

November 2024

Prepared for **Scottish and Southern Electricity Networks Transmission**

1. Introduction

- 1.1 This Design and Access Statement (DAS) has been prepared for Scottish Hydro Electric Transmission plc (“the Applicant”), operating and known as Scottish and Southern Electricity Networks Transmission (“SSEN Transmission”)¹ to support an application for planning permission under the Town and Country Planning (Scotland) Act 1997 (as amended) to construct and operate a new 400 kV substation known as Emmock Substation, hereafter referred to as “the Proposed Development”, on land at Balkemback Farm, approximately 330 m northwest of the existing Tealing Substation, and approximately 2.8 km north of Dundee, in Angus. The area proposed for the construction and operation of the Proposed Development is here on referred to as “the Site”.
- 1.2 In July 2022, National Grid, the Electricity System Operator (ESO), published the Pathway to 2030 Holistic Network Design (HND), setting out the blueprint for the onshore and offshore electricity transmission network infrastructure required to enable the forecasted growth in renewable electricity across Great Britain, including the UK and Scottish Government’s 2030 offshore wind targets of 50 GW and 11 GW respectively.
- 1.3 The extensive studies completed to inform the ESO’s Pathway to 2030 HND confirmed the requirement to increase the power transfer capacity of the onshore corridor from Kintore to Tealing. This requires a new 400 kV connection between these locations to enable the significant power transfer capability needed to take power from onshore and large scale offshore renewable generation which is proposed to connect at onshore locations on the East Coast of Scotland and transport it to areas of demand.
- 1.4 To achieve this, SSEN Transmission is proposing a new 400 kV overhead transmission line (OHL) between Kintore and Tealing. This new connection also requires two new 400 kV substations to be constructed near Tealing in Angus and in Fetteresso Forest in Aberdeenshire to enable future connections and export routes to areas of demand. In addition, two of the existing 275kV OHLs from the existing substation at Tealing, and Alyth and Westfield substations require to be upgraded to 400kV and connected to the new 400kV substation near Tealing. Additional short 275kV connections between the new 400kV and existing Tealing substation are also required. Planning applications under the Town and Country Planning (Scotland) Act 1997 are being submitted in respect of both substation applications, while consent is being sought for the new and upgraded OHL developments via applications under the Electricity Act 1989.
- 1.5 Submission of a DAS is required of all major and national planning applications, as set out in Regulation 13 of Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013. The application is submitted with an Environmental Impact Assessment (EIA) Report and Pre-application Consultation (PAC) Report, references to which are made in this DAS.

¹ In this DAS, the Applicant and SSEN Transmission are used interchangeably unless the context requires otherwise.

- 1.6 This DAS explains and illustrates the principles and concepts which have determined the design and layout of the Proposed Development, taking account of specific site and locational circumstances.

2. The Site and Site Selection

Site Location and Setting

- 2.1 The Site comprises arable land at Balkemback Farm – several fields with associated boundaries of hedging and fencing – located south of the Sidlaw Hills in Angus, an area of open agricultural lowlands with scattered properties and existing infrastructure. The Site covers an area of 77.9 hectares (ha).
- 2.2 The settlement of Tealing is located approximately 1.6 km to the east of Site and the settlement of Bridgefoot is located approximately 1.8 km to the southwest of the Site. Dundee is located approximately 2.8 km to the south of the Site. Tealing Substation is located approximately 230 m to the southeast of the Site. The Alyth-Tealing 275 kV overhead line passes east to west through the southern part of the Site. Two on-site, low-output wind-turbines are located within the western part of the Site, which will be decommissioned prior to construction.
- 2.3 The Site is bounded to the south by existing field boundaries and to the southwest by the Fithie Burn which is heavily modified. To the west the Site is demarcated by traditional agricultural boundary treatments. At the northern periphery the Site boundary terminates mid-field with the aim to return much of the field to agricultural use post-construction. To the eastern extent, a culverted watercourse runs near the periphery of the agricultural land, separating the fields from Emmock Road (U322).
- 2.4 The wider site setting is similar in character to the Site, comprising agricultural land with small pockets of residential properties to the north and east of the Site, of which eight properties are located within 200 m from the northern edge of the Site boundary.
- 2.5 Two notable exceptions to the general pattern of the wider landscape are: Craigowl Hill, some 2 km north, with its associated elevations and woodland to the northwest; and the existing Tealing Substation located approximately 230 m to the southeast of the Site, along with its attendant infrastructure, including two existing 275 kV OHLs connecting Tealing Substation with Alyth and Westfield Substations.
- 2.6 The Site is surrounded by a number of individual residential properties, such as the dwelling at Balkemback farm located immediately to the northeastern boundary of the Site, and Balkemback Cottages, which is approximately 50 meters to the north of the Site.
- 2.7 The Proposed Development is located approximately 2.5 km to the east of the A90. Access to the Site will be taken from a new bellmouth onto Emmock Road (the public road network), with material deliveries originating from the A90 corridor located to the east. Access for construction of the Proposed Development would principally be afforded from this existing unclassified public road leading to the Site from the A90.

