

Loch Toftingall Battery Energy Storage System Design and Access Statement

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INTRODUCTION TO THE PROPOSED LOCH TOFTINGALL BATTERY ENERGY STORAGE SCHEME

Background

Toftingall Wind Limited (the 'Applicant'), a company formed by Boralex Ltd, the UK branch of Boralex Inc., a Canadian-based independent power provider, is proposing to construct and operate a battery energy storage system with a maximum output of 49.9 megawatts (MW) within Toftingall plantation located approximately 1.6 km south east of Spittal in Caithness, Highlands (referred to as the 'Site'). The project is known as the Loch Toftingall Battery Energy Storage System (BESS) (hereafter referred to as the 'Proposed Development').

As the Proposed Development exceeds 20 MW, the Applicant has submitted a 'major development' planning application to The Highland Council, which will be determined under the Town and Country Planning (Scotland) Act 1997 (as amended). This Design and Access Statement (DAS) accompanies the planning application.

At an earlier stage, the project comprised a six turbine wind farm. In response to consultation feedback and grid connection arrangements this was progressively amended so that the proposal now consists only of a battery energy storage system.

In April 2023, an EIA screening request was submitted to Highland Council to establish whether a formal EIA was still required for the scheme which consists of a 49.9MW battery energy storage system. In May 2023, the planning authority issued a formal EIA screening opinion which confirmed that an EIA was not required.



The Proposed Development comprises:

- 52 battery storage units which would be installed in groups of four units. Each unit would be approximately 6.1 m long, 2.5 m wide and 2.9 m high;
- Inverter and transformer units serving each group of battery units;
- Two switchgear and control buildings;
- An access route into the site, part of which consists of existing track that forms part of the Halsary Wind Farm and the remainder comprises 590 m of new track formed of crushed rock;
- An area of native species landscaping around the compound which will provide screening and biodiversity benefits;
- Felling of the commercial plantation to the east of the compound and restoration to peatland over a period of years;
- A landscape mitigation scheme; and
- Native species riparian planting along the corridor of the Allt Eireannaich

The BESS would import and store electricity from the electricity network when there is a surplus of generation, and then export this again when there is a deficit. This balancing function reduces the amount of time that renewable generation needs to be curtailed (switched off) reducing the need to create electricity from fossil fuels. The facility would also help make the electricity network more resilient to outages. The project would have a maximum storage output of 49.9 megawatts.

The purpose of this DAS is to outline the opportunities, constraints and decision-making processes that have led to the design of the Proposed Development. The DAS accompanies the planning application and describes the iterative design process undertaken for the Proposed Development, including the evolution of the proposal and the design principles that were established at the outset of the design process and the alternatives that have been considered throughout the process.



Image 1: LVIA Viewpoint 7 - Halsary Wind Farm Access Track

Figure 1: Site Context

Site Location

- 2.1 The Site is located approximately 17 kilometres (km) west of Wick, 1.6 km south-east of Spittal (at its nearest point) and 5.6 km to the west of Watten in Caithness, The Highlands. Figure 1 above shows the location and wider context of the Site and Figure 2 above shows the site in detail.
- 2.2 To the north and east of the site, the area is characterised by gently undulating topography and scattered properties set within farmland. To the south and west lies part of the 'flow country' peatlands which comprise a broad expanse of relatively level land which is sparsely inhabited. There are a number of plantations and lochs within the local area around the site.
- 2.3 The Site lies adjacent to several operational wind farms including Achlachan, to the west, Causeymire and Bad a Cheo to the south west and the recently constructed Halsary development which lies immediately to the south, and through which the access corridor part of the site passes. Together these schemes constitute a large wind farm cluster.
- 2.4 The land in the immediate vicinity of the site is relatively flat and has an elevation of between 100 m and 75 m AOD. Spittal Hill lies approximately 3.4 km to the north west and rises to an elevation of 176 m AOD. Backlass Hill lies approximately 2.7 km to the north east with an elevation of 112 m AOD.
- 2.5 The Site lies within the Wick River catchment. In the immediate vicinity of the site, the watercourses drain, in most cases via Loch of Toftingall, into the Burn of Acharole which flows in a shallow valley to the east. The River Thurso lies approximately 3 km away to the west.
- 2.6 Loch of Toftingall is effectively enclosed by plantation forestry. The Loch is used for fishing on an occasional basis, except in the winter when angling rarely takes place.

- The northern section of the A9 trunk road (Latheron 2.7 Thurso) lies approximately 580m to the west of the main part of the site. The A882 (Wick to Thurso) passes 5km to the north east. The B870 lies approximately 1.2km to the north. There is a private track that leads from the B870 to the boat house on the northern shore of Loch of Toftingall.
- 2.8 There are a number of electricity transmission lines that feed into the large Mybster substation which lies approximately 500 m to the west of the Site. To the south of the substation, a 132 kV electricity transmission line runs parallel to the A9.

Designations

- 2.9 The Site is not located within or near a national landscape designation. The Causeymire Knockfin Flows Wild Land Area lies approximately 3.5km to the south west of the Site at its nearest point, and the East Halladale Flows Wild Land Area lies approximately 10.5km to the west of the Site at its nearest point.
- 2.10 The Flow Country and Berriedale Coast Special Landscape Area lies approximately 4.5km to the south west of the nearest part of the Site and the Dunnet Head Special Landscape Area is situated approximately 15km to the north of the Site.
- 2.11 The Site is well separated from Inventoried Gardens and Designed Landscapes, with the nearest, Dunbeath Castle, lying approximately 25 km to the south.
- 2.12 The Caithness and Sutherland Peatlands Special Area of Conservation, Ramsar and Special Protection Area and Shielton Site of Scientific Interest lies to the south of the site at a distance of approximately 1.5km at its nearest point.
- 2.13 The boundary of the Flow Country candidate World Heritage Site (cWHS) lies approximately 1.5 km away to the south east, extending along the southern edges of Halsary and

Snottergill burns. The cWHS is being nominated as it is widely recognised to be the largest area of blanket bog in the world. Together with associated areas of heath and open water it is of international importance as a habitat and for the range of wildlife it supports.

- of the Site.

2.

