Scottish & Southern Electricity Networks

Fanellan Hub 400 kV Substation and Converter Station

Environmental Impact Assessment Report

Volume 2 | EIA Report

Chapter 4 – Site Selection and Alternatives

February 2025

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OTHER VOLUMES

4. THE SITE SELECTION PROCESS AND ALTERNATIVES

4.1 Introduction

4.1.1 This Chapter describes the site selection process including consideration of reasonable alternatives assessed by the Applicant, in accordance with Regulation 5(2)(d) and schedule 4, paragraph 2 of the EIA Regulations. It discusses the main reasons for selecting the site for the Proposed Development, and the design and layout Options that have been considered.

4.1.2 The need for the Proposed Development and studies undertaken to inform the strategic electricity transmission infrastructure requirements are explained in **Volume 2, Chapter 2: Project Need**.

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

- development considerations and design solutions;
- the approach to the site selection process;
- a summary of the outcomes of each site selection stage including the alternative sites considered and consultation responses, where relevant; and
- how alternatives have been considered through the EIA process.

4.2 Development Considerations

4.2.1 SSEN Transmission has an obligation under section 9 of the 1989 Electricity Act to '*develop and maintain an efficient, co-ordinated and economical system of electricity transmission*'.

4.2.2 As a transmission licence holder under the 1989 Act, when formulating relevant proposals, the Applicant has a statutory duty under paragraph 3 of Schedule 9 to the 1989 Act 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*".

4.2.3 Furthermore, the requirements of the Construction (Design and Management) Regulations 2015[1] (CDM Regulations) require that the Proposed Development design aims to minimise hazards and reduces risks during construction.

4.2.4 Taking account of these obligations, SSEN Transmission has considered technical, economic and environmental factors in evaluating reasonable alternatives for the Proposed Development.

4.3 Design Solutions

4.3.1 **Volume 2, Chapter 2: Project Need**, describes the technical system design requirements that are the drivers for the infrastructure selected for the Proposed Development. The particular characteristics of the design solution have to take into account compliance with the Applicant's statutory and licence obligations, and the delivery strategy that is designed to ensure that the drivers for the Proposed Development can be met.

4.3.2 The Applicant has considered design solutions that could mitigate likely significant environmental effects and provide other benefits such as biodiversity net gain (BNG). Such solutions included consideration of appropriate technology choice: air (AIS) and Gas (GIS) insulated Switchgear for the substation. The Fanellan Hub will be

[1] The Construction (Design and Management) Regulations 2015. Available at: http://www.legislation.gov.uk/uksi/2015/51/contents/made [Accessed July 2024].

developed as an AIS Substation for the AC infrastructure, which is the standard technology utilised unless constraints such as a limitation of available footprint on potential sites or proximity of selected sites to a marine environment, necessitating a need to put equipment inside buildings, drive a requirement to review the use of GIS infrastructure. GIS is not the default technology due to the usage of gases with Global Warming Potential in a number of the current solutions to act as an insulating medium, leakages of which can have an impact on the environment. This include Sulphur Hexafluoride (SF6) and alternatives, which AIS infrastructure uses in significantly less volume. In addition, GIS infrastructure requires increased outages and offers less operational flexibility when under maintenance or introducing additional connections with AIS generally demonstrating greater reliability when in service, providing improved network reliability.. To avoid the need for additional electrical plant in the substation, in the form of reactive power compensation, and ultimately to minimise the size and cost of the Proposed Development, one of the strategic objectives underpinning the site selection process was to minimise the distance between the HVDC Converter and the 400 kV substation, to which it connects. The maximum distance was considered to be 1 km, which supports the co-located arrangement at the Proposed Development.

4.3.3 Proximity to the existing transmission network was also a strategic consideration in order to minimise the amount of new overhead lines or underground cables that would be required to connect the new 400 kV Fanellan Hub substation to the existing network (via the Beauly to Denny OHL). This would reduce visual and other impacts on the wider Beauly area.

4.3.4 Consideration was also given to the non-infrastructure elements when establishing the total land requirement for the Site. These included BNG, landscape screening and bunding to reduce potential visual and noise impacts, and all elements associated with water management and treatment both during construction and permanent operations.

4.4 Approach to Site Selection

4.4.1 Internal guidance for the selection of new electricity transmission substation sites has been developed by SSEN Transmission. This guidance provides a framework to ensure environmental, technical, and economic considerations are consistently and robustly identified and appraised at each stage of the site selection process. In line with this guidance, the principal site selection stages for the Proposed Development were:

- Stage 0: Strategic Options Assessment;
- Stage 1: Initial Site Screening;
- Stage 2: Detailed Site Selection; and
- Post Site Selection Activities: Consenting Process.

4.4.2 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.

4.4.3 Site location options were identified for the project following desk-based review and site walkovers, giving due consideration to the principles set out in the SSEN Transmission guidance.

4.4.4 The method of identifying a Preferred Site involved the following four key tasks:

- identification of the baseline situation;
- identification of feasible site options;
- environmental, technical and economic comparative assessment of site options; and
- identification of a Preferred Site to take to external consultation.

4.4.5 The detailed methodology for each stage noted above can be found in the guidance document. For Stage 2: Detailed Site Selection, all criteria within the respective categories (engineering, environmental, and cost) were

assigned RAG (Red, Amber, Green) ratings against a pre-defined list of descriptors and thresholds. The principle of the rating key is shown below in **Table 4-1 RAG Rating Key**.

Table 4-1 - RAG Rating Key

Performance	Comparative Appraisal
Most preferred	Low potential for the development to be constrained.
	Intermediate potential for the development to be constrained.
Least preferred	High potential for the development to be constrained.

