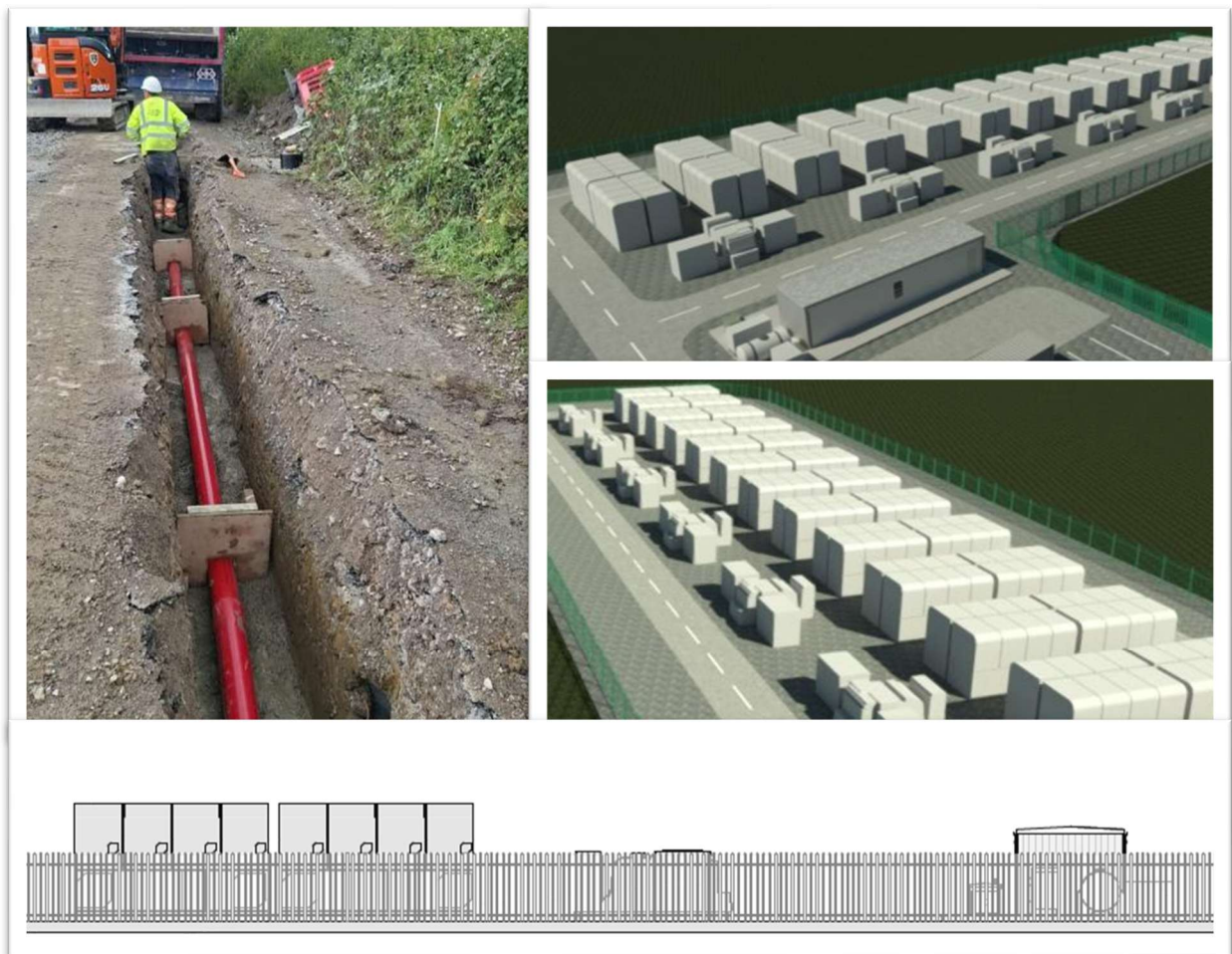


Outline Construction Methodology



Greenhills Energy Park - Battery Energy Storage System (BESS)



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1.0 Introduction

The purpose of this Outline Construction Methodology is to assist the client (RSK) with considerations relating to Electrical and Civil works arising from the Battery Energy Storage System (BESS) Development in Co. Cork.

The proposed BESS development electrical plant will consist of 7 Inverter Twin Skid (2 inverters + 1 transformer + 1 RMU) units with 4 associated electrical plant Batteries per Inverter (each unit consists of a skid and 4 batteries pods), giving a total of 56 Battery Container Units within a fenced compound adjacent to the proposed Greenhills Energy Park 220 kV Substation. The BESS development is expected to have a maximum storage capacity of 80MW with a 4-hour storage capacity, leading to a maximum 320MWh total storage capacity for the development. The total footprint area of this compound will amount to 7,760m².

A list of fundamental components are as follows below.