SITE

2.14 Loch Watten, which lies approximately 5.5km to the north east, Loch Scarmaclate approximately 6.9km to the north east and Loch Calder approximately 10.7km to the north west are designated as SACs, and are part of the wider Caithness Lochs SPA and Ramsar designation and are also SSSIs. The River Thurso is designated as a SAC and lies approximately 2.7km from the nearest part of the Site.

2.15 Spittal Quarry which lies approximately 1.7km to the north of the Site and Achanarras Quarry which lies approximately 3.0km to the north west are both designated as SSSIs due to their fossil and geological interest.

2.16 There are 18 scheduled monuments within 5km of the BESS compound. The nearest scheduled monument is Knockglass Broch (SM561) which lies approximately 1,300m to the north. Gallows Hillock scheduled monument (SM450), a prehistoric burial cairn, is situated approximately 3.6km to the north east of the compound. The other scheduled monuments within 5km include: eight brochs, four prehistoric cairns and a standing stone and three medieval chapels.

2.17 There are no Category A listed buildings within 5km of the turbines. There is a cluster of Category B listed buildings in Westerdale approximately 5km to the west of the BESS, including Westerdale Bridge, Dale House and its associated Dovecot and Walled Garden. There is one Category C Listed Building, Causeymire Church of Scotland Mission Hall approximately 3.7km to the south west. The nearest Conservation Area is in Wick approximately 17km to the east

2.18 Designations are illustrated on Figure 3.

Landscape Character

2.19 The site lies within Landscape Character Type 134: Sweeping Moorland and Flows Caithness and Sutherland and close to the neighbouring Landscape Character Type 143 Farmed Lowland Plain which lies to the north. Further details about these two character areas can be found in Chapter 6 of the Environmental Report that accompanies the planning application.

Local Landscape Context

The Site

2.20 The Site, which is shown in detail in Figure 2 above, slopes gently from west to east from approximately 100 m above ordnance datum (AOD, approximately equivalent to sea level) near the access junction with the A9 to 80 m AOD at its eastern end. The application Site area totals 39.3 hectares (ha).

Land Use

- 2.21 The main part of the Site predominately comprises commercial forestry plantation consisting of largely sitka spruce which is densely planted. There are a number of forest rides within the main part of the Site.
- 2.22 The access corridor part of the site was formerly also a coniferous plantation, however the trees were felled during the early stages of constructing Halsary Wind Farm and the land is being restored to peatland.
- 2.23 There is an existing wind farm access track (previously a forestry track) within the first half of the access corridor part of the site. There is a pole mounted 33 kV electricity line passing over the access track and a 132 kV transmission line which also passes over the track near the junction with the A9.

2.24 Drainage

2.25 The Allt Eireannaich is located within the southern part of the main site area, and flows from west to east into Loch of Toftingall. There are a number of minor streams that feed into Allt Eireannaich from the neighbouring Halsary site.

Geology

- 2.26 British Geological Survey (BGS) bedrock geology mapping indicates that the site is underlain by Spital Flagstone Formation comprising Siltstone, Mudstone and Sandstone. The BGS mapping indicates that the superficial deposits are dominated by peat.
- 2.27 Peat probing undertaken across the site indicates that the peat is typically less than 2.0 m deep in the eastern half of the main site and is largely between 1.0 and 4.0 m deep within the western part. The peat depth along the access corridor element of the site is shallower, with thicknesses generally of less than 1.0 m.

Built Infrastructure

- 2.28 There is no built infrastructure on the site itself. However, the site lies immediately adjacent to the north of the existing Halsary Wind Farm and the Mybster electricity substation compound to the immediate west, along with overhead power lines. The A9 road also lies close to the site boundary to the west and other wind energy development also lie close to the site on the opposite side of the A9 at Bad a Cheo, Causeymire and Achlachan.
- 2.29 There are a number of residential properties situated along the A9 and along the B870 that passes to the north of the site.

Sensory and Perceptual Characteristics

2.30 As the site lies close to several existing wind farms, the presence of energy development is already an existing characteristic of the landscape providing a sense of vertical scale to what is otherwise a wide open expansive large scale moorland landscape. Aside from the wind farms and substation there is relatively little other development, but the presence of the A9 is such that the site does not feel especially remote or wild in its nature.

Future Change in the Landscape

- Development.
- character of the landscape.

Planning Policy Context

- considerations.

2.31 The main foreseeable forces for change in the landscape surrounding the site relate to changes to the forest plantations with areas of felling and replanting in line with forest management plans. Further changes may also occur due to changes in agricultural land use in the farmed landscape to the north and through peatland restoration within the Halsary site to the south.

2.32 Within the wider landscape, there are several commercial wind energy developments, consented, in planning or being considered at scoping which, if approved, would also influence the existing nature of the immediate landscape surrounding the Proposed

2.33 In addition to the consented or proposed developments within the vicinity of the site, it is widely recognised that climate change will have an impact on the future character of the Scottish landscape through changes to weather conditions that will in turn result in changes to vegetation that will affect the intrinsic

2.34 The Planning Statement which accompanies the application provides an assessment of the extent to which the Proposed Development accords with planning policies and other material

2.35 The statutory Development Plan against which the Proposed Development should be considered comprises:

 National Planning Framework 4 (NPF4); the Highland-wide Local Development Plan (2012); and the Caithness and Sutherland Local Development Plan.

Image 1: LVIA Viewpoint 6 - Haul Road to Mybster Substation

National Planning Policy

- 2.36 NPF4 was adopted on 13 February 2023 and now comprises the national element of the statutory Development Plan. NPF4 sets out the long-term vision for development and investment across Scotland and replaces Scottish Planning Policy (SPP) and National Planning Framework 3 (NPF3) in their entirety.
- 2.37 NPF4 sets out a list of national planning policies to assess applications, alongside national developments and spatial priorities for different regions within Scotland.
- 2.38 There are two central themes running through NPF4 namely addressing i) the climate emergency and ii) the nature crisis. These key themes are reflected in the detailed wording of many policies, as well as their stated Intent and Outcomes. The positive contribution that the Proposed Development can make to addressing the twin nature and climate crises is set out in the accompanying Planning Statement which also provides a commentary against each policy.
- 2.39 Of particular relevance to this proposal is Policy 11: Energy whose intent is to:

'encourage, promote and facilitate all forms of renewable energy development onshore and offshore. This includes energy generation, storage, new and replacement transmission and distribution infrastructure and emerging low-carbon and zero emissions technologies including hydrogen and carbon capture utilisation and storage (CCUS)'

2.40 NPF4 Policy 11 now explicitly recognises in national planning policy that significant landscape and visual impacts 'are to be expected for some forms of renewable energy'. Policy 11 also notes that proposals will generally be acceptable where significant landscape and visual effects are localised and/or appropriate design mitigation has been applied.