4.4.6 The Substation Site Selection process also took into consideration the required connections that the Proposed Development will facilitate subject to the relevant consents being granted (as detailed in **Volume 2 - Chapter 2: Project Need - Section 2.5.2**). As such, the site selection process also considered the potential impact of the associated OHL and cable connections into the Site Options .

4.4.7 Following the completion of Stage 2 internal assessments and identification of a Preferred Site, stakeholder consultation was undertaken to present the Site Options and the rationale for, and approach to, the selection of the Preferred Site. Feedback from stakeholders (including statutory, non-statutory and the wider public) on the sites was reviewed and, where feasible, amendments or further analysis was undertaken to address concerns or alternatives put forward. Following the completion of the consultation process, a Proposed Site to be taken forward to the consenting process was selected. The Proposed Development is located on the Proposed Site. Details on the consultation process and findings can be found in the Report on Consultation[2].

4.5 Stage 0: Strategic Options Assessment

4.5.1 A Strategic Options Assessment undertaken by SSEN Transmission identified the following key strategic requirements for the new substation site:

- proximity to the existing 400 kV OHL network to minimise the amount of new OHL or cabling required to connect to the network. This was set nominally at 10 km for an effective Search Area, taking account of the local topographical and physical constraints;
- ideally large enough to accommodate the proposed individual or combined 400 kV substation / HVDC converter station footprints, together with associated landscaping, contractor compounds, access and new connection routes (or provide two sites within 1 km of each other);
- in areas which do not contain environmental designations and minimise impacts on local communities and environmental receptors;
- enable feasible connection routes for the proposed new 400 kV OHLs from Spittal and Peterhead and HVDC cable from the Western Isles; and
- provide sufficient space for known future connections.

4.6 Stage 1: Initial Site Screening

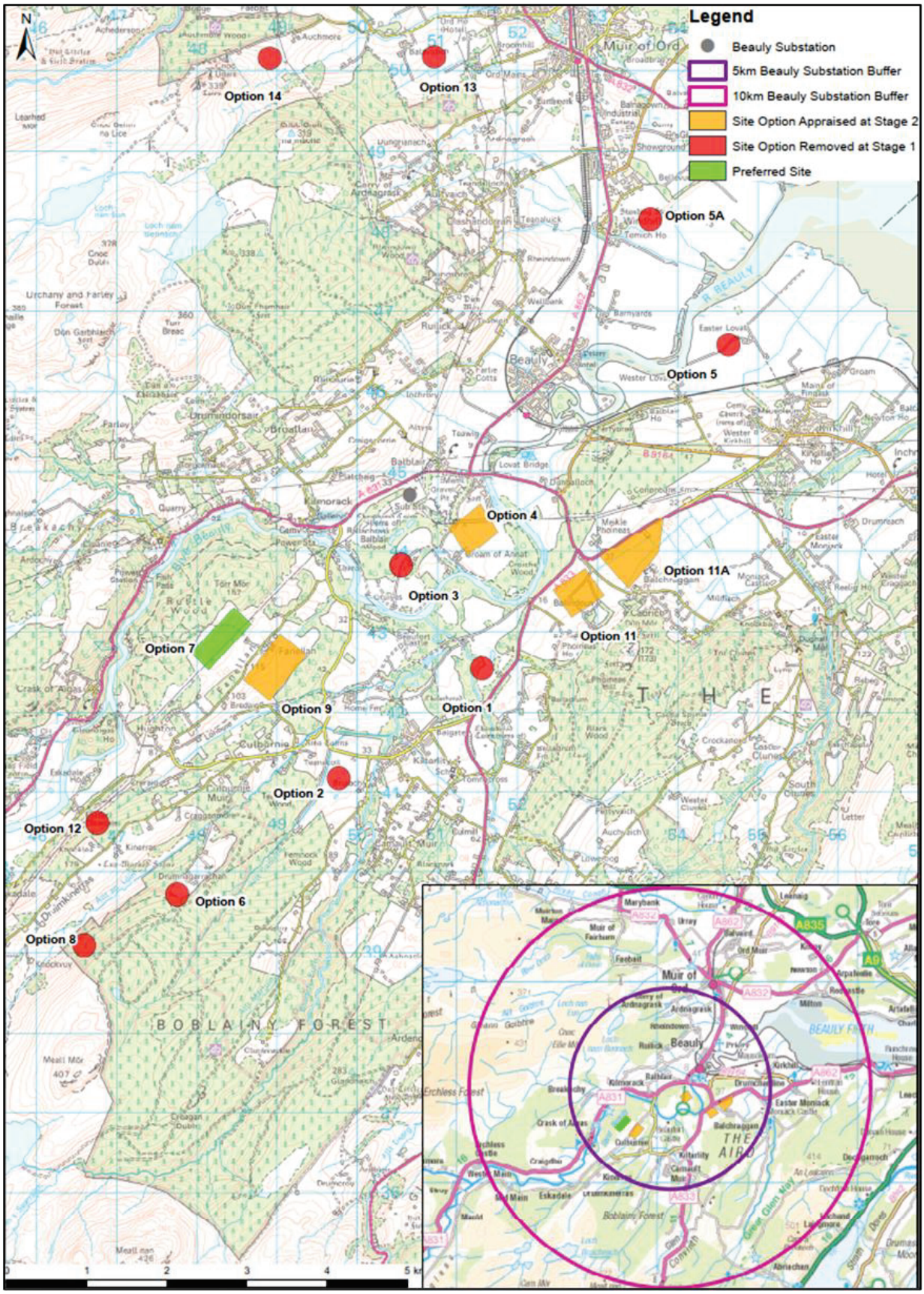
4.6.1 The Area of Search for the site selection process was defined as the area within a 10 km radius of the existing Beauly substation at Wester Balblair, which corresponds to the maximum feasible length for a direct connection between the proposed new 400 kV substation and a point of connection at or near the existing substation.

