

2. PROJECT DESCRIPTION

2.1 Introduction

This Chapter provides a description of the physical characteristics of the elements of the Project and the main construction and operational activities associated with it for the purpose of identifying and assessing potential environmental effects.

2.2 Project Need

An increase in applications by developers of renewable generation seeking connection to the SSEN Transmission network in the Argyll and Kintyre area is driving the requirement for further reinforcement to the network.

The volume of contracted generation has significantly increased since 2019, with approximately 612 MW signing connection offers since October 2019. Since then other developers have submitted connection applications, and a large volume of scoping generation has been identified by local stakeholder engagement events that were held in 2021. This significant increase in the generation background requires reinforcement of the network in order for SSEN Transmission to maintain compliance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS).

The key drivers for the project are the connection of the Earraghail Windfarm and Tangy IV Windfarm, both due to connect in April 2027.

2.3 Location

The site for the Project is located approximately 4 km south west of Inveraray, 300 m west of Douglas Water and upslope of the existing An Suidhe substation, at National Grid Reference (NGR) 204851, 705556. The Project is located wholly within the Argyll and Bute Council Local Authority and would be accessed from the A83 using existing tracks.

The location plan (**Figure 1.1**) shows the Proposed Development within the red line boundary, comprising of the substation platform along with additional land take to accommodate the ancillary works. This location plan also shows the route of the associated overhead line works required to tie in with the new substation, identified as the Associated Development.

The Project ranges in topography from 190 m Above Ordnance Datum (AOD) on a downward slope towards the north-eastern boundary to 160 m AOD.

The Project, including the entire extent of the substation, is located within recently felled commercial coniferous woodland. The surrounding land is a mix of broadleaved and coniferous woodland plantations with smaller areas of seminatural mixed woodland and broadleaved woodland within the site of the Proposed Development and adjacent to the boundary where a number of large trees have been retained. There are a number of watercourses running through the site of the Proposed Development including the Allt Tom a' Challtuinne stemming south of the Douglas Water.

Ancient woodland is located along the eastern boundary of the site for the Proposed Development and there are no other statutory or non-statutory ecology, heritage or landscape designations within the Proposed Development or the Associated Development site. The Proposed Development is located 1.8 km east of a locally designated landscape, West Loch Fyne (Coast) Area of Panoramic Quality (APQ) and 4.6 km north east of the East Loch Fyne (Coast) APQ. There are no ecological sites within 5 km designated for habitat. The nearest Listed Building and Scheduled Monument is located approximately 1 km south east and 4.2 km south west respectively.

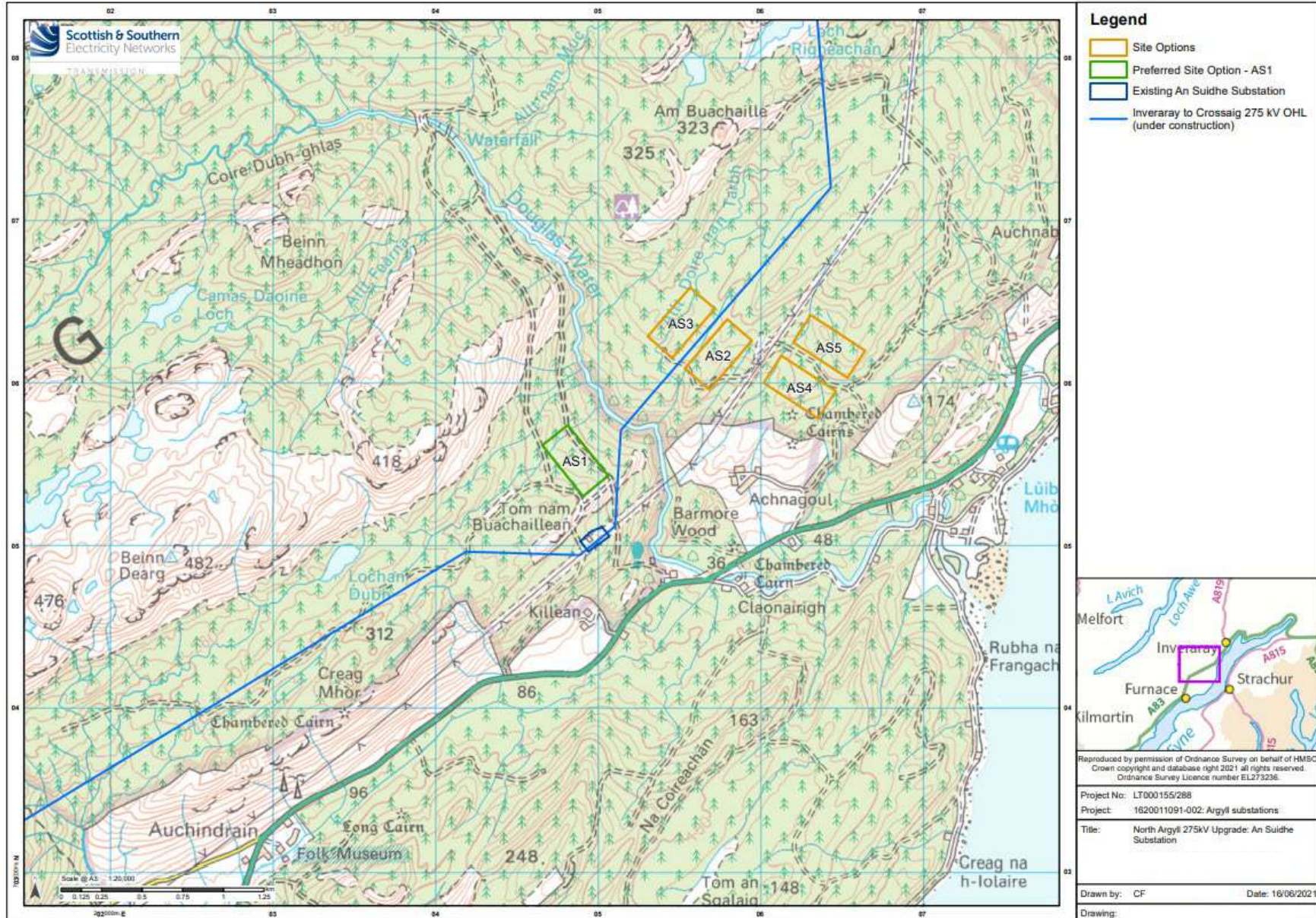
The wider surrounding area is sparsely populated with the nearest residential receptor located 870 m south of the Project. Access to the Project, for all construction traffic, including AIL (Abnormal Indivisible Load) deliveries, would be via the A83 and onto well-established forestry tracks, leading to the existing An Suidhe substation.

More detailed descriptions of the baseline environment associated with the Project are described in **Chapters 3 to 9** of this report.

2.4 **Alternatives**

A total of five potential Site Options were identified based on a requirement to position the Project within 1 km of the Inveraray - Crossaig 275 kV overhead lines (OHL), and within 3 km of the existing An Suidhe substation. The five options are shown below in **Figure 2.1**.

Figure 2.1 Alternative Sites



The selection of the preferred substation site at An Suidhe was undertaken through an appraisal of operational, technical, health and safety, economic and environmental factors.

All site options were subject to similar constraints in terms of elevated topography, the potential to interact with PWS and the potential to impact the setting of heritage assets. All sites were identified to be at moderate risk from salt pollution due to their proximity to the coast of Loch Fyne.

The analysis of the Site Options identified that the preferred sites were AS1 and AS2 on the basis of the least potential for environmental and technical constraints. Site Option AS1 was ultimately selected as the Preferred Site Option on the basis that it is considered to provide an optimum balance of environmental, technical and cost factors.

Site Options AS1 and AS2 had similar degrees of risk in relation to environmental constraints. Both sites shared a medium risk in relation to hydrology, geology, designated and non-designated cultural heritage assets, as well as forestry.

AS1 was assessed as having medium risk to habitats due to the presence of semi-natural broadleaf woodland on Site, which is of higher ecological importance than the surrounding conifer habitat. AS2 was not assessed as having risk to habitats but instead was assessed as being of medium risk to protected species due to the area of mature conifer woodland onsite, which includes the potential for red squirrel to be present which are a protected species.