The Highland – wide Local Development Plan (LDP) 2012

- 2.41 The LDP is the Highland-wide element of the Development Plan, supported by the Caithness and Sutherland Local Development Plan.
- 2.42 The LDP policies most relevant to the Proposed Development are:
 - Policy 67 Renewable Energy Developments;
 - Policy 28 Sustainable Design;
 - Policy 29 Design Quality and Placemaking;
 - Policy 36 Development in the Wider Countryside;
 - Policy 52 Principle of Development in Woodland;
 - Policy 56 Travel:
 - Policy 57 Natural, Built and Cultural Heritage;
 - Policy 55 Peat and Soils;

- Policy 58 Protected Species;
- Policy 61 Landscape;
- Policy 63 Water Environment; and
- Policy 64 Flood Risk.
- 2.43 The Council do not have Supplementary Guidance that covers BESS proposals.

Policy Summary

- 2.44 The Planning Statement accompanying the planning application provides an assessment of the extent to which the Proposed Development accords with planning policies and other material considerations.
- 2.45 The planning application requires to be determined in accordance with the relevant provisions of the Development Plan unless material considerations indicate otherwise. As of February 2023, NPF4 now comprises the national element of the Development Plan, and sits alongside the LDP.
- 2.46 As a matter of principle it is considered that the Proposed Development complies with the key NPF4 policy, Policy 11 'Energy', and the principle LDP Policy 67 'Renewable Energy Developments'. The Planning Statement assessment against the policy criteria in NPF4 Policy 11 demonstrates that the Proposed Development will not give rise to any unacceptable environmental effects and that it is not 'significantly detrimental overall' when the LDP Policy 67 criteria are considered in the round.
- 2.47 NPF4 now requires, as a matter of national planning policy, that decision makers give 'significant weight' to the extent to which a proposal contributes to the climate emergency and nature crisis. This is expressed through NPF4 Policies 1 and 11 and this is where NPF4 differs from the general support for renewable energy projects in the LDP.
- 2.48 The Planning Statement accompanying the planning application demonstrates that the Proposed Development will help contribute to the attainment of renewable energy targets and net zero by 2045 while at the same time incorporating an integral package of measures to secure significant and demonstrable biodiversity benefits across the Site.
- 2.49 Some localised landscape and visual effects will arise, but with the proposed landscape planting and screening these will be mitigated over time. The acknowledgement of localised landscape and visual impacts is not unusual for a BESS development nor do they equate to a policy conflict to the extent that this Proposed Development is considered to be in conflict with the Development Plan. The Proposed Development is located in an area that is characterised at present by renewable energy and grid infrastructure and it would be complementary to these existing facilities.

- the energy system.

2.50 In addition to helping meet to meet the Scottish Government's legally binding target of reaching net-zero greenhouse gas emissions by 2045, the Proposed Development also has positive impacts on the economy through job creation and supporting the Scottish economy. The UK and Scottish Government energy policy documents discussed in Section 4 of the Planning Statement all lend further support to the case for granting planning permission. These documents recognise the need for more battery storage across the country as we continue to progress towards the decarbonisation of our energy system, which will add resilience to

2.51 Overall, it is concluded that the Proposed Development complies with relevant Development Plan policies. The material considerations of relevance in this case lend support to a compliant Development Plan position.

Need for the Development

- 3.1 The United Kingdom's electricity network has historically relied on large, centralised power stations. However, numerous coal fired power stations have recently been decommissioned and gas fired power stations are increasingly being used intermittently when demand is high and electricity cannot be supplied by renewable sources. Existing nuclear power stations are reaching the end of their design lives and there will be further delays before new nuclear plants come online.
- 3.2 There is an ever-increasing reliance on renewable forms of electricity generation, such as wind and solar, to meet the United Kingdom's electricity demands. The amount of renewable electricity generated from wind and solar is, however, intermittent due to weather dependency. As a consequence, electricity demand and supply are becoming more challenging to balance.
- 3.3 The BESS would import and store electricity from the network when there is a surplus of generation, and then export this again when there is a deficit. This balancing function reduces the amount of time that renewable generation needs to be 'curtailed' (i.e. switched off) reducing the need to generate electricity from fossil fuel sources; primarily gas fired power stations.
- 3.4 The BESS has been largely designed to fulfil a balancing function. The BESS has been sized at 49.9 MW maximum output principally as a result of the import export grid capacity that was available at Mybster substation. The use of a 4-hour discharge design parameter enables the BESS to provide a sizeable amount of balancing.
- 3.5 The changing generation mix (explained above) and increasing intermittency is also decreasing the level of system inertia. Lower system inertia affects the ability of the system to manage the electricity network frequency within normal operating limits (within +/- 1% of 50hz). If the network is not maintained within the required frequency tolerance, system stress can result in widespread power supply issues and damage network infrastructure.
- 3.6 The BESS would have the ability to discharge electricity extremely quickly and therefore it could, at least in part, be operated so that it serves a frequency response purpose, as well as a balancing function.

3.7 Overview

3.8 Assessment and design work has taken place on the Loch Toftingall site over an extended time period. At an early stage the project comprised a six turbine wind farm scheme with the potential to include a battery energy storage element. In response to consultation feedback and grid connection arrangements this was progressively amended so that the proposal now consists only of a battery energy storage system.

