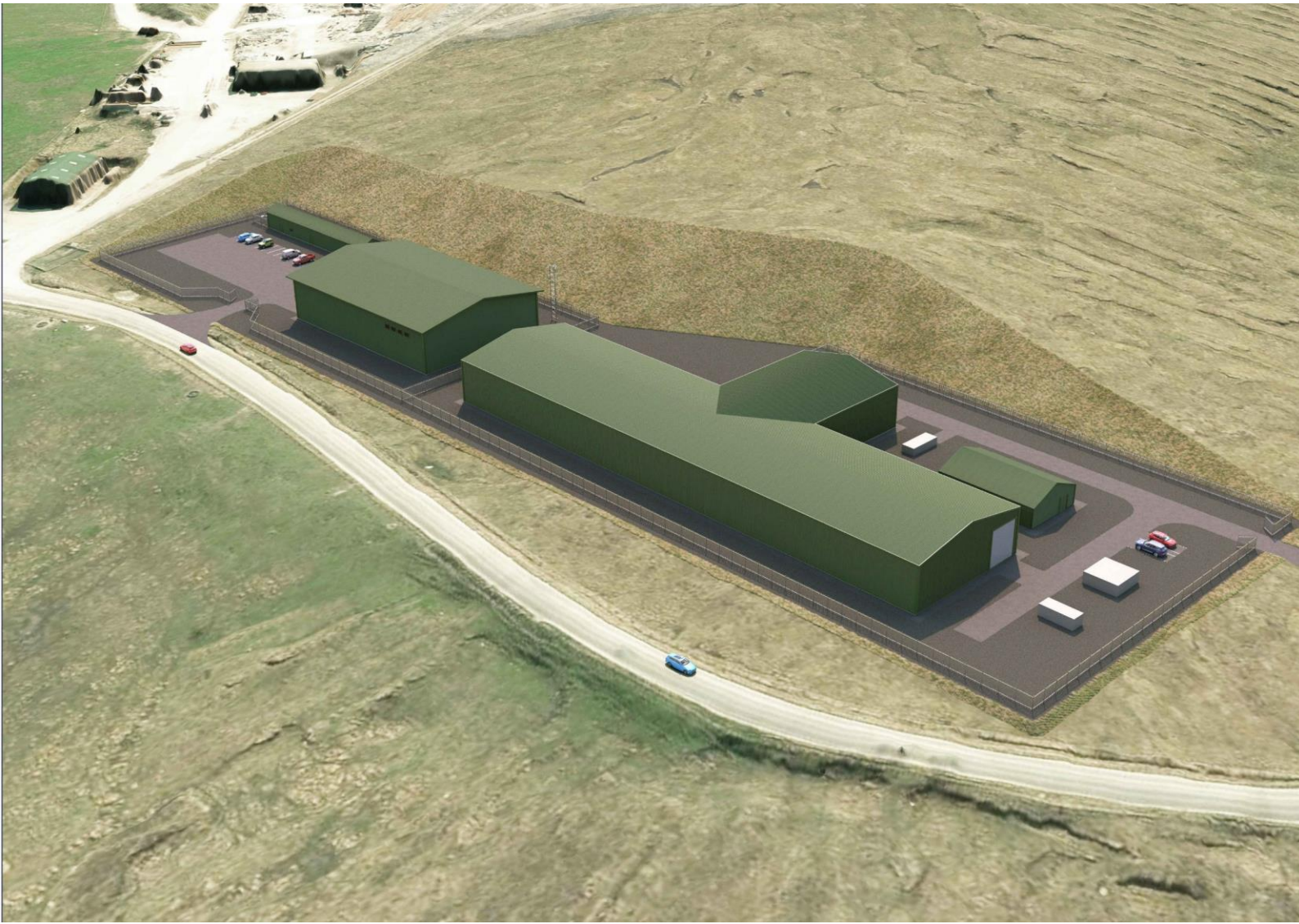
Mossy Hill Wind Farm Substation

Design and Access Statement

December 2024



Mossy Hill Wind Farm Substation: Design and Access Statement

1. Introduction

This Design and Access Statement (DAS) outlines the design process and resultant proposal for constructing and operating a substation (the 'Proposed Development'). The Proposed Development will connect the approved Mossy Hill Wind Farm to the electricity grid being developed by Scottish and Southern Electricity Networks Transmission (SSENT), linking Kergord to Gremista within the Shetland Islands Council (SIC) area. This DAS accompanies the planning application submitted to SIC, seeking permission to construct and operate the Proposed Development.

The DAS provides an overview of the principles and approach guiding the design process, demonstrating how the Site and its surroundings have been thoroughly assessed to achieve the most suitable design solution. It explains the starting point for the Proposed Development's design and the subsequent layout modifications made in response to issues identified during the consultation and appraisal process. Additionally, it details the proposed access arrangements for the Site.

This DAS should be read alongside the **Supporting Environmental Information Report (SEIR)**, which offers further details on the design iteration process (Section 6), anticipated landscape and visual impacts (Section 8), traffic and access-related effects (Section 13), and includes a Construction Traffic Management Plan (Appendix 8).

The DAS fulfils the requirements of The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013, which mandate a DAS for all 'national' and 'major' developments. As the Proposed Development Site exceeds 2 hectares (ha), it is classified as a Major development under The Town and Country Planning (Hierarchy of Developments) (Scotland) Regulations 2009, Schedule, Part 9. The preparation of this DAS has also considered relevant planning guidance, particularly Planning Advice Note (PAN) 68: Design Statements, which recommends that a DAS should include:

- Background information;
- Site details;
- Site and area appraisals;
- Design principles;
- Public involvement;
- Programme; and
- Design solution.