AS2 was assessed as having a higher risk in terms of engineering constraints than AS1. Operation and maintenance at AS2 were assessed as medium risk due to proximity of a well-maintained road and to existing distribution assets. Adjacent land use also resulted in AS2 being assessed as medium risk due to being encumbered on three elevations, which could create challenges to accommodate ancillary infrastructure. Although both pertaining similar risk in terms of environmental constraints, the engineering risk at AS2 exceeded that of AS1, therefore AS1 was named the preferred site.

Although AS3 was assessed as having a similar constraint risk compared to AS1 and AS2, in that there was no risk to either protected species or habitats, the site was assessed to be of high risk due to Hydrology consideration. This was due to the proximity of the Allt Doire nan Tarbh which flows in a south westerly direction through the centre of the Proposed Development, and also due to the potential for downstream connection to the Kilbride Chalet PWS. Unlike AS1 and AS2, AS3 was assessed as being of low risk with regard to noise, whereas the preferred sites were assessed to be of medium risk. AS3 was disregarded due to its risk due hydrology and that any noise impacts could be mitigated appropriately.

AS4 had potential red squirrel protected species to be present and was therefore similar to AS2. In addition, AS4 showed potential for visual amenity effects to the Argyll and Bute Area of Panoramic Quality (APQ) and to three heritage assets. AS4 had similar engineering constraints to AS1 and AS2, requiring further access track to be developed given its distance from existing highway. AS4 was considered to be technically constrained by the requirement for a new 33 kV switchboard to be built close to distribution assets. This Site Option comprised a large area of forestry to be felled, which presented further environmental, technical and finances constraints.

AS5 was considered to be similar to AS4 in that there is great potential for visual amenity effects to the Argyll and Bute APQ and to the settings of a number of heritage assets. It was also the furthest site from the point of connection and would therefore not be cost effective on top of existing environmental constraints. AS5 would require additional access track to be developed given its distance from existing highway and would be technically constrained by a new 33 kV switchboard to be built close to distribution assets. When compared to AS1, otherwise known as the preferred site, the environmental, technical and finances constraints were substantial due to an area of forestry felling.

2.5 The Project

The Project comprises of the construction of a new 275 kV electricity substation which will connect into the recently completed overhead line between Inveraray and Crossaig which is capable of operation at 275kV but at present is routed into the existing substation, so the overhead line requires to be realigned to connect into the new substation. The project will support the export of renewable energy from the Argyll area.

2.5.1 The Proposed Development

The layout of the Proposed Development is shown in **Figure 2.2** and building elevations on **Figures 2.3 and 2.4** and comprises the following:

- A substation platform approximately 1.3 ha at a height of 176 AOD;
- Gas insulated Switchgear (GIS) building, maximum height 22 m and single storey control building annex;
- 275/132 kV super grid transformer (SGT), rated at 480 MVA located in a ventilated building of maximum height 16 m;
- Two gantries and electrical equipment/downleads to connect the OHL and the proposed substation;
- A Temporary Works Area (TWA) adjacent to the Proposed Development site, of approximately 0.69 ha.;
- Diesel generator housed in a building;
- Borehole for water;
- Turning and parking areas;
- Use of existing forestry access track with some upgrades, approximately 1.7 km in length;
- Construction of a new access track, approximately 174 m long;
- A 2.4 m high security fence of palisade construction around the substation platform perimeter;
- Deer fence around new areas of woodland planting;
- Landscape planting to screen the Proposed Development and provide biodiversity enhancement; and
- Foul and surface water drainage.

In addition, tree felling is required as detailed in **Chapter 5: Forestry and Annex I**.

Buildings will comprise steel portal frames with metal cladding and roof. There would be some un-housed electrical switchgear and plant located within the platform area.

The substation would not be illuminated during normal operational activities. Flood lights would be installed but would only be used in the event of a fault during the hours of darkness or during the over-run of planning works or when sensor activated as security lighting for night-time access.

The main noise source within the substation during operation would be the two 240/480 MVA super grid transformers. A noise assessment has been carried out to estimate the noise levels emitted from the Proposed Development and to understand the future operational impacts at noise sensitive receptors (NSRs) (see **Chapter 8 Noise Appraisal**).

Small scale alterations to the existing access track off the A83 may be required. Subject to survey, and to satisfy the requirements of ABC Roads Department, works may include widening of the existing bellmouth, increasing turning radii and improving visibility splays. Between the access point and the Proposed Development site, works may include widening at bends/road strengthening to accommodate the long and heavy construction vehicles. A Construction Traffic Management Plan will be submitted post-application as part of the discharge of conditions along with a delivery and transport assessment (including swept path analysis and abnormal loads assessment).

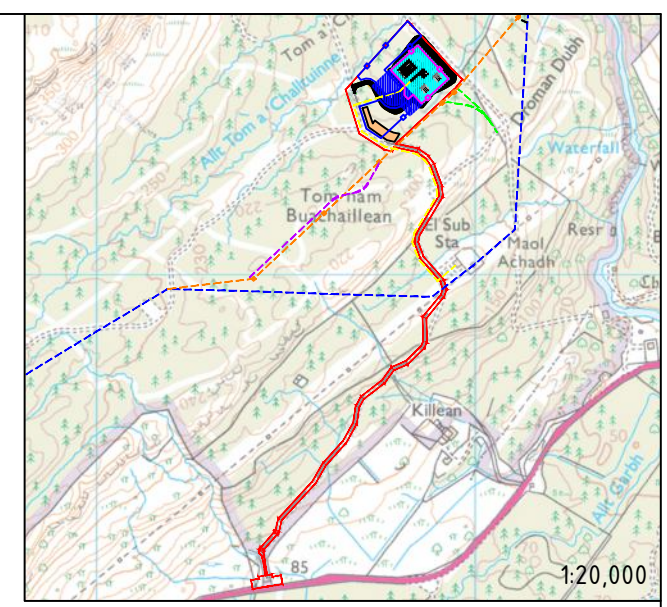
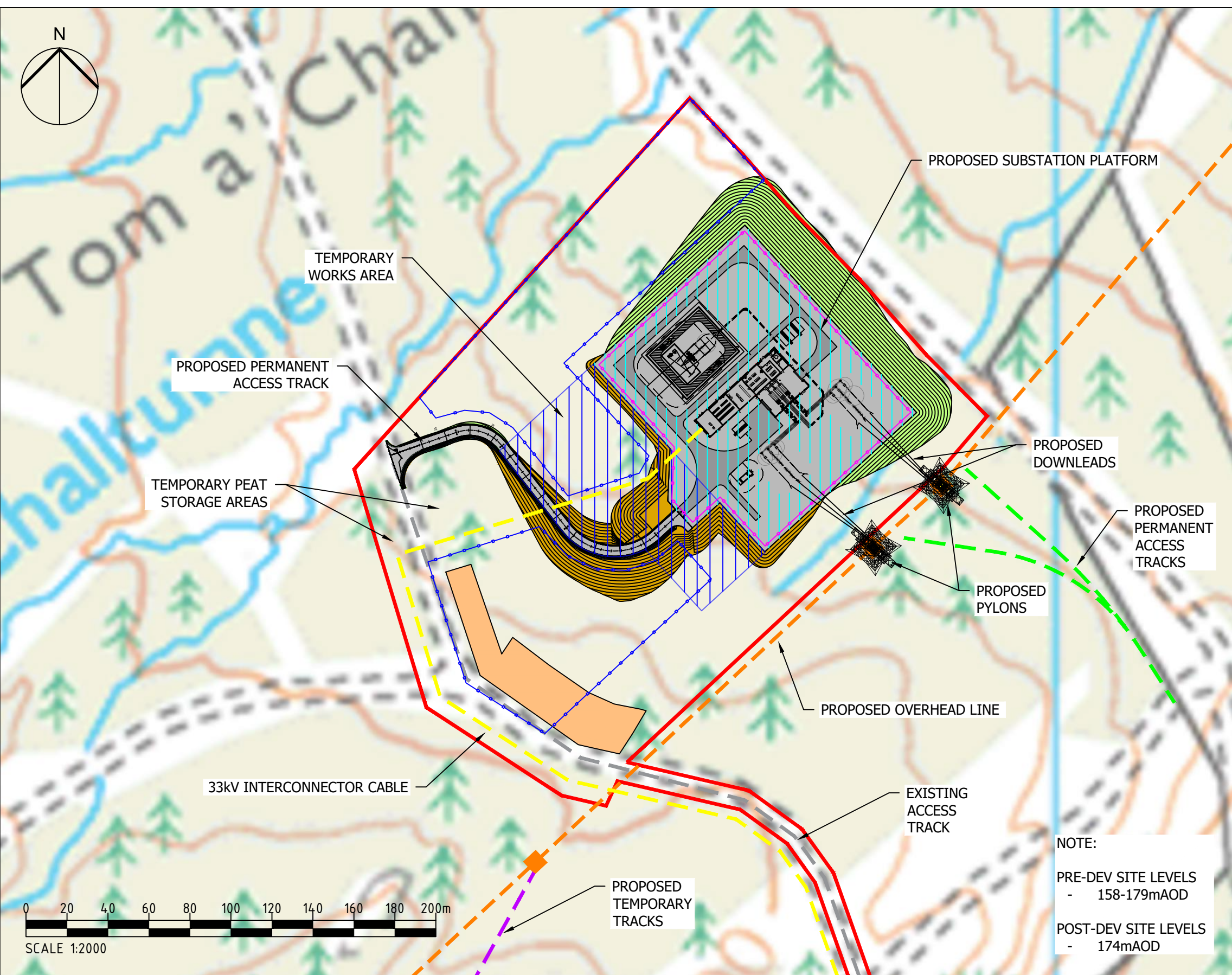
To illustrate the appearance of the Proposed Development in situ, visualisations have been produced at **Annex E**. Each visualisation includes a baseline photograph, terrain model view, and two visualisations, one on