Site Selection

- 3.9 In late 2016, Infinergy undertook some feasibility work on the Loch Toftingall plantation site to establish whether it had potential to accommodate wind turbines. The appraisal work undertaken at the feasibility stage covered a range of different issues, including:
 - distance to private dwellings;
 - nearby wind farms;
 - grid connection distances and costs;
 - site access;
 - land designations;
 - landscape and visual considerations;
 - initial noise modelling;
 - wind speed data;
 - ecology and ornithology;
 - archaeology;
 - local development plan policies;
 - telecommunication links; and
 - aviation.
- 3.10 In early 2017, the site was progressed to the EIA and wind farm project design stage for reasons that included the following:
 - the Site lies next to the existing Causeymire/Bad a Cheo/ Halsary/Achlachan wind farm cluster. It was considered that the site presented an opportunity for further turbines to be well integrated with the existing wind farms;
 - the Site does not lie within, nor is it in close proximity to, any areas of national landscape designation nor within or close to a Special Landscape Area or Wild Land Area;
 - the Site lies within a group 3 area with potential for wind farm development in the Highland Council wind farm spatial framework;
 - the Site does not lie within any ecological designation;
 - the Site enables adequate separation to be achieved from the nearest residential properties;
 - the average wind speed is high compared to other sites;
 - the availability of good access route options to the Site involving minimal environmental disruption;
 - · the site lies close to a potential grid connection point at Mybster substation; and
 - there are no civil and military radar issues.

Layout Iterations

Pre-scoping layout

3.11 Initial constraint analysis undertaken in 2018 revealed that there were a number of constraints covering different parts of the site which limited the number and siting of the wind turbines. These included:

- cumulative noise limits;
- peat depth; •
- residential amenity;
- telecoms links; and

Figure 4: Pre-scoping layout

ESIGN PROCESS

bird activity associated with the Loch;

- cultural heritage.

3.12 An initial pre-scoping wind farm layout was prepared in February 2019 consisting of six, 149.9 m to tip wind turbines, four on the western part of the site and another two beyond Loch Toftingall on the eastern side of the site. This pre-scoping wind farm layout is shown in Figure 4 below. The area to the north and to the south east of Loch Toftingall were kept free of wind turbines to preserve corridors for osprey and divers that had been recorded feeding on the Loch.

3.13 A formal pre-application meeting with Highland Council and key consultees was held in early March 2019 where this initial wind farm layout was presented and a pre-application response letter was received from the council in early April 2019. This response letter raised concerns about the scale of the wind turbines, the gap within the layout created by the Loch, the ability of the location to accommodate further wind turbine development and the number of properties where there would be residential amenity impacts.

- 3.14 The proposals presented at the pre-application meeting did not, at that stage, include an energy storage element although this aspect was being considered by the Applicant. The response letter stated that the inclusion of energy storage within the scheme would be supported by Highland Council.
- 3.15 A cumulative noise feasibility assessment was also undertaken in March 2019. This established that without the use of reduced noise mode there would be exceedances above the applicable cumulative noise limits at the nearest receptors to the west and north of the site.

Wind Farm Scoping Layout

- 3.16 In May 2019, a scoping report was then prepared based on a further iteration of the wind farm layout which comprised six, 138.5m to tip wind turbines with two turbines in the western part of the site and a further four turbines on the eastern side of the Loch. This wind farm scoping layout is shown in Figure 5 below.
- 3.17 The main reason for relocating two wind turbines from the western side of the Loch to the eastern side was cumulative noise levels at residential receptors to the north and west of the site. The position of the wind turbines was adjusted as a result of phase 1 peat survey results so that no turbine was located within peat of greater than 3 m depth.
- 3.18 The wind turbine tip height was reduced from 149.9m to 138.5m in response to Highland Council's concerns about the scale of the turbines in the pre-application response letter.

Figure 5: Wind Farm Scoping Layout

- 3.19 The scoping proposals did incorporate a sizeable battery energy storage array in association with the wind farm substation, although the size and location of this facility was not specified.
- 3.20 A scoping opinion was received from Highland Council in June 2019.

Two Wind Turbines and Battery Storage Layout

- 3.21 In late 2019, a distribution grid application was made to accommodate the output of the six wind turbines in the scoping layout. At the start of 2020, a grid offer was received which provided a relatively early and low cost connection into Mybster substation. The grid offer was accepted in early 2020.
- 3.22 The EIA and design work was put on hold from early 2020 to late 2021, while negotiations took place with neighbouring landowners to secure an access track into the site that could accommodate wind turbines.
- 3.23 As a consequence of the grid connection agreement, in early 2022 it was decided to progress with a two wind turbine layout (with tip heights of 149.9 m) together with a battery array of approximately 20MW output in the southern western part of the site
- 3.24 This key design change was made because it was considered that the two turbines would be seen in the context of the adjoining Halsary turbines, Mybster substation and associated pylons. It was decided that this landscape and visual setting could facilitate an approval at committee, without the need for an appeal, which would enable the short grid connection timescale to be met. It was decided that the spare grid agreement output, created by the deletion of four of the wind turbines, could be re-purposed as import-export battery storage output.

Figure 6: Two Wind Turbines and Battery Storage Layout

- - area of the Site; and

 - for two main reasons:
 - Mybster substation; and
 - locations.
- below.

Initial Battery Facility Layout

3.25 In the middle of 2022, the grid agreement was modified so that the battery array could import as well as export electricity. At this time it was established that there was further grid capacity available at this location for battery import and export and a second grid application was submitted. The grid offer that was received for this together with the modified agreement enabled the battery array output to be increased to nearer 40 MW.

3.26 At this stage of the project the following two access track options into the site were being considered:

(i) an access track into the site using the existing northern Halsary wind farm access track with a new stretch into the southern

(ii) an alternative northern option, using the existing forestry track into the Loch Toftingall plantation.

3.27 The substation and battery array compound was located in the south western corner of the overall Loch Toftingall plantation site

(i) to reduce the distance for the future electricity connection to

(ii) the peat is shallower in this part of the site compared to other

3.28 Due to the deletion of wind turbines on the eastern side of Loch Toftingall the red line of the site area was reduced so that it only included land to the west of the Loch.