Site Selection

- 2.8 A detailed, two-stage site selection process was undertaken to determine the location of the Proposed Development, following the Applicant's internal guidance.² The objective of this process is:

“To facilitate the design, consenting and operation of new substations in a manner that is technical, feasible and financially viable which causing, on balance, the least disturbance

² SSEN Transmission (September 2022) Substation Site Selection Procedures for Voltages at or above 132 kV. PR-NET-ENV-502.

during construction and operation to the environment and the people who live, work and use it for recreation.”

- 2.9 Following the first site selection stage, two sites, out of an initial seven, were considered for assessment in stage 2:
- Site 4: Land at Balkemback Farm, centred at National Grid Reference (NGR) NO 389 377. The site lies on relatively flat terrain with an elevation change of approximately 25 m. It comprises open arable farmland with some fields separated by drystone dykes.
 - Site 7: Land to the south of North Mains of Baldovan, centred at NGR NO 391 364. The site lies on relatively flat terrain and comprises arable fields and with polytunnel horticulture on neighbouring land to the east. The site overlaps with a minor road.
- 2.10 Site 4 was identified as the preferred site for the following reasons summarised in the Applicant’s Consultation Document – Substation Site Selection (May 2023):
- “...there is little to distinguish between Sites 4 and 7, the principal factors being cultural heritage, the works necessary to rationalise existing connections and the associated costs. While Site 7 is marginally preferred in terms of its greater distance from cultural heritage features, the lower costs of Site 4 in rationalising existing connections is a material factor which weighs in favour of Site 4. There are fewer residential properties in close proximity to Site 4 than to Site 7. Moreover, while Site 4 is a little closer to some of the principal cultural heritage assets identified, none is so close that their integrity and essential setting would be adversely impacted by development at Site 4.*
- SSEN Transmission has identified Site option 4, located on land at Balkemback Farm as the Preferred Substation Site. This site accommodates the substation design and size and offers a degree of flexibility with regards to connections to the existing Tealing Substation site.”*
- Stakeholder Engagement and Pre-application Consultation**
- 2.11 Seven rounds of online engagement meetings with key stakeholders have been undertaken since December 2022. These meetings have included representatives from Angus Council, Scottish Environment Protection Agency (SEPA), NatureScot and Historic Environment Scotland (HES). These meetings have generally covered all the Kintore to Tealing 400kV project proposals, including Emmock substation, as they have developed through the site and corridor/route selection process and as more developed proposals have been under development. Stakeholders have had the opportunity to provide feedback at these meetings and separately in writing or in follow up phone calls.
- 2.12 SSEN Transmission undertook public consultation on the preferred substation location in May 2023, as well as direct engagement with statutory and non-statutory consultees, community councils, elected representatives, and landowners and occupiers. This included a public event that took place between 2pm and 7pm on 11th of May 2023 at Tealing Village Hall.
- 2.13 Supporting this consultation was a consultation document published in May 2023, detailing key project elements, the site selection process to date, and key questions for feedback. Public events were attended by members of the SSEN Transmission project team and appointed consultants and included information boards and large format maps.
- 2.14 Formal Pre-Application Consultation (PAC) for the Proposed Development was initiated by the submission of a Proposal of Application Notice (PAN) on 31 January 2024, which was followed by extensive publicity of events and preparation of consultation materials. The first PAC event was held at Tealing Village Hall on 7th March 2024, at which layouts, drainage, landscape, and access designs in early development were presented, among other information. Stakeholders and members of the public were invited to provide feedback online or feedback form.

