2. PROJECT DESCRIPTION

2.1 Introduction

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

2.2 Project Need

SHE Transmission has a statutory duty under Schedule 9 of the Electricity Act 1989 to develop and maintain an efficient, coordinated and economical electrical transmission system in its licensed areas. Where there is a requirement to extent, upgrade or reinforce its transmission network, SHE Transmission's aim is to achieve an environmentally aware, technically feasible and economically viable route which would cause the least disturbance to the environment and the people who use the area.

The need for reinforcement of the electricity transmission network in Argyll and Kintyre is predominantly driven by onshore renewable wind generation and pumped storage hydro generation seeking connection to the transmission network in the local area. The volume of contracted generation has significantly increased since 2019. As of January 2023 there is 1797MW of generation contracted to connect to the network in Argyll and Kintyre, of which only 108MW can be accommodated by the existing network, post completion of the Port Ann – Crossaig 275kV overhead line project which is under construction. On top of this a further 617MW has been issued a connection offer, and a number of potential future connections have been identified by local stakeholder engagement events that were held in 2022. This significant increase in the generation background requires reinforcement of the transmission network in order for SSEN Transmission to maintain compliance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS) and facilitate these connections.

There is an existing 132 kV substation at Crossaig. However, this substation is of insufficient size and capacity to accommodate the works required to connect the contracted generation and therefore a new substation will be required which will operate at 275kV. There are a number of new renewable generator connections which are key drivers for the project, and are listed below;

- Sheirdrim – Wind Farm
- Blarghour – Wind Farm
- Earraghail – Wind Farm
- Tangy 4 – Wind Farm
- West Torrisdale – Wind Farm
- Cnoc Buidhe – Wind Farm
- Narachan – Wind Farm
- Eredine – Wind Farm
- Auchnasavil – Battery Storage
- Balliemeanoch – Pumped Storage Hydro

2.3 Location

The Project is located approximately 8 km southwest of the village of Claonaig in Argyll and Bute, West Scotland, at National Grid Reference (NGR) 182464 650251, and is 1 km from the Firth of Clyde. The Project is located

wholly within the Argyll and Bute (ABC) Local Authority area and would be accessed from the A83 using existing private tracks known as the Cross Kintyre Haul Road and the Cour Estate track.

The location plan (**Figure 1.1**) shows the Proposed Development, including the temporary work area and temporary peat storage areas, within the red line boundary. The location plan also shows the associated over headline route and diversions comprising the Associated Development.

The topography of the Project and immediate vicinity is gently undulating throughout. The elevation of the Site ranges from around 80 metres (m) Above Ordnance Survey Datum (AOD) to around 96 m AOD in the area of the proposed substation.

The Proposed Development is in an area of commercial forestry with low conservation value, as well as an area of semi-natural broadleaved woodland with higher ecological importance. It is situated approximately 1 km from the Firth of Clyde, and approximately 500 m from the B842.

A small watercourse is located adjacent to the south west corner of the Proposed Development. There are also Private Water Supplies located in proximity to the Proposed Development and in the wider area.

Habitat is dominated by mature conifer plantation woodland which has a boggy understorey in places that are associated with natural watercourses or dysfunctional drainage. Other habitats occur to the east, with marshy and neutral grassland and areas of broadleaved woodland and continuous scrub being the most frequent. No sites designated for their nature conservation importance lie within the Proposed Development Site. Ten sites lie within 10 km; the closest is Kintyre Goose Roosts Special Protected Area (SPA), Ramsar Site and Site of Special Scientific Importance (SSSI), which are located approximately 2.5 km north west of the proposed substation Site.

The existing private access tracks runs from the west coast of the Kintyre peninsula, starting at the A83 near Killean, heading east across the peninsula and then in a northerly direction before finishing south of the existing Crossaig substation. Adjacent to the access track, heath communities are present, including an expanse of blanket bog at the highest point. Pockets of broadleaved semi-natural and recently felled confider woodland are found in a number of locations along the route. The nearest designated site to the existing access track is the Sound of Gigha SPA which is located approximately 0.67 km west Eight woodlands listed on the Ancient Woodland Inventory also lie adjacent to the existing access track.

There are no designated heritage assets within the Proposed Development area. There is one Category A Listed Building, Cour House, within 1.8 km of the Proposed Development; one group of Category A Listed Buildings; North Wing, North Range, The Doll's Houses, Killean approximately 40 m from the existing works access track and there is one Scheduled Monument, Fort NE of Killean approximately 45 m from the existing works access track.

The nearest residential receptor to the Project is South Crossaig, located approximately 800 m north of the Proposed Development.

2.4 Alternatives

A Draft Environmental Site Selection Study was completed by SSEN in June 2021 which sought to identify potential site options, document the evaluation of each site option against an agreed set of environmental criteria, to identify an environmentally preferred site option and identify any further environmental issues to be considered at the detailed design stage.

A total of seven potential Site Options were identified, these are shown below in **Figures 2.1 to 2.3**.