[2] Scottish and Southern Electricity Networks, 2023. New Beauly Area 400kV Substation and HVDC Converter Station: Report on Consultation . Available at: https://www.ssen-transmission.co.uk/globalassets/projects/rocs/beauly/report-on-consultation---new-beauly-area-400kv-substation-and-hvdc-converter-station.pdf Accessed October 2024.

4.6.2 Sixteen (16) Site Options were initially identified in the Area of Search using publicly available data and Multi Criteria Analysis (MCA) to provide information about key constraints. The locations of the identified Options are shown on **Figure 4-1: Stage 1 Site Locations** below. Assessment of the 16 Options was undertaken against the key criteria within SSEN Transmission's internal guidance and using the RAG matrix (**Table 4-1 - RAG Rating Key**). This resulted in 12 of the 16 Options being discounted from further assessment based on their proximity to designated areas and local settlements, visual impact, engineering challenges and connectivity to the existing and future 400 kV circuits around Beauly being more constrained, when compared to the other 4 Options.

4.6.3 Option 10 was an area represented by Site Options 3 and 4 and therefore is not shown in **Figure 4-1 Stage 1 Site Locations**. Options 4, 7, 9 and 11/11a were shortlisted and taken forward to Stage 2.

Figure 4-1: Stage 1 Site Locations



Site Identification and Appraisal

4.6.4 The appraisal of site Options involved systematic consideration against the topic areas noted in **Table 4-2** below.

Table 4-2 – Topic Areas

Environmental	
National Heritage	Designations
	Protected Species
	Habitats
	Ornithology
	Hydrology / Geology
Cultural Heritage	Designations
	Cultural Heritage Assets
Landscape and Visual	Designations
	Landscape Character
	Visual Amenity
Land Use	Agriculture
	Woodland / Forestry
	Recreation
Planning	Policy
	Proposals
Technical	
Connectivity	Existing circuits / network
	Future development possibilities
	Interface with other SSE businesses (business separation)
	DNO connection
Footprint Requirements	Technology
	Adjacent land use
	Space availability
Hazards	Unique Hazards
	Existing utilities
Ground Conditions	Topography
	Geology
Environmental Conditions	Elevation
	Salt pollution (salinity)
	Flooding
	Carbon footprint
	SF6
	Noise
Commercial	Capital Costs
	Operational Costs

4.7 Stage 2: Detailed Site Selection

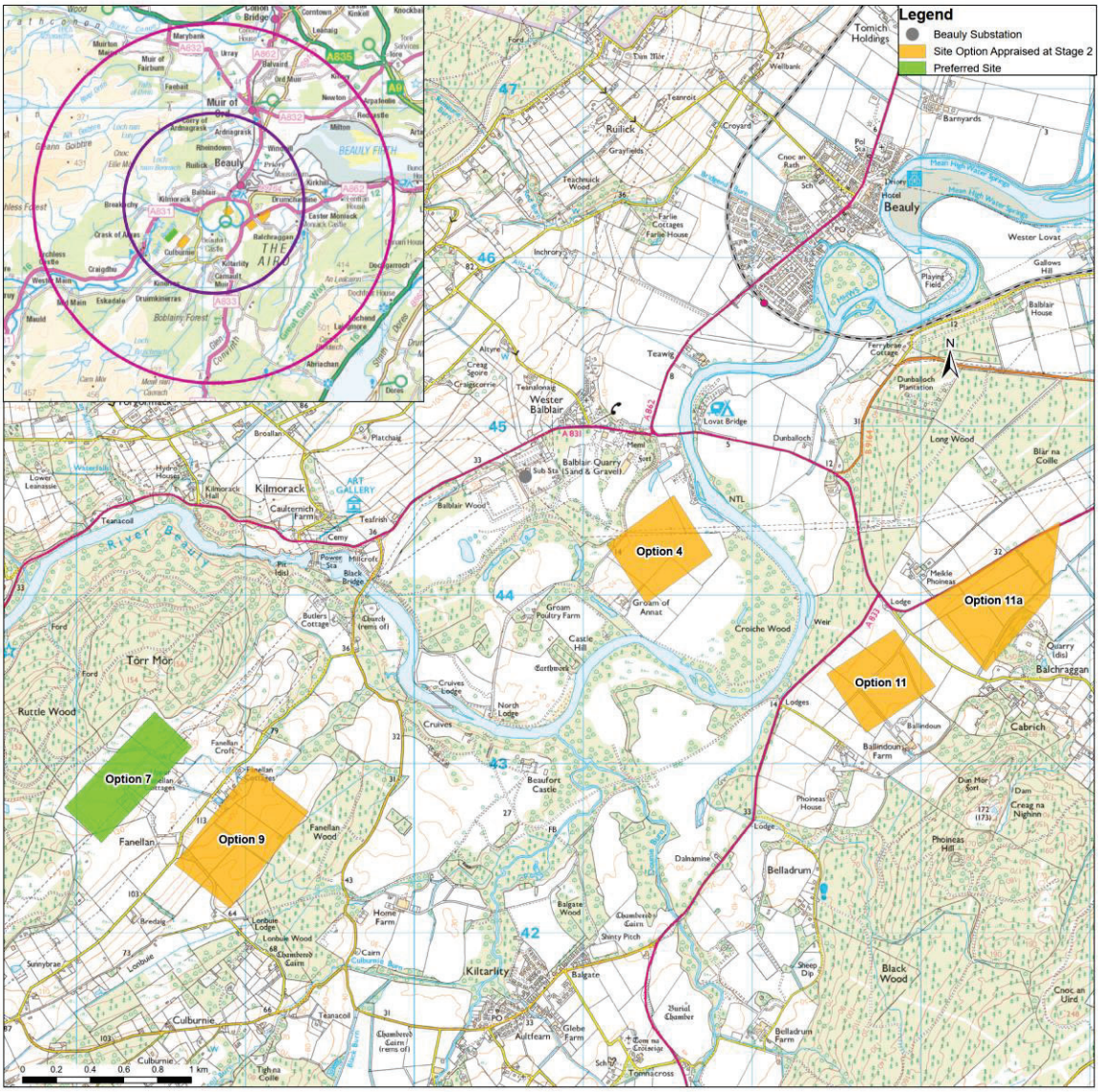
4.7.1 The following part of this Chapter summarises the single and in-combination Site Options appraised during Stage 2 of the site selection process. A summary of the Site Options is set out, together with the main environmental and technical constraints identified during the appraisal. Confirmation of the initially Preferred Site Option (i.e. the Site Option taken to consultation), a summary of consultation responses and confirmation of the Proposed Site (i.e. following consultation) is provided.