2. Background Information

Name of the Scheme

The Proposed Development is called Mossy Hill Wind Farm Substation.

The Applicant

The Applicant, Mossy Hill Shetland Limited, is a wholly owned subsidiary of Statkraft UK Limited (Statkraft).

Statkraft is a leading company in hydropower internationally and Europe's largest generator of renewable energy. The Group produces hydropower, wind power, solar power and supplies district heating. Statkraft is a global company in energy market operations and has 7,000 employees in over 20 countries. Statkraft produces hydropower, wind power, solar power and supplies district heating, generating 62 terawatt hours (TWh) of renewable power.

Statkraft is at the heart of the UK's energy transition. Since 2006, Statkraft has gone from strength to strength in the UK, building experience across wind, solar, hydro, storage, grid stability, EV charging, green hydrogen and a thriving markets business. Statkraft has invested over £1.3 billion into the UK's renewable energy infrastructure and facilitated over 4.5GW of new-build renewable energy generation through Power Purchase Agreements (PPA). Statkraft develops, constructs, owns and operates renewable facilities across the UK and employs over 550 people in offices across Scotland, England and Wales.

Further information about Statkraft can be found at www.statkraft.co.uk.

Advisors

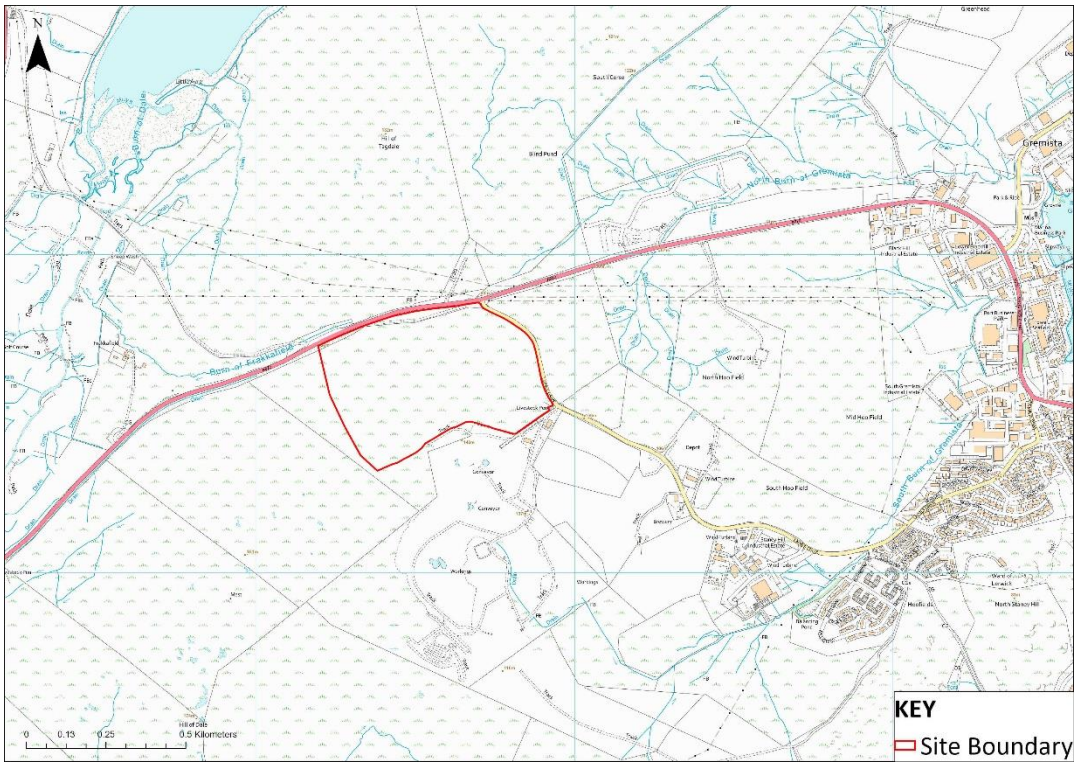
The Applicant appointed ITPEnergised (part of SLR) to undertake the environmental assessments, complete the DAS and also advise on the design of the Proposed Development. ITPEnergised has been supported by a team of technical specialists with excellent experience undertaking environmental assessment work for similar developments across Scotland and the wider UK. ITPEnergised has been supported by the following external technical specialists:

- David Bell Planning – Planning and Policy;
- Axis – Landscape and Visual Appraisal;
- AOC Archaeology – Cultural Heritage;
- Pell Frischmann – Traffic and Transport; and
- Gondolin Land and Water – Flood Risk and Drainage.

3. Site Details

Location and Site Description

The Proposed Development Site ('the Site') is situated approximately 600 metres (m) north-west of the western extent of Lerwick, at British National Grid (BNG) reference HU 44549 42610 **(Drawing 1)**. The Site is bordered to the north by the A970 and to the east by Ladies Drive.