completion (including any proposed earthworks) and the other after 12 years (including any proposed earthworks and planting). The visualisations have been prepared in accordance with NatureScot visualisation guidance⁵.

Within a GIS substation, live electrical equipment uses a dense gas as the insulating medium, usually Sulphur Hexa-Fluoride (SF6); however, SSEN Transmission are reviewing an alternative SF6 free technology solution in support of their commitments and responsibilities to the decarbonisation of the electricity network. GIS typically allows safe clearance distances between live conductors to be reduced. This results in a smaller footprint compared to the more traditional substations comprising Air Insulated Switchgear (AIS).

⁵ Scottish Natural Heritage (2017) Visual Representation of Wind Farms Guidance. Version 2.2.

Plot Date : 09 September 2022 08:41:39
File Name : Y:\CAD\4534 ARGYLL SUBSTATIONS\01-WORKING\01-01-DRAWINGS\4534A-AN SUIDHE TOWN & COUNTRY PLANNING APPLICATION\4534A-DR-P-0017 P1 - SITE LAYOUT PLAN



KEY

- SITE BOUNDARY
- PROPOSED SUBSTATION PLATFORM
- EXISTING ACCESS TRACK
- EXISTING OVERHEAD LINE
- PROPOSED PALISADE FENCING
- PROPOSED DEER FENCING
- PROPOSED AREAS OF CUT
- PROPOSED AREAS OF FILL
- TEMPORARY PEAT STORAGE AREA
- SuDS CAPPING LAYER
- TEMPORARY WORKS AREA

APPLICATIONS UNDER S.37 OF THE ELECTRICITY ACT 1989

- PROPOSED 33kV INTERCONNECTOR CABLE
- PROPOSED OVERHEAD LINE
- PROPOSED PERMANENT ACCESS TRACKS
- PROPOSED TEMPORARY ACCESS TRACKS

NOTE:

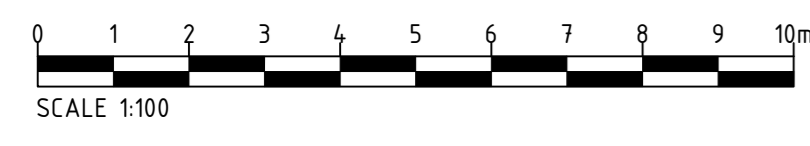
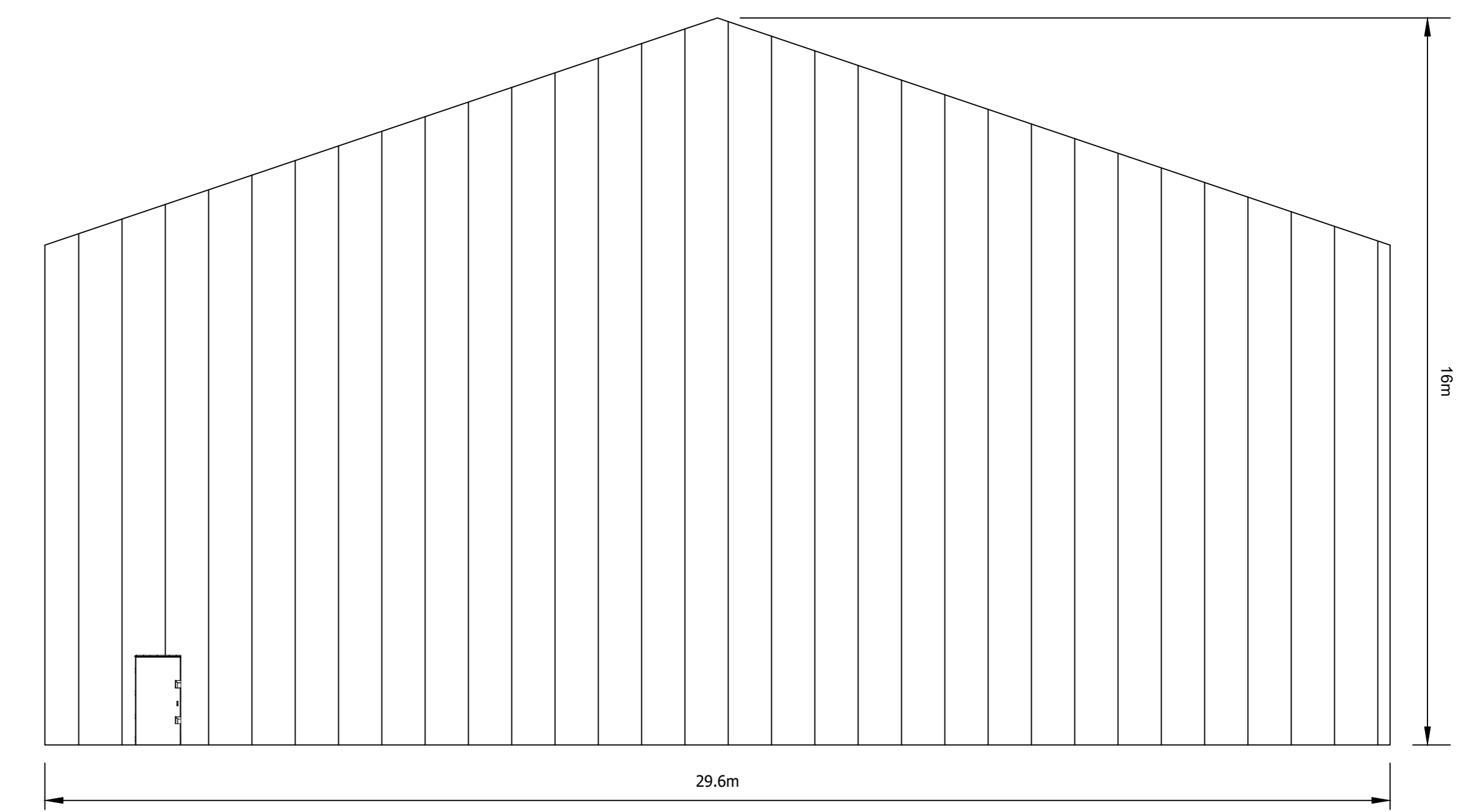
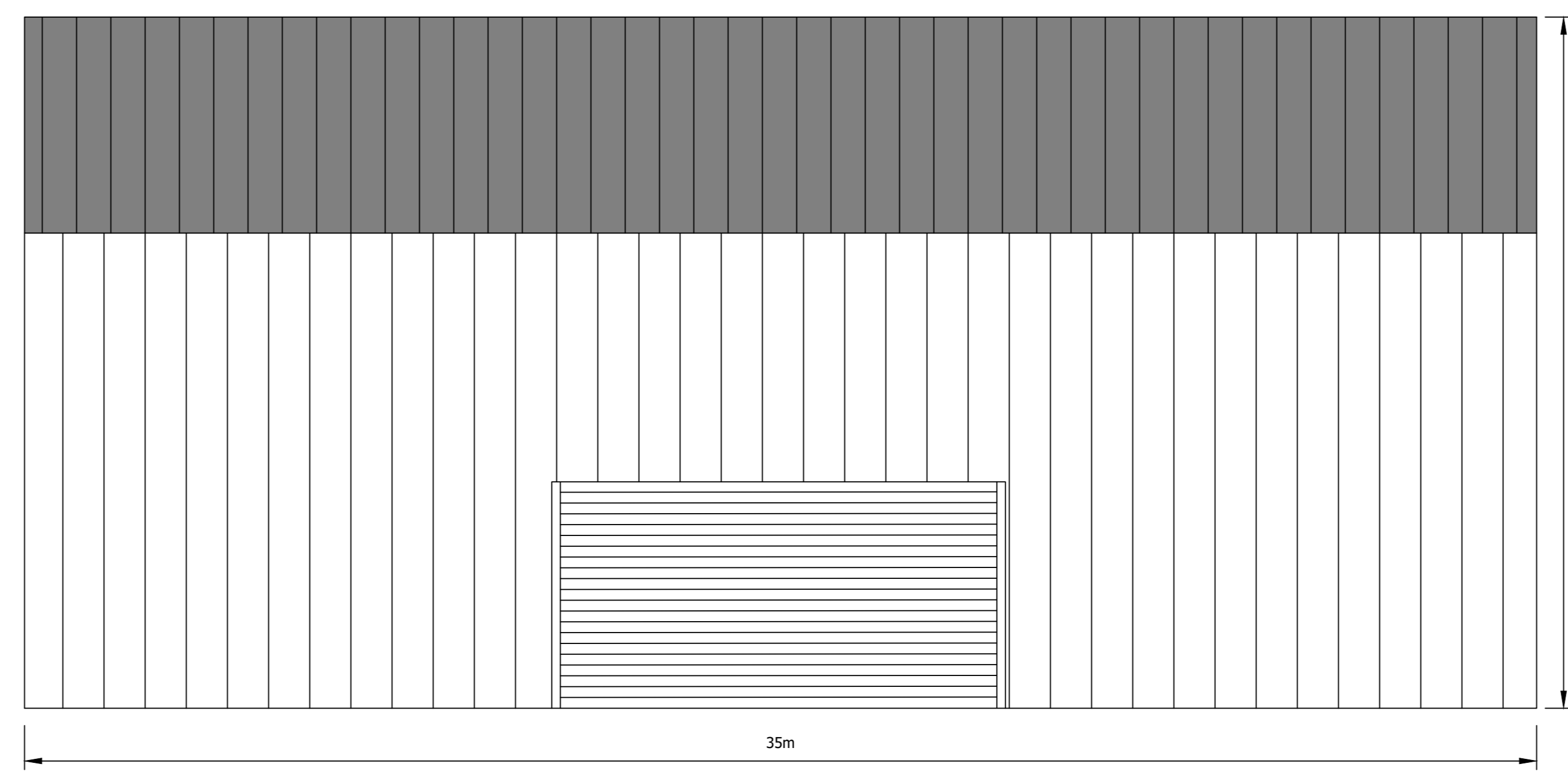
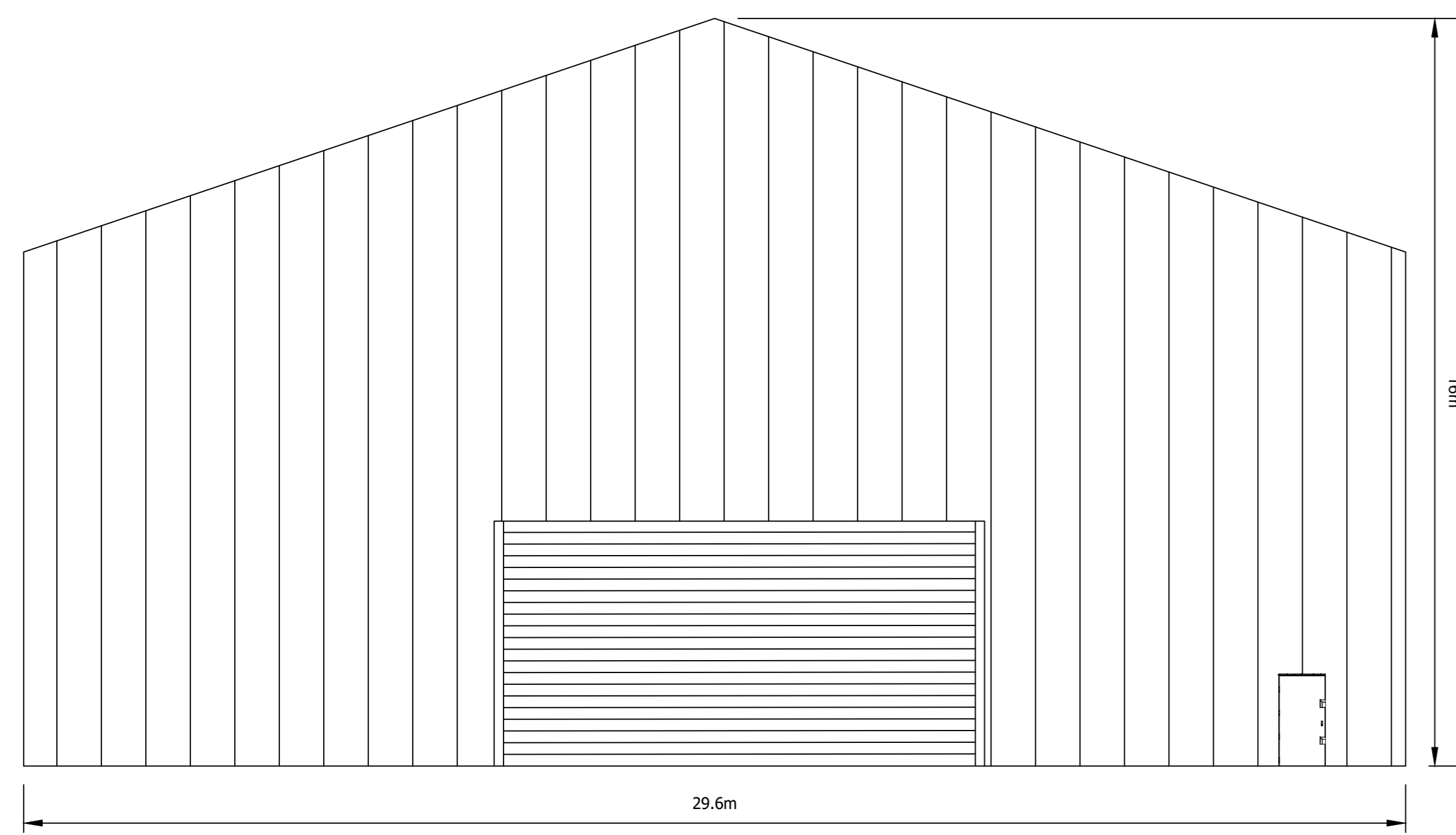
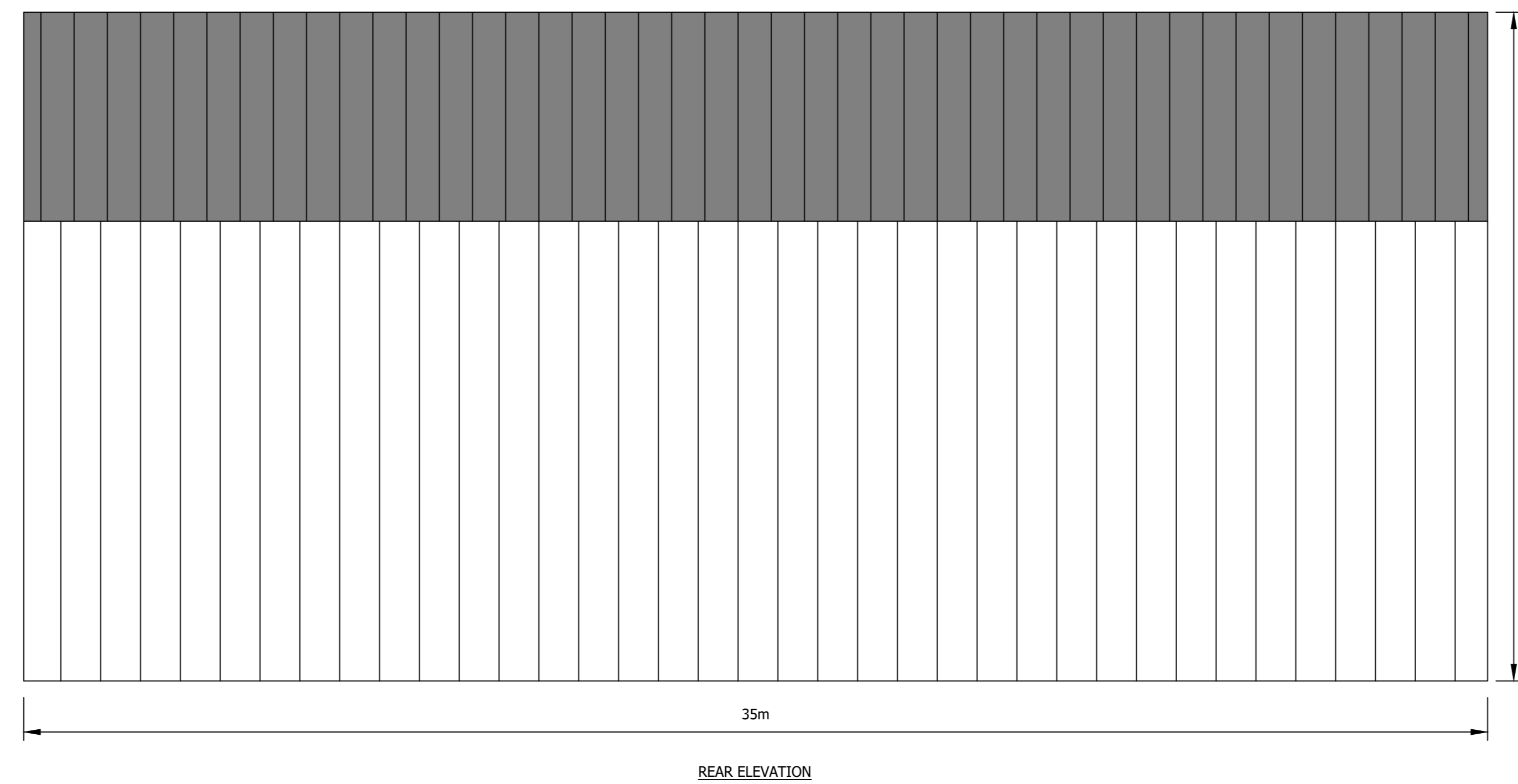
PRE-DEV SITE LEVELS
- 158-179m AOD