4.7.2 Following the completion of Stage 1, a total of 5 individual site locations were shortlisted and taken forward to Stage 2 as 4 Site Options. Since only Site 7 provided enough space for the substation and HVDC converter to be located on the same site, the other Sites were assessed as a combination to provide a suitable Site Option for locating all the required infrastructure. These Site Options were identified as they were determined to be the most technically feasible, economically viable and environmentally acceptable. Environmental and engineering surveys were then undertaken for these Site Options to supplement information gathered from earlier desk-based assessments and walkovers. The Options were then consulted upon through a series of in-person and virtual consultation meetings and events, as outlined in **Section 4.8**. Summary details of the Site Options are set out below and locations are shown on **Figure 4-2 Stage 2 Site Locations**.

4.7.3 Summary of the 4 Site Options for Stage 2 Appraisal:

- **Option 7 Combined:** comprising a site for locating both the HVDC converter station and 400 kV substation on a single shared substation platform at Site 7;
- **Option 7/9:** comprising locating the 400 kV substation at Site 7 and locating the HVDC converter station at Site 9;
- **Option 11/11a:** comprising locating the 400 kV substation and Site 11a and locating the HVDC converter station at Site 11; and
- **Option 4/11:** comprising locating the 400 kV substation at Site 4 and locating the HVDC converter station at Site 11.

Figure 4-2 Stage 2 Site Locations



4.7.4 The following part of this section summarises the appraisal undertaken in Stage 2. It includes a summary of the main environmental and engineering criteria used during the appraisal, an overview of factors in comparison with other Options, confirmation of the Preferred Site Option following the detailed analysis, a summary of consultation responses, and confirmation of the Proposed Site Option to be taken forward to detailed design and consenting.

Detailed Site Selection Appraisal Overview

4.7.5 **Table 4-2** below provides a summary of the key differentiating factors between each of the Site Options. **Appendix 4.1 – Site Selection Consultation Document: Beauly Area 400kV Substation and Western Isles HVDC** provides the table of the environmental comparison of shortlisted Options.

Table 4-2: Summary RAG

	Option 7 Combined	Option 7/9	Option 4/11	Option 11/11A
Designation Areas				
Protected Species				
Habitats				
Ornithology				
Geology, Hydrology, Hydrogeology				
Heritage Designations				
Heritage Assets				
Landscape Designations				
Landscape Character				
Visual				
Agriculture				
Forestry				
Recreation				
Planning Policy				
Planning Proposals				
Connectivity – Existing circuits/network				
Connectivity – Future development possibilities				
Connectivity – Interface with SSE Distribution and Generation				
Connectivity – DNO Connection				
Footprint Requirements – Technology				
Footprint Requirements – Adjacent Land Use				
Footprint Requirements – Space Availability				
Hazards				
Ground Conditions				

	Option 7 Combined	Option 7/9	Option 4/11	Option 11/11A
Environmental Conditions				
Construction Access				
Operation and Maintenance				
Cost – Capital				
Cost – Operational				

Summary of Comparative Appraisal

Environmental

4.7.6 When considering the four Stage 2 Site Options individually, all Options are relatively comparable from an environmental perspective. Option 7 Combined is rated the more favourable with regards to natural heritage, cultural heritage, land use and planning. However, Option 7 Combined and Option 7/9 are located on a hillside and would be more widely visible across the valley, although a degree of landscape screening would be possible. When compared to Option 4/11 and Option 11/11a and the potential landscape and visual impacts, Option 7 Combined and Option 7/9 are the least preferred option when considered in isolation.

4.7.7 The potential cumulative impacts of the proposed new overhead line infrastructure that requires to connect into the proposed substation form a significant part of the holistic considerations when selecting the Preferred Site Option. Options 4/11 and Option 11/11a would significantly increase the amount of new overhead line infrastructure required for both the connection to the existing Beauly–Denny 400 kV OHL and routeing the proposed Spittal to Beauly 400 kV OHL when compared to Option 7 Combined and Option 7/9. Conversely, Option 7 Combined and Option 7/9 would require additional OHL infrastructure for the proposed Beauly to Peterhead 400 kV OHL.

