



**Supporting Document,
Bolfornought Energy Storage**

A report to
Stirling Council

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Document prepared for

Andrew Hughes

Shires Hamilton Limited

The Shires, 33 Bothwell Road, Hamilton, Lanarkshire ML3 0AS

Authorised by

Simon Munro
Director

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1 INTRODUCTION

1.1 The application

This document supports an application to Stirling Council by Intelligent Land Investments Group plc for consent under the Town and Country Planning (Scotland) Act 1997 for construction of a battery energy storage system at Bolfornought Farm, by Springkerse, Stirling FK7 7LL. The proposal is described as Bolfornought Energy Storage.

The application seeks consent for the installation of an energy storage system with a generating capacity of up to 49.99 megawatts. The development would consist of containers containing batteries, associated equipment, an access track, electricity meter building, fencing and new planting. Figures show the site location, and layout.

1.2 Site description

The proposed development site lies in farmland, part of Bolfornought Farm, a working farm. The site is agricultural land. The field in which the proposed development is sited is accessed from the A91 Distributor Road at the Muirton roundabout from where the existing private access serves the farm and 6 houses. This is in the vicinity of Forthbank Stadium and St Modans High School.

The site lies on the flat carse farmland around 2 kilometres east of the town of Stirling on the edge of the large Springkerse industrial area.

The site is around 300 metres from the nearest house at Upper Taylorton Farm to the north.

2 PROJECT DESCRIPTION

2.1 Introduction

This section describes the proposed development in terms of its physical elements and in terms of the construction process.

The area of the red line boundary is 1.7 hectares.

2.2 Design

The project has been designed to give efficient and effective operation, and acceptable and minimised local impacts.

The location is close to the existing Stirling national grid substation, providing for efficient operation. The flat site and surroundings allows for a development composed of low structures to be effectively screened with sympathetic new planting and there is plenty of set back to residents and sensitive uses.

The site layout has been developed to give a compact footprint assisting efficiency and minimising the land take. Standard container units allows maximum efficiency and effectiveness by allowing final selection of internal equipment at late stage in an area where battery technology is progressing rapidly. The proposed planting will provide screening and allow the development to be absorbed into the existing landscape.

2.3 The development

The grid battery energy storage system will comprise batteries housed in steel containers, associated electrical equipment, security cameras, access track, meter building, fencing, landscape bund and new planting. The generation capacity will be up to 49.99 megawatts.

Containers

Batteries, inverters, transformers and control equipment will be housed in steel containers of 13 metres by 2.5 metres by 2.6 metres high. The containers will be placed just above ground level. Cooling units will be situated at low level on the side of the containers. The colour would be agreed with the Council, dark green RAL6005 is proposed.

Power converters

Banks of power converter cabinets will sit within the site to switch between alternating and direct current. The height will be below that of the external fence and so these are not expected to be significantly visible outside of the compound.

Transformers

There will be an electrical transformer beside each power converter group. The height will be below that of the external fence and so these are not expected to be significantly visible outside of the compound.

Store

Two containers housing stores are proposed being metal containers of colour dark green RAL6005, unless otherwise agreed in writing.

Track

Access to the site will be from the A91 Muirton roundabout. The existing access is suitable for all vehicles that would access the site. The existing private road in the vicinity of the site will be widened slightly and new track will be formed into the site with a running surface of aggregate on permeable geotextile.

Meter building

A small building is proposed to house Scottish Power switchgear, site switchgear, electricity metering and control equipment and health & safety equipment. This would

be a prefabricated GRP building up to 13 metres by 6 metres by 3.2 metres high. The colour would be agreed with Stirling Council Planning, dark green RAL6005 is proposed.

Water system

A water tank and valve house is proposed for fire suppression. This will comprise a water tank of 3 metres height and 12 metres in diameter of steel with a matt green finish. A guard rail and valve housing would rise above the top of the tank by 0.6 metres. Adjacent to the water tank would be the valve house, a prefabricated GRP building of 5 metres by 5.5 metres housing valves and equipment with a textured dark green finish.