Drawing 1 - Site Location and Boundary

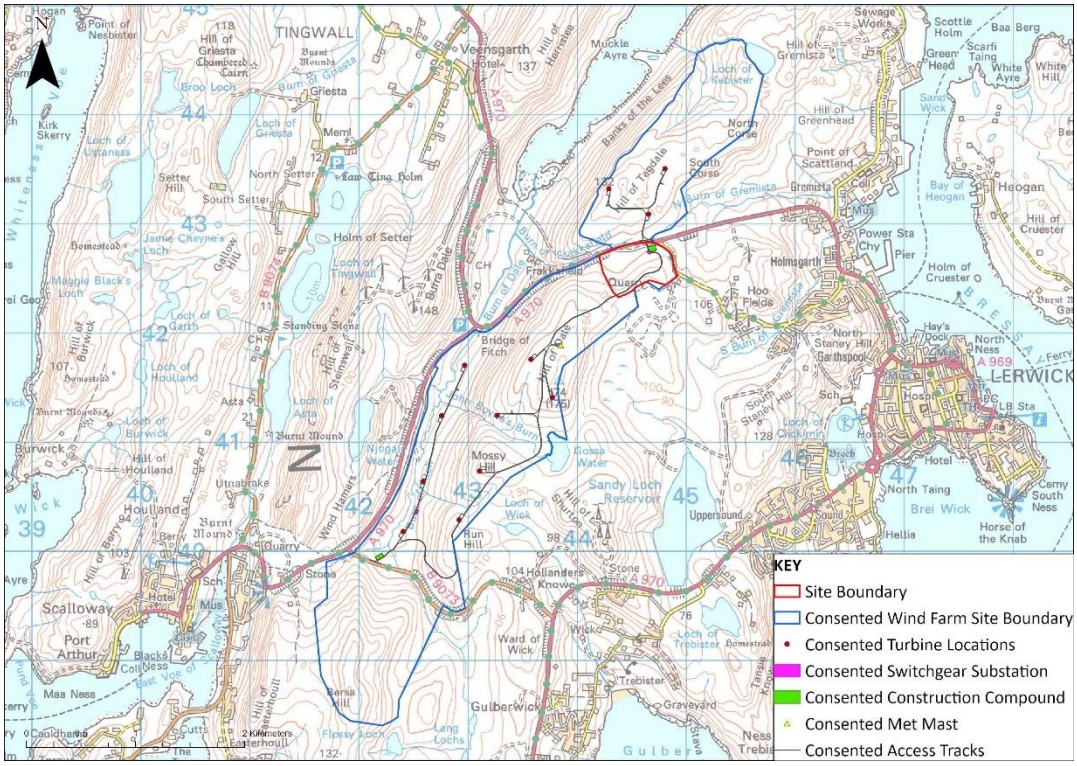
Description of the Site

The Site is approximately 25.8 hectares (ha) in area, and predominantly comprises rough grazing, acid grassland and blanket bog. The Site is bordered to the north by the A970 and to the east by Ladies Drive. The Site is also within the consented Mossy Hill Wind Farm boundary **(Drawing 2).**

Elevation rises from approximately 95 m Above Ordnance Datum (AOD) in the north of the Site to approximately 140 m AOD in the south of the Site. There are no watercourses within the Site.

The Site is in a rural setting and is surrounded predominantly by agricultural ground for livestock grazing and industrial developments such as the adjacent quarry, Lerwick Brewery, and Staney Hill Industrial Estate. There is a small historic landfill site within the Site boundary.

There is one residential property within 1 km of the Proposed Development; Shetland Self Catering located approximately 500 m south-east of the Proposed Development.



Drawing 2 - Site Location within Consented Wind Farm

The Proposed Development will be accessed from the two consented Mossy Hill Wind Farm access junctions, one from the A970 and one from Ladies Drive in the north eastern corner of the Site. Additionally, there will be a new access junction off Ladies Drive to service the Applicant's substation in the south-east of the Site (see **Drawing 3**). There is potential to construct a link road direct to the quarry to further reduce vehicles using Ladies Drive.

Drawing 3 - Site Access Arrangements

4. The Proposed Development

A detailed description of the Proposed Development is provided within the SEIR and illustrated on the accompanying figures and application drawings but a summary of the key elements of the Proposed Development is provided below.

- A combined substation platform with an area of approximately 1.66 ha. This platform is divided into two compounds one which will be operated by SSENT and the other to be operated by Statkraft.
- SSENT's substation compound (approximately 9,505 m²) comprising;
  - SSENT's 132 kV substation building with an area of approximately 3,115 m² housing electrical switchgear and associated equipment with a height of approximately 11 m;
  - SSENT's control and welfare building with an area of approximately 227 m² and a height of approximately 6 m;
- Statkraft's substation compound (approximately 6,224 m²) comprising;
  - Statkraft's 132 kV substation building with an area of approximately 1,210 m² housing an electrical transformer, electrical switchgear and associated equipment with a height of approximately 12 m;
  - Statkraft's smaller 33 kV switch-room, control and welfare building with an area of approximately 222 m² and a height of approximately 8 m;
  - A construction laydown area of approximately 2,000 m²;

- One temporary construction compound to service SSENT construction with an approximate area of 3,575 m^2;
- Drainage system including an attenuation pond and pipework;
- Associated on-site underground cabling which will run to the Site boundary;
- Mains water connection;
- Wastewater facility (to serve the site welfare provisions);
- Hard surfacing for access tracks, internal service roads, car parking and areas under electrical equipment;
- Site security fencing and gates approximately 2.4 m in height; and
- CCTV and internal motion sensor floodlights mounted on posts measuring approximately 3 m in height.