4.7.8 For the Western Isles HVDC underground cable, all Site Options require a similar length of cable to connect, with the environmental constraints also being broadly similar (with the exception of Option 11/11a, which would be likely to pass through areas of Ancient (Native) Woodland.

4.7.9 Site Option 7 Combined eliminates the need for an additional 400 kV connection between the HVDC converter and substation. For the other Options a similar length of new connection infrastructure is required which would encounter environmental constraints that are broadly similar, with the exception of Option 4/11, which is likely to pass through areas of Ancient (Native) Woodland at Croiche Wood.

4.7.10 When considering the potential connections outlined above, Site Option 7 Combined is preferred as it limits works required to divert the Beauly–Denny OHL, reduces the encroachment of the Spittal–Beauly 400 kV OHL connection into the valley and removes the requirement for a separate 400 kV connection which would be required between separate substation and HVDC converter sites.

4.7.11 When considering the potential impacts of the Site Options and connections together, Option 7 Combined was considered to be preferred, as this Option limits the amount of new linear infrastructure (overhead line and underground cable) within the wider Beauly area and minimises their cumulative impacts. It is noted that Option

7 Combined may have slightly more widespread landscape and visual impacts in itself, when compared to other Options, however there will be opportunity for new hard and soft landscaping mitigation.

Engineering

4.7.12 Site Option 7 Combined is the preferred Option from an engineering perspective. This is a result of favourable scoring on Connectivity (Existing circuits/network) and Footprint Requirements. This Option allows for the least amount of re-routing of the Beauly-Denny 400 kV OHL as well as space to accommodate the HVDC converter station on a single platform. Furthermore, there is adjacent land available for both temporary and permanent ancillary infrastructure. It has also been assessed that this Option can accommodate and provide suitable routeing for future connections. Topography at Option 7 Combined provides an opportunity to lower the site platform level and screen the site further using won material to create new naturalistic landforms in front of the platform. The remaining sides of the site are naturally screened by woodland. The co-location of the substation and HVDC converter station reduces overall earthworks and land take requirements of the project.

4.7.13 The second preferred option was Option 7/9 which allowed for more adjacent land surrounding the substation which would be located at Site 7. This would also provide room for future site expansion. The HVDC converter station would be located at Site 9, however this is less favourable as it may have restricted future connections due to cable routes and buildings used by the HVDC infrastructure. Site 9 also presents significant challenges in terms of its topography and proximity to Ancient Woodland and the River Beauly. Site Option 11/11a was unfavourable in general comparison, with the main factor being the extended diversion requirements of the Beauly-Denny 400 kV OHL. Site Option 4/11 was the least favourable due to general constraints on adjacent land, and proximity of both 275 kV and 132 kV OHL routes which would need to be diverted to accommodate the platform position.

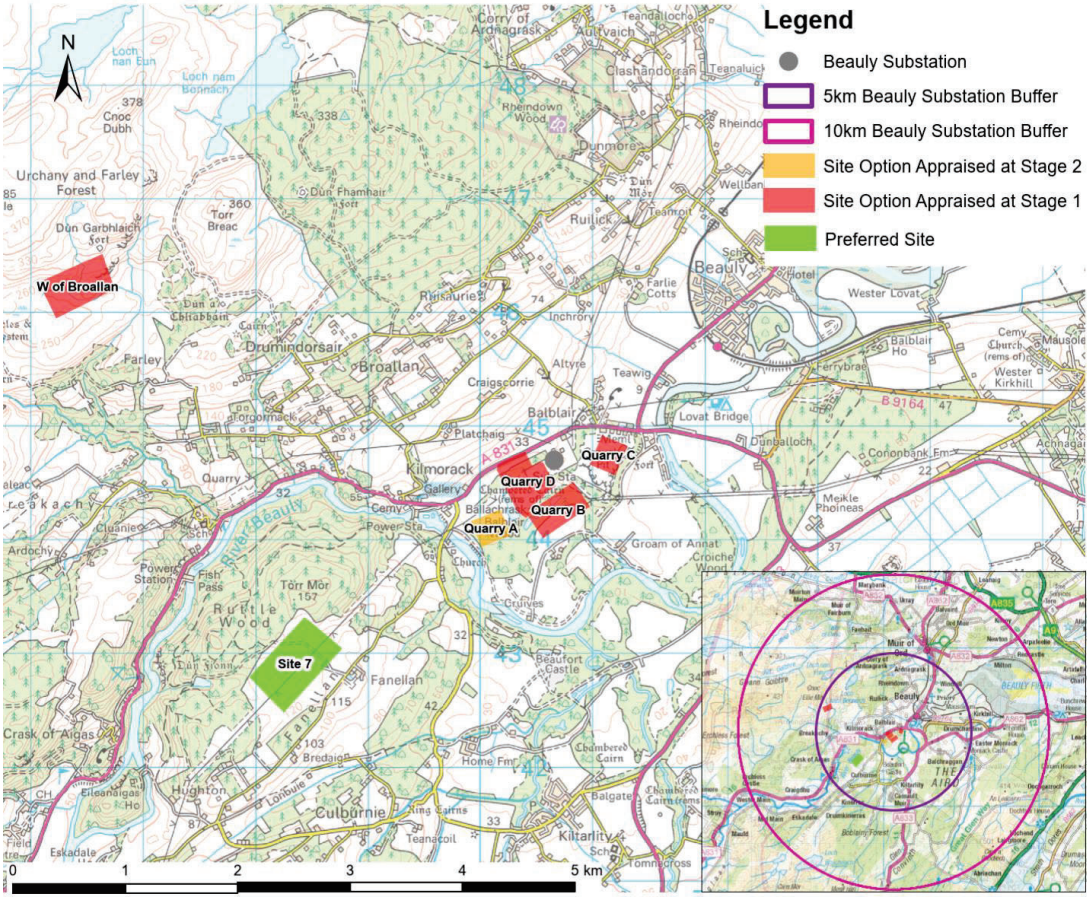
Conclusion

4.7.14 When considering the substation Site Options alongside the required connections to and from each site, it was concluded that Option 7 Combined is the best on balance as it reduces the engineering complexities and cost of siting the Proposed Development whilst also offering the best opportunity to limit overall environmental impacts in the wider Beauly area.