Parking

No staff will be based at the site. Parking places will be provided adjacent to the meter building for visiting maintenance personnel.

Electrical connection

The project would be connected to the Stirling national grid electricity substation by buried cables.

Fencing, security, lighting

A 3m high solid wooden fence would be built around the battery site. The fence will be dark green RAL 6005 unless otherwise agreed in writing.

The site will not employ dusk to dawn external lighting. Infrared security lighting may be used. External lighting will be provided for use infrequently by maintenance staff when on site.

Sustainable drainage

A sustainable drainage scheme is proposed in line with planning policy. All of the site tracks and hardstandings are proposed as permeable aggregate.

Landscape bund

A landscape bund of 1.4 metres high is proposed around the outside of the compound fence. This will act to screen the fence when seen from the surrounding area and permit the new planting to more quickly develop to screen the development from view. The bund will be composed of the topsoil from the compound area and on the north east and south east sides will contain drainage pipes of 150mm diameter at 15m spacing at ground level to allow any surface water to exit.

New planting

New planting is proposed to help screen the proposal and provide new habitat. The screening would be a mix of native trees/ hedgerow species.

Hedgerow planting - number of plants of each species, unless agreed in writing with Stirling Council: Willow (common osier) 400 Hawthorn 800, Blackthorn 700, Hazel 400, Blackberry 100, Crab Apple 100, Dogwood 100, Yew 50, Juniper 50. Size of plants when planted 0.5-1.0m, approx 1 plant per 2.5m². All plants to be suitably staked with tie and spacer and spiral guard.

A landscaping and maintenance plan is proposed to ensure the new planting is successfully established. Planting is to be checked annually for first 5 years and any failed or failing plants are to be replaced. New planting is to be watered every 2 weeks in dry weather April to September for first 5 years.

Certain engineering and technical details can only be finalised on award of procurement and construction contracts. These details may vary according to the specific battery, inverter and containers used, and would not significantly increase the impacts described.

The installation would be in accordance with current regulations and practices including the Electricity Safety, Quality and Continuity Regulations 2002 as amended.

2.4 The construction process

The start of construction would depend on the Planning process, and on procurement and construction management activity. The on-site construction period is estimated to be 9 months covering three phases:

Ground works

- construct access tracks
- construct sustainable drainage scheme
- form landscape bund
- trench and lay cables
- prepare foundation pads
- prepare meter building
- construct fencing

Installation

- deliver & install components including battery containers & meter building
- new planting

Commissioning

- electrical connections
- commissioning (checking and setting in operation)
- site reinstatement

Excavated material would be reused on the site. Concrete for the foundations will be imported ready mixed.

Working times

Normal working times proposed for any noisy activity during the construction period, including operation of on site equipment or vehicles, are 08h00 to 18h00 Monday to Friday, plus 0800 to 13h00 Saturday.

Decommissioning

The site will be decommissioned and restored at the end of its life.

2.5 Battery safety

Lithium ion batteries are accepted in our homes, workplaces and in our pockets, in laptop and tablet computers, mobile phones, uninterruptible power supplies, and increasingly in cars. We accept some risk with all technology and batteries are no different. We cannot eliminate all risk, but it can be reduced to an acceptable level and designed to limit the consequences of an event. This facility will be a fixed installation, designed around safety.

We are not aware of any injury to a member of the public from a battery energy storage system. There is around 1000 megawatts (MW) of battery storage operational in the UK alone¹. Whilst a relatively new and developing technology, in the USA over 350 MW of battery energy storage was already operational by 2015².

Comprehensive safety standards³ based on the learning of all previous known incidents have been produced and will be applied to this site. The facility will be designed to and comply with all relevant safety codes. The project's insurers will independently vet the design and operation of the facility. Safety reviews will be conducted at final design stage, installation, commissioning (setting in use), and regularly in use. Batteries are transported in a discharged state. The facility will employ a battery management system that will monitor the status of each battery cell, and safely isolate items if required.