Figure 2.1 Alternative Options A

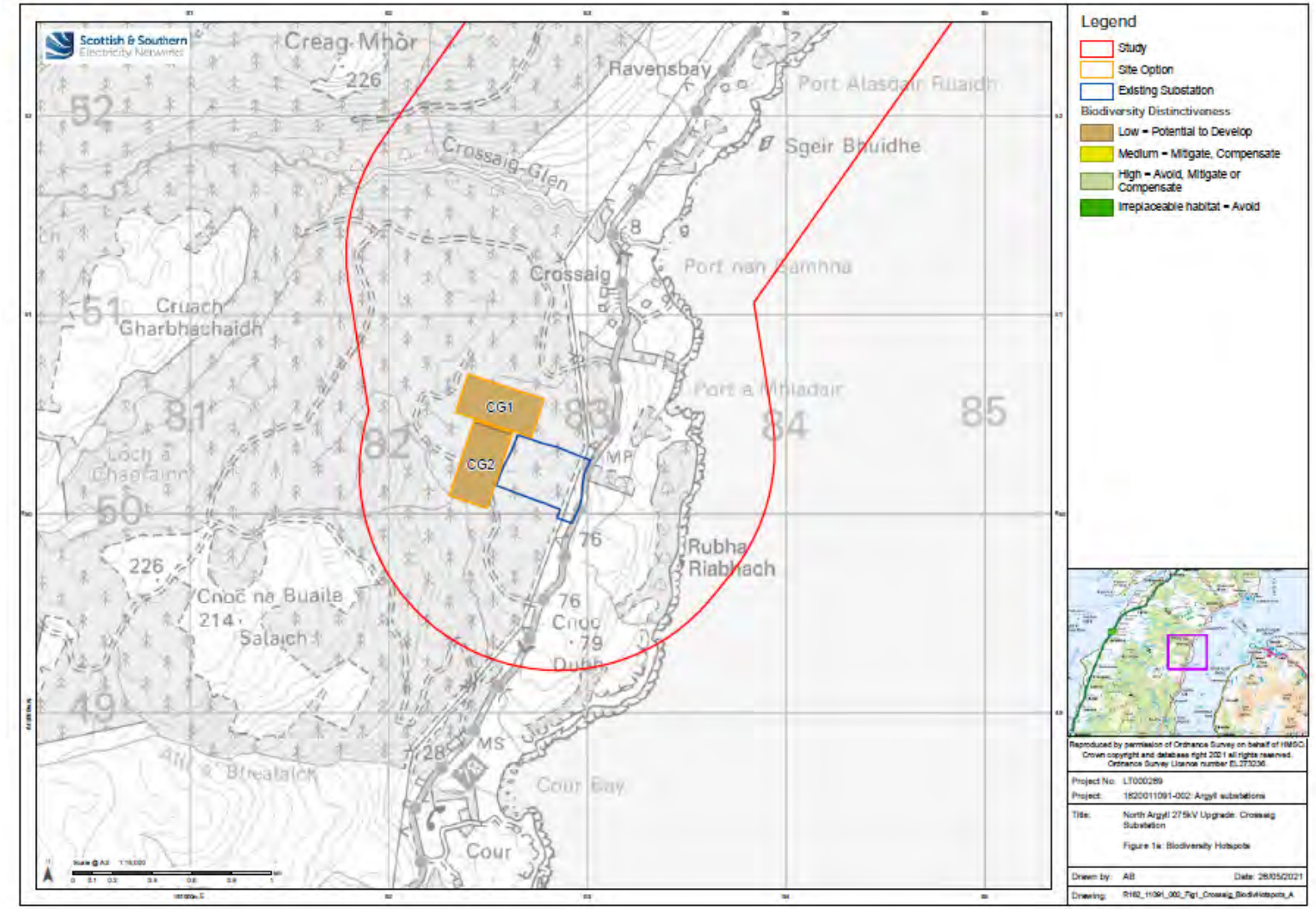


Figure 2.2 Alternative Options B

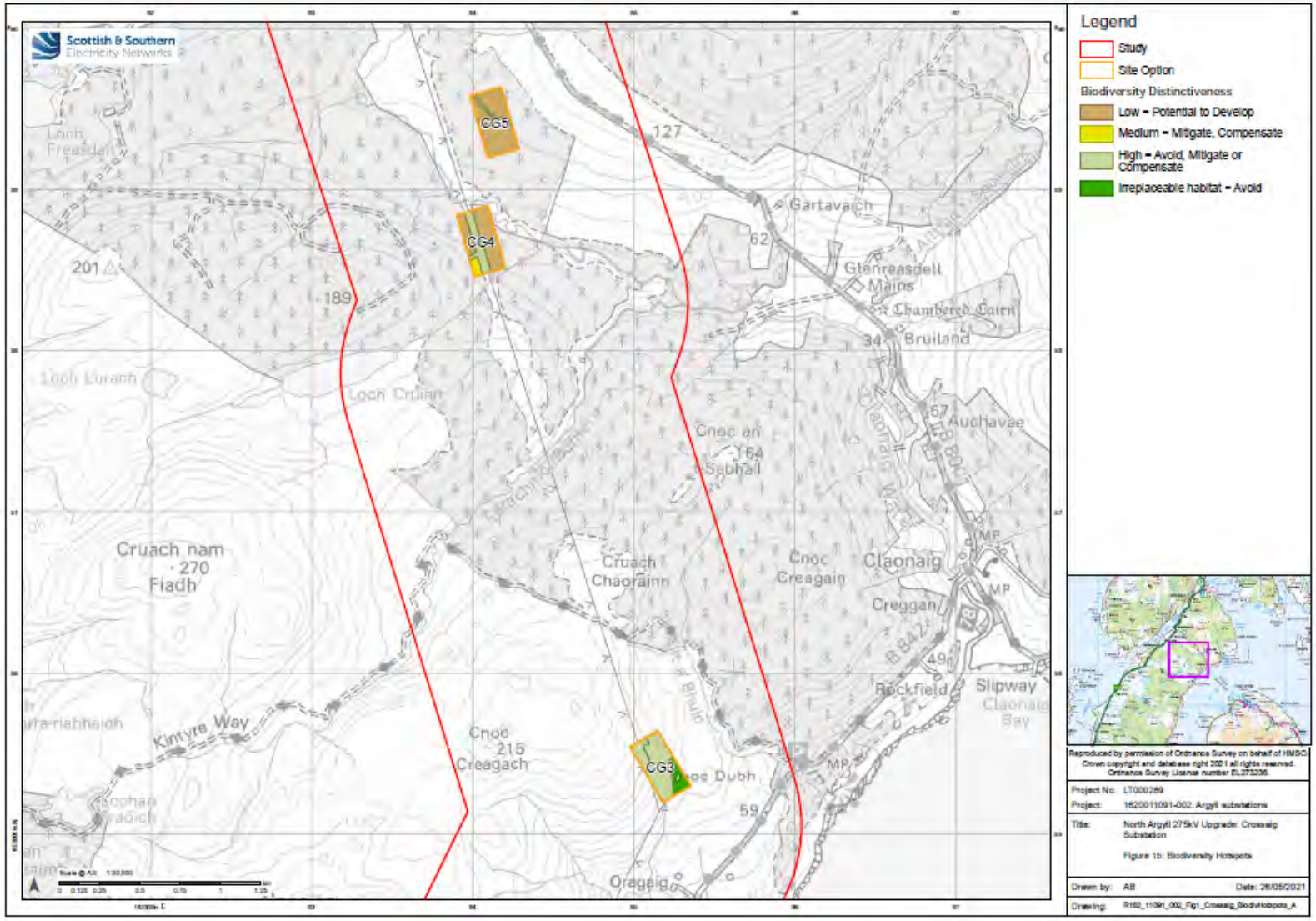
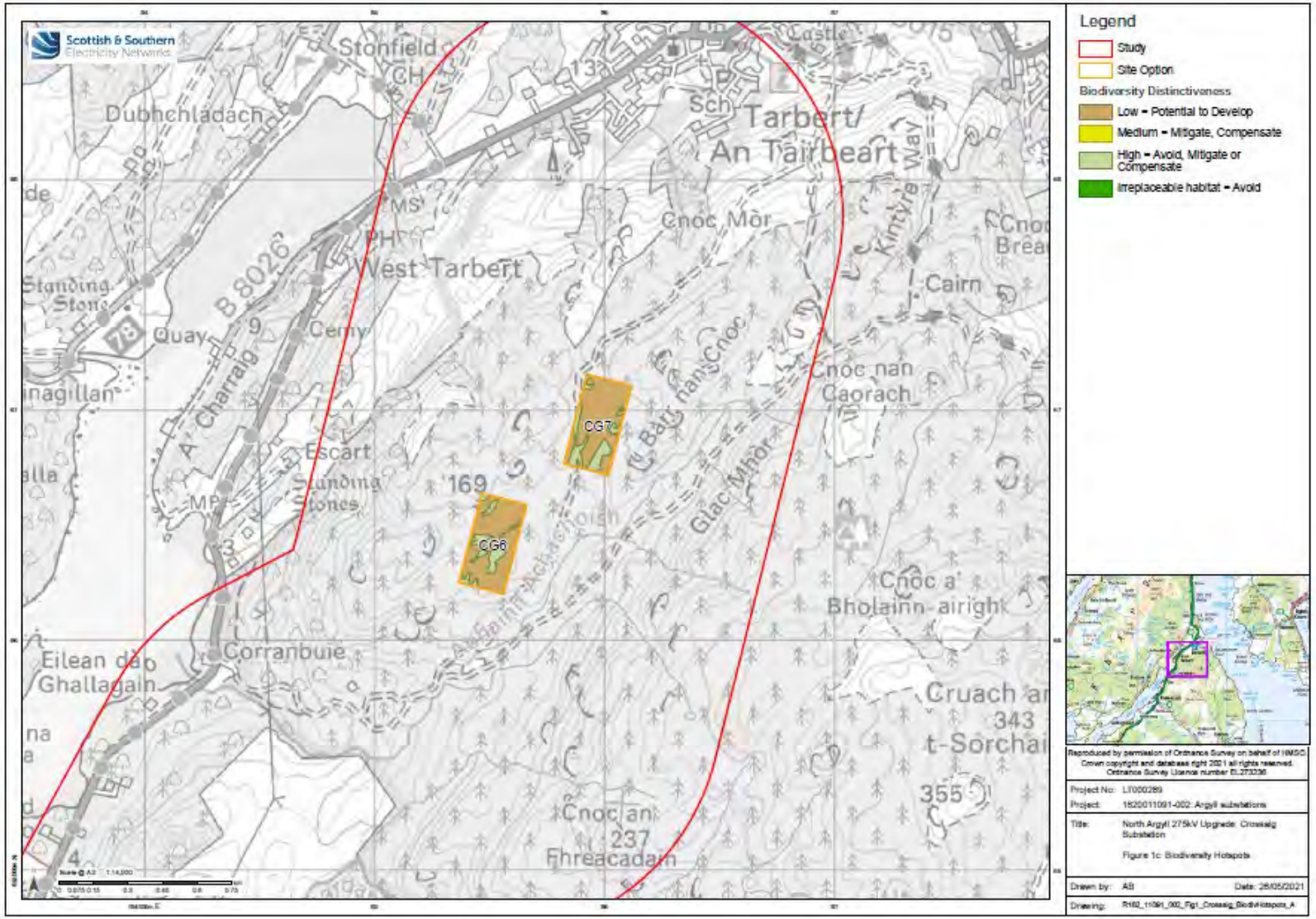


Figure 2.3 Alternative Options C



The selection of the preferred substation Site Option at Crossaig (CG2) was undertaken through an appraisal of operational, technical, health and safety, economic and environmental factors.

From an environmental perspective Site Options CG2 and CG1 were preferred as these options have fewer environmental constraints and/or the constraints presented would be more easily mitigated in most circumstances. Both sites have also been assessed to have a median total project cost. As a result, Site Options CG1, CG3, CG4, CG5, CG6, and CG7 would be less preferred.

CG2 was the Preferred Site over CG1 as CG2 has lower potential for environmental, engineering and cost constraints. Both sites have relatively few environmental constraints, however, the Preferred Site (CG2) has some risk of constraint from a hydrology perspective while CG1 does not. This is the result of a watercourse being located in the south west of Preferred Site CG2. This can, however, be mitigated through micrositing and imposing a suitable buffer from the watercourse. In terms of engineering constraints, CG1 and the Preferred Site (CG2) face the same constraints. The most significant of these being the potential impacts from a noise perspective, and salt pollution due to the sites being located less than 2 km from the coast of Kilbrannan Sound.

CG3 presented a higher risk of environmental constraints compared to CG1 and the Preferred Site, CG2. Blanket bog is present within site CG3, which represents a sensitive, Annex 1 habitat. Further constraints associated with Site Option CG3 relate to potential landscape character and visual impacts on Arran NSA, the North Arran WLA and the North Arran SLA, at distances of over 5 km. The steep topography of the site would require an extensive cut and fill to form a flat substation platform, and the associated earthworks and operational infrastructure would be visible from a wide area, particularly to the east of the Kilbrannan Sound. Thus, there would be the potential for widespread landscape character effects. CG3 was deemed to have lower engineering constraints related to it. Potential engineering constraints were assessed to be medium risk, while CG1 and CG2 were deemed to be high risk, however, CG3 does have the highest total project cost compared to the other Site Options.

CG4 has higher potential for environmental constraints compared to the other Site Options. A watercourse crosses the centre of CG4, while Claonaig Water lies adjacent to the east and further smaller watercourses lie adjacent to the north and south on and around the site. Similar to CG3, there are increased risks of visual impacts arising from Site Option CG4. Potential impacts to visual amenity from the B8001 to the east, at a distance of at least 400 m were highlighted. This path/ road is also part of the National Cycle Network. The Proposed Development would be viewed in combination with other large-scale infrastructure and the nature and character of views from within this valley would be substantially altered. CG4 is also similar to CG3 in that it has lower engineering constraints related to it, with possible constraints from noise only being assessed to be medium risk whereas CG1 and CG2 were assessed as high risk. Risks from salt pollution were also assessed to be medium risk compared to CG1 and CG2 which were assessed to be high risk. Furthermore, out of all the Site Options, CG4 would have the third highest total project cost.

CG5 is similar to CG4 in that it has a greater potential risk of environmental constraints from both a hydrology and visual amenity perspective. Like CG4, CG5 has multiple watercourses located on site, with one running across the centre of the site in an easterly direction and present in the south of the site. CG5 also has the same risks from visual impact to the B8001, which is part of the National Cycle Network. CG5 does, however, have fewer potential engineering constraints. Like CG4, noise and salt pollution constraints were assessed to be of medium risk. CG5 does however have the second highest Total Project Cost of the seven site options.

CG6 has a similar degree of potential for environmental constraints as CG1 and CG2, however, it also poses a medium risk towards protected species as a red squirrel drey and the potential for a pine marten den were recorded during a site walkover. CG6 also has more associated engineering risks of constraints compared to Site Options CG1 and CG2. The location of CG6 is at a higher elevation compared to CG1 and CG2, while also being in close proximity to three 11 kV OHLs. This would require additional effort for vehicles to reach construction platform, and so there are increased risks of constraints from an elevation and carbon footprint perspective. CG6,

like CG1 and CG2, is deemed to be at high risk from salt pollution due to its close proximity to Kilbrannan Sound. However, CG6 has the second lowest total project cost of the seven site options.