Additional Options Considered

4.7.15 Potential site options near to the existing quarry at Balblair were not originally identified at Stage 1 due to the operational nature of the Quarry, space restrictions, cumulative impacts with the existing substation and proximity to the settlement of Wester Balblair. However, following consultation and feedback from communities and statutory stakeholders throughout March 2023, an additional five site options were identified. These are highlighted in Figure 4-3 as Quarry A, B, C, D and West of Broallan. These site options are located in close proximity to the existing substation, potentially making use of the operational quarry and surrounding area. These site options were taken through a Stage 1 assessment and, where feasible, taken through to Stage 2 and compared against the current best on balance option (Preferred Site), Site Option 7 Combined.

Figure 4-3 Location of Additional Sites added to Stage 1 (Initial Site Screening)



Additional Options Stage 1: Initial Site Screening

4.7.16 The following site options were assessed and key constraints were identified as follows:

Quarry A

- Environmental constraints limited to containing AWI (2b LEPO), however quarry activities have removed the majority of woodland within the site.
- Generally free from other environmental constraints that would preclude the development of this Option.
- Potential to conflict with planning policy (Policy 53: Minerals within the Highland Wide LDP). However, the quarry is due to close in December 2025 and will therefore no longer be operational should this site be taken forward. Quarry restoration may however be affected.
- The position of the site on land impacted by the quarry works results in unique hazards, unfavourable topography, and risk of contaminated land.
- Noise- Close to residential properties, risk of adding to the current levels from the existing Beauly substation.
- Connectivity to future OHL (Beauly to Loch Buidhe 400kv OHL) would be challenging.
- Limited space would limit technology choice for the substation to GIS arrangement and also prevent future expansion if required.

Quarry B

- Approximately 120m from the existing Beauly Substation.
- AWI (2b LEPO) covers margins of the site, this woodland has potential to support recreational activities.
- Three unnamed water features route through the site and the site sits within an area with low to medium-risk of fluvial flooding.
- Sits across a former meander of the River Beauly and would necessitate the removal of a relatively large area of mixed woodland with oxbow ponds, affecting one of the key characteristics of the LCT, though likely only very locally.
- Contains Class 3.1 agricultural land and the current land use is for agricultural purposes.
- Potential planning policy conflicts relate to landscape character, flooding, agricultural land and ancient/native woodland.
- Connectivity to future OHL (Beauly to Loch Buidhe 400kv OHL) would be challenging
- Diversion of an existing OHL required and outages required to enable this.
- Limited space available for ancillary infrastructure, such as temporary compounds, welfare, screening and SuDs.
- Noise- close to residential properties, risk of adding to the current levels from the existing Beauly substation.

Quarry C

- Approximately 120m from the existing Beauly Substation.
- Scheduled Monument, Corff House fort (SM3195), located approximately 30m east.
- Potential to conflict with planning policy (Policy 53: Minerals within the Highland Wide LDP). However, the quarry is due to close in December 2025 and will therefore no longer be operational should this site be taken forward. Quarry restoration may however be affected.
- Land currently in use for quarry activities and industrial components, therefore ground conditions are unknown and contaminated land is likely.
- Limited space available would prevent future expansion if required.
- Noise- close to residential properties, risk of adding to the current levels from the existing Beauly substation.
- Unique engineering hazards as a result of proximity to quarry.
- Option was noted as a potential site for the LT14 Western Isles HVDC convertor station only, due to impact of connecting Beauly/Denny OHL and the impact to both existing and future connections.

Quarry D

- The site is an extension to the existing Beauly Substation.
- Land currently in use as a quarry, comprising bare ground and structures associated with the quarry activities and woodland.
- An unnamed water features route through the site and three unnamed water features are located 20m, 35m and 65m north west.
- Potential for direct and indirect impacts on 14 non-designated assets within the Site.
- Potential to conflict with planning policy (Policy 53: Minerals within the Highland Wide LDP). However, the quarry is due to close in December 2025 and will therefore no longer be operational should this site be taken forward. Quarry restoration may however be affected.

- The existing 400kv platform at Beauly would not be able to accommodate the new Beauly 2 due to limited room, surrounding land would be required.
- Limited space available would limit technology choice to GIS arrangement, would prevent future expansion, if required and result in a non standardised design of substation.
- Significant earthworks requirements in order to build up to existing platform level for the GIS hall.
- Complex and prolonged outages to the network required to facilitate construction and commissioning.
- Connectivity to future OHL (Beauly to Loch Buidhe 400kv OHL) would be challenging.
- The position of the site on land impacted by the quarry works results in unique hazards, unfavourable topography, and risk of contaminated land.
- Noise- close to residential properties, risk of adding to the current levels from the existing Beauly substation.