5. Site Selection and Alternatives

The Site was identified as the appropriate location for the Proposed Development due to a number of environmental and technical considerations. Proximity to the new Kergord to Gremista 132 kV cables was a key factor. As the consented Mossy Hill Wind Farm will connect directly into one of the two new cables which are being installed through the northern part of the Site, and will serve consumer supplies in Shetland, the Proposed Development must be located close to one of these cables and also consider cable routing and bend radius for the connection into the substation. The Proposed Development is required to connect the wind farm directly into the underground cables which means no additional overhead lines are required to connect Mossy Hill Wind Farm to the grid. Additionally, one of the smaller consented substations (which the Proposed Development would replace) would have been within the Site boundary, and maintaining proximity to the consented Mossy Hill Wind Farm's substation was an important objective.

Following the selection of the Site boundary, several alternative locations were evaluated before confirming the current position for the Proposed Development. The environmental considerations that informed the siting included:

- Landscape and visual impact;
- Ecology and biodiversity;
- Geology, peat, hydrology and hydrogeology; and
- Transport and access.

The location and layout of the Proposed Development within the Site has been carefully selected to safeguard critical infrastructure, minimise visual impacts, and avoid or mitigate environmental impacts as much as possible.

6. Public and Community Involvement

The Applicant has engaged with local communities throughout the design phases of the Proposed Development. This engagement has been undertaken through a variety of approaches. See the **Pre-Application Consultation (PAC) Report** accompanying this planning application for more details on public engagement to date.

The Applicant held the following public consultation events:

- 8th May 2024 at Islesburgh Community Centre, Lerwick; and
- 9th May 2024 at Scalloway Public Hall, Scalloway.
- 6th November 2024 at Sound Hall, Lerwick; and
- 7th November 2024 at Scalloway Public Hall, Scalloway.

The main design feedback received at the first exhibition included:

- Request to keep the Proposed Development further from the main A970.
- A preference to site the Proposed Development as close as possible to the existing quarry.
- Concern about environmental impacts particularly about avoiding siting the Proposed Development on any deep high-quality peat.

7. Design Principles

Introduction

The design process for the Proposed Development included the preparation and evaluation of various iterations for the layout and on-site ancillary infrastructure. To develop a layout that represents the most appropriate design, the process considered potential environmental impacts and effects, physical constraints, access requirements, and the relationship to adjacent land.

Key information was gathered through desktop research, field surveys, local planning policy review, planning conditions, and community engagement. This comprehensive baseline assessment helped identify and prioritise site-specific issues and sensitivities, guiding further detailed evaluations and influencing the design iterations of the Proposed Development.

The overarching design principle for the Proposed Development was to embed environmental mitigations into the design, adhering to the mitigation hierarchy. This approach prioritises:

1. Avoiding impacts wherever possible.
2. Minimising impacts when avoidance is not feasible.
3. Compensating for and restoring areas affected by unavoidable impacts.

Onsite Environmental Constraints

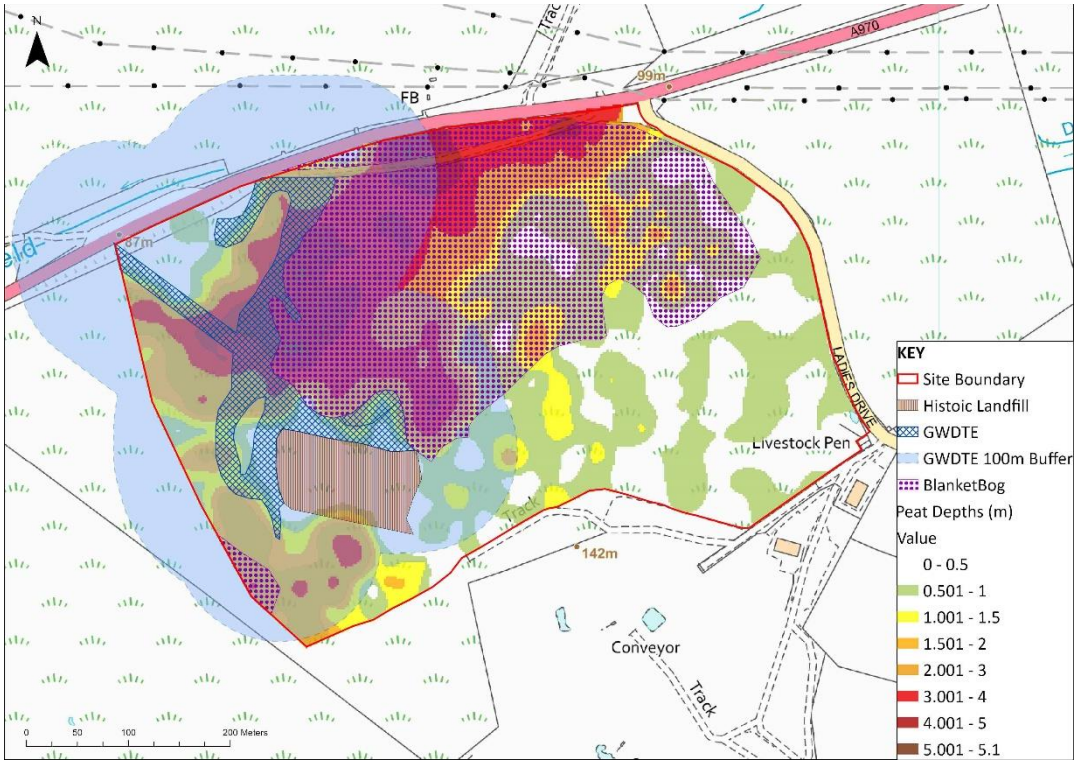
It is important to note that the identification of a constraint does not necessarily result in the exclusion of that area from the potential development envelope; rather it means that careful thought and attention was paid to the constraint and the design altered appropriately.