CG7 has the lowest potential for environmental constraints but, unlike all other sites, it has been assessed as being of medium risk to designated cultural heritage assets due to potential impacts on the setting of the Tarbert Conservation Area. CG7, like CG1 and CG2, also has been assessed to have a medium risk to landscape character and visual amenity due to potential impacts to landscape/seascape and visual amenity as experienced from the A83 and the northern edge of Tarbert. In addition, visual amenity from along the shores of West Loch Tarbert, from water vessels on Loch Fyne and from the summit of Meall Mor would also be affected. CG7 shares the same engineering risks of constraints as CG6 in that it is in proximity to three 11 kV OHLs, as well as at a higher elevation compared to CG1 and CG2. This would require additional effort for vehicles to reach construction platform and so there are increased risks of constraints from an elevation and carbon footprint perspective. CG7, like CG1 and CG2, is deemed to be at high risk from salt pollution due to its close proximity to Kilbrannan Sound. CG7 does however, have the lowest total project cost of the seven site options.

2.5 The Project

The Project will connect a new 275 kV electricity substation to the 275 kV Inveraray to Crossaig OHL (currently in construction) to provide an upgrade to the existing substation to current specification and standards, and to provide reinforcement to the existing network which will support the continued operation of renewable energy.

2.5.1 The Proposed Development

The layout of the Proposed Development is shown in **Figure 2.4** and building elevations on **Figures 2.5 to 2.8** and comprise the following:

The Proposed Development which is subject to consent under the Town and Country Planning Act comprises:

- A substation platform extending approximately to 2.4 ha for the new Crossaig North substation;
- A 275 kV Gas Insulated Switchgear (GIS) Building, maximum height 16m;
- A 132 kV Gas Insulated Switchgear (GIS) Building, maximum height 16m;
- Installation of two 275/132 kV supergrid transformers (SGT), rated at 480 MVA, each located in a ventilated building of maximum height 18m;
- Installation of two gantries and electrical equipment to connect the OHL and the proposed substation;
- A temporary works area (TWA) adjacent to the substation site, of approximately 3 ha and areas for temporary peat storage;
- Diesel Generator and 2 automatic voltage regulators;
- Borehole for water and septic tank;
- Turning and parking areas;
- Use of existing forestry access tracks (those being the existing Cross Kintyre Haul Road and Cour Estate track), approximately 25 km in length to enable access to the existing Crossaig substation. Ongoing maintenance of this track will be required;
- Construction of a section of permanent access track, approximately 660 m in length between the existing Crossaig substation and the proposed Crossaig North substation and for access to the SuDS pond;
- A 2.4 m high security fence of palisade construction around the substation perimeter;
- Foul and surface water drainage (Sustainable Drainage System (SuDS) pond and outfall pipe);
- An extension to the south of the substation platform at the existing Crossaig substation of approximately 0.13 ha to support electrical equipment and associated access; and

- Tree and vegetation clearance required to accommodate both the Proposed Development and the Associated Development.

In addition, tree felling and compensatory planting will be required, as described in **Chapter 5 Forestry Appraisal and Appendix J**. Works are required within the existing Crossaig substation platform to which Permitted Development rights apply. Those include construction of a single storey building extension to accommodate expansion of the existing protection room and to facilitate installation of electrical equipment. The proposed 132 kV interconnector cables between the existing substation and the proposed substation would be installed underground and Permitted Development rights apply to those activities.

The substation would not be illuminated at night for normal operation. 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 planned works; or when sensor activated as security lighting for night-time access.

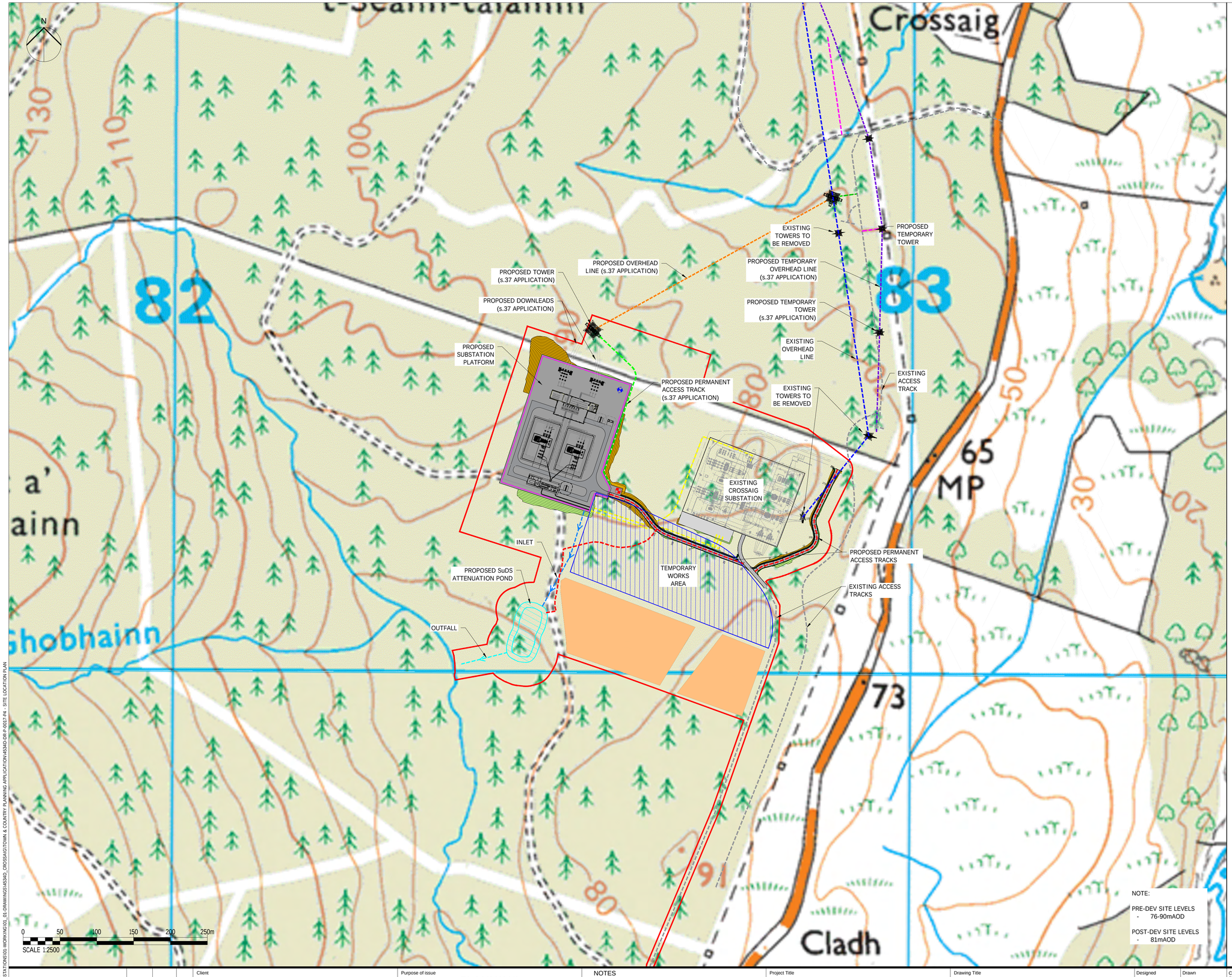
The main noise source within the substation during operation would be the two 480 MVA super grid transformers. A noise assessment has been carried out to estimate the noise levels emitted from the Proposed Development and understand the future operational impacts at noise sensitive receptors (NSRs). The results of this survey and any required mitigation are presented in **Chapter 8 Noise Appraisal** and **Annex S**.

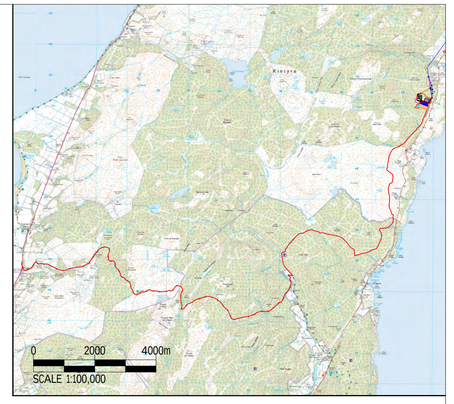
Small scale alterations to the existing access off the A83 may be required. Subject to survey, and to satisfy the requirements of ABC Roads Department, works may include widening of the existing bellmouth, increasing turning radii and improving visibility splays. Between the access point and the Proposed Development site, maintenance work to the track will be undertaken. Any works to include realignment and widening of the track would be submitted as part of a separate application.

Two visualisations have been produced to illustrate how the Proposed Development will look in situ, (see **Annex E)**. Each visualisation includes a baseline photograph, terrain model view, and two visualisations: on completion (including any proposed earthworks); and after 10 years (including any proposed earthworks and planting). The visualisations have been prepared in accordance with NatureScot visualisation guidance[3].

Within a GIS substation, live electrical equipment uses a dense gas as the insulating medium, usually Sulphur Hexa-Fluoride (SF6); however, SSEN 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).

[3] Scottish Natural Heritage (2017) *Visual Representation of Wind Farms Guidance. Version 2.2.*





KEY

- SITE BOUNDARY
- PROPOSED SUBSTATION PLATFORM
- PROPOSED EXISTING SUBSTATION PLATFORM EXTENSION
- EXISTING ACCESS TRACK
- EXISTING OVERHEAD LINE
- PROPOSED PERMANENT ACCESS TRACK
- PROPOSED PALISADE FENCING
- PROPOSED AREAS OF CUT
- PROPOSED AREAS OF FILL
- TEMPORARY PEAT STORAGE AREA
- PROPOSED SuDS ATTENUATION POND
- INLET
- OUTFALL
- BOREHOLE WATER SUPPLY PIPE
- SEPTIC TANK

PERMITTED DEVELOPMENT

- PROPOSED 132kV INTERCONNECTOR CABLE

APPLICATIONS UNDER S.37 OF THE ELECTRICITY ACT 1989

- PROPOSED OVERHEAD LINE
- PROPOSED TEMPORARY OHL BYPASS
- PROPOSED PERMANENT ACCESS TRACKS
- PROPOSED TEMPORARY ACCESS TRACKS

Plot Date: 22 February 2023 14:46:21
File Name: X:\SHO\HGR\ARGYLL SUBSTATIONS\01-WORK\HG\01_01-DRAWINGS\HG54D_CROSSAIG\TOWN & COUNTRY PLANNING APPLICATION\4534D-DR-P-0017-R4 - SITE LOCATION PLAN

Revision Details	By / Check	Date	Rev

Client: Scottish & Southern Electricity Networks TRANSMISSION

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Figure 2.4

NOTES

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Project Title: CROSSAIG NORTH SUBSTATION