- 2.15 The second consultation event was held at Tealing Village Hall on 5th and 6th June 2024 to present the feedback received from first consultation event, inform attendees of project developments, and invite further comments. Since the first consultation event, the substation design was refined by reducing the platform width from 300 m to 285 m and lowering its height from 140.5 m to 139 m AOD, which, along with landscaping, reduces visibility from the north and lowers the fill height on the southern edge. The Site access was moved further from Balnuith to reduce direct views and repositioned the landscape bund closer to the eastern boundary, with the compound area located behind it for improved screening. Early formation and planting of the bund along the eastern boundary will screen construction works and reshaping the drainage channel will help manage storm flows and reduce flood risks on Emmock Road.
- 2.16 Further details of pre-application consultation and materials used to support it are provided in the accompanying PAC Report and its appendices.

3. The Proposed Development

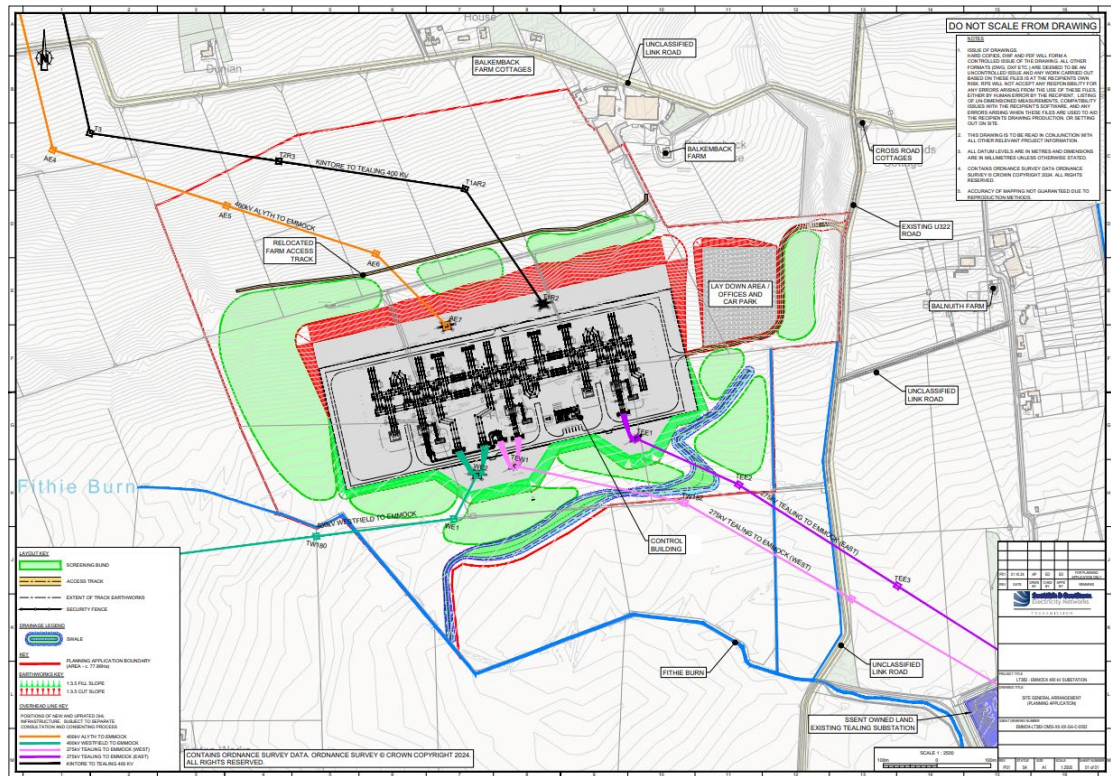
- 3.1 The Proposed Development comprises the construction and operation of a 22 bay, 400/275 kV Air Insulated Switchgear (AIS) substation located on a level platform and the formation of associated earthworks, access, drainage, landscaping, and security, including the creation of temporary construction compounds.
- 3.2 Site development would principally involve cut and fill earthworks to create a level platform of approximate dimensions 675 m x 285 m along an east-west orientation in the centre of the Site. To the west, north and east of the platform, earth bunds would be formed to screen the electrical infrastructure, with further bunds and SuDS³ to the south of the platform. A new access would be formed between Emmock Road (U322) and the platform. A temporary combined compound and laydown area approximately 188 m x 140 m would be formed to the east of the platform. This area would be returned to agricultural use following construction and reinstatement.
- 3.3 The key design elements of the Proposed Development are described below:
- > Cut and fill operations to create a development platform to accommodate the electrical infrastructure;
 - > Creation of a new permanent access road east of the Site from Emmock Road;
 - > Construction of a structure over an unnamed culverted watercourse that drains to the Fithie Burn to the south;
 - > Widening of the access track at Emmock Road to allow for passage of heavy goods vehicles;
 - > The erection and commissioning of electrical equipment;
 - > Erection of a single storey control building;
 - > Palisade fence around the substation platform;
 - > Landscaping, including screening bunds and new planting to deliver landscape and visual mitigation, and biodiversity net gain (BNG) measures (both on and off site);
 - > Permanent earthworks and site drainage provisions, including Sustainable Drainage Scheme (SuDS) basins, swales, and a network of interceptors draining into Fithie Burn;
 - > Internal accesses and vehicle parking spaces with electric charging stations within the substation platform area;