3.29 This two wind turbine and 40 MW battery array layout including the two access track options, was the proposal presented at the first round of community consultation events which took place at the end of January 2023. This layout iteration is shown in Figure 6

3.30 At the first round of community consultation events at the end of January 2023, the majority of local residents who attended and/or responded using feedback forms made it clear that they objected to the two wind turbines. This was primarily due to potential cumulative effects as a consequence of the large number of existing turbines nearby. A number of residents also objected to the use of the northern forestry track access option.

3.31 In response to the feedback, it was decided to remove the two turbines from the project so that it only included the battery facility before the second round of community consultation events in the middle of March 2023. It was also decided to only include the southern access track through Halsary wind farm in the scheme.

3.32 The size of the battery compound was increased to provide a maximum output of 49.9 MW and to facilitate a longer period of discharge, compared to the array in the previous layout iteration. The location of the facility remained unchanged compared to the

previous stage.

- 3.33 Due to the deletion of the wind turbines entirely from the proposals, it was considered that there would now be less of a requirement for clear felling and peatland restoration. The red line of the site was therefore further reduced so that it only covers the battery compound area and the more immediate forestry blocks which would still be required for landscaping, riparian planting along the Allt Eireannaich and peatland restoration.
- 3.34 The layout that was shown at the second round of consultation events is shown in Figure 7 below.

Figure 7: Initial Battery Facility Layout

Final Battery Energy Storage System Layout

- 3.35 The battery facility layout underwent a final iteration in April 2023. The size of the compound was further increased to include land immediately to the east.
- 3.36 The main reasons for this were as follows:
 - (i) to include more units to facilitate a longer period of discharge at the same output;
 - (ii) to increase spacing between battery units for fire safety reasons; and
 - (iii) to incorporate a construction compound area which could also serve as a rejuvenation area where extra battery units could be installed if the overall maximum output of the array drops below 49.9 MW in the future.
- 3.37 The final BESS layout is shown in Figure 8 opposite.

Figure 8: Final BESS Layout

	Battery Infrastructure
	Inverter Infrastructure
	Standby Watertank
	Car Park
	Proposed Access Track
	Proposed CCTV
_	Proposed 3m High Pallisade Fence
_	Proposed 4m High Acoustic Fence

Figure 9: Indicative BESS Internal Layout

Consultation

Overview

- 4.1 Two rounds of public consultation events have been held to date. The first round of consultation was undertaken in January 2023, with a follow up round undertaken in March 2023.
- 4.2 Consultation activity is expected to continue throughout the planning application process.

Consultation Activity

- 4.3 Consultation activity has included:
 - distribution of invitation postcards to local addresses;
 - a dedicated project website with online consultation tool (www.lochtoftingallwindfarm.co.uk);
 - social media activity;
 - a Freephone telephone number;
 - community open days held on 31st January in Spittal Village Hall and 1st February in Watten Village Hall; and
 - follow up community open days held on 14th March in Spittal Village Hall and 15th March in Watten Village Hall.
- 4.4 Local residents and other key stakeholders were invited to attend the open days. The first round was publicised via a postcard sent out to all addresses (415) within a 5km radius of the project and editorial coverage in the John O'Groat Journal, as well as promotion on social media. The second round was again publicised via a postcard mailing, this time increased to cover a 10km range which increased the address data to 1,223 properties.

Community Open Days

- 4.5 At the Community Open Days members of the development team were on hand to explain the proposals, discuss the wider issues around onshore wind and battery development and demonstrate landscape and visual impact via photomontages.
- 4.6 As well as being able to discuss the Proposed Development, alongside the wider issue of climate change, energy security etc., members of the development team were able to offer visitors the chance to view specific landscape and visual impact by utilising a 3D computer modelling programme able to generate views from any given view point, thus allowing residents to see just how the development of turbines and battery storage units would look from their own homes.
- 4.7 In total 69 people attended the exhibitions. 34 people attended the first round of community open days and 35 people attended the second round where the revised BESS only proposals were presented.

How have our studies influenced the lawout?

The layout has gone through a number of design iterations. In May 2019 a scoping opinion was requested from Highland Council with input from a range of other consultees. At this stage the site area was larger and the layout consisted of six wind turbines, four located on the eastern side of the loch and two on the western side.

This has been amended largely as a result of pre-application consultation with Highland Council with a reduction in the turbine numbers from six to two and the alignment of the two turbines has been changed so that they are closer to Halsary wind farm

The main environmental constraints which have defined the layout are as follows:

Landscape and Visual: complex cumulative situation with operational turbines of differing dimensions.

Peat: based on surveys carried out on site, the peat depth ranges from 4m+ in depth to less than 0.5m deep. The turbines and other infrastructure have been positioned to avoid the areas of deeper peat.

Noise: Following the completion of a 'background noise assessment', the turbines have been positioned to ensure they remain within strict national and local guidelines for noise limits.

Cultural Heritage: both the turbines and related infrastructure have been positioned to minimise impacts on known cultural heritage assets.

ent: the layout has Water Enviro maintained standard separation distances from watercourses and private water supplies.

nications: there are two telecommunications links that pass through the site and the turbine positions have been selected to avoid interference.

In addition, the layout has been influenced by a detailed wind measurement campaign

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PHOTOMONTAGES

Photomontage photography taken from Grid Reference 316885, 953713 set with a 53.5 degree field of view

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Image 1: Examples of Consultation Boards shown at the first consultation events in January 2023

How have our studies influenced the layout?

The proposed development has gone through a number of design iterations. In May 2019 a scoping opinion was requested from Highland Council with input from a range of other consultees. At this stage the site area was much larger and the proposal consisted of six wind turbines and a battery energy storage facility.

This was amended largely as a result of pre-application consultation with The Highland Council so that it included only two wind turbines instead of six, together with the retention of the Battery Energy Storage Facility, which was sized at a capacity of 40MW and located in the south western part of the site area.

At the first round of community open days at the end of January, the majority of local residents who attended and/or responded using feedback forms made it clear that they objected to the two wind turbines. This was primarily due to potential cumulative effects as a consequence of the large number of existing turbines nearby. In response to the feedback, it was decided to remove the two turbines from the project.

The proposal therefore now only consists of a battery energy storage system in the same location as previously indicated.

There would also be an access track to the facility through the northern part of the Halsary wind farm.