Drawing Title: PLANNING FIGURE 003a SITE LOCATION PLAN

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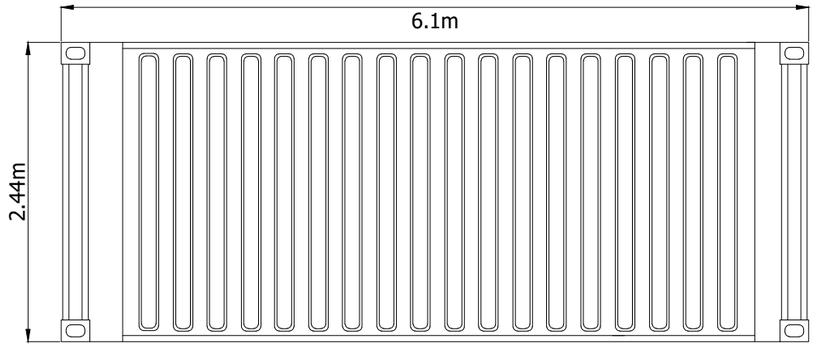
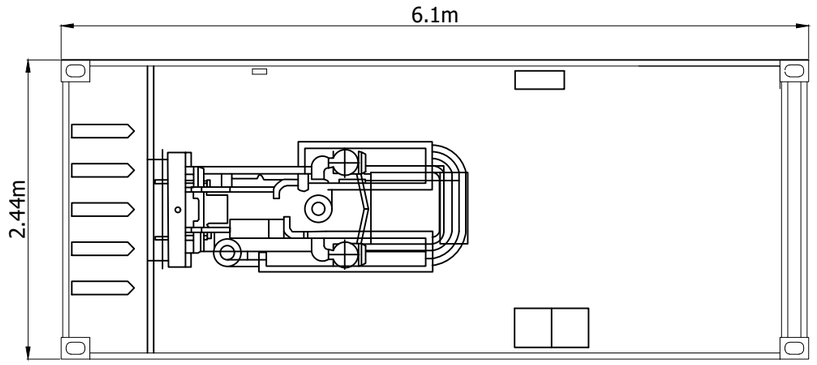
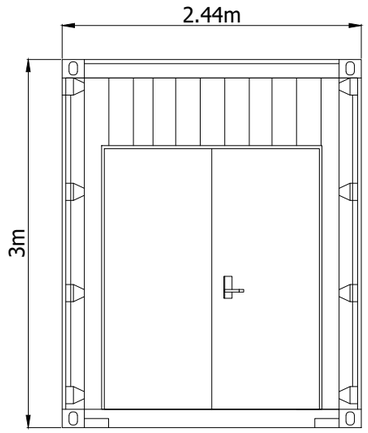
RAL 8008: OLIVE BROWN



ROOF PLAN



FLOOR PLAN



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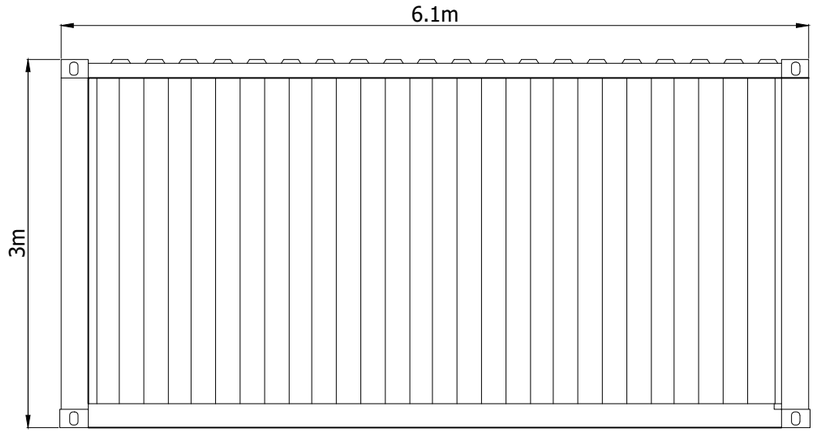
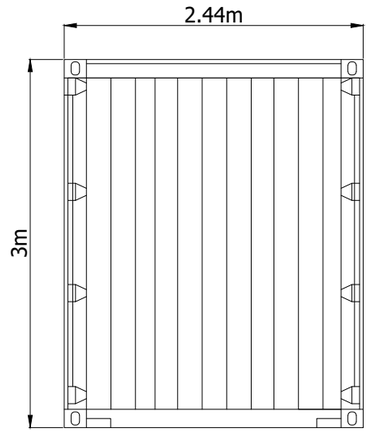


NORTH & SOUTH ELEVATION



EAST ELEVATION

SCALE 1:50

Project Title

CROSSAIG NORTH SUBSTATION

Client

Scottish & Southern Electricity Networks TRANSMISSION

Drawing Title

Figure 2.5

PLANNING FIGURE 005
GENERATOR BUILDING ELEVATIONS

Purpose of issue: PLANNING

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Arcus Internal Project No.: 4534

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Plot Date : 20 February 2023 13:39:48
File Name :Y:\CAD\4534 ARGYLL SUBSTATIONS\01-WORKING\01_01-DRAWINGS\4534D_CROSSAIG\TOWN & COUNTRY PLANNING APPLICATION\4534D-DR-P-0009 P2 - GENERATOR BUILDING ELEVATIONS

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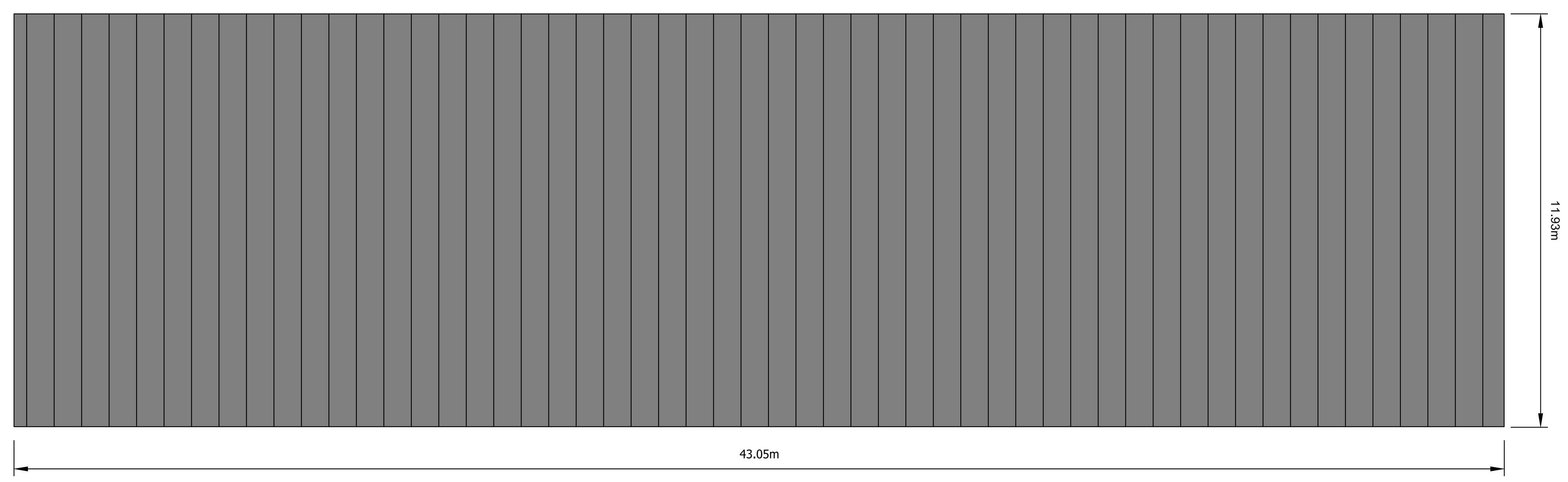
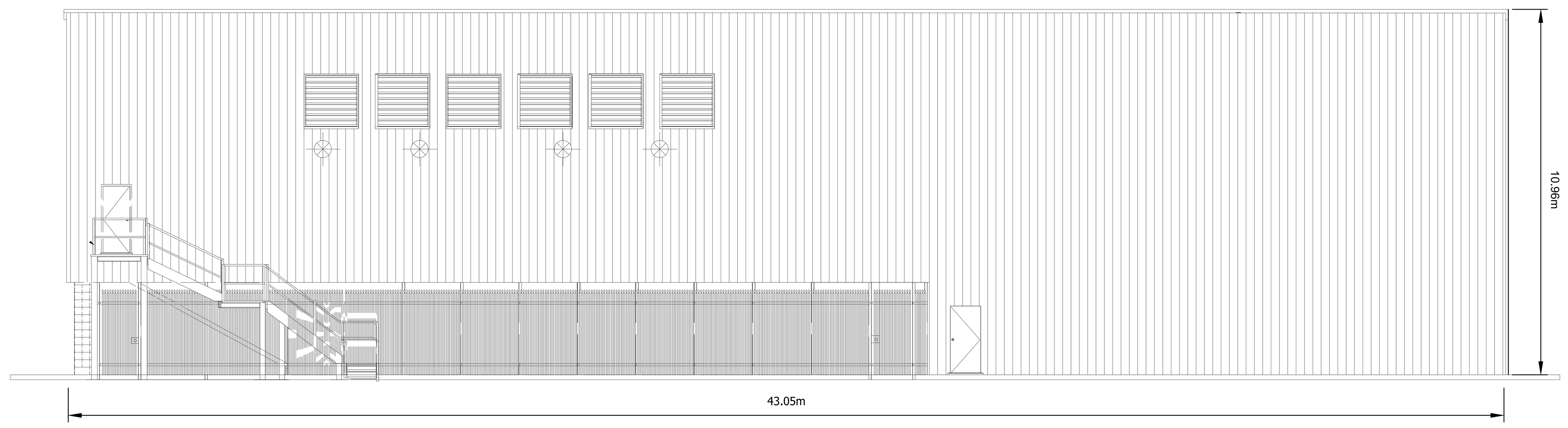
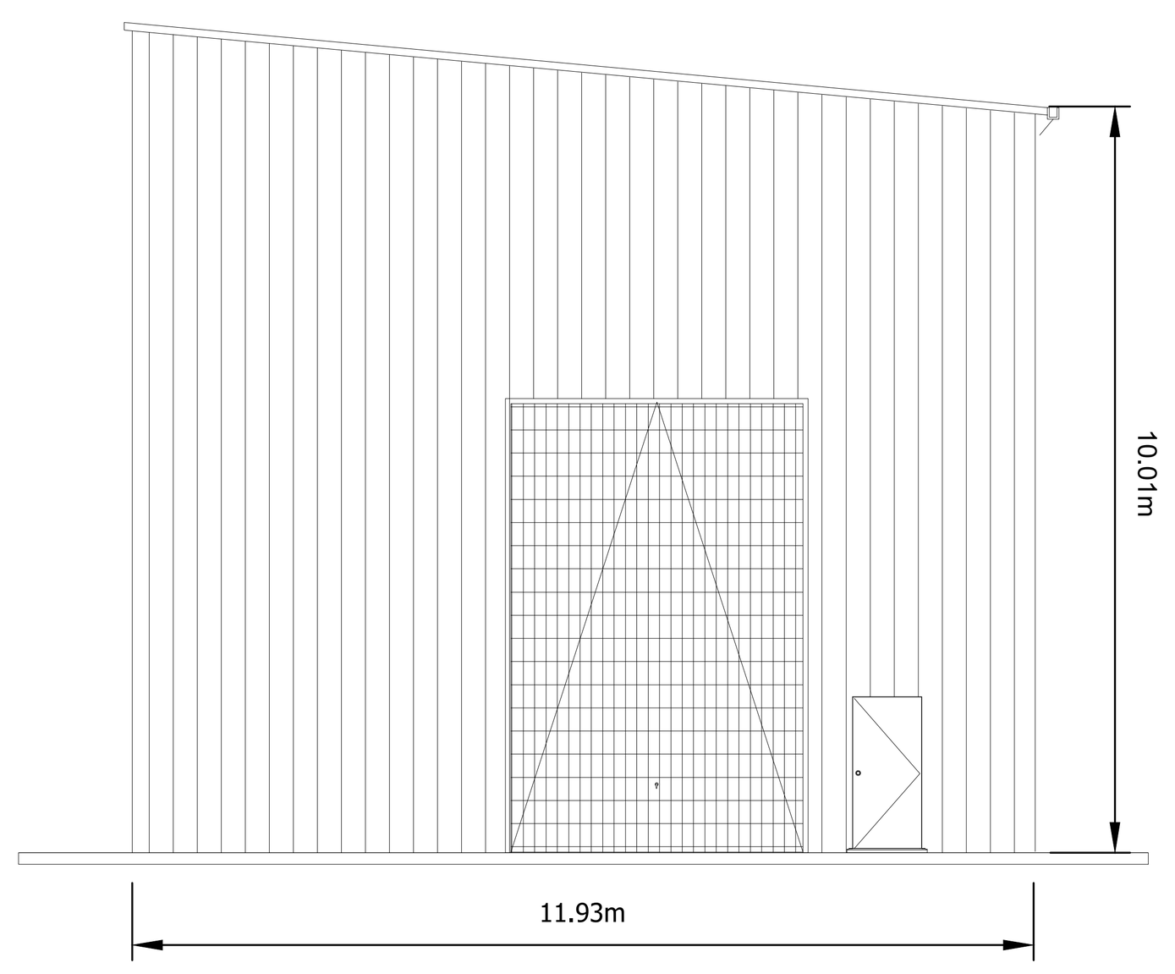
RAL 8008: OLIVE BROWN