³ Sustainable Urban Drainage Systems

- > Temporary site compound lay down area and material storage areas; and
- > Temporary site offices and welfare facilities for on-site construction workers.

3.4 A detailed description of the Proposed Development is contained in Volume 2, Chapter 3 of the EIA Report. The General Arrangement of the Proposed Development (EMMO4-LT382-OMSI-XX-XX-GA-C-0002) is replicated in Figure 3.1.

Figure 3.1: The Proposed Development – General Arrangement



4. Design

Key Design Principles and Objectives

- 4.1 Throughout the design process, the Applicant has sought to balance technical, engineering and environmental considerations. With the environment in mind, design principles and objectives have been adopted to ensure the Proposed Development is sited and designed as sensitively as possible with regard to sensitive receptors, and the context in which it sits.
- 4.2 Legislation and standards drive the basic design with the functionality of each Substation required by the Applicant as an Electricity Undertaker, and this is prescribed within the National Electricity Transmission Security and Quality of Supply Standard. The Applicant has prepared a layout for the substation determined by these system requirements.
- 4.3 The requirement for a level platform determines the general size and shape of the Site. The primary objective has been to balance the cut and fill, along with other essential components necessary for the development. These include, but are not limited to, providing vehicular access to the site, construction compounds, security measures, an appropriate relationship with existing infrastructure, and opportunities for screening, drainage design, new habitats, and other forms of embedded mitigation to minimize impacts on sensitive receptors.
- 4.4 Key design principles and objectives followed in the design evolution of the Proposed Development included:

- > Optimise the development 'footprint' within the Site to limit the area required for development, to minimise visual impact in the wider landscape and to utilise existing topography afforded by landform.
- > Minimise the disturbance or displacement of protected species.
- > Utilise existing access and minimise need for land take with regard to reducing potential disturbance on natural and human environment.
- > Minimise traffic required during construction.
- > Minimise the potential impact on nearby sensitive human receptors during construction and operation.
- > Propose appropriate architectural form, colour and materials.
- > Maximise available land for additional planting and mounding to improve screening and provide habitat and biodiversity enhancement.
- > Take advantage of, and minimise, changes to the existing ground form and levels.

4.5 The layout and design of the Proposed Development has examined the potential impacts on sensitive receptors and features within the surrounding environment. The design process utilised this information to minimise the potential permanent effects on such receptors by way of an iterative appraisal process. In this location the key sensitivities are neighbouring properties and surrounding context.

Design Evolution

4.6 The substation design has evolved iteratively, integrating ongoing work to optimise electrical, civil engineering, and environmental features. The design aims to minimise significant environmental impacts of the Proposed Development through embedded mitigation, considering site topography, slope, drainage, existing land uses, and vegetation.

4.7 The principal iterations of the design have resulted in a reduction of the Site and platform areas, and optimisation of cut and fill. The Site area has been decreased from 90 ha to approximately 78 ha. The main platform width has been reduced from 300m to 285m, and the platform level has been lowered from 140.5m to 139m AOD, reducing the visibility of the electrical infrastructure, especially from the north. These reductions have helped the Proposed Development reduce environmental impacts, meet landowner requirements, and respond to consultee feedback.