POST-DEV SITE LEVELS
- 174m AOD

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|---|---|---|----------|-------|---------|----------|---|----|----|----|----------------------------|--|------|--|------|--|----------|--|----------------------|--|--|--|---|----------------|-----|-----------------|---|---|
| <p>Project Title</p> <p style="text-align: center;">AN SUIDHE SUBSTATION</p> | <p>Drawing Title</p> <p style="text-align: center;">FIGURE 2.2 PLANNING FIGURE 003a SITE LOCATION PLAN</p> | <p>Purpose of issue</p> <p style="text-align: center;">PLANNING</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Designed</td> <td style="width: 25%;">Drawn</td> <td style="width: 25%;">Checked</td> <td style="width: 25%;">Approved</td> </tr> <tr> <td>-</td> <td>RC</td> <td>RC</td> <td>DB</td> </tr> <tr> <td colspan="2">Arcus Internal Project No.</td> <td colspan="2">Date</td> </tr> <tr> <td colspan="2">4534</td> <td colspan="2">06/09/22</td> </tr> <tr> <td colspan="4">Scale @ A3 1:2000</td> </tr> </table> | Designed | Drawn | Checked | Approved | - | RC | RC | DB | Arcus Internal Project No. | | Date | | 4534 | | 06/09/22 | | Scale @ A3 1:2000 | | | | <p>THIS DOCUMENT HAS BEEN PREPARED IN ACCORDANCE WITH THE SCOPE OF ARCUS' APPOINTMENT WITH ITS CLIENT AND IS SUBJECT TO THE TERMS OF THAT APPOINTMENT. ARCUS ACCEPTS NO LIABILITY FOR ANY USE OF THIS DOCUMENT OTHER THAN BY ITS CLIENT AND ONLY FOR THE PURPOSES FOR WHICH IT WAS PREPARED AND PROVIDED</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Drawing Number</td> <td style="width: 50%;">Rev</td> </tr> <tr> <td>4534a-DR-P-0017</td> <td>1</td> </tr> </table> | Drawing Number | Rev | 4534a-DR-P-0017 | 1 | <p>Arcus Consultancy Services</p> <p>7th Floor 144 West George Street Glasgow, G2 2HG</p> <p>Tel: +44 (0)141 221 9997 Fax: +44 (0)141 221 5610 www.arcusconsulting.co.uk</p> |
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NOTE:

- STEEL PORTAL FRAMES WITH METAL CLADDING AND ROOF.
- AIS BUILDING WOULD BE PAINTED WITH A RECESSIVE COLOUR MID-BROWN, SUCH AS RAL 8008: OLIVE BROWN OR SIMILAR APPROVED (EXAMPLE BELOW).



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DOCUMENTATION INCLUDING THE PROJECT HEALTH & SAFETY FILE FOR ANY IDENTIFIED POTENTIAL RISKS.
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Client
AN SUIDHE SUBSTATION

Project Title
**FIGURE 2.4
PLANNING FIGURE 004d
TRANSFORMER BUILDING
ELEVATIONS**

| Designed | Drawn | Checked | Approved |
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| Arcus Internal Project No. 4534 | | Date | 07/09/22 |
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2.5.2 The Associated Development

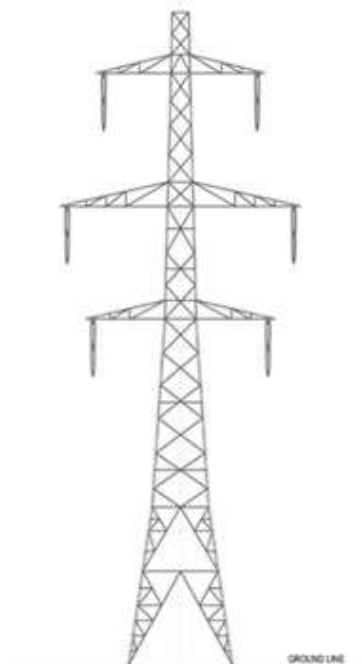
The Associated Development comprises the construction of a new OHL section and associated towers in order to connect the Proposed Development to the recently constructed 132 kV OHL between Inveraray and Crossaig. This will replace the section of overhead line that currently connects into the existing 132 kV substation.