There was a great deal of environmental baseline data available from the previous planning application for the consented Mossy Hill Wind Farm. This data was used as the basis for the initial site appraisals and design.

Additional surveys were undertaken to inform the siting and design of the Proposed Development, and the environmental assessments detailed within the SEIR and associated technical appendices.

- Peat Depth Surveys: A 20x20 m grid of peat probing was undertaken in June 2024 to inform the Proposed Development's location. The Proposed Development has been located with the aim of avoiding and minimising impacts on deep peat. A higher density of Phase 2 peat probing using a 10x10 m grid was undertaken in October 2024 of the Proposed Development's infrastructure and earthworks.
- Ecology Surveys: Following consultation with NatureScot, an ecological walkover survey was undertaken to confirm habitats onsite and check for otter presence. These surveys confirmed the majority of the habitats onsite are heavily modified bog habitat with extensive peat hagging, historic peat cutting and grazed by sheep. No otter presence was recorded.
- Landscape and Visual: The landscape and visual team undertook a site visit to familiarise themselves with the landscape context and to take photography which has formed the baseline of the Landscape and Visual Appraisal.

The on-site environmental constraints are illustrated in **Drawing 4**.



Drawing 4 - Onsite Environmental Constraints

Design Considerations

Taking into consideration the above constraints, as well as advice from SIC and public feedback received at first round of public consultations (which took place in May 2024), the following principles were adopted during the design iterations undertaken by the Applicant to ensure that the final design of the Proposed Development is the most suitable for the Site:

- Avoiding areas of deep and higher quality peat which are mostly along the northern boundary of the Site.
- Avoiding Ground Water Dependent Terrestrial Ecosystems (GWDTEs).
- Avoiding a historic landfill site within the Site boundary.
- Minimising impacts on Blanket Bog habitats.
- Backdropping the substation compound into the hillside to prevent it being visually prominent in the skyline.
- Minimising visibility from residential properties in and around Lerwick.

- Aligning the substation location with existing industrial developments, such as the quarry and the Staneyhill Industrial Estate.
- Ensuring proximity to the consented Mossy Hill Wind Farm access junctions to facilitate efficient construction and operational access to the substation compounds.

Embedded Mitigation

Landscape and Visual

The advantages of the Site location from a landscape and visual perspective are that it:

- Is located away from most visual receptors, such as residential receptors, with the closest receptors being relatively fast-moving car users on the A970 to the west of Lerwick.
- It takes advantage of the hillside screening directly adjacent, screening views from the majority of the northern, western and southern extents of the Study Area.
- While slightly separated from Lerwick, it would partially associate with built form within the town, particularly in views from the east, as opposed to a position which would be much more isolated within the more open parts of the island.

Aside from the locational advantages, the key elements of the design which have considered the potential landscape and visual effects are:

- The selection of a substation design which utilises buildings to contain the internal components. This creates a simpler form, which is more consistent with large, modern agricultural buildings than that of a typical substation which would comprise a more complicated array of electrical infrastructure.
- The use of a muted green colour which blends more with the earthier tones of the Shetland landscape and assimilates the buildings more successfully.

Overall, the Applicant has made best efforts to design the Proposed Development to limit its landscape and visual effects as far as is reasonably possible, while acknowledging that the substation is required to be positioned within the vicinity of the Site to achieve optimum functionality for the consented Mossy Hill Wind Farm.

Peat

The peat survey results show that although much of the application boundary is located on peat, the Proposed Development infrastructure has avoided the thickest areas. Much of the western and northern Site area is underlain by deep peat (>1 m), with probes exceeding 5 m in places. The survey in the southern and eastern areas of the Site show that although not entirely absent, where peat is present it is generally thin (<1 m) and discontinuous.

Although the access track entering the Site is underlain by deep peat, this has been deemed the most suitable access point from the public highway. The combined substation platform almost entirely avoids deep peat, with 98% of probes less than 1 m thick. 46% of probes were located on peaty soils (<0.5 m), with an average probe depth across the substation platforms of 0.47 m.

Ecology

The ecological baseline has been considered throughout the design process for the Proposed Development with an aim to either eliminate or reduce the potential for any significant effects on receptors and following the “mitigation hierarchy” as described in CIEEM guidance.

Minimising impacts on blanket bog habitats by ensuring the majority of the permanent infrastructure is sited on unimproved acid grassland habitats.

GWDTEs were fully assessed as part of the consented Mossy Hill Wind Farm and so areas considered to have “true” potential groundwater dependency have been avoided plus a 100 m buffer as part of the embedded design mitigation process for the Proposed Development.