4.8 The proposed access road from Emmock Road has been repositioned and shortened to enter the platform from a different point, improving stormwater flow management and eliminating the need to elevate part of the proposed road. The SuDS has been redesigned as a single detention channel, maintaining its role in ensuring runoff from the Site remains consistent in volume and quality with current runoff. The landscape design has been adjusted due to the reduced Site area while still providing mitigation for potential landscape and visual impacts.

Substation Platform

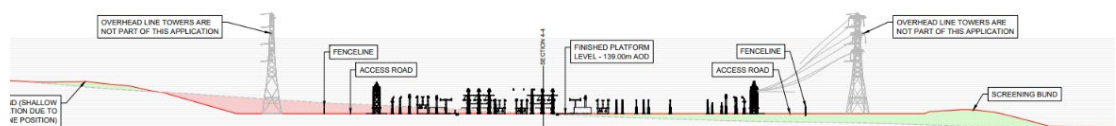
4.9 Design and orientation of the substation platform have been driven by requirements of the electrical infrastructure constituting the substation itself, as well as surrounding electrical infrastructure. The platform will be a flat, rectangular area measuring 675 m x 285 m along an east-west orientation, accommodating the electrical infrastructure, control building, car parking, and palisade fence around the perimeter.

4.10 The site slopes from approximately 173 meters AOD in the north to 131 meters in the south. The substation level platform will be created by excavating into the site's slope and embedding it into the landscape, the effect of which, in combination with landscape mitigation

proposals, will serve to reduce the visual impact of the platform. The substation electrical infrastructure would have an approximate height of 15 m above platform level, including transformers, connection bays and gantries.

- 4.11 Excavated material will be used to form the platform where the site slopes away and to create screening bunds around the platform. Figure 4.1 shows an excerpt of a submitted site section drawing (EMMO4-LT382-OMSI-EWKS-XX-ELE-C-0003 sheet 1 of 2) from a north-south perspective, with areas of cut material indicated in red, and fill in green.
- 4.12 Drainage from the platform will be managed by a network of surface drains with interceptor traps, which will drain to the SuDS, which are an integrated part of the landscape and drainage design. Engineered stone may need to be imported to the Site for the upper drainage layer.

Figure 4.1 North-South Site Section Excerpt



Control Building Design and Form

- 4.13 As an Air Insulated Switchgear substation, the majority of the electrical plant and machinery on the platform will be out in the open. On the substation platform, the Proposed Development will also contain a steel-framed and clad control building to house equipment for monitoring, controlling, and protecting electrical systems. This single storey building would have approximate dimensions of 50 m in length, 24 m in width, and 6 m in height.
- 4.14 The Applicant would use this facility to manage the substation's maintenance and operation, and it would include welfare facilities for members of staff. The building would be located towards the southern boundary of the Site, near to the on-platform car parking and accessible from the access gate. The building would be in close proximity to one of the landscape bunds on the south of the platform, serving to screen the building.
- 4.15 The colour scheme is indicated on drawings as bottle green RAL 6007, however, this would be confirmed in consultation with Angus Council. Like similar SSEN Transmission substation developments, it is intended that the colour would be recessive so as to more easily conceal it against the backdrop of its surroundings.
- 4.16 The proposed floorplan of the control building (EMMO4-LT382-OMSI-BLDG-CNT-LAY-C-0002) is shown in Figure 4.2 below and the control building elevations (EMMO4-LT382-OMSI-BLDG-CNT-ELE-C-0002 sheet 1 of 2) are shown in Figure 4.3.