THE PROPOSED LAYOUT

The main environmental constraints which have defined the layout are as follows:

Grid Connection: the Battery Facility has been located in the south western part of the Loch Toftingall landholding to reduce the distance for the grid connection to the Mybster Substation.

Landscape and Visual: the Battery Facility is well separated (approximately 700m) from the A9 and the terrain slopes gently away towards the Loch so that the compound lies at a lower level (by approximately 10m). The Battery Facility is situated within the south western part of the Loch Toftingall plantation. Whilst the felling and replanting of the blocks near the facility will change over the lifetime of the development, the forestry will provide some important landscape screening.

Peat: The facility needs to be located near the connection point. The facility has been located in an area where the peat depth is shallower relative to other land within the south western part of the Loch Toftingall plantation. The peat depth at the Battery Facility location ranges from 2.0m in depth to 0.5m deep, whilst the peat along the new access track through Halsary ranges from 1.5m in depth to less than 0.5m. Peatland restoration rather than forestry restocking is likely to be undertaken on deeper areas of peat nearby.

Residential Amenity: the Battery Facility is well separated from the nearest properties. The closest property lies next to the A9, approximately 730m away to the north west.

Cultural Heritage: there are no known cultural heritage features near the Battery Facility.

Water Environment: the facility would be sufficiently separated from the upper parts of the Allt Eireannaich watercourse which flows into the Loch.

Construction and Access

Should the Loch Toftingall Proposal be granted planning permission, construction would not be expected to commence until approximately autumn 2024.

The battery containers can be transported to the site on standard articulated lorries, and therefore there is no need for a particular abnormal indivisible load route to be established as there was with the previously proposed wind turbines.

The potential effects of construction traffic is being assessed as part of the Environmental Impact Assessment (EIA) process, and in consultation with The Highland Council and Transport Scotland.

THE INDICATIVE DESIGN

Image 2: Examples of Consultation Boards shown at the second consultation events in March 2023

Proposed Development Layout

- 5.1 The footprint of the main compound, the potential future augmentation area and the access track covers an area of 1.3 hectares.
- 5.2 The main BESS compound would measure 100 m by 65 m and the potential future augmentation area hardstanding would measure 50 m by 50m. The main BESS compound would be surrounded by fencing, and the overall facility would be set within a landscaping scheme.

Project Components

Energy Storage Units

- 5.3 The main compound is likely to contain up to 52 energy storage units, which would be installed in sets of four units, in a grid arrangement, as shown in Figure 9. Each unit would typically be approximately 6.1 m long, 2.5 m wide and 2.9 m high and would sit on small, concrete footings (approximately 0.5m high).
- 5.4 The units would consist of steel containers which are designed to be secure and protect the contents from weather. The containers will have an appropriate RAL light grey and/or green finish, which will be agreed with the planning authority.

Image 3: Typical Energy Storage Unit

- 5.5 The container units will house rows of battery modules arranged in racks. The battery cells are likely to be of the Li-lon type.
- 5.6 The battery units are likely to incorporate a fire detection and suppression system and a liquid cooling system rather

than an air conditioning based cooling system. It is therefore unlikely that there would be HVAC (Heating Ventilation and Air Conditioning) units on top or on the side of the container units. It is likely that each unit would have a vent which would be flush with the side of the unit.

57 It is proposed that the final approval of the appearance and specification of the energy storage units should be made the subject of an appropriate planning condition.

Inverter and Transformer Units

- 5.8 The Direct Current (DC) battery voltage needs to be converted into Alternating Current (AC) using inverters and then transformed to a network voltage. Each group of four energy storage units would be associated with a single combined inverter and transformer unit, which means that circa 13 of these would be required, as shown in Figure 9.
- 5.9 The combined inverter and transformer units would typically be 6.1 m long, 2.4 m wide and 2.9 m high.

Switchgear and control buildings

- 5.10 There would be two switchgear and control buildings. Each could typically be 21.5 m long, 6.0 m wide and have a height to the ridgeline of the roof of 4.0 m.
- 5.11 The building in the southwestern corner of the main compound is the distribution network operator's building. Part of this building would be for switchgear and other connection equipment, and another part would be for control systems. This building would be accessed from within the main compound but it would have its own fence to separate it from the remainder of the BESS.
- 5.12 The other building would be for the battery facility operator. Part of this building would house switchgear and other connection equipment. It would also contain the control room which would include the supervisory control and data acquisition (SCADA) and the battery management system (BMS) equipment. There would be an office with stores and welfare facilities within another part of the building.
- 5.13 No staff would be based at the Proposed Development. Four parking places will be provided adjacent to the battery facility operator's building for visiting maintenance personnel.
- 5.14 The Proposed Development would not have a foul sewer connection. Foul drainage from staff welfare facilities on site would be disposed of either by a packaged biological foul treatment plant with discharge to the surface water system or to a storage tank for offsite disposal via road tanker.
- 5.15 The battery units would be connected to the on-site switchgear and control building via cables which would be buried in trenches of around 0.5 m to 1 m in depth, within the compound.

Lighting

- enclosure.
- scheme for the BESS.

Fencing

Closed Circuit Television Masts

- approximately 4 m high.

Hardstanding

- geology is unsuitable.

5.16 There will be no permanent visible lighting within the BESS. The visible lighting within the main compound will consist of motion-sensitive lighting at the entrances to the storage units and buildings, which will only be activated during occasional visits by maintenance personnel. This will be designed to be downward facing to minimise any light-spill beyond the

5.17 There would also be invisible infra-red lighting within the compound which will be detectable by security cameras. It is proposed that a condition be attached to the planning permission requiring the submission and approval of a lighting

5.18 The compound would be enclosed by a 4 m high wooden acoustic fence. This would provide acoustic attenuation and screen the internal infrastructure. There would also need to be an outer 3 m high steel palisade fence alongside the acoustic fence for security reasons.

5.19 The exact colour of the fences would be agreed with the council but they are likely to be either dark green or brown. There will also be a peripheral outer standard wire mesh deer fence, to protect the landscaping while it becomes established.

5.20 It is anticipated that there would be seven closed circuit television (CCTV) masts with security cameras on the perimeter of the compound. The masts would be slender and

5.21 The masts will accommodate infrared night-time cameras, as well as standard cameras to maintain security surveillance during the hours of darkness.

