OUTLINE CONSTRUCTION METHODOLOGY

East Limerick Substation Development

220 kV Grid Connection and Substation

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List of Abbreviations

Abbreviation	Definition
AIA	Archaeological Impact Assessment
BESS	Battery Energy Storage Scheme
CEMP	Construction Environmental Management Plan
ECC	Earth Continuity Conductor
ECoW	Ecological Clerk of Works
ESBN	Electricity Supply Board Networks
GIS	Gas Insulated Switchgear
HV	High Voltage
IPP	Independent Power Producer
LV	Low Voltage
OHL	Overhead Line
UGC	Underground Cable

1 Introduction

1.1 Background

TLI Group ("the Consultant") were engaged by Harmony Solar East Limerick Ltd ("the Client") to identify and analyse potential 220 kV loop in option available for the East Limerick Substation Development, which will loop into the existing Knockraha – Killonan 220 kV line.

1.2 Purpose of this document

The purpose of this document is to outline and explain the construction techniques and methodologies which will be implemented during the construction of the 220 kV loop-in works and proposed Battery Energy Storage System (BESS) as part of the East Limerick Substation Development.

The 220 kV grid connection will consist of constructing two single circuit strain towers (Type 269E) and a new standard EirGrid GIS loop in substation. East Limerick Substation will be connected by diverting the existing Knockraha – Killonan 220 kV overhead line via two 220 kV angle masts which will connect to the new substation via two new gantries compounds. The OHL works will consist of the installation of two masts and two gantries.

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 and drawings which accompany the planning application. Also, this document is in outline form only and will be revised and updated prior to the commencement of any construction activities. For the purposes of the planning application, this document should be read in conjunction the Planning and Environmental Report and all other supporting documents.

The construction methodology for the BESS is documented in Appendix A.

Table 1 – Summary of proposed 220 kV Loop-In and Substation	
Section	**Description (all lengths are to be confirmed at detailed design stage)**
Section 1 **220 kV** **Loop-in**	Existing 220kV Knockraha – Killonan Overhead Transmission line to be broken between towers 68 and 69 and a new a single circuit type 269E mast with shieldwire will be built in the place. The existing 220 kV line will also be broken between existing towers 69 and 70 with a new single circuit type 269E mast with shieldwire to be built. The new towers 68A and 69A will connect the existing line to the gantry compounds with approx. 52 m of 3 phase overhead conductor per circuit. From the gantry compounds, cables will pass through electrical equipment as post insulator, surge arrester and cable sealing end to the GIS Substation. Existing tower 69 to be disassembled and removed.
Section 2 **Substation**	Construction of a new 220 kV Gas Insulated Switchgear (GIS) Loop-in Substation including GIS building, 220/33kV transformer, and associated customer control building.
The precise location of the proposed route within the planning application boundary is subject to change as result of existing services/utility locations, ground conditions and any environmental constraints.	

Table 1: Summary of Works

2 Preliminary Site Investigation

Preliminary site investigations will be carried out in accordance with requirements outlined in the project CEMP and AIA reports. Investigations are needed at the locations of the proposed overhead line structures and the substation site. These investigations will confirm ground composition, geotechnical conditions, and the thermal and electrical resistivity of the soil.

2 no. boreholes or trial pits required at each tower location and along the access track to confirm ground geotechnical composition.

At least 8 No. Boreholes, 4 trial holes and 2 percolation test sites are required at specified locations within the substation site to ascertain ground composition and thermal/electrical resistivity of the soil.

Equipment:

- 4x4 vehicle
- Wheeled dumper
- Soil compactor
- 360° tracked excavator (wheeled excavator where required)
- Borehole Drill Equipment

3 Loop-In Masts

3.1 Existing 220 kV OHL

The proposed East Limerick Substation Development 220 kV loop-in station will connect into the existing Knockraha – Killonan 220 kV overhead transmission line. Two new masts of Type 269E with shieldwire (68A and 69A) will be constructed under the existing circuit and placed between the existing mast No.68 and No.70. Connection to the substation is via two new masts, with the configuration of OHL connection from existing mast No. 68 - mast No. 68A – Gantry Compound – GIS Substation and GIS Substation – Gantry Compound – mast No. 69A – existing mast No. 70.

The existing mast 69 will be demolished and removed from site.

The duration of works of the overhead line construction is expected to be approximately 16 weeks. Construction of foundations for masts circa. 7 days each with time allowing for curing of the concrete, erection of the masts circa 5 days each, weather dependant. Stringing of conductor will be a 2-week process and final connection to the existing grid will be carried out by ESBN and at that point in time commissioning of the substation can start.

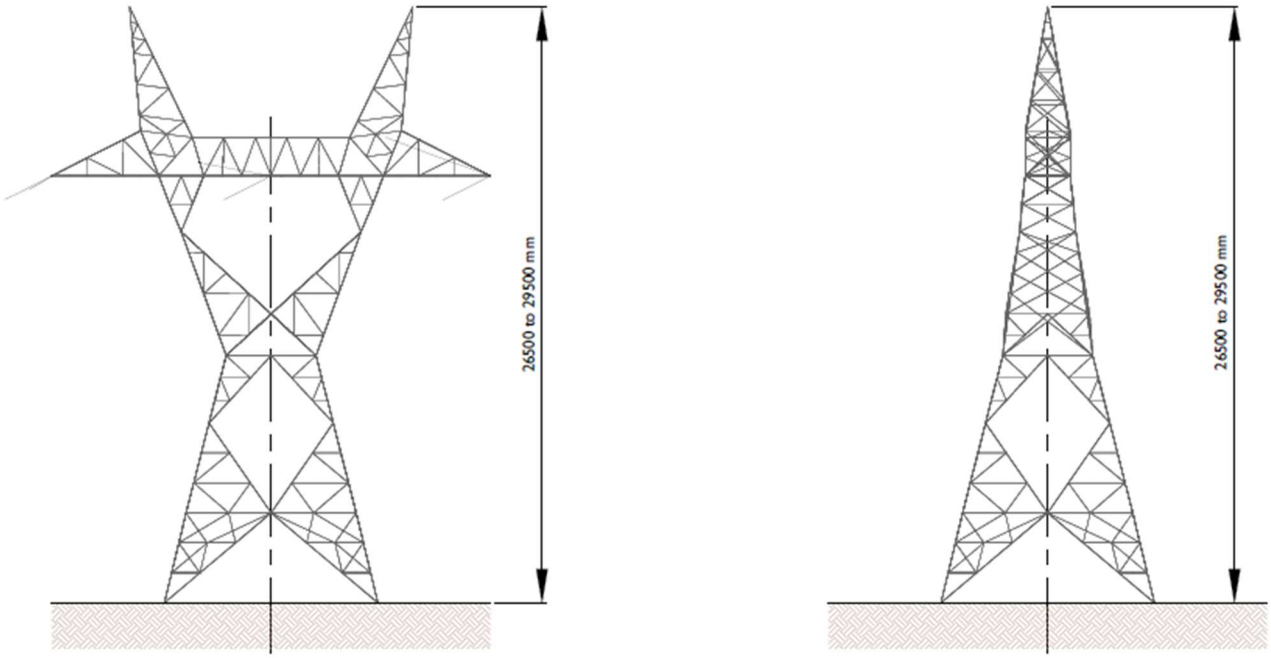

Figure 1: 220 kV Type 269E Single Circuit Tower

3.2 Steel Mast Structures

The proposed mast and gantry structure locations have been selected based on ground surveys, ground profiles, permissible angles, and ruling span checks.

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

Equipment:	Materials:
5 operatives	Lattice Steel Mast
4x4 vehicle	Insulators
Winch	Electrical Connections
Tractor and trailer	Concrete (foundation)
Crane	Aggregate
Teleporter	Insulators
Chains / small tools	Steel guy ropes
Tracked Excavator	Electrical Connections
Tracked Dumper	Crushed rock & timber (foundation)
Sheet Piling Rig	Crushed rock and concrete (alternative foundation)

Table 2: Equipment and Materials for Steel Mast Construction

The following section outlines the methodology that shall be followed during construction mast structures which shall be constructed within private lands.

1. Temporary access tracks shall be constructed to allow access to the tower locations.
2. Mast sites are scanned for underground services such as cables, water pipes etc. Consultations with landowners shall help to identify hazards and ensure that there are no unidentified services within the area.
3. For each leg of the 2 masts (8 legs in total) a foundation of circa 4.4m by 4.4m by 3.6m deep are required. To allow for safe construction where ground conditions are good, the excavation shall be stepped back which

requires additional area to be excavated as outlined in Figure 2. The formation levels (depths) shall be checked by the onsite engineer. The excavated material shall be dealt with in accordance with the requirements outlined in the CEMP.

Figure 2: Stepped Back Excavation

4. To aid construction, a concrete pipe shall be placed into each excavation to allow operatives level the mast at the bottom of the excavation. The frame of the reinforcing bars shall be prepared and strapped to a concrete pipe with spacers as required. The reinforcing bars shall be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each mast shall then be assembled next to the excavation.
5. In areas of insufficient ground and high-water table, it may be necessary to use sheet piles supported by hydraulic frame(s) to prevent collapse of the sides and prevent the excavation becoming too large. In this scenario, the requirement of a concrete pipe (which is typically used in tower foundations) is removed. During any dewatering activities, a standard water filtration system shall be utilised to control the amount of sediment in surface water runoff. All activities will be carried out in accordance with the Site Waste Management Plan (SWMP) and Construction Environmental Management Plan (CEMP).
6. A setting template is used to set and hold the tower stubs in position while the concrete is being poured and cured. Any water present in the excavation shall be removed prior to pouring concrete into the foundation.
7. Concrete trucks shall pour concrete directly into each excavation in distinct stages.
8. A final pour for the base is the encasing of the mast leg which shall be finished 300 mm over finished ground level. The leg of the mast required to be shuttered with metal panels to form its required shape.
9. Once concrete is set after five days, the shuttering is removed along with sheet piles (if required).
10. The mast foundations shall be backfilled one leg at a time with the material already excavated at the location. The backfill shall be placed and compacted in layers. All dimensions shall be checked following the backfilling processes. All surplus excavated material shall be dealt with in accordance with the project CEMP.
11. An earth mat consisting of copper wire will be laid circa 600 mm below ground around the mast. This earth mat is a requirement for the electrical connection of the equipment on the mast structure.
12. Once the base section of each mast is completed and its concrete is sufficiently cured, it is ready to receive the mast body.
13. A hardstand area for the crane shall be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.
14. A physical barrier (Heras Fence Site Boundary) shall be put in place to restrict plant from coming too close to the overhead line.

15. A temporary hardstand area (circa 35m x 45m) shall be constructed adjacent to all new towers to allow the assembly and laydown of the towers. These are temporary and ground will be reinstated as per landowner requirements to green field status post construction.
16. The masts shall be constructed lying flat on the ground beside the recently installed mast base on the temporary hardstand.
17. The mast section will be lifted into place using the crane and guide ropes.
18. The body sections will be bolted into position.

4 Proposed Substation Build

The East Limerick Substation Development 220 kV substation will be made up of a GIS building, transformer compound and customer control building. The proposed construction scope will require the relevant personnel, machinery and materials as outlined in Table 3.

Equipment:	Materials:
• Up to 10 Electrical/Civil Crews • Tracked Excavators • 360° Tracked Excavators • Tracked dumpers/ tractors and trailers. • Crane • Hoist • Power Tools • Generator • Scaffolding	• Cable • Electrical Equipment • Stone • Geotextile • Lighting • Paving • Fencing • Steel Uprights • Concrete • Timber • Cladding • Doors

Table 3: Equipment and Materials for Substation Construction

1. The new substation will consist of an EirGrid compound of circa 14,158 m^2 (area inside property boundary fence and excluding Cut and Fill required area) and a customer compound (customer side) of circa 4,576 m^2, surrounded by a 2.6m high palisade fence.
2. The substation compound and drainage will be marked out by a qualified engineer.
3. A level compound area will be created using cut and fill methods.
4. A drainage system will be excavated and installed around the compound area.
5. Topsoil and subsoil will be removed from the footprint of the compound using an excavator. The excavated material will be stored separately and reinstatement works carried out in accordance with the project CEMP.
6. A layer of geotextile material will be laid over the footprint of the compound.
7. 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.
8. Each layer will be compacted using a vibrating roller.
9. Earthing cable will be laid underground around the substation for connection to the various electrical components during the electrical fit out phase.
10. The construction of the substation compound will include a two-storey 220 kV GIS switching building (1844m^2 Footprint and internal floor area of 3550.8m^2), an customer control building (346.2m^2 Footprint and 311.8m^2 Internal Floor Area), associated outdoor electrical equipment including one 220/33 kV transformer, an internal access track, 2.6 m-high station perimeter fencing and post-and-rail property fencing.
11. Adequate lighting will be installed around the compound on the lighting masts.
12. Lightning protection masts of approximate height 18m will be installed to protect the station from direct lightning strikes.

13. The electrical installation includes the following:
    - Delivery and installation of one 220/33 kV transformer. The deliveries will be managed in accordance with regulations governing the movement of large loads.
    - Delivery and installation of all other HV equipment.
    - Wiring and cabling of HV/LV equipment, protection, and control cabinets.
    - Commissioning of all newly installed equipment.

Figure 3: Typical Transformer and Outdoor Equipment.

4.1 Gantry Structures within Substation

The proposed construction of the gantries shall require the relevant personnel, machinery and materials, see Table 4 below.

Equipment:	Materials:
5 Operatives	Steel Gantry
4X4 Vehicle	Insulators
Winch	Electrical Connections
Tractor and Trailer	Concrete (foundation)
Crane	Aggregate
Teleporter	Steel guy ropes
Chains/small tools	Crushed rock & timber (foundation)
Tracked Excavator	Crushed rock and concrete (alternative foundation)
Sheet Piling Rig	
Tracked Dumper	

Table 4: Gantry Construction Requirements

1. For each mast of the 2 gantries (4 masts in total) a foundation of circa 5m by 4m by 2.35m deep are required. To allow for safe construction where ground conditions are good, the excavation shall be stepped

back which requires additional area to be excavated. The formation levels (depths) shall be checked by the onsite engineer. The excavated material shall be temporarily stored close to the excavation and excess material shall be used as berms along the site access tracks.

2. The reinforcing bars shall be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each gantry shall then be assembled next to the excavation.
3. A setting template is used to set and hold the gantry J-bolts in position while the concrete is being poured and cured. Any water present in the excavation shall be removed prior to pouring concrete into the foundation.
4. Concrete trucks shall pour concrete directly into each excavation in distinct stages.
5. A final pour for the base is the encasing of the gantry leg which shall be finished 300 mm over finished ground level. The leg of the mast required to be shuttered with metal panels to form its required shape.
6. The Gantry mast foundations shall be backfilled one mast at a time with a 200 mm layer deep compacted T.0 graded granular fill material. A finishing 100 mm layer of compound stone is layered on top of a geotextile to finish the compound ground level. The backfill shall be placed and compacted in layers. All dimensions shall be checked following the backfilling processes.
7. Once the base section of each gantry is completed and its concrete is sufficiently cured, it is ready to receive the gantry body.
8. The gantries shall be constructed lying flat on the ground on the temporary hardstand.
9. The gantry section will be lifted into place using the crane and guide ropes.
10. The body section will be bolted into position.

Figure 4: Example of a 220kV Loop-In From OHL to Gantry

5 Access Routes to Work Areas, Crane Pads and Temporary Laydowns

Access tracks, laydown areas and crane pads on the proposed Substation Development lands (if required due to ground conditions and/or landowner requirements) will consist of crushed rock on a geotextile. All temporary tracks will be removed and ground reinstated as per the project CEMP requirements. Permanent tracks, such as the substation access track will remain in place following construction to provide long-term access to the substation grounds.

Careful and considered local consultation will be carried out to minimise the amount of disturbance caused during works. Prior to the commencement of construction, the contractor will assess all access routes and determine any specific requirements, which will be incorporated into the relevant method statement. All plant and equipment employed during the works (e.g., diggers, tracked machines, footwear etc.) will be inspected prior to arrival on site and on leaving site and cleaned where necessary to prevent the spread of invasive aquatic / riparian species.

A combined laydown and crane pad area (40 x 82 m) will be utilised for tower installation and erection.

Figure 5: Crushed Rock Track build-up with Geotextile

Figure 6: Crane Pad and Laydown Areas

6 Design and Construction & Environmental Management

Prior to commencement of construction works the contractor shall 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 measures listed below. These method statements 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:

- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. Inland Fisheries Ireland ("IFI"), 2016;
- Fishery guidelines for Local Authority works. Department of Marine and Natural Resources 1998;
- Construction Industry Research and Information Association ("CIRIA") – Guideline Document C532 – Control of Water Pollution from Construction Sites;
- CIRIA – Guideline Document C624 – Development and Flood Risk – Guidance for the Construction Industry;
- CIRIA – Guidance Document C515 – Control of groundwater for temporary works (Somerville et al., 1986);
- CIRIA – Guidance Document C811 – Environmental good practice on site guide (Kwan et al, 2023);
- CIRIA – Guidance Document C750D – Groundwater control: design and practice (Preene et al., 2016);
- CIRIA – Guidance Document SP156 – Control of water pollution from construction sites - guide to good practice;
- CIRIA – Guidance Document C648 – Control of water pollution from linear construction projects & Site Guide C649;
- NetRegs Guidance for Pollution Prevention for works and maintenance in or near water (NetRegs, February 2018);
- PPG6 Pollution Prevention Guidelines for working at construction and demolition sites (Environmental Agency, 2012);

The proposed works will be carried out by employing accepted good working 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 within the substation field and transported to the works zone immediately prior to construction;
- No construction equipment, materials or waste shall be stored with 3m of hedgerows and treelines.
- Where drains and watercourses are crossed with underground cables, the release of sediment will be prevented through the implementation of best practice construction methodologies.
- Weather conditions will be considered when planning construction activities to minimise risk of run off from site;
- Provision of 10 m exclusion zones and barriers (silt fences) 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 trenches for underground cabling or 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 be strictly confined to a designated and controlled wash-out area within the substation site; remote from watercourses, drainage channels and other surface water features;
- 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 beyond the 10 m hydrological buffer at all times.

7 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 re-vegetate naturally or reinstated with excavated grass turves and will be restored to their original condition. This work will be carried out in consultation with the landowner and in line with any relevant measures outlined in the planning application, CEMP, landscape management plan (drawing LD.EAST.LMRCK-SID 1.1) and planning conditions.

8 Emergency Response Plan

All site personnel will be inducted in the provisions of the Emergency Response Plan. The following outlines some of the information, on the types of emergencies, which must be communicated to site staff (list not exhaustive):

- Release of hazardous substance - Fuel or oil spill
- Concrete spill or release of concrete
- Flood event – extreme rainfall event
- Environmental buffers and exclusion zones breach
- Housekeeping of materials and waste storage areas breach
- Stop Works order due to environmental issue or concern

The Emergency Response Plan must be completed by the appointed contractor before the project begins in accordance with the CEMP.

9 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 in accordance with the CEMP, 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.
- All Plant and machinery will be cleaned via power washer prior to arrival on site in a dedicated cleaning area and then inspected upon departure from site and cleaned/washed as necessary to prevent the spread of invasive aquatic/ riparian species such as Japanese knotweed (Fallopia japonica), and Himalayan Balsam (Impatiens glandulifera). A sign off sheet will be maintained by the contractor to confirm the implementation of measures. Material gathered in the dedicated clean down area will be treated as contaminated material onsite.
- Site hygiene signage will be erected in relation to the management of non-native invasive material.

10 Construction Hours

Standard working hours for construction will be 7:00 - 19:00 Monday to Friday, and 8:00 - 14:00 on Saturday (if required), with no works on Sundays or Bank Holidays except in exceptional circumstances or in the event of an emergency. If required, all local residents will be notified.

11 Construction 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 will be prepared by the contractor prior to the commencement of construction. All waste material will be disposed of at a fully licensed facility.

12 Archaeology

An additional programme of archaeological test trenching is to be carried out at the proposed substation location in advance of construction as per the recommendations noted in the AIA.

The following are the mitigation measures which will be carried out during construction where required:

- If required a project archaeologist will be appointed to oversee the project.
- Demarcation of protective buffer zones around cultural heritage sites where there is a potential for disturbance during the construction phase and inclusion of the same in site induction.

13 Programme

Estimates for the duration of the construction works are included in the table below. Please note that some of the elements are likely to happen concurrently.

Table 6: Estimated Construction Duration (Activities Run Concurrently)	
Development Element	**Estimated Construction Duration**
Construct 220 kV Substation	16 months
Overhead Line Structures	4 months
Connection to Existing OHL and Commissioning	12 weeks
BESS	18 months
Total	18 Months

Table 5: Estimated Construction Duration

14 Appendix A – BESS OCM

07/09/2026

East Limerick Substation Development
BESS Project Construction Methodology

1 INTRODUCTION

1.1 Background and Purpose

Harmony Solar East Limerick Ltd (the Client) has engaged Enertis UK Limited (Enertis) to advise on a battery energy storage system (BESS) for collocation with the East Limerick Solar Farm, which will loop into the existing Knockraha – Killonan 220 kV line.

This appendix describes a reasonable planning-stage construction approach and the principal activities likely to be required.

1.2 Planning-Stage parameters and Detailed Design

The outline design is fixed in respect of the site layout, equipment numbers, principal equipment dimensions, access arrangements, construction area, foundation approach, drainage strategy and proposed battery chemistry.

The detailed internal configuration and specification of the BESS equipment will be supplier-specific and finalised during detailed design, while remaining consistent with the proposed battery chemistry and the fixed parameters of the outline design. Final construction details and component specifications will comply with applicable statutory, technical and safety requirements.

1.3 Project technology

The BESS project is proposed to comprise 55 no. BESS containers, 28 no. power conversion system (PCS) units, one switchgear unit and auxiliary transformer, an