Figure 4.2 Control Building Floorplan

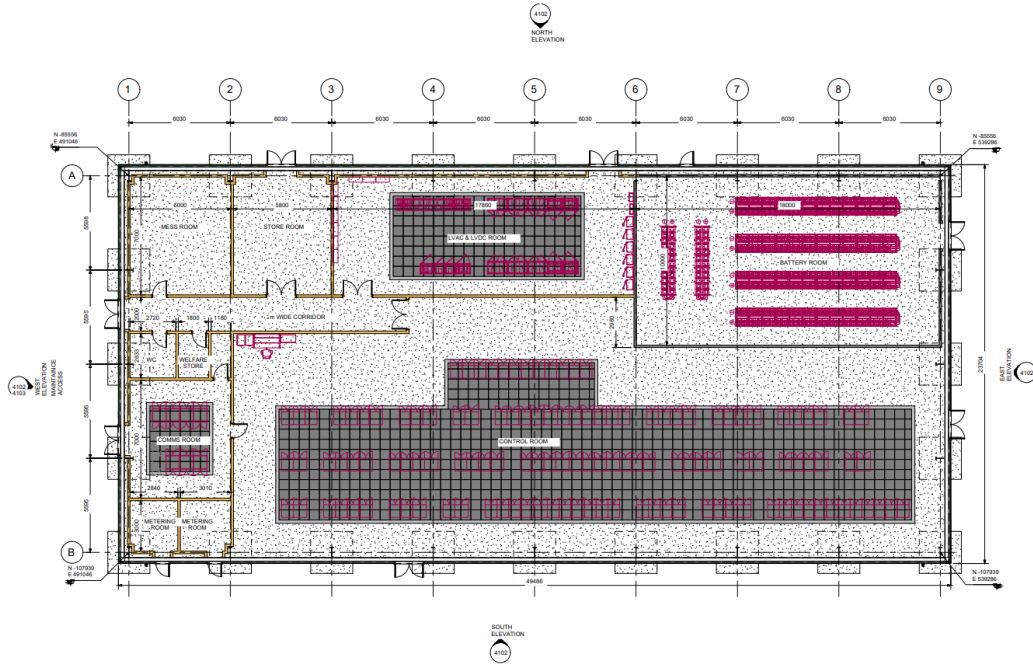


Figure 4.3 Control Building Elevations



Landscape Design

4.17

The landscape design has been developed to integrate the proposed substation into the landscape. The proposed landscape design, illustrated in Figure 4.1, includes screening bunds, SuDs, and new plantings to enhance visual screening and biodiversity.

- 4.18 Nine landscape bunds, ranging in height from 1.5 m to 10 m, will encircle and screen the substation platform. Bunds 1 to 3 will provide screening to the north and northwest, while Bunds 4 to 6 will screen the east and southeast. Bund 5 has been repositioned closer to the eastern boundary to reduce direct views of the site, merging with Bund 4 and to screen the southeast. Bunds 7 to 9 will screen views to the south and southwest.
- 4.19 Where new proposed OHL⁴ infrastructure is shown, no landscaping bunds or vegetation of significant height would be included. This is to ensure that the minimum safety standards for clearances beneath OHL are maintained and to ensure that mature vegetation does not pose a safety risk were trees to fall.
- 4.20 The planting schedule includes woodland blocks, scrub, shelterbelts, riparian woodland hedgerows, wetland planting, and new grass with native species. Landscape planting will occur in phases: from April to June 2026 for initial screening, and from October to December 2027 and January to March 2028 for completion. Once planting has matured, it will help screen infrastructure elements and therefore help to reduce visual impacts, and form habitats for wildlife.

Figure 4.1 Landscape Zonal Plan



5. Access

- 5.1 Access will be required for construction and operation for authorised personnel only, as required by the Electricity Safety, Quality and Continuity Regulations 2002. Access and security of the Proposed Development have been designed accordingly. No specific access provisions for people with disabilities have been incorporated into the proposals, nor was this a feature of pre-application consultation.
- 5.2 The electrical infrastructure will be made secure by use of palisade fencing around the platform, and controlled entry via a gate. During operation, the Site will be accessed for maintenance and inspection purposes only. It is assumed this would be required at regular