West of Broallan

- Approximately 5km from the existing Beauly Substation.
- An unnamed watercourse routes through the site and the site sits within an area with low to medium-risk of fluvial flooding.
- Scheduled Monument, Dun Garbhaich fort (SM2422), located approximately 50m north.
- Brings presence of infrastructure to an area where there is currently none, this would likely to compromise the sense of remoteness and lack of human artefact, a key characteristic of the LCT.
- Technically challenging to create a new access route to site due to the remote location.
- Steep slopes / topography of site would make constructability challenging.
- Distance of the site from the existing Beauly-Denny 400kv OHL and from the existing Beauly substation would mean a diversion of the OHL and additional new infrastructure.
- Future connections from the new 400kv OHLs would also be challenging and may result in a 'wirescape'. •
- Elevation of site would constrain choice of technology to GIS.

Additional Options Stage 2: Detailed Site Selection

4.7.17 Following completion of the Stage 1 appraisal, one additional Site (Quarry A) was shortlisted and taken forward to Stage 2 as it was determined to be potentially technically feasible, economically viable and environmentally acceptable. Since Quarry A Site cannot accommodate both the 400 kV substation and HVDC converter station as a combined site due to the available space, for the purposes of the assessment it was paired with either Site option 7 or Site Option 4, which were previously determined to be technically feasible, economically viable and environmentally acceptable site Options taken through to Stage 2. Environmental and engineering surveys were undertaken for these sites to supplement information gathered from desk-based assessments and walkovers. This additional Option A was considered as two variant Options as follows:

- **Site 7 / Quarry A:** locating the substation at Site 7 and HVDC converter at Quarry A.
- **Site 4 / Quarry A:** locating the 400 kV substation at Site 4 and HVDC converter at Quarry A.

4.7.18 Table 4-3 provides a summary of the differentiating factors between each of the additional Stage 2 Options and the original Preferred Site Option (Option 7 Combined). **Appendix 4.1 – Site Selection Consultation**

Document: Beauly Area 400 kV Substation and Western Isles HVDC Converter provides the detailed environmental and engineering comparison of these Site Options.

Table 4-3 Summary RAG for Stage 2 Site Options

	Option 7 Combined	Option 7/ Quarry A	Option 4/ Quarry A
Designated Areas			
Protected Species			
Habitats			
Ornithology			
Geology, Hydrology, Hydrogeology			
Cultural Heritage Designations			
Heritage Assets			
Landscape Designations			
Landscape Character			
Visual			
Agriculture			
Forestry			
Recreation			
Planning Policy			
Planning Proposals			
Connectivity – Existing circuits/network			
Connectivity – Future development possibilities			
Connectivity – Interface with SSE Distribution and Generation			
Connectivity – DNO Connection			
Footprint Requirements – Technology			
Footprint Requirements – Adjacent Land Use			

	Option 7 Combined	Option 7/ Quarry A	Option 4/ Quarry A
Footprint Requirements – Space Availability			
Hazards			
Ground Conditions			
Environmental Conditions			
Construction Access			
Operation and Maintenance			

4.7.19 From an environmental perspective, Option 4/Quarry A was preferred from a landscape and visual perspective compared to Option 7 Combined when considered as a site in isolation due to its lower overall setting. Option 4/Quarry A also helped to limit the spread of infrastructure, concentrating development within an area of existing electrical infrastructure, however, engineering constraints would make development of Option 4/ Quarry A challenging.

4.7.20 Option 4/Quarry A was the least preferred from an engineering perspective due to propensity to flooding, general constraints on adjacent land and proximity / complexity of existing 275 kV and 132 kV OHL routes which would need to be diverted in order to accommodate the infrastructure. As a result, Option 4/Quarry A was deemed not to be feasible from an engineering perspective, thus outweighing the slight landscape and visual benefit, and was therefore discounted from further detailed comparison.

When comparing Option 7 Combined to Option 7/Quarry A from a substation perspective, Option 7 Combined would provide the benefit of increased land available surrounding the site to accommodate site expansion or future new connections, if required. Approximately 2km of underground cable would be required to connect the substation at Option 7 to the HVDC converter station at Quarry Site A. This would require a HDD crossing under the River Beauly, This may introduce additional electrical losses and reactive power need and potentially changing the converter station design (multiple cables and bore holes required). Option 7 Combined is considered the most technical and cost-efficient solution to progress with compared to the Option 7/ Quarry site A. Option 7 Combined is the Preferred Site from an engineering perspective compared to the quarry sites and the west of Broallan site due to lesser noise impacts, connectivity constraints and future connection potential.

4.7.21 Further detail is outlined in **Appendix 4.1 – Site Selection Consultation Document: Beauly Area 400kV Substation and Western Isles HVDC Converter**.

Preferred Site

4.7.22 The Stage 2 appraisal determined that overall Site Option 7 Combined is still the preferred choice from an environmental, technical and economic perspective for the following reasons:

- Option 7 combined limits the distance of linear infrastructure (overhead line and underground cable) within the wider Beauly area and reduces the associated environmental impacts.
- Option 7 combined is preferred from a connection perspective as it limits the work to the Beauly-Denny OHL, the distance for the Spittal to Beauly 400kV OHL connection and removes the requirement for a separate 400kV underground connection.

- Option 7 combined does have some environmental impacts from a visual perspective but does present substantial opportunity for landform and planting mitigation. It is also preferred from the perspective of environmental conditions (salt pollution, flooding, SF6, contaminated land and noise) as well as from a biodiversity, geology, hydrogeology and hydrology perspective. Option 7 combined minimizes impacts on adjacent land uses, maximises the space available and best accommodates the technology required.
- From an engineering perspective, Option 7 combined is considered the most technical and cost-effective solution. Option 7 minimizes the use of HDD, reduces cabling and provides greater opportunity for future connectivity. Option 7 also doesn't limit technology choice and presents less risk of unique hazards and contamination.