ROOF PLAN



NORTH ELEVATION



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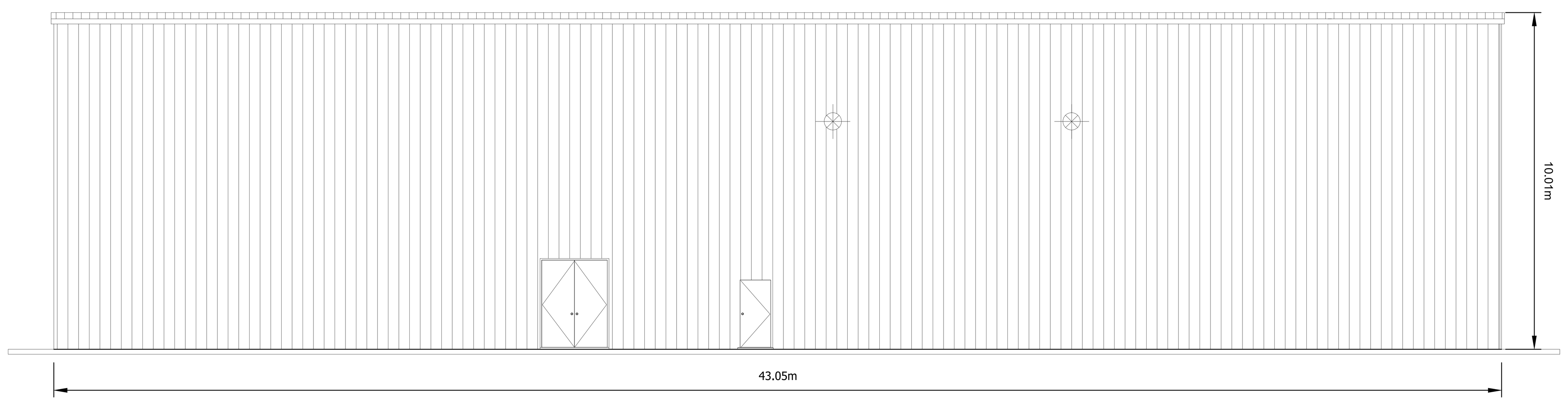
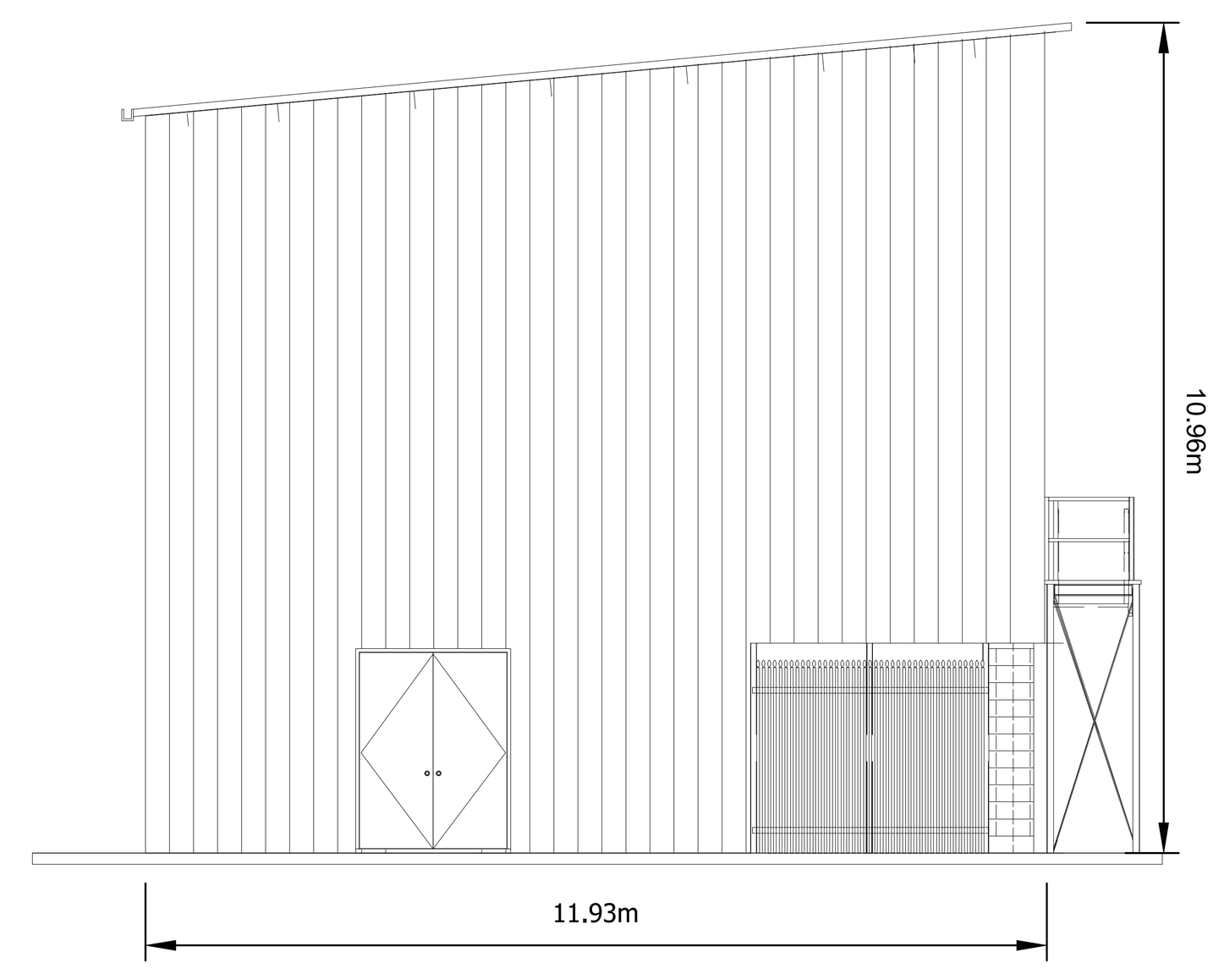


SOUTH ELEVATION



EAST ELEVATION

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100

Revision Details	By / Check	Date	Suffix

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Figure 2.6

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Project Title: CROSSAIG NORTH SUBSTATION