Flood Risk and Drainage

A flood risk and drainage assessment has been undertaken and a sustainable drainage system (SUDs) has been designed into the Proposed Development. The proposed drainage / SuDS scheme for the Proposed Development will comprise the management of surface water runoff from the substation development platform and intercept surface water catchments upgradient of the Proposed Development areas through the implementation of filter drains, cut off ditches and a SuDS Attenuation Basin as shown in **Drawing 6.**

Cultural Heritage

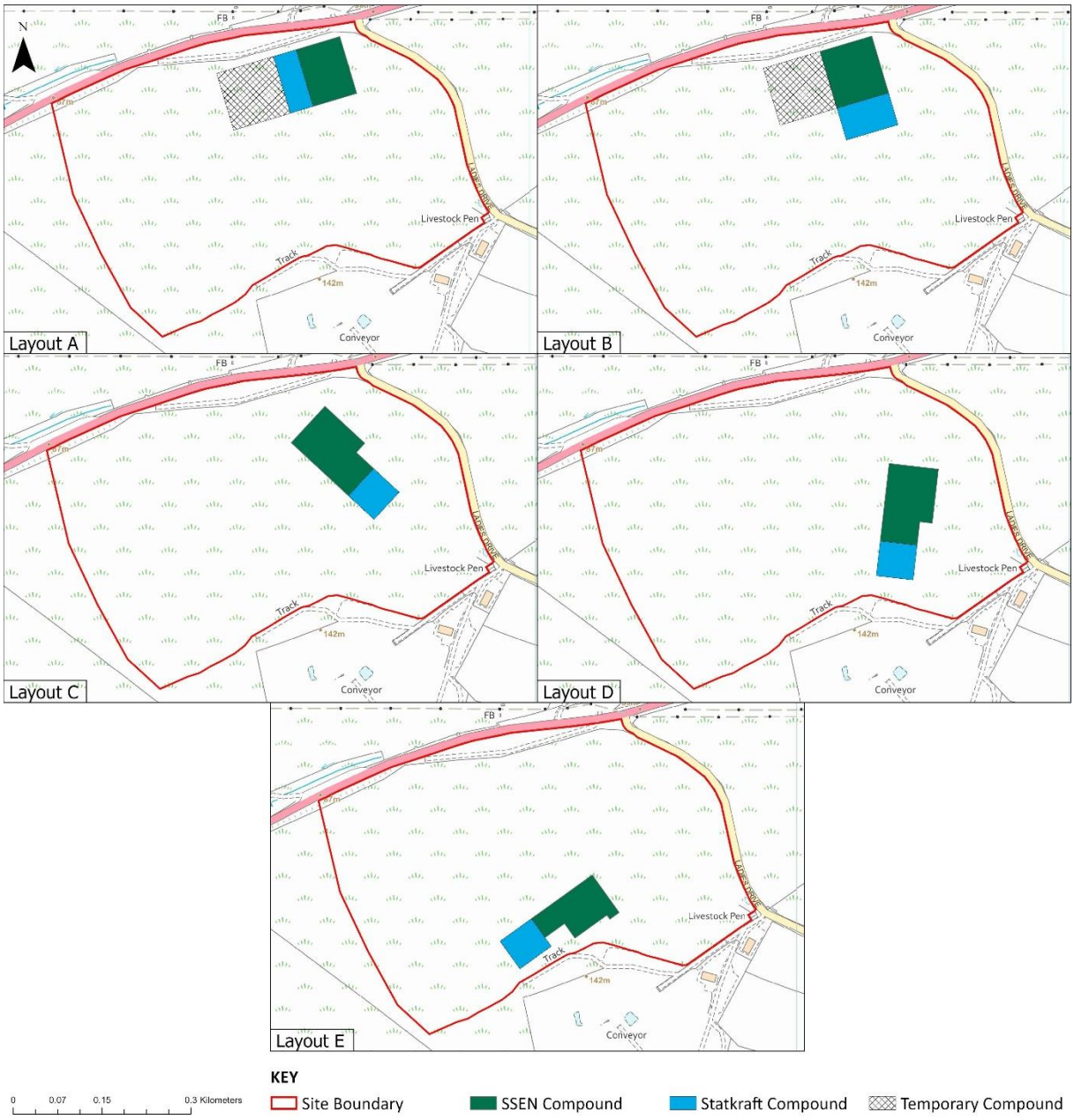
Peat has been identified underlying the Site and there is evidence of peat extraction and historic cutting of peat on the Site. The peat survey identified peat depths between 0 m and 5.5 m within the Site, with the deepest peat recorded within the north and central areas of the Site. Where deeper peat deposits have been identified there is considered to be the potential for paleoenvironmental remains to survive. Peat can also obscure buried archaeological remains. As the Proposed Development has been designed to avoid the deeper areas peat this should reduce the likelihood of impacting buried archaeological remains.

8. Layout Iterations

A number of alternative locations and layout iterations were considered as part of the design process.

Five previous design iterations (A-E) are presented in the **Drawing 5** below.

- **Layout A:** This layout and location were not progressed as it is within an area of deep peat and would require a redesign of the consented access junctions.
- **Layout B:** This layout was a second option being considered at the same time as Layout A. This layout and location were also not progressed for peat and accesses constraints.
- **Layout C:** This layout and location were more suitable for maintaining consented access and cabling lengths and bends to connect to the Kergord-Gremista cables. However, following more peat probing it was found that there are peat depths greater than 1 m here and therefore this was no progressed.
- **Layout D:** This layout avoided the deeper areas of peat however given the rise in topography in this area Layout D was deemed not appropriate due to the extensive civil engineering works which would be required to construct into the hill.
- **Layout E:** Was considered as it is along the consented access track. This layout and location were discounted due to it being within the 100m GWDTE buffer and on small areas of peat greater than 1 m. Additional this location is at a higher elevation and therefore would be more visible to the west and south of the Site.