4.7.23 Site Option 7 was therefore identified as the "Proposed Site" to be taken forward for design development, formal Pre Application Consultation and ultimately planning application. **Section 4.8.3** outlines the responses received from stakeholders to all consultations for the Proposed Development.

4.8 Reporting of Options Appraisal and Consultation

4.8.1 The appraisal of Options was set out in greater detail in the Consultation Document[3] , published in September 2023. The Consultation Document provided a summary of project need, the option process that had been undertaken and a description of the Options appraised. The Consultation Document sought comments from stakeholders and members of the public on the option studies undertaken, and the rationale for, and approach to, the selection of the preferred site. The different stakeholder groups consulted are listed below:

- statutory consultees;
- non-statutory consultees;
- community members and local organisations; and
- landowners and occupiers.

4.8.2 Consultation events took place on the following dates:

- statutory Consultee meeting (March 2023) to discuss the Substation Site Selection process;
- stage 1 and Stage 2 Digital Consultation Document presented the key information alongside interactive maps and images, which was presented to statutory consultees in March 2023;
- one public consultation event (March 2023) provided face-to-face public engagement;
- a Consultation Booklet and a feedback form for public consultation (March and April 2023) was made available at in-person events;
- one online virtual consultation event (March 2023) to supplement the in-person event;
- newspaper adverts in the Press and Journal, Caithness Courier, Northern Times, Ross-Shire Journal and Inverness Courier (February 2023);
- posters and communications in community councils;
- proposal of Application Notice submitted to The Highland Council 21st February 2024;
- newspaper adverts in the Press and Journal for Pre-Application Public consultation event 1 (March 2024);
- newspaper adverts in the Press and Journal for Pre-Application Public consultation event 2 (June 2024);
- posters; maildrops to properties within a 10 mile radius; email notifications to Ward 12 Councillors, MSPs and the Community Liaison Group; Press releases including on social media; and information on the project website;

[3] SSEN (2023). Site Selection Consultation Document: Beauly Area 400 kV Substation and Western Isles HVDC Converter. Available at: https://www.ssen-transmission.co.uk/globalassets/projects/new-beauly-area-400kv-substation-downloads/beauly-400kv-substation-hub_site-selection_consultation-document-sep-2023.pdf (Accessed September 2024).

- pre-Application Consultation Report (October 2024)[4];
- two rounds of Pre-Application Public consultation events (March and June 2024); and
- pre-Application meetings with The Highland Council (THC) (September 2023 and March 2024).

4.8.3 A range of responses were received from stakeholders, including but not limited to, concerns about the potential environmental impacts, particularly on local biodiversity and impacts on the local community including visual and tourism impacts[5] , noise, construction traffic, and health.

4.8.4 Some responses questioned the need of this Proposed Development. In many cases, these concerns stemmed from the perception that some of the electricity generated by the Proposed Development will be transmitted out of the north of Scotland. However, this project, which is part of a major upgrade of the electricity transmission network across Great Britain, is needed to unlock the north of Scotland's vast renewable electricity resources and transport that power to demand centres. The renewable electricity this project will transport will play a key role in meeting UK and Scottish Government renewable energy and climate change targets[6].

4.8.5 Comments received from stakeholders in response to the Consultation Document or following initial consultation events in 2023, were documented in the Report on Consultation, published in November 2023. The Report on Consultation confirmed that the Preferred Site (Option 7 Combined) was to be taken forward. Comments from stakeholders in response to the Pre-Application Public consultation events are documented in the Pre-Application Report October 2024 published as part of the proposed development planning application.

4.8.6 Further information on consultation undertaken is reported in **Volume 2, Chapter 6: Scope and Consultation and the Pre-Application Report October 2024**.

4.9 Summary of Site Selection Process

Following evaluation of the different site Options, both pre and post consultation, Option 7 Combined is the preferred choice for locating the new substation and HVDC converter station from engineering, environmental and cost perspectives, and thus is most aligned with the Applicant's licence duties. This is due to the following reasons:

- it limits the distance / quantity of new linear infrastructure (OHL and underground cable) within the wider Beauly area and reduces the associated environmental impacts, engineering challenges and costs
- it is preferred from a connection perspective as it limits the work to divert the Beauly-Denny OHL, reduces the distance of the Spittal to Beauly 400 kV OHL connection and removes the requirement for a separate 400 kV underground connection between the two elements of the Proposed Development;
- it presents substantial opportunity for new hard and soft landscaping to be provided to mitigate visual impacts;
- it is preferred from the perspective of technical environmental conditions (salt pollution, flooding, SF6, contaminated land and noise) as well as from a biodiversity, geology, hydrogeology and hydrology perspective. Option 7 Combined minimises impacts on adjacent land uses, maximises the space available and best accommodates the technical requirements of the scheme; and
- it is considered the most technically efficient and cost-effective solution. Option 7 Combined reduces new OHL and underground cabling (including the requirement for Horizontal Directional Drill (HDD)) and provides greater opportunity for future connectivity. Option 7 Combined also does not limit technology choice and presents less risk of unique hazards and contamination.

[4] SSEN (2024) Pre-Application Consultation Report Fanellan 400 kV substation and HVDC converter station project.

[5] SSEN (2023). New Beauly Area 400kV Substation and HVDC Converter Station: Report on Consultation. Available at: https://www.ssen-transmission.co.uk/globalassets/projects/rocs/beauly/report-on-consultation---new-beauly-area-400kv-substation-and-hvdc-converter-station.pdf (Accessed September 2024).

[6] As above.