Drawing Title: PLANNING FIGURE 004d 132kV GIS CONTROL BUILDING ELEVATIONS

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-	RC	HB	KG

Arcus Internal Project No.: 4534

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Date: 08/02/23

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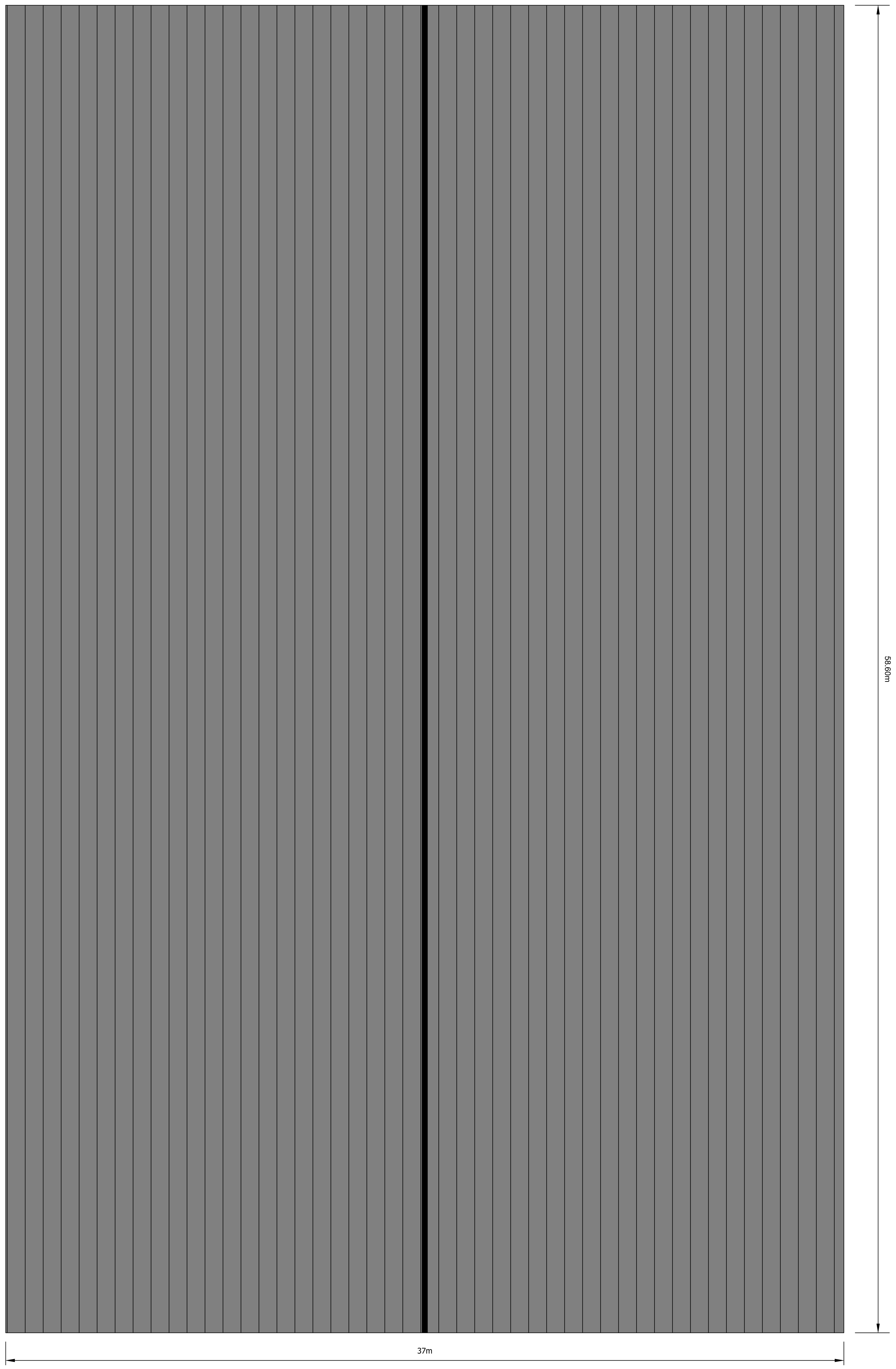
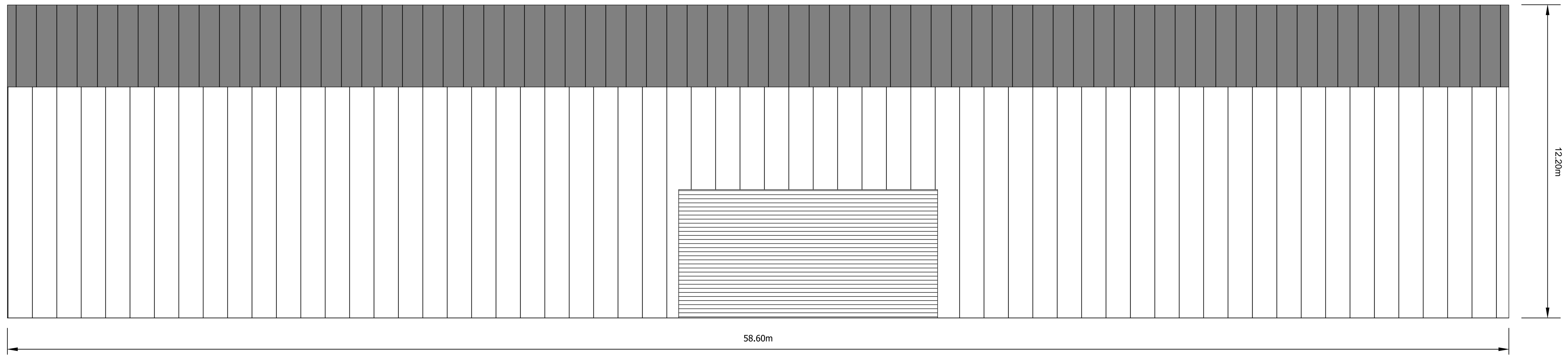


ROOF PLAN



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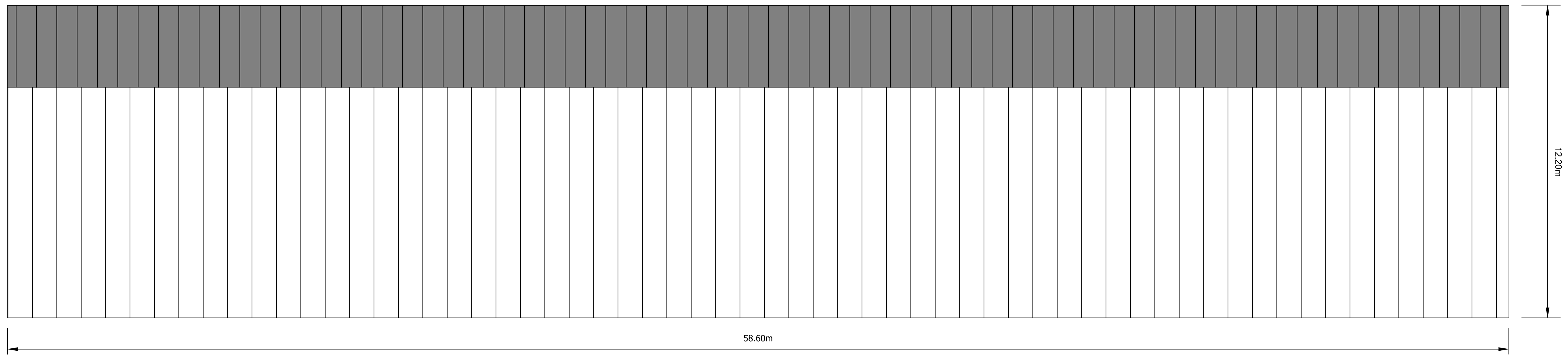
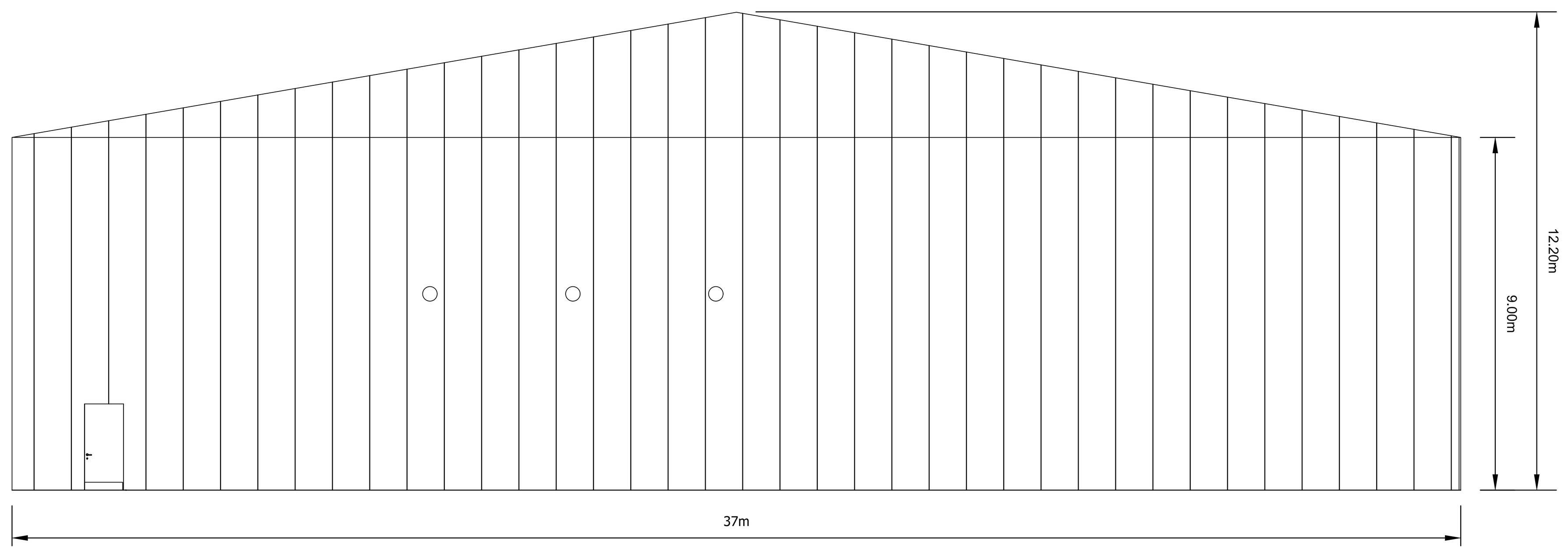
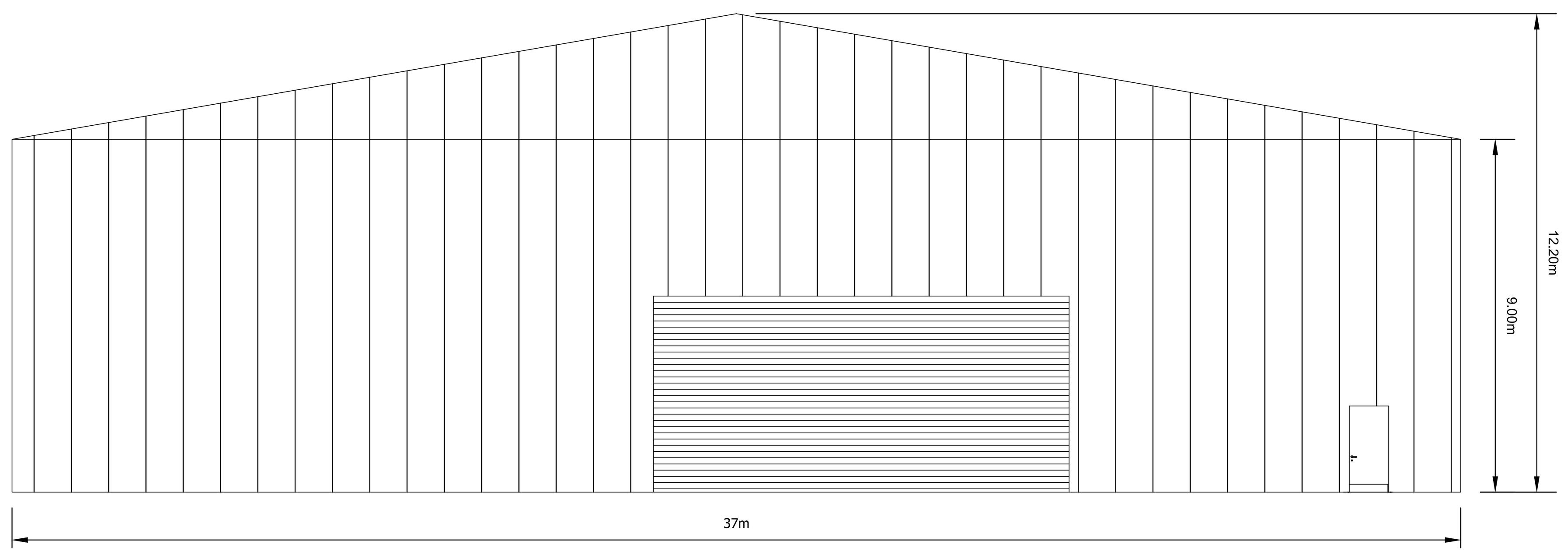