The Associated Development would comprise the following:

- Construction of six new steel lattice towers (max height 57.4 m) to support the realigned overhead line which will connect into the new substation;
- Two downloads from the realigned overhead line into the substation;
- Tree and vegetation clearance where required;
- Construction of three new permanent access tracks leading to the three northern most towers:
 - One of approximately 164 m;
 - One of approximately 109 m; and
 - One of approximately 14 m.
- Temporary overhead line diversions during construction; and
- Dismantling of the existing overhead line section connecting the existing 132 kV substation which comprises seven redundant towers and associated cabling.

In addition, the proposed 33 kV interconnector cable as seen in **Figure 1.1** would be undergrounded to make way for the Associated Development and can be carried out under Permitted Development rights.

The transmission tower design is illustrated on **Figure 2.5**.



Proposed L8 (c)
Tower Suite

Figure 2.5: Transmission Tower Design

The Proposed Alignment as shown in **Figure 1.1** has been determined based on the environmental assessments, engineering analysis and stakeholder consultation undertaken to date. Following the grant of consent, the investigation of sub-surface and geotechnical conditions at proposed tower locations would be undertaken and may result in the requirement for additional adjustments (micro siting) to the tower locations or to tower heights.

The s37 application seeks consent for the construction and operation of the proposed OHL with a prescribed horizontal and vertical Limit of Deviation (LOD), to allow flexibility in the final siting of individual towers to reflect localised land, engineering, and environmental constraints:

Horizontal LOD: Allows towers to be relocated up to 100 m either side of the proposed alignment. A 50 m LOD applies to proposed access tracks.

Vertical LOD: It is possible that further engineering analysis at the detailed design stage might alter the proposed heights, and therefore would be subject to a vertical limit of deviation, provisionally up to 20 % variation based on the tower schedule.

2.6 Construction Works Programme

The construction of the Project will follow the key stages identified below. There will be an overlap between the civil construction work and electrical construction, with a total construction programme lasting approximately 30 months.

2.6.1 Phase 1: Enabling Works and Civils Construction

For the Proposed Development, this phase is anticipated to take approximately 15 months, and is expected to comprise of the following:

- New permanent access tracks within the Proposed Development site, approximately 174 m in length, with a 3.5 m wide running surface. Works to widen the existing track may also be required to create a 5 m running surface and 20 m service corridor, however the exact locations of any upgrades will be confirmed by the Principal Contractor;
- Temporary works drainage (clean and dirty water systems);
- An infiltration basin to receive all surface water runoff generated within the platform area (and runoff from the construction compound). The basin will be constructed during the construction phase and thus provide appropriate storage facility for surface water runoff during excavation and earth works (to capture and reduce suspended solids);
- A temporary works area containing storage, control building (office and welfare facilities) and septic tank to receive foul drainage from the compound. The exact specification of the septic tank will be confirmed once the contractor has been appointed. The septic tank will be emptied by a licensed contractor for off-site disposal at regular intervals dependent upon usage. Anticipated size is 18 m³ giving an interval between emptying of 45 days;
- Cut and fill engineering works to form a level platform;
- Individual concrete foundation slabs situated within the finalised platform to support essential electrical components, and substation control building;
- Erection of a GIS building and transformer building of a steel portal frame design
- Subsurface platform drainage in the form of suitably sized perforated pipes to drain runoff from internal hardstanding areas and incident rainfall landing on the permeable formations. Suitable gradients for pipe runs will be achieved within the total depth of the formalised platform layers; and
- Filter trench (or similar mechanisms) located parallel to the outside of the platform perimeter access track which will intercept runoff from the track and receive flow from the internal platform drainage before being routed towards the proposed Infiltration Basin via an open swale / pipe or similar.

For the Associated Development, this phase is anticipated to take up to three months, and is expected to comprise the installation of the following:

- Creation of level platforms at each tower location through processing of site won materials and import of commercial aggregates, as required;
- Concrete foundations/bases for new tower and electrical equipment; and

- Erection of temporary OHL diversion infrastructure, if required

The Associated Development is situated within areas of commercial forestry and broadleaved woodland, and in these areas a clear operational corridor would be required. The width of the corridor would be variable depending on the nature of the woodland, with an average corridor of 80 m required (40 m either side of the tower centre line), subject to the Limits of Deviation mentioned previously. In addition, minor vegetation management and felling would be required around the existing access track network for the Project to provide sufficient width. Further detail is available in **Annex I: Forestry Assessment**.

Foundation types and designs for each tower would be confirmed following detailed geotechnical investigation at each tower position, although it is currently anticipated that most tower foundations are likely to be of a concrete pad and chimney type. Individual tower foundations and associated construction activities would require a working area of approximately 2,500 m² (50 m x 50 m) around each individual tower location. The exact dimensions of the working area around each tower will be confirmed following micrositing.

It should be noted that the Associated Development will utilise the same access track and temporary works area as the Proposed Development, however there will be additional tracks to be constructed to the tower locations for maintenance purposes.

In terms of the overall Project, detailed access proposals would be developed by the Principal Contractor (to be appointed following granting of consent). Similarly, the Principal Contractor would confirm the final location of site compounds post-consent.

Works would be required to the existing distribution network infrastructure which are crossed by the OHL. It is anticipated that these distribution network assets, such as the proposed 33 kV interconnector cable as seen in **Figure 1.1**, would be undergrounded to make way for the Associated Development and can be carried out under Permitted Development rights.

2.6.2 Phase 2: Electrical Construction

This phase is anticipated to take 18 months for the Proposed Development and would comprise:

- Installation of electrical infrastructure; and
- Commissioning of the substation.

For the Associated Development, the following would take place during this phase:

- Existing OHL network diversion;
- Installation of electrical plant e.g., cable sealing ends and tower. Scaffolding will be required for cable jointing; and
- Removal of temporary OHL diversion.

2.6.3 Phase 3: Commissioning

The Project would be subject to an inspection and snagging process. This allows the Principal Contractor and SSEN Transmission to check that the works have been built to specification and are fit to energise. The Project would also go through a commissioning procedure for the switchgear, communications, and protection controls. The circuits would then be energised.

2.6.4 Phase 4: Reinstatement

Following commissioning of the Proposed Development, all temporary construction sites will be reinstated with the exception of an area to be retained for operational purposes. Reinstatement will form part of the contract obligations for the Principal Contractor and will include removal of buildings and materials from the construction compound and revegetation.

2.7 Description of Construction Works

2.7.1 Formation of Substation Platform

The Proposed Development slopes moderately to the north, therefore cut and fill would be required to create a level substation platform. The proposed finished platform level would be at approximately 176 m AOD.

Peat probing surveys undertaken and updated in 2021 confirmed the Project is located on areas of peat ranging from 0 m deep to 4 m deep. Peat depths are shallow across a vast majority of the Project with 96 % of recorded depths being 1.0 m or less. However, given the presence of peat, and particularly deeper peat associated with the Associated Development, a Peat Management Plan (PMP) has been prepared and can be seen in **Annex N**.

The substation platform will comprise a balanced cut and fill construction, which will use imported material where the excavated on-site material does not meet the requirements of the SSEN Transmission substation earthworks specification. The final cut and fill design would be based on a detailed ground investigation and site-specific topographic survey to be undertaken by the Principal Contractor once appointed.

2.7.2 Formation of Tracks

Access track work consists of constructing new permanent access tracks associated with the Proposed Development, construction of temporary access tracks for the Associated Development, and the potential requirement to upgrade existing forestry tracks.

- The new permanent access tracks will be constructed at the beginning of the construction period to enable use during the construction phase. The access tracks would be capable of accommodating the substation equipment deliveries, and other heavy plant and vehicles required for the construction, including cranes and concrete deliveries. All tracks would be constructed to good practice working methods^{6,7,8,9,10}, with watercourse crossings designed and constructed to comply with legislation set out in The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended.