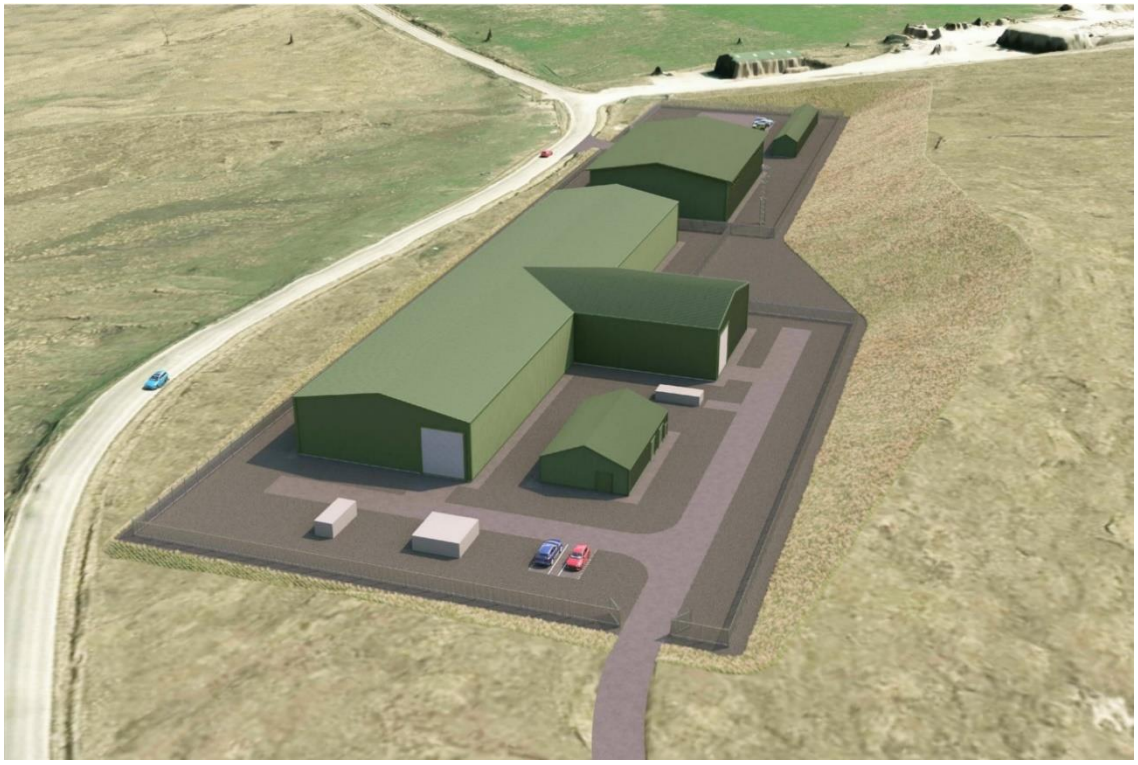
Drawing 5 - Design Iteration A-E

9. Design Solution

Consideration of the main design principles and avoidance and minimising of environmental impacts resulted in the final design freeze as shown in **Drawing 6** and illustrated in **Visuals 1-3**. It is considered that this resulting design freeze is most appropriate for this Site and has taken on board feedback from the public, local stakeholders and the environmental assessments undertaken.

Drawing 6 - Proposed Development Layout

Visual 1 - 3D Visualisation Looking North-West



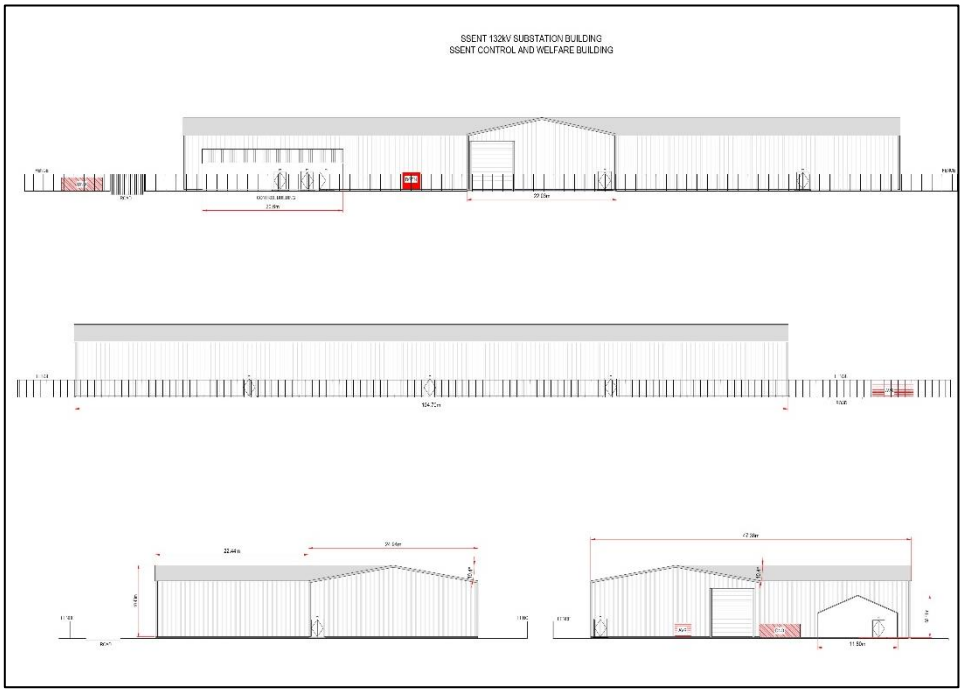
Visual 2 - 3D Visualisation Looking South-East