WEST ELEVATION



NORTH ELEVATION



SOUTH ELEVATION

0 1 2 3 4 5 6 7 8 9 10m

SCALE 1:100

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Figure 2.7

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Project Title: CROSSAIG NORTH SUBSTATION

Drawing Title: PLANNING FIGURE 004f TRANSFORMER BUILDING ELEVATIONS

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-	RC	RC	DB

Arcus Internal Project No. 4534

Scale @ A0 1:100

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Drawing Number: 4534d-DR-P-0019

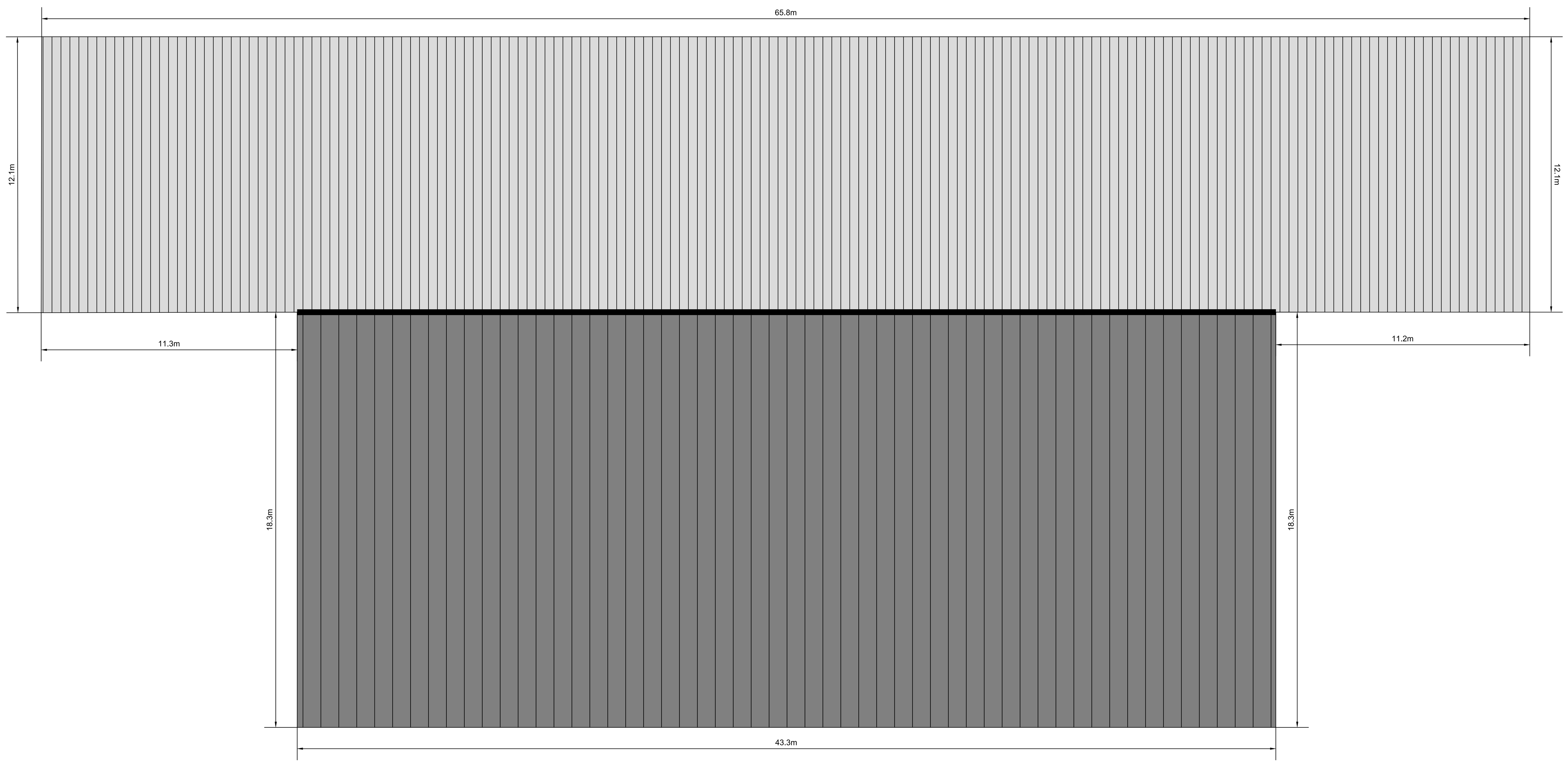
Rev: -

Plot Date : 21/10/2022 16:01:25

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).

RAL 8008: OLIVE BROWN



ROOF PLAN

Revision Details	By / Check	Date	Suffix

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.
2. DO NOT SCALE FROM THIS DRAWING, USE ONLY PRINTED DIMENSIONS.

Purpose of issue: PLANNING

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

Figure 2.8

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: CROSSAIG NORTH SUBSTATION

Drawing Title: PLANNING FIGURE 004b 275kV GIS CONTROL BUILDING ELEVATIONS

Designed	Drawn	Checked	Approved
-	RC	HB	KG

Arcus Internal Project No.: 4534

Scale @ A0: 1:100

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Drawing Number: 4534d-DR-P-0006

Rev: 2

Plot Date : 20/02/2023 17:26:27
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2.5.2 The Associated Development

Components of the Associated Development subject to Section 37 of the Electricity Act 1989 comprise:

- Construction of one new terminal lattice steel tower and one new lattice steel angle tower to support a new OHL connection from the existing Inveraray to Crossaig OHL into the new 275 kV Crossaig North substation including new downlead terminations from the terminal tower to the substation gantries;
- Four temporary towers or masts and associated temporary OHL diversion to facilitate the build of the new towers to avoid double-circuit network outages;
- A new section of permanent access track approximately 225 m long connecting the Crossaig North substation to the southernmost proposed permanent (terminal) tower and a 25 m long track connecting the northern most proposed permanent (angle) tower to the existing track;
- A temporary access track 134 m long, connecting existing private forestry tracks to the northern most proposed temporary tower;
- A temporary access track 22.7m long connecting existing private forestry tracks to the most southerly proposed temporary tower; and
- Dismantling of three redundant lattice steel towers near the existing Crossaig substation;
- Tree and vegetation clearance.

The indicative transmission tower design is illustrated on **Figure 2.9.**

The proposed 132 kV interconnector cables between the existing substation and the proposed substation, as seen in **Figure 1.1**, would be installed underground and works within the existing Crossaig substation platform (including construction of a single storey building extension to accommodate expansion of the existing protection room and installation of electrical equipment) would be undertaken under Permitted Development rights.