Given the new proposed track route is located on peat of varying depths, the following principles would be applied, which would be developed at the pre-construction stage based on the detailed site investigation work completed prior to construction commencing:

- In areas of shallow or no peat (0 m to 1 m), a 'cut track' design would be utilised, for which any vegetation, topsoil and peat would be stripped to expose a suitable foundation on which to build the track. Surplus excavated soil, together with any vegetation, would be used for landscaping and reinstatement work around the track shoulders following construction. The track would then be constructed by laying and compacting crushed rock to the level required using a combination of tracked excavators and vibratory compacting rollers. Road aggregate will either be sourced from site won "cut" material, on site borrow pits or from an off-site licensed quarry. The volume of aggregate required will be confirmed following detailed ground investigation.
- Where peat depth is greater than 1 m (See **Annex N**: PMP for information on peat depth on-site), a 'floating track' design would generally be used. This would incorporate geotextile material laid onto the surface at a width to suit the road width, which would greatly increase the resistance to prevent the tracks settling into the ground. A layer of crushed stone would then be laid on the geotextile to form the track, which produces a steep stone batter with the edges of the site track raised above the surface. Where ground conditions are found to be saturated, and potentially supporting ground water dependent ecosystems, the track construction would incorporate drainage measures to maintain groundwater flows

⁶ Forestry Commission (2011). Forests and Water. UK Forestry Standard Guidelines. Forestry Commission, Edinburgh. i-iv + 1- pp.

⁷ Scottish Natural Heritage (2015) Good Practice During Wind Farm Construction, A joint publication by Scottish Renewables, SNH, SEPA, Forestry Commission Scotland and Historic Scotland, 3rd Edition.

⁸ CIRIA Publications 2006: Control of Water Pollution from Linear Construction Projects. Site Guide (C649)

⁹ Scottish Natural Heritage (2013) Constructed Tracks in the Scottish Uplands, 2nd Edition

¹⁰ Forestry Commission Scotland and Scottish Natural Heritage (2010) Floating Roads on Peat

and levels, such as using perforated pipes wrapped in free draining geotextile membrane incorporated into the floating track.

When upgrading the existing forestry track between the A83 and the new substation site a sacrificial stone layer will be added to the existing road construction. Road aggregate will either be sourced from site won "cut" material, on site borrow pits or would either be sourced from an off-site licenced quarry. The volume of rock aggregate required will be confirmed following detailed ground investigation.

2.7.3 Construction Compound/Facilities

A temporary works area (TWA) would be located on the Proposed Development site (as shown in **Figure 1.1**). The TWA would provide storage for materials and welfare facilities for both the Proposed Development and the Associated Development. It would include storage cabins, waste disposal skips, toilet units with washing facilities, a changing / drying room, a mess cabin, a parking area and a small storage area. On completion of the Proposed Development, the compound would be partially reinstated with half being retained for operational purposes.

2.7.4 Tower Foundations

Different approaches to forming foundations may be used, subject to ground conditions at each tower location. These would/are likely to comprise:

spread type e.g., concrete pad and chimney;

rock anchor; or

piled type e.g., driven concrete, tube, and micro pile; or augered.

Foundation types and designs for each tower would be confirmed following detailed geotechnical investigation at each tower position, although it is currently anticipated that most tower foundations are likely to be of a concrete pad and chimney type.

Dimensions of each foundation would be confirmed following micrositing. For the purposes of this assessment however it has been assumed that each foundation would be buried to depths estimated up to 2.5 m below ground level (bgl) although extending up to 4 m depth where ground conditions require. They would extend over an area suitable to deliver the loading characteristics required (which would be a function of the underlying ground conditions and the weight of the structures to be supported). Piled foundations may be required where low strength ground conditions exist, particularly where peat is encountered at over 1 m depth.

For the purposes of the EA it has been assumed that individual tower foundations and associated construction activities would require a working area of approximately 2500 m² (50 m x 50 m) around each individual tower location. The exact dimensions of the working area around each tower would/will be confirmed following micrositing.

Where encountered, top soil (including peat) would be stripped from the tower working area to allow installation of tower erection pad(s) as necessary to accommodate construction plant as per the Soil Management GEMP provided in **Annex A**. Concrete will be brought to site ready-mixed with no requirement for concrete batching at individual tower locations. Once the concrete has been cast and set, the excavation would be backfilled, using the original excavated material where possible. The Working with Concrete GEMP provided in **Annex A** will inform concrete works.

It is anticipated that formation of each tower foundation would take approximately four weeks.

2.7.5 OHL Construction

Tower construction can commence two weeks after the foundations have been cast, subject to weather conditions and concrete curing rates. Tower steelwork would be delivered to each tower construction site either as individual steel members or as prefabricated panels, depending on the method of installation and the available access.

Each tower would be assembled on site into panels by a team of up to eight people. The lower tower panels may be erected using a telehandler, but upper panels would normally be erected into position using an all-terrain crane. Where access is not available for a crane, a derrick would be used. Most towers would be assembled within about five days each and erected by crane in one to two days depending on weather conditions and tower type. Large angle or terminal towers, or towers within restricted sites may take longer.

2.7.6 Conductor Stringing

The conductor would be delivered to site on wooden drums in pre-determined pulling section lengths. Typical drum lengths for conductors are up to a maximum 2,400 m (approximate weight of 4 tonnes) but would depend on the specific length of section to be strung.

Prior to stringing the conductors, temporary protection measures, (e.g. netted scaffolds) would be erected across public roads and existing access tracks.

Conductor stringing equipment including winches, tensioners and ancillary equipment would be set out at either end of pre-selected sections of the OHL. Pilot wires would be pulled through the section to be strung. These would be hung in blocks (wheels) at each suspension tower in the section and connected to a winch and tensioner at the respective end of the section. The winch, in conjunction with the tensioner would be used to pull the pilot wires which would be connected to the conductor at the tensioner end. The conductor would be pulled via the pilot wires through the section and under controlled tension to avoid contact with the ground and any under-running obstacles including protection scaffolds. Once the conductor has been strung between the ends of the section it would then be tensioned to provide the necessary sag and then permanently clamped at each tower.

Dependent on terrain or site constraints pilot wires can be pulled through either with the use of all-terrain vehicles, tractors, or helicopters.

2.7.7 Construction and Contracting Strategy

The Project would be constructed by an experienced construction contractor with a proven track record working on similar projects in accordance with UK and international standards in respect of quality, health, safety and environmental management.

The contract to construct the Project would be a design and build contract based on the pre-consent designs included in this EA. This procedure allows the final design to take account of any consent conditions. It also allows the contractor to adapt design and construction proposals to address specific issues relating to actual ground conditions and limitations found onsite, as well as allowing for advances in technology and construction methodology.

2.7.8 Construction Employment

The number of construction workers employed on-site would vary throughout the different phases of construction works. Employment of construction staff will be the responsibility of the Principal Contractor but SSEN Transmission encourages the Principal Contractor to make use of suitable labour and resources from areas local to the location of the works. There will be multiple contractors working on sites across Argyll and so it is difficult to give an accurate figure with regard to the number of workers that will be required per site. The peak number of workers is likely to occur during the final phase of civil engineering works and commencement of the electrical equipment installation where these phases overlap.

2.7.9 Hours of Work

Construction activities would in general be undertaken during daytime periods. This would involve work between approximately 07:00 to 19:00 on week days and 07:00 to 18:00 on Saturdays. Construction works will only take place during these agreed hours and in planning the works, contractors will look to minimise the impact of construction noise on neighbours and the public. There may be times that construction works require to take place outwith these agreed hours due to time critical activities - this would only be done with the prior agreement

of ABC. Works outwith of daylight hours requiring illumination would be undertaken in accordance with relevant guidance to avoid light spill.

The Principal Contractor will develop a construction noise management plan as part of the Construction Environmental Management Plan (CEMP).

2.7.10 Construction Traffic and Plant

Access to the Project during construction and operation would be via the A83 and then the existing access track to the An Suidhe 132kV substation and onto the substation site.

It is anticipated that Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) will access the site on a daily basis throughout the duration of the construction period to deliver materials and construction plant such as excavators, dump trucks, cranes and deliveries of machinery and scaffolding. All materials would be delivered to the construction compound. The transformers will be delivered by a small number of abnormal indivisible loads.

Further details of the anticipated volume and type of construction traffic are provided within **Chapter 9: Transport Appraisal**. A Construction Traffic Management Plan (CTMP) will be developed by SSEN Transmission, which will be agreed with the Argyll and Bute Council Roads team in advance of construction, as part of the CEMP.