5.22 The detailed design of the CCTV masts and equipment would be submitted at a later stage to satisfy a planning condition.

5.23 The BESS compound will be formed of crushed aggregate laid on permeable membranes. The aggregate will be sourced from local guarries and transported to the site via the A9 and the existing northern Halsary Wind Farm access junction and track. The aggregate cannot be obtained from within the Loch Toftingall plantation land using a borrow working because the

5.24 Cut and fill earthworks across the compound area would be carried out at an early stage of the construction process to create a suitable level development platform. The earthworks will be designed to minimise the need for fill material to be brought to the site or for excess material to be removed from site, as far as practicable.

5.25 The aggregate within the compound will be uncompacted and therefore permeable. There will be some elements of the compound surface which will not be aggregate, for example the internal access tracks within the main compound will be tarmac.

Potential Future Augmentation Area

- 5.26 The storage capacity and maximum output from the battery units is likely to diminish after a period of about 10 years. There are various methods of maintaining the output including: progressive replacement of battery cells within units, replacement of whole units within the main facility (commonly known as repowering) or installing additional battery units within or next to the main facility.
- 5.27 The decision on whether to install further battery units would be taken at a later date. As a precaution, a potential future augmentation area measuring 50 m by 50 m has been included in the Proposed Development layout design and planning application. This is located immediately to the east of the access track opposite the main BESS compound access gate.
- 5.28 The potential future augmentation area would be laid out as a crushed rock hardstanding, during the construction programme for the main facility.

Construction Compound

- 5.29 During the construction phase a temporary construction compound area will be required. This will be located within the potential future augmentation area. The compound would be used to store materials, provide vehicle parking, and would form a location for site cabins, offices and welfare facilities.
- 5.30 The construction plant and materials would remain for the anticipated 36-week duration of the groundwork and installation phases of construction but would be removed during the commissioning stage to leave a clear hardstanding for the potential augmentation area.

Access Track

- 5.31 The access to the BESS will initially be along the existing northern access track into the Halsary Wind Farm, and then along a new section of track approximately 590 m long, orientated north-south, from a point approximately 250 m to the west of Halsary Turbine 5 to a point on the south western perimeter of the Loch Toftingall plantation land.
- 5.32 The new section of track will be constructed of crushed rock and have an approximate running width of 5 m. The track passes across land that is relatively flat and therefore would not require sizeable embankments or cuttings and there would be no watercourse crossings.

Grid Connection

- 5.33 The proposed energy storage scheme will be connected to Mybster substation which lies approximately 500 m to the west of the compound.
- 5.34 The distribution network operator will be responsible for assessing, designing, and obtaining consent for the connection. It is anticipated that it will take the form of underground cable along a relatively direct route corridor.

Attenuation Pond

- 5.35 An attenuation pond has been included in the overall scheme layout. The pond will be designed as a SuDS feature. Runoff from the impermeable elements of the BESS compound will be collected and directed into the pond which will provide treatment and attenuation prior to discharge to the receiving watercourse.
- 5.36 The pond will have graduated margins and will be natural in shape so that it is well integrated into the surrounding landscaping area. The margins would be planted with wetland plant species appropriate to the local area to promote biodiversity.
- 5.37 The detailed design of the pond will be provided as part of a surface water drainage scheme which will be submitted to satisfy a planning condition.

Forestry Felling

- 5.38 The forestry plantation compartments within the site will be felled as the first stage of the construction programme. These compartments were due to be felled in the period 2026 - 2030 in accordance with the felling plan for the Loch Toftingall plantation. The timber is likely to be extracted using the existing forestry track from the B870.
- 5.39 The remainder of the forestry block to the north of the compound (excluding the native landscaping area) will be restocked with sitka spruce and, over time, this will provide further landscape screening. The compartment to the east of the compound containing part of the Allt Eireannaich will not be restocked and instead it will be dedicated to peatland restoration and riparian planting.

Landscape Mitigation

- 5.40 As shown in Figure 10, an area of native species landscaping will be created around the compound which will reduce internal visibility as well as visibility of the wooden acoustic fence and steel palisade security fence. The area of landscaping will also provide some biodiversity enhancement.
- 5.41 The planting will be checked annually for the first 5 years and any gaps will be refilled.
- 5.42 Open areas within the outer site perimeter fence which are not required for operational reasons or peatland restoration, including

the area around the SuDS attenuation pond, will be planted with an appropriate wildflower and grassland mix.

Peatland Restoration

- is felled.

Riparian Planting

- application.

5.43 The details of the planting and its aftercare would be agreed through an appropriate planning condition.

5.44 As shown in Figure 10, the land to the east of the BESS will, over an extended period of time, be restored to peatland after the forestry

5.45 Two principal restoration techniques are likely to be adopted: (i) cross tracking and (ii) ground smoothing. With cross tracking, a tracked excavator would be used to flatten plantation plough ridges and disrupt drainage pathways. Ground smoothing would involve using an excavator bucket to upturn stumps and infill furrows. The type of technique that would be adopted is likely to vary across the peatland restoration area depending on which is most suitable.

5.46 Both approaches would impede conifer regeneration and help to raise water levels which are key requirements to facilitate peatland restoration. In addition to the main techniques there would also be hand-clearance of conifer regeneration and damming of existing drains and the deeper furrows to impede water flow.

5.47 Restoration proposals would be set out in a habitat management plan and agreed through an appropriate planning condition.

5.48 As shown in Figure 10, the indicative landscaping scheme native species riparian planting is proposed along the course of the Allt Eirennaich to the east of the BESS within the red line of the planning

5.49 The detailed species mix would be agreed at the condition discharge stage. It is anticipated that the native riparian planting will be similar to that proposed within the adjoining Halsary Wind Farm site.

5.50 A detailed survey including a water vole and otter species survey would be undertaken to inform the tree planting plan.