Visual 3 - 3D Visualisation Looking South-West

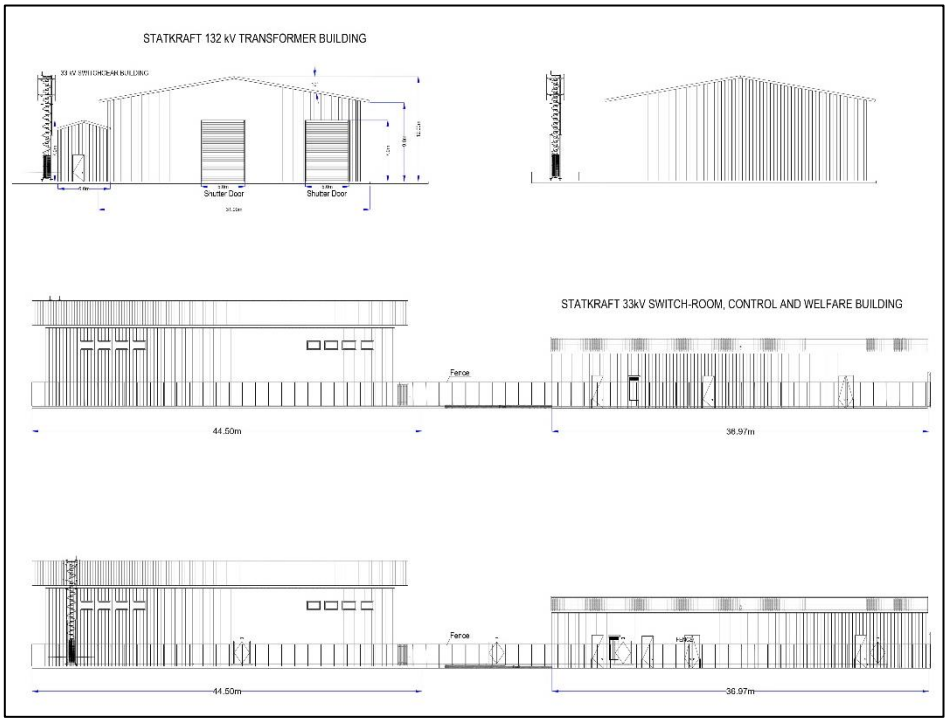
The Proposed Development will feature electrical switchgear and protection equipment to ensure reliable operation of both the consented Mossy Hill Wind Farm and the power supply to customers. The Applicant, under its grid connection agreement with National Energy System Operator (NESO, and formerly National Grid Electricity System Operator (NGESO)), must obtain consent for the Proposed Development, which replaces two smaller substations previously approved for the consented Mossy Hill Wind Farm. The majority of the Proposed Development will be built, owned, and maintained by SSENT, with NESO responsible for its operation.

The Proposed Development will comprise two main buildings: a larger one for SSENT, housing the majority of the electrical switchgear, and a smaller one for the Applicant, containing a transformer to step up the voltage. Two additional smaller buildings will be included: a control and welfare building for SSENT, and the Applicant's facility for managing turbine cables and staff welfare. During construction, each main building will have its own compound, which will be removed once the Proposed Development is complete (refer to **Drawing 6**).

Further details of the Proposed Development infrastructure are provided within Section 6 of the SEIR. The final layout of the Proposed Development is shown in **Drawing 6, Visual 1 -3**and an elevation drawing of the substation buildings is illustrated in **Drawing 7 & 8.**



Drawing 7 - Elevations SSEN Substation



Drawing 8 - Elevations Statkraft Substation

Access Strategy

The Proposed Development Site is split into two distinct developable areas, with the northern section of the Site constructed and operated by Scottish and Southern Electricity Networks (SSEN), while the southern section will be constructed and operated by the Applicant.

Access to the northern section of the Site will be via a proposed access junction, which formed part of the previously consented Mossy Hill Wind Farm scheme, located in the vicinity of the junction between the A970 and Ladies Drive, while access to the southern section will be via new access junction located to the north of the existing access junction to the Staney Hill Quarry. There is potential to construct a link track direct to the quarry in order to further reduce trips on Ladies Drive.

Access to the two sections of the Site within the Site boundary will be via new access tracks, accessed via the aforementioned junctions and will be the sole points of vehicular access into the Site. The access tracks would be private, and it is not proposed that they would be put forward for adoption into the list of publicly adopted roads.

During construction, a temporary laydown and Site compound area will be used, with each site having their own stand-alone areas. The SSEN compound will be located to the south of the proposed access junction, outwith the main development area of the substation, whilst for the southern section of the Site, this will be located within the main substation area, immediately to the south of the proposed access junction. The location of both construction compounds / laydown areas can be seen in **Drawing 6**.

10. Conclusion

The final layout has been informed by a robust environmental assessment and design iteration process, taking into account physical constraints, potential environmental, landscape and visual impacts and their effects. The information used to inform the design iteration process included consultation responses received, baseline data and the impact assessment undertaken.

The final layout of the Proposed Development comprises a substation, and its associated infrastructure, including hardstandings, drainage, access tracks, and temporary construction compounds as shown in **Drawing 6**.

Overall, the Proposed Development is an appropriately designed, sensibly located, sustainable development which is in line with policies in the local and strategic development plans and conforms to national policy. It will also provide a valuable contribution towards economic growth in the SIC area.