It is unlikely that construction lighting would be required during summer months. Should lighting be required in the winter, these would either be mobile or fixed temporary lighting. Any lighting would be located and directed to avoid impacts to sensitive receptors.

2.8 Construction Environmental Management

The Applicant adopts a consistent approach to the construction of all developments. It is standard practice that, following receipt of approval for development, a Construction and Environmental Management Plan (CEMP) is prepared by the Applicant's Principal Contractor. This would be provided as part of a condition to any planning consent. The key objective of the CEMP is to ensure that commitments to mitigate environmental impacts that may arise during construction are delivered. Compliance with the CEMP will be required as part of the Principal Contractor's contract terms.

The CEMP will include the following SSEN Transmission General Environmental Management Plans (GEMPs):

- Oil Storage and Refuelling
- Soil Management
- Working in or Near Water
- Working in sensitive habitats
- Working with concrete
- Watercourse crossings
- Waste Management
- Contaminated Land
- Private Water Supplies
- Forestry
- Dust Management
- Biosecurity (on land)
- Restoration
- Bad weather

The CEMP will also include development-specific plans developed by the Applicant, including Species Protection Plans (SPPs), as well as the Stage 1 Peat Management Plan prepared in accordance with the requirements of the 'Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste', Scottish Renewables and SEPA, Version 1, January 2012. Outline Species Protection Plans (bird, bat, red

squirrel, otter, pine marten, badger, wildcat) are provided in **Annex H** and the outline PMP is provided in **Annex N** of this EA. The PMP sets out the general principles for the management and re-use of excavated peat.

A Construction Site Licence will be required and obtained in accordance with the Controlled Activity Regulations (CAR) from SEPA prior to any construction works commencing on-site. The Licence would specify the control measures that would be used at the site to safeguard the water environment.

2.8.1 Forestry

The Project site is located within a region of felled plantation forest; however, some felling will be required to remove immature trees which have recolonised the area, as well as any remaining mature trees. Further details of the long-term effect of the Proposed Development on forestry and woodland are provided in **Annex I: Forestry Assessment**. It is possible that some localised felling and pruning will be required along the existing access road. This will be confirmed by the principal contractor and will be subject to mitigation identified in this EA.

2.8.2 Surface Water Drainage Proposals

Surface water drainage from the Project would be minimised through the installation of an upslope cut-off drain on the upslopes around the substation perimeter, which would divert surface water around the substation platform, with a discharge point proposed to the south of the substation. For further information on surface water drainage see **Annex J: Drainage Strategy and Drainage Plans**.

The surface water runoff within the substation platform area would be managed using a multi-tiered sustainable drainage system (SuDS), providing filtration and attenuation, prior to discharge to a local watercourse. The surface water runoff will be attenuated to equivalent greenfield runoff rates, which would ensure that the runoff from the Project would not result in any increase in flood risk within the wider surface water catchment.

The SuDS system will be designed in compliance with CIRIA C697¹¹, providing two levels of treatment for road and paved runoff, and one level of treatment for roof runoff.

For further information on the drainage proposal see **Chapter 6: Hydrology, Hydrogeology and Geology Appraisal** and supporting annexes.

2.8.3 Watercourse Crossings

Possible watercourse crossing upgrades, including the upgrade to the existing culverted watercourse, may be required on the access track from the public road during the construction of the Project. As watercourse crossings would be designed and constructed to comply with legislation set out in The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended. These measures would be carried out in line with the Water Construction Management Plan (WCMP), as outlined in **Annex M**.

2.8.4 Private Water Supplies

A PWSRA has been undertaken for the Project. The PWSRA identified all PWS within a 2 km radius of the Project and confirms the location of source water supplies. **Annex L** informs the risk assessment of the effects of the Project on the private water supply, source water and associated distribution infrastructure. Where new access tracks or upgrades to existing tracks are required, within 100 m of supplies, mitigation measures are proposed. Potential effects and mitigation measures are discussed in detail within **Chapter 6: Hydrology, Hydrogeology and Geology Appraisal** and associated technical annexes.

2.9 Operational Phase

2.9.1 Life of the Project

It is anticipated that the Project will be operational for 45 years.

¹¹ CIRIA C697 (2007) The SUDS Manual

2.9.2 Operational Activities and Employment

The Proposed Development would not be staffed on a full-time basis. Operations would be controlled remotely from the network operation centre in Perth. Maintenance activities would be managed from the Applicants Highlands and Islands depot in Inverness.

2.9.3 Operation and Maintenance (O&M) Programme

Once operational, it is likely that monthly site visits would be made by maintenance personnel to undertake routine checks and operational switching. More specialist works, such as maintenance repairs or environmental management, may be subcontracted to specialists as required.

Planned maintenance is completed approximately once every four to six years on each circuit. This work would last for approximately one week. During this time up to four or five LGV site vehicles may access the site per day and this may include a small crane. Further limited maintenance would be required for the Associated Development.

The O&M manual would ensure an environmental management / maintenance programme is in place to prevent any adverse impacts on the environment during operation and will confirm the frequency of maintenance visits etc.

Measures to be included in the O&M manual would include (but not be limited to) the following:

- Inspection / maintenance of site infrastructure including bunds, oil / water interceptor and SUDs facilities;
- Inspection / maintenance of oil filled / Non SF6 insulated electrical equipment; and
- Landscape maintenance.

The O&M manual would be developed by the Applicant and Principal Contractor for handover to the SSEN Transmission O&M team.

2.9.4 Waste Management

During Operation, it is anticipated that very small volumes of waste would be produced. Waste generation would be limited to wastewater from maintenance only arising in the control building from visiting contractors, and from routine maintenance activities. Waste generated during routine operations and maintenance would not be stored on-site and would be removed at the time by SSEN Transmission staff/contractors, under the appropriate waste carrier's licence.

2.9.5 Emissions to Air / Land / Water

Emissions to water would be limited to rainwater run-off and discharge from the foul sewage treatment system. Foul sewage and rainwater run-off will be managed in accordance with the drainage management system.

Routine emissions to land and air are not anticipated.

2.9.6 Operational Noise

Noise emissions generated by the Proposed Development would originate primarily from transformers in the form of low-frequency tonal noise in the range of 63 Hz to 2kHz. There would be limited noise generated from the Associated Development once operational.

2.9.7 Substation Lighting

Lighting would be restricted to times when the Project is being accessed after dark. A complete floodlighting scheme would be designed to achieve a maintained average of 6 lux illumination throughout the HV substation compound. The maintained minimum point illumination would be 2.5 lux.

2.9.8 Electrical and Magnetic Fields (EMFs)

The UK Health Protection Agency (HPA) is the government body responsible for policy and guidance on Electric and Magnetic Fields (EMF)¹². Exposure guidelines have been developed by the International Commission on Non-Ionising Radiation Protection (ICNIRP) to ensure protection of human health in different situations, occupational exposure and public exposure, which have been adopted by the HPA for application in the UK.

Whilst substation equipment is known to generate EMFs, these have been observed to drop away to background levels quickly with distance from source. In addition, EMF generated by substation infrastructure has been consistently recorded to be lower than that associated with incoming/outgoing overhead line or underground cables associated with the substation¹³.

All EMF generating infrastructure is located at least 100 m from the Project site boundary. It is therefore anticipated that EMF would be at, or close to background levels at the Project site boundary. No significant EMF emissions are therefore expected and the Project will adhere to the relevant regulations and guidance for EMF limits.

2.10 Decommissioning Phase

Should the Project be decommissioned the site would be restored as follows:

- The substation infrastructure would be removed;
- Where removal of the infrastructure such as substation foundations would result in more damage than leaving them in place, they would be left in-situ; and
- Disturbed ground would be reinstated.

Full details of the decommissioning plan would be agreed with the appropriate authorities and landowners prior to any decommissioning works commencing.

¹² Health Protection Agency. URL: <http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/ElectricAndMagneticFields/ExposureGuidelinesForElectricAndMagneticFields/>

¹³ <http://www.emfs.info/Sources+of+EMFs/Substations/National+Grid+substations/>