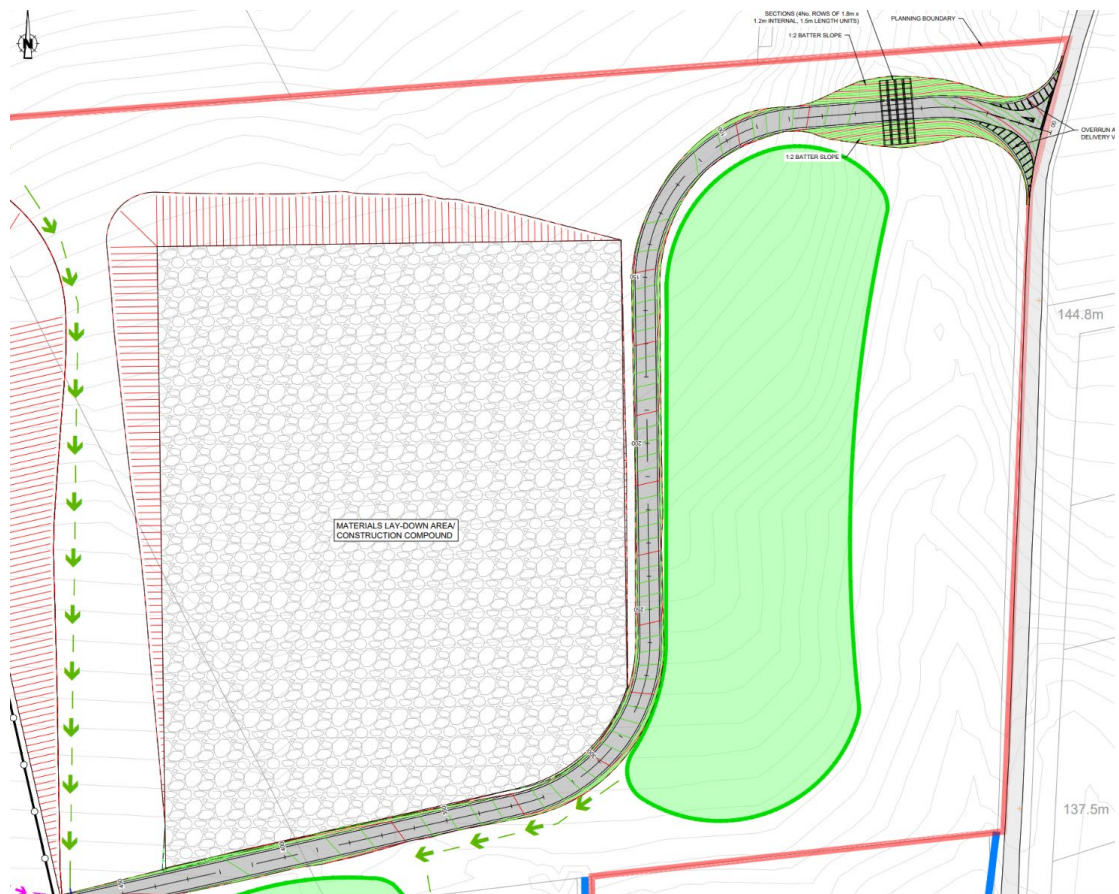
⁴ New OHL infrastructure will be subject to applications under the Electricity Act 1989, and are not part of the substation planning application.

intervals however this will be dependent on specific operational requirements. Maintenance on the bays is likely to be required annually in some form and this would require presence on site for one week.

5.3 Access to the Site will be taken from the public road network at Emmock Road (U322). A single internal access road within the Site would provide access between Emmock Road and the substation platform. During design development, the access from Emmock Road was repositioned and shortened to enter the platform at a different point, accommodating storm water flows in a more efficient manner and removing the need to raise part of the proposed road. In doing so, this sought to minimise areas of hardstanding, and integrate with, and benefit from, the proposed landscape and drainage design. During construction, the same internal access road would provide access to the temporary laydown and welfare area. Potential impacts on the public road network during construction would be managed through a Construction Traffic Management Plan.

5.4 The proposed access junction and internal access road for the Proposed Development are shown in Figure 5.1.

Figure 5.1: Internal Access Road and Emmock Road junction



6. Conclusions

6.1 The Applicant has given careful consideration to the siting, design, layout and access of the Proposed Development to ensure it is in the most suitable location, and that it is designed with sensitivity given to its local context. The development of the design has taken on board feedback from members of the community, the landowner, and other key stakeholders. The proposal seeks to deliver a functional development, which avoids significant impacts on nearby receptors. The design has been progressed to fit sustainably into the environment in which it sits whilst satisfying technical requirements and functionality. The Proposed

Development as a whole seeks to deliver sustainable development via facilitating net zero targets and increased transmission of renewable energy.

- 6.2 The Proposed Development's access has been designed to be accessible to authorised personnel only. The primary access to the Site will be taken from Emmock Road. The Site has been designed to only be accessible to authorised persons with clearance to access a live substation. No public access is authorised and the design, and appropriate fencing reflects the requirement such that the Site is designed to be secure from public access. This is to be in accordance with the Electricity Safety, Quality and Continuity Regulations 2002.