- BESS Inverter
- BESS Battery
- Interconnection Cable Network

This document is intended to be used as an aid to understand the methodologies to be employed during construction and should be read in conjunction with all other specialist reports which accompany the planning application. Also, this document is in outline form only and will be revised and updated before the commencement of any construction activities as part of the CEMP. Detailed method statements will be prepared in respect of each aspect of the proposed development by a specialist contractor.



Figure 1: Typical Elevation for BESS Compound

2.0 BESS Construction

The proposed construction scope will require the relevant personnel, machinery and materials which is as follows:

• Electrical/Civil Crews • Tracked Excavators • 360° tracked excavators (13 ton normally, 22 ton for rock breaker) • Tracked dumpers / tractors and trailers • Crane • Hoist • Power Tools • Generator • Scaffolding	• Stone • Geotextile • Lighting • Paving • Fencing • Steel Uprights • Concrete • Timber • Cladding • Doors
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1. This new BESS will be in a compound of circa 7,760m² (the footprint is irregularly shaped) surrounded by a 2.6m high palisade fence.
2. The BESS compound and drainage will be marked out by a qualified engineer.
3. A drainage system will be excavated and installed around the control building.
4. Topsoil and subsoil will be removed from the footprint using an excavator to be used in the cut and fill construction of the compound to achieve the finished compound level of 122.06m (the compound reaches its final level after the addition of 400 of stone).
5. A layer of geotextile material will be laid over the footprint of the compound.
6. Using an excavator, a base layer of Clause 804 material will be laid followed by a 6F2 capping layer which will provide the finished surface.
7. Each layer will be compacted using a vibrating roller.
8. Earthing cable will be laid underground around the BESS for connection to the electrical components during the electrical phase.
9. The construction of a BESS compound circa 7,760m², comprising of approx. 64.6m² control building and associated outdoor electrical equipment, including 7 Inverters Twin Skid (2 inverters + 1 transformer + 1 RMU) with 4 associated electrical plant batteries per Inverter, with a subsequent total of 56 battery container unit, associated internal access track, 2.6m high station perimeter fencing will be built. Please refer to enclosed drawing number 300101185-DR-203 – BESS Layout Plan and Drainage for details.
10. A crane will be necessary to lift the BESS equipment into place. The units will be secure to foundations using anchor bolts and seismic reinforcement kits if required.
11. Three inverter twin skids will be connected in one 33 kV UGC to the BESS control building. In total, for the 7 inverter twin skids, a total of three 33 kV UGC will be necessary.
12. A minimum of three 33 kV UGC will be utilised to interconnect the BESS Control Building into the IPP Switchroom located in the proposed 220 kV Substation (subject to a separate planning application).

2.1 Managing Excess Material

All excavated material will be temporarily stored adjacent to worksite prior to re-use in the compound cut and fill (where applicable). Stockpiles will be restricted to less than 2m in height. Where excess material exists, it will be used to landscape around the BESS and other areas in accordance with the Waste Management Plan.

2.2 Storage of Plant and Machinery

All plant, machinery and equipment will be stored on site within the works area or within the temporary construction compound to be located within the proposed Development Area. Oils and fuels will not be stored on site and will be stored in an appropriately bunded area within the temporary storage compound where the proposed 220kV substation (part of a separate planning application) will be built.

3.0 Access Routes to Work Area

Access tracks and crane pads on the consented land (if required due to ground conditions and/or landowner requirements) will consist of crushed rock on a geotextile. Upon completion of the works, all access tracks will remain in place for future access to the substation and solar farm grounds. Access routes will be carefully selected to avoid any damage to land. Local consultation will be carried out with the relevant landowners to ensure that any potential disturbance will be minimised. Prior to the commencement of construction, the contractor will assess all access routes and determine specific requirements for each area. Any such requirements will be incorporated into the relevant method statement. A crane pad area will be utilised for the battery installation.



Figure 2: Temporary Aluminium Panel Tracks



Figure 3: Crushed Rock Roadway



Figure 4: Crushed Rock Roadway Build-up With Geotextile

4.0 Best Practice Design and Construction & Environmental Management Methodology

Prior to commencement of construction works the contractor will draw up detailed Method Statements which will be informed by this Outline Construction Methodology, environmental protection measures included within the planning application, measures proposed within the CEMP, and the guidance documents and best practice measures listed below. This method statement will be adhered to by the contractors and will be overseen by the Project Manager, Environmental Manager and ECoW where relevant.

The following documents will contribute to the preparation of the method statements in addition to those measures proposed below:

- Inland Fisheries Ireland (2016)
 . Inland Fisheries Ireland
- . National Roads Authority, Dublin;
- E. Murnane, A. Heap and A. Swain. (2006)
 Technical guidance (C648). CIRIA;
- E. Murnane et al., (2006) . Site guide (C649).
 CIRIA.
- Murphy, D. (2004) Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin;
- H. Masters-Williams et al (2001)
 (C532);
- Enterprise Ireland (unknown).
- Law, C. and D'Aleo, S. (2016) . (C762) 4th edition.
 CIRIA;
- CIRIA .

The proposed works will be carried out by employing accepted good work practices during construction, and environmental management measures such as those discussed below. Please note that the following measures will be supplemented by further specific environmental protection measures that will be included in method statements prepared for specific tasks during the works and will form part of the detailed CEMP.

- All materials shall be stored at the temporary compound and transported to the works zone immediately prior to construction;
- Weather conditions will be taken into consideration when planning construction activities to minimise risk of run off from site;
- Provision of minimum of 10m from surface water features between any excavated material and any surface water features to prevent sediment washing into the receiving water environment;
- If dewatering is required as part of the proposed works e.g. in wet areas, water must be treated prior to discharge;
- The contractor shall ensure that silt fences are regularly inspected and maintained during the construction phase;
- If very wet ground must be accessed during the construction process bog mats/aluminium panel tracks will be used to enable access to these areas by machinery. However, works will be scheduled to minimise access requirements during winter months;

- The contractor shall ensure that all personnel working on site are trained in pollution incident control response. A regular review of weather forecasts of heavy rainfall is required, and the Contractor is required to prepare a contingency plan for before and after such events;
- The contractor will carry out visual examinations of local watercourses from the proposed works during the construction phase to ensure that sediment is not above baseline conditions. In the unlikely event of water quality concerns, the Environmental Manager and ECoW will be consulted;
- Excavations will be left open for minimal periods to avoid acting as a conduit for surface water flows.
- Only emergency breakdown maintenance will be carried out on site. Emergency procedures and spillage kits will be available and construction staff will be familiar with emergency procedures.
- Appropriate containment facilities will be provided to ensure that any spills from vehicles are contained and removed off site. Adequate stocks of absorbent materials, such as sand or commercially available spill kits shall be available;
- Concrete or potential concrete contaminated water run-off will not be allowed to enter any watercourses. Any pouring of concrete (delivered to site ready mixed) will only be carried out in dry weather. Washout of concrete trucks shall not be permitted on site.
- Entry by plant equipment, machinery, vehicles and construction personnel into watercourses or wet drainage ditches shall not be permitted. All routes used for construction traffic shall be protected against migration of soil or wastewater into watercourses;
- Cabins, containers, workshops, plant, materials storage and storage tanks shall not be located near any surface water channels and will be located with a minimum of 10m from surface water features at all times.

5.0 Reinstatement of Private Land

Once all construction works are complete, the work areas will be reinstated with excavated soil and either seeded out with native species, allowed to vegetate naturally or reinstated with excavated grass turves and will be restored to their original condition.

6.0 Implementation of Environmental Protection Measures

All environmental protection measures contained with the Planning and Environment Report which accompanies the planning application will be incorporated into a detailed CEMP submitted as part of the construction method statements prior to the commencement of development and will be implemented in full during the construction phase. The Project Manager and Site Manager will be responsible for the implementation of measures following consultation with the Environmental Manager and ECoW where necessary.

7.0 Invasive Species Best Practice Measures

Invasive species can be introduced into a location by contaminated plant, machinery and equipment which were previously used in locations that contained invasive species. Good site organisation and hygiene management shall be maintained always on site, and best practice measures will be implemented, as follows:

- The contractor will prepare an Invasive Species Action Plan to be implemented during construction, and all personnel will be made aware of the requirements contained within;

- Plant and machinery will be inspected upon arrival and departure from site and cleaned/washed as necessary to prevent the spread of invasive aquatic / riparian species such as Japanese knotweed and Himalayan Balsam . A sign off sheet will be maintained by the contractor to confirm the implementation of measures;
- Site hygiene signage will be erected in relation to the management of non-native invasive material.

Please refer to the accompanying Natura Impact Statement and CEMP for further details.

8.0 Waste Management

All waste products (general waste, plastic, timber, etc.) arising during the construction phase will be managed and disposed of in accordance with the provisions of the Waste Management Act 1996 and associated amendments and regulations, and a Waste Management Plan (WMP) will be prepared by the contractor prior to the commencement of construction. An Outline Waste Management Plan has been prepared to form the basis of the WMP. Please refer to the accompanying CEMP submitted with this planning application for further information.

9.0 Programme

Estimates for the duration of the construction works are included in the table below. The BESS system will be constructed at the same time as the proposed 220kV substation (part of a separate planning application) the commissioning of the BESS will depend on connection to that substation.

Table 3: Estimated Construction Duration (Activities Run Concurrently)	
Development Element	Estimated Construction Duration
Construct of BESS Compound	16 months
<u>Total</u>	16 Months