The battery storage facility will use lithium ion battery technology. Lithium ion battery chemistry involves an immobilised electrolyte with no risk of pollution to air, ground or water in normal operation. Even in the extreme conditions of a fire, it has been shown that the combustion products do not pose a risk to surrounding residents. Battery containers will employ deflagration protection. The facility will be designed to avoid the circumstances that could lead to a fire and for a fire to be safely extinguished should one occur.

Safety reviews by authorities have found no undue risk to nearby residents from battery storage facilities. For example, in relation to the Cleve Hill 350 MW Solar Park battery storage facility in Kent, with many houses within 200 metres, following extensive examination at public inquiry, the Planning Inspectorate found, Feb 2020, a sound basis of managing and mitigating safety risk and no compelling evidence to the contrary.

The facility will be designed, built and operated to all relevant safety standards, and vetted by independent engineers. The facility will be safe in construction and in use, and will pose no undue risk to residents.

¹ Source UK government <https://www.gov.uk/government/news/battery-storage-boost-to-power-greener-electricity-grid> July 2020

² Battery Storage in the United States: An Update on Market Trends, July 2020, Independent Statistics & Analysis, US Department of Energy www.eia.gov

³ For example NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, 2020, National Fire Protection Association

3 LOCATION JUSTIFICATION

A national need for increased energy storage has been established. The UK is moving away from carbon intensive fossil fuels towards low carbon sources. One aspect of this is an increasing need for energy storage, in combination with developments in energy storage technology, to assist in cost-effectively matching supply and demand on the electricity grid. The degree of storage on the electricity grid directly influences the amount of intermittent renewable energy sources that can be accommodated.

The project requires to be sited close to a substation with suitable electrical connection capacity. The site has been chosen because it fits this criteria and is considered to have acceptable impacts in terms of amenity and other impacts.

The Scottish Energy Strategy, published 2018, supports new energy storage capacity. It states that the Scottish Government will continue to support innovation and deployment in storage and to work to accelerate its penetration across Scotland.

This proposal has been designed carefully and will be well from the road. The site is on agricultural land, the use of this land has been minimised by a dense design. Stirling Council supports use of agricultural land for generation of energy. The nature of the proposal is such that it will be straightforward to restore the site should the storage no longer be required. The developer commits to restore the site at the end of its life.

Energy Storage is supported under Policy 12.2 (b) of the Stirling Local Development Plan 2018. Environmental assessment and mitigation is covered in this document.

The proposal accords with Policy 1.5 Green Belts as it will diversify the rural economy, is for essential infrastructure and will not undermine the core role and function of the green belt. The development plan refers to Green Belts Supplementary Guidance but such a document does not appear to be present on the Council's website as at March 2021.

This proposal is for a low carbon energy scheme that fits with the Council's support for energy innovation, investment and infrastructure. The site has been selected and designed to appropriately avoid, minimise and mitigate impacts from the proposed development.

4 NOISE

A noise assessment has been produced for this development and impacts found to be acceptable and sufficiently low not to cause disturbance at neighbouring properties.

5 VISUAL IMPACT

A visual impact appraisal has been produced for this development and impacts found to be acceptable.

6 TRANSPORT, ROAD SAFETY AND ACCESS

Access to the site will be from the A91 Stirling Eastern Distributor Road at the Muirton roundabout on the existing farm road that serves Bolfornought and Taylorton Farms with a total of around 6 dwellings. The farm road is a private single track access with passing places.

The ground slopes down from the public road (roundabout) and so water from the site will not enter the public road. The existing roundabout junction is of modern design with good visibility and alignments.

The existing farm road will be widened slightly in the vicinity of the development and the new bellmouth off the farm road will be usable as a passing opportunity following construction. Within the site, the new track will be formed with a running surface of aggregate on permeable geotextile.

In use, the development will be associated with very low traffic flows. Typical maintenance visits will involve a single van not every day.