KEY

EXISTING

Site boundary

Existing vegetation / forestry plantation

PROPOSED

Proposed battery storage area

*

Proposed access track from Halsary Wind Farm / areas of hardstanding

Indicative location of proposed gate, flanked by lengths of **Caithness Flag Fence**

Area to be cultivated and allowed to naturally regenerate to rough grassland to be specified and managed in line with ecological advice

Area left for peatland restoration, to be specified with regard to relevant NatureScot guidance and ecological advice

Riparian planting zone surrounding watercourses within peatland restoration area, to be specified with regard to relevant NatureScot guidance and ecological advice

Shallow attenuation basin

Figure 10: Indicative Landscape Scheme

Access

Existing Road Network

- 5.51 The A9 is the main trunk road in the area and connects Perth to Scrabster. The road is operated on behalf of Transport Scotland by BEAR Scotland. Outwith the settlements in the area, the road is subject to the national speed limit. The A9 in the vicinity of the Site is a single carriageway road, with centre line markings operating at the national speed limit.
- 5.52 The A9 is currently maintained as part of the trunk road network with no posted weight limits. Given its trunk road status, it is expected that the road is well suited to accommodate HGV traffic and that any effect of temporary construction traffic on this route should be negligible.
- 5.53 The A882, to the north of the Site is a rural traffic distributor road which carries traffic between the A9 and the A99 trunk roads and provides an alternative route connecting the northern towns of Wick and Thurso. The A882 is a rural single carriageway road, running in an east-west direction while operating at the national speed limit, except in built up areas including Haster and Watten, where the limit reduces to 30-mph.
- 5.54 As the A882 is one of the major traffic routes in the region, it is assumed that temporary increases in HGV traffic are not uncommon and that any effects of the increase in traffic numbers due to construction of the Proposed Development will be low.

Policy

- 5.55 The following policy has been considered during the development of the access strategy:
 - The National Planning Framework 4 (NPF4) (2023);
 - The National Transport Strategy (2020); and
 - The Scottish Planning Advice Note 75 (PAN 75) Planning for Transport (2005)

Access Strategy

- 5.56 Access to the Site will be via the existing access junction into the Halsary Wind Farm off the A9 located to the southwest of the Site. This priority junction is well formed with good visibility and was used during construction and maintenance of the Halsary Wind Farm. It, therefore, will not require improvement works to enable access to the Proposed Development.
- 5.57 From the existing Halsary Wind Farm access tracks a new 590 m section of access track formed of crushed stone will lead north to the BESS compound.
- 5.58 The existing access from the A9, the existing Halsary Wind Farm access tracks and the proposed 590 m section of access track will provide suitable access for all construction, operation and maintenance vehicles and users requiring access to the Site.

Image 5: Illustrative photomontage (Year 10) showing screening provided by landscape planting

Image 4: Illustrative photomontage (Year 1)

Construction of the Proposed Development

- The start of construction would depend on the planning process, 6.1 and the procurement stage.
- 6.2 The on-site construction period is estimated to be approximately 9 months, however, this could be longer if there is a delay between the ground works and the installation stage due to the lead in time for the delivery of the battery units and inverters.
- 6.3 The construction activities are listed below in the approximate order that they would take place, albeit that the duration of some activities will overlap.

Ground works

- Felling and extraction of forestry within the main part of the site;
- Formation of the construction compound (potential future augmentation area) immediately to the east of the main BESS compound;
- Construction of new access track from the existing Halsary Wind Farm track into the Loch Toftingall site;
- Levelling and preparation of the main BESS platform;
- Preparation of battery unit and other foundation footings within the compound;
- Trenching and laying of cables within the compound;
- Formation of compound with imported aggregate;
- Construction and electrical fit out of buildings and enclosures within the compound;
- · ;Preparation of landscaping areas and formation of attenuation pond; and
- Erection of the acoustic and palisade fences around compound perimeter.

Installation

· Delivery of the battery units, inverters and transformers using heavy goods vehicles and installation using a crane.

Commissioning

- · Installation of underground electrical cable to Mybster substation (not part of this application); and
- · Setting, testing and monitoring initial operation of the battery facility.

Site re-instatement

· Restocking of the remaining part of the forestry block to the north of the compound.

Landscape planting

- Seeding of wildflower grassland areas around compound;
- Riparian planting along the course of Allt Eireannaich; and
- Longer term peatland restoration to the east of the compound.
- 6.4 The typical construction plant to be used would include: excavators, graders and haulage vehicles, mobile and tower cranes, heavy and light goods vehicles.
- 6.5 The crushed rock used to form the compound hardstanding will be imported from local guarries. The material for the foundations will be imported ready mixed concrete. Material excavated during the ground works phase will be reused within the site.
- 6.6 Normal construction working hours would be Monday to Friday 08:00-18:00 and Saturday 08:0013:00. No Sunday, bank holiday or night working is proposed except as described below. Up to an hour before and after the normal construction working hours, the following activities may be undertaken:
 - arrival and departure of the workforce at the site and movement around the project site that does not require the use of plant;
 - site inspections and safety checks; and
 - site housekeeping that does not require the use of plant.
- 6.7 Non-noisy activities such as fit-out within buildings may be undertaken outside of those hours where these would not cause disturbance off-site. It is possible that certain construction activities that cannot be interrupted, such as a continuous concrete pour, may be required for the foundation slabs of the development platforms.
- 6.8 Directional task lighting may be required during normal construction hours in winter. Outside normal construction working hours, motion-activated directional security lighting may be used at the site.
- 6.9 A Construction Environmental Management Plan (CEMP) will be prepared and agreed prior to any work commencing on site. A Construction Traffic Management Plan (CTMP) will also be produced prior to the commencement of construction.

Operation of the Proposed Development

- lower at this time.
- a 24-hour basis.

6.10 The BESS is likely to operate intermittently on a 24-hour, seven day a week basis, although operation during the middle of the night would be less likely to occur, as electricity demand is

6.11 The facility would not require a permanent manned presence. Maintenance would be overseen by suitably gualified personnel who would visit the development as required. This would typically be less than twice per month. Online monitoring of performance and identification of issues would be provided on

6.12 Typical traffic to the site would be one or two vans per month. During the normal course of operations, no heavy good vehicles (HGV) are anticipated to be required. There would, however, be some additional HGV movements if any part of the BESS required replacement during the operational life of the development.

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