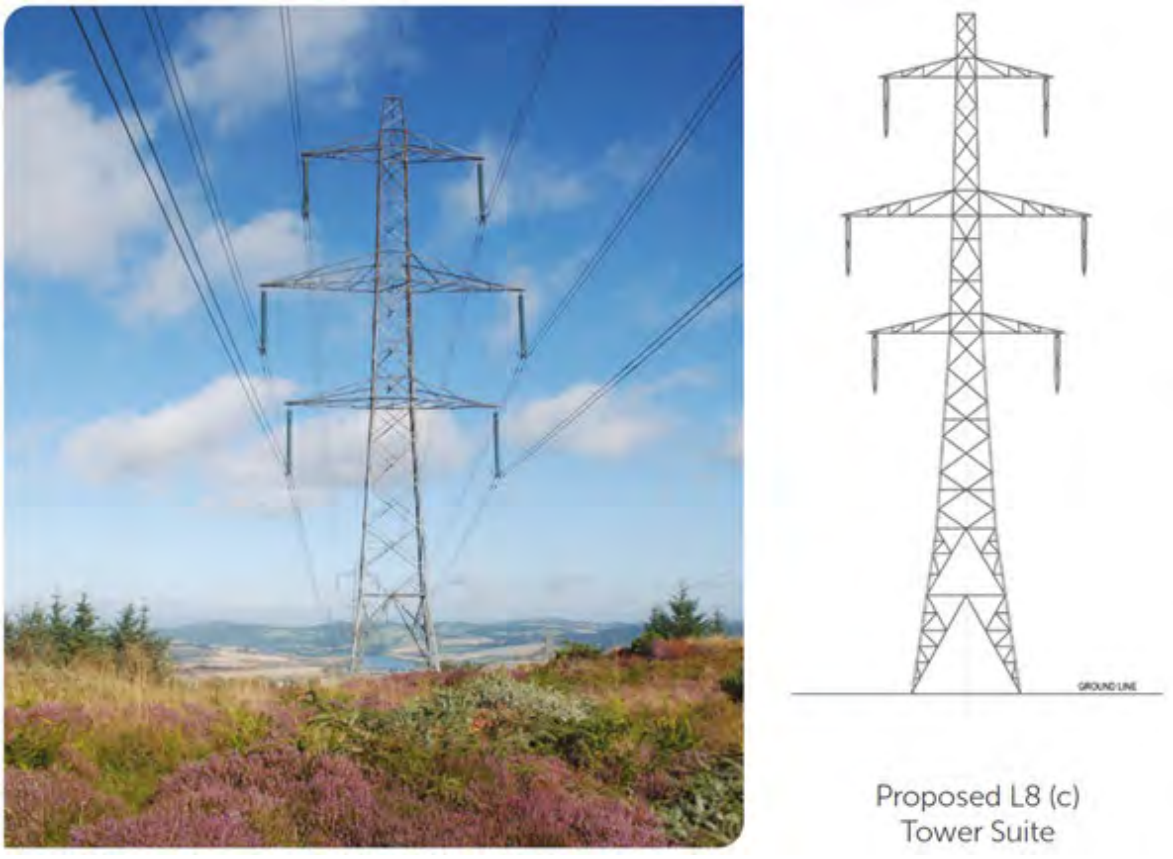

Figure 2.9: Indicative Transmission Tower Design

The Proposed Alignment for the OHL works are as shown in **Figure 1.1** has been determined based on the environmental assessments, engineering analysis and stakeholder consultation undertaken to date. Following 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) in the tower locations or 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 and Access

2.6.1 The construction of the Project will follow the key stages identified below. There will be overlap between the civil construction work and electrical construction, with a total construction programme lasting approximately 30 months. It should be noted that the construction phases described below will overlap.

2.6.2 Phase 1: Enabling Works and Civils Construction

This phase is anticipated to take up to 15 months, and is expected to comprise the installation of the following for the Proposed Development:

- Construction of a new permanent access track. Works to widen the existing track within the substation site to the existing substation may also be required to create a 5 m running surface and 10 m service corridor, however exact lengths of upgrades will be calculated following the submission of this application. The track will be run at a maximum gradient of 8% to ensure it is level with the substation platform;
- Temporary works drainage (for surface water runoff from construction areas);
- A temporary 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 (TWA) approximately 3 ha containing storage, cabins (office and welfare facilities), power generators, potable water supply, fuel storage and septic tank to receive foul drainage from the compound. The septic tank will be emptied by a licensed contractor for off-site disposal at regular intervals dependent upon usage;
- 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 GIS & transformer buildings;
- GIS buildings of a steel portal frame design, maximum 16 m in height, with a single-story annexe all with cladding in olive brown, or similar;
- Transformer buildings of a steel portal frame design with metal cladding and roof, maximum 18 m in height with cladding in olive brown or similar;
- The drainage measures implemented within the TWA will be the responsibility of the contractor appointed by the Applicant. This area will comprise aggregate underlain by a permeable membrane. The contractor will

implement temporary construction drainage measures in accordance with best practice guidance which will prevent any significant run-off in relation to the compaction of soils during construction (e.g., spill kits, drip trays, plant nappies, designated refuelling points, emergency response plans). Following the construction of the Development, the TWA will be decommissioned, with underlying ground reinstated to its original condition.

- To prevent any sediment increase in associated run-off during the construction phase, mitigation measures (e.g., spill kits, bunds, drip trays, plant nappies, designated refuelling points and emergency response plans) will effectively prevent sediment entering surrounding watercourses.
- Filter trench (or similar 'conveyance' mechanisms) located parallel to the outside of the platform perimeter access track 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.

Delivery of the Associated Development is anticipated to take up to 2 years, and is expected to comprise the installation of the following:

- Creation of a level platform through processing of site won materials and import of commercial aggregates,
- Concrete foundations/bases for new tower and electrical equipment;
- Dismantling of redundant towers.

The Associated Development crosses areas of commercial forestry and broadleaved woodland, and in these areas an operational corridor, free of trees and vegetation would be required. The width of the corridor would be variable depending on the nature of the woodland, with an average corridor of 85 m required (42.5 m either side of the tower centre line). In addition, minor vegetation management and felling would be required around the existing access track network for the Project to provide sufficient width. Further details can be found in **Annex J: 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 2500 m^2 (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.

It should be noted that the Associated Development will utilise the same access and temporary works area as the Proposed Development, however there will be additional tracks required to the tower locations for maintenance purposes, see **Figure 1.1**.

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.

2.6.3 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.

2.6.4 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.

2.6.5 Phase 4: Reinstatement

Following commissioning of the Proposed Development, all construction sites will be reinstated. 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

Given the slightly sloping topography, cut and fill would be required to create a level substation platform. The proposed finished platform level would be at approximately 81 m AOD.

Peat probing surveys undertaken and updated in 2021 confirmed the Project is located on areas of peat ranging from 0 m to 3 m deep. Given the presence of peat a Peat Management Plan (PMP) has been prepared, see **Annex O**.

2.7.2 Formation of Track

Access track work consists of constructing two permanent access tracks associated with the Proposed Development and two for the Associated Development. In addition, there are two proposed temporary access tracks for the Associated Development. Maintenance work will be required on the existing Cross Kintyre Haul Road and Cour Estate access track.

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[4,5,6,7,8], 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 would be confirmed following detailed ground investigation.
- Where peat depth is greater than 1 m (See **Annex O**: 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 and levels, such as using perforated pipes wrapped in free draining geotextile membrane incorporated into the floating track.

When upgrading the existing access track between the A83 and the new substation a sacrificial stone layer will be added to the existing road construction, where considered necessary. 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 rock aggregate required would be confirmed following detailed ground investigation.

2.7.3 Construction Compound/Facilities

A Temporary Working 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. The construction compound would include storage cabins, waste disposal skips,

[4] Forestry Commission (2011). Forests and Water. UK Forestry Standard Guidelines. Forestry Commission, Edinburgh. i–iv + 1– pp.
[5] 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.
[6] CIRIA Publications 2006: Control of Water Pollution from Linear Construction Projects. Site Guide (C649)
[7] Scottish Natural Heritage (2013) Constructed Tracks in the Scottish Uplands, 2nd Edition
[8] Forestry Commission Scotland and Scottish Natural Heritage (2010) Floating Roads on Peat

toilet units with washing facilities, a changing / drying room, a mess cabin, a parking area and a small storage area.

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.

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 m^2 (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, topsoil (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 would/is likely to 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 will be difficult to give an accurate figure in regards 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,07:00 to 18:00 on Saturdays and for short periods (for non-construction work, for example commissioning and switching works) on Sundays 08.00 to 13:00. Construction works will only take place during these agreed hours and in planning the works, our contractors will look to minimise the impact of construction noise on neighbours and the public. There may be times we need to undertake construction out of these agreed hours due to time critical activities, this would only be done with the prior agreement of ABC. Works outside 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

Construction vehicle access will be taken via the Cross Kintyre Haul Road (CKHR) which starts at the hamlet of Killean on the A83. Vehicles will remain on the CKHR until they reach the Cour Estate access track, built by SSEN Transmission to facilitate the build of the existing Crossaig substation. Cars will likely use the B8001/ B842.

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 Traffic Management Plan (TMP) will be developed, which will be agreed with the ABC Roads team in advance of construction, as part of the CEMP. The CEMP will include traffic management measures to ensure that the Project will not have an unacceptable impact on the public road network or nearby road users.

It is unlikely that construction lighting would be required during summer months. Should lighting be required in the winter, these would either be mobile of 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 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 General Environmental Management Plans (GEMPs):

- Oil Storage and Refuelling
- Soil Management
- Working in or Near Water
- Working in Sensitive Habitats
- Working with Concrete
- Waste Management
- Watercourse Crossings
- 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 PMP 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[9]. Outline Species Protection Plans (bird, bat, red squirrel, otter, pine marten,

[9] Scottish Renewables and the Scottish Environmental Protection Agency (2012) [Online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2014/07/assessment-of-peat-volumes-reuse-of-excavated-peat-and-minimisation-of-waste-guidance/documents/guidance-on-the-assessment-of-peat-volumes-reuse-of-excavated-peat-and-the-minimisation-of-waste/guidance-on-the-assessment-of-peat-volumes-reuse-of-excavated-peat-and-the-minimisation-of-waste/govscot%3Adocument/Guidance%2Bon%2Bthe%2Bassessment%2Bof%2Bpeat%2Bvolumes%252C%2Breuse%2Bof%2Bexcavated%2Bpeat%252C%2Band%2Bthe%2Bminimisation%2Bof%2Bwaste.pdf (Accessed 28/03.22)

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

A Construction Site Licence would 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 Project site to safeguard the water environment.

2.8.1 Forestry

The Project site is located within a region of partly 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 J: Forestry Assessment.** It is possible that some localised tree maintenance will be required along the existing access road which may include pruning and removal of small self-seeded trees on the track verges. 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

It is proposed that the impermeable areas within the Development will be connected to an attenuation pond to the south west of the Site via a piped filter drain system. The pond will enable surface water to be intercepted in accordance with existing topography and flow routes at the location of the Development. For further information on surface water drainage see **Annex K: Drainage Strategy and Drainage Plans.**

2.8.3 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 M, Private Water Supply Risk Assessment** 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 appendices.

2.9 Operational Phase

2.9.1 Life of the Proposed Development

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

2.9.2 Operational Activities and Employment

The Proposed Development and the Associated 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 Applicant's Highlands and Islands depot in Inverness.

2.9.3 Operation and Maintenance Programme

Once operational, it is likely that monthly site visits would be made to the Project site 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 Proposed Development 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 waste water 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 63Hz 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 site 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)[10]. Exposure guidelines have been developed by the International Commission on Non-Ionising Radiation Protection (ICNIR) 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 substation[11].

[10] Health Protection Agency. URL: http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/ElectricAndMagneticFields/ExposureGuidelinesForElectricAndMagneticFields/

[11] http://www.emfs.info/Sources+of+EMFs/Substations/National+Grid+substations/

All EMF generating infrastructure is located at least 100 m from the site boundary. It is therefore anticipated that EMF would be at, or close to background levels at the 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 substation be decommissioned, the Project 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 the landowners prior to any decommissioning works commencing.