Construction will involve taking construction machinery to site, delivery of aggregate for the site track, delivery of site components including the battery containers and other materials, a mixture of light commercial and HGV loads.

The A91 by the site is a busy distributor road and traffic associated with this development would be insignificant to its flows.

There is no current public access on the land which is a field. No change to existing public access is proposed.

A Transport Statement has been produced for this development.

7 COAL ISSUES

The site lies within in a Coal Mining Reporting Area, which covers most of Lowland Scotland. The proposal is not within a Coal Mining Development High Risk Area. Such areas appear at Springkerse around 350 metres away and at Bannockburn and Fallin. No special coal risk measures are necessary for this development.

8 HISTORIC ENVIRONMENT & ARCHAEOLOGY

Existing cultural heritage records were reviewed including Pastmap, Canmore, Historic Environment Record, scheduled monuments, and listed buildings.

The site is within the Battle of Bannockburn Battlefields Inventory Boundary, designated in 2011. The boundary includes the Springkerse Retail Park and much of the Stirling agglomeration Coxethill, Braehead, Broomridge and Bannockburn town. The Bolfornought site is on the periphery of the battlefield site.

The Carse of Stirling and the Dryfield incorporating the Pelstream and Bannock Burns, Bannockburn Moor, Broomridge, Bannockburn village and Balquhiddelock Wood were the location of the English camp and the potential locations for the second day of fighting in June 1314. Well preserved landscape characteristics of the battlefield are considered to include the views from and spatial relationship between the Carse, Stirling Castle and the hill terraces to the south west.

The development would change, temporarily, part of the carse, from ploughed field and cropland, to a compound surrounded by planting. This would not block any key views nor change the appearance of the carse as flat land containing the channels of the Bannock Burn and the Forth.

The Stirling Council Supplementary Guidance of May 2019 Historic Environment – Battlefields sets out the relevant policy in relation to development within the defined battlefield site on pages 13 to 22. The carse area is considered to have hosted action on the latter part of the second day of the battle. After the Scots routed the English army between the Bannock and Pelstream Burns *“the English fled in a variety of directions one of which is likely to have been across the carse to the north-east of the battlefield, in the opposite direction to the advancing Scots.”* (3.21).

Retreating English troops and pursuing Scots may have crossed land at Bolfornought and Taylorton before encountering the natural obstacles of the Forth and the Bannock Burn.

The project site comprises flat, very slightly elevated land within the flat carse area, with no significant ditches or obstacles, and so is not one of the places, part of the story of the battle, where troops became trapped by the terrain.

Section 3.22 of the Supplementary Guidance states:

“The carse therefore represents a major factor in the scale of the Scottish army’s victory and represents an essential component of the battlefield. The maintenance of open views across it and to the site of the putative English Camp and Day 2 of the battle is essential to the integrity and comprehension of the battle.”

The proposed project comprises low structures and planting and will not interfere with open views across the carse, nor subtract from the general impression of flatness, nor from views (from higher ground in the vicinity of Bannockburn High School) to the site of the English Camp and to the site of Day 2 of the battle (considered to be around the A91 north of Skeoch Farm and then in flight assumed to be north-east).

Therefore it is considered that this development will not significantly impact the key landscape characteristics and special qualities of the battlefield designation. A scheme of archaeological works is proposed in association with the development, that may provide new understanding of cultural heritage features.

At the end of its life, the scheme will be decommissioned following a written scheme of reinstatement.

There are no Pastmap records within 200 metres of the site.

By Upper Taylorton to the north, a linear earthworks and rig was recorded.

A metal detection survey by Mallard Cottage found a 19th century coin.

A C-listed stableyard is present at Stewarthall around 850 metres south east of the project site, once associated with a nearby historic tower house that was demolished. It is not considered that the proposed development would significantly impact on that building or its setting.

Cambuskenneth Abbey, a Scheduled Monument, the remains of a twelfth century monastery lies around 1km to the north west of the site and forms part of the Conservation Area covering the adjacent old village. Due to the intervening woodland and office buildings etc., there is no invisibility and the development would have no impact on these designations or their setting.

A smallpox isolation hospital is understood to have previously stood at nearby Taylorton.

No other significant records were identified.

The development site has been farmed for a considerable time. The Ordnance Survey six inch first edition surveyed 1860 shows the project field, Upper Taylorton and Bolfornought farms being present at that time. It is unlikely that significant archaeological features are present at the project site.

The developer proposes that an archaeological scheme is agreed in writing with Stirling Council prior to commencement. The scheme will include metal detection survey in advance of all works, and an archaeological watching brief for all ground breaking works.

In summary, the proposed development would not cause any significant impact to the battlefield designation nor to any other cultural heritage feature and accords with Planning policy.

9 ECOLOGY & ORNITHOLOGY

There are no national or international designations on or within 1km of the project site. The site is agricultural land which is cropped regularly.

Wester Moss Site of Special Scientific Interest lies a little over 2.5km to the south east of the site and was designated in 1985 for its raised bog.

The extensive Firth of Forth Special Protection Area, Ramsar and Site of Special Scientific Interest, being the intertidal area of the Forth Estuary, is around 3km east of the project site at its closest, designated for a range of features and species.

There are no trees within the development field.

There is considered to be limited potential for ecological impact beyond some potential loss of winter grazing for wildfowl for which there is extensive alternative available in the surrounding area.

New planting of native species is proposed around the development site in order to provide wildlife habitat and visual screening.

The development will have no significant impact on ecology or ornithology and will provide some new habitat.

10 DRAINAGE ASSESSMENT AND DESIGN

The site comprises slightly elevated land within the flat carse of Stirling, with elevations over 8 metres above Ordnance Datum. This is well above the highest flood levels of the Forth. So the site does not form part of the functional floodplain. No part of the site is subject to surface water flooding or is predicted to be so with the impact of climate change. Some localised temporary ponding does occur on nearby low points on the carse and these can be seen to gradually infiltrate.

National and local policy was considered in the design including Stirling Council's Supplementary Guidance of May 2020 Flood Risk Management and the Water Environment.

The site soil is a noncalcareous gley, a mineral gley formed of estuarine low raised beach deposits of silts and clays, part of the Stirling Soil Map Unit and the Stirling Soil Association. Nearby boreholes show topsoil then clay with some rootlets, on sandy silt. Groundwater was found at between 1.5 metres and 3.5 metres below ground level. Existing field drains are present, draining east to the lower Bannock Burn.

A landscape bund is proposed around the site formed of topsoil from within the site. The bund will possess drainage pipes at ground level to allow surface water within the compound to exit. For the avoidance of doubt, the bund is purely a landscaping feature and is not intended to nor will it keep surface water in or out of the compound. New tracks within the site will be formed with a running surface of crushed aggregate on permeable geotextile.

The majority of the site will remain as permeable land allowed to infiltrate naturally. A Sustainable Drainage Scheme (SuDS) is proposed for the site. This will comprise a retention pond taking drainage from the meter building, water tank and valve house.

The new planting will act as a buffer zone and also reduce runoff as compared with the existing agriculture.

The batteries employed on site will be lithium ion type. Such batteries have an immobilised electrolyte and do not pose a pollution risk to the water environment.

The site will not be subject to flooding, and the site will not increase the risk of flooding elsewhere. The proposal is in accordance with local and national policies.

11 CONCLUSIONS

An energy storage system is proposed on the project site and would provide a useful contribution to national energy and carbon reduction targets, grid stability, local energy generation and agricultural diversification. The project will provide employment during construction and ongoing value added in operation and maintenance and contribute local authority rates.

There will be some visual impact from the development and this will reduce as the new trees grow and effectively screen the site. No change to existing public access is proposed.

The project has been assessed against a range of potential issues, and impacts have been found to be acceptable.

The development accords with the development plan and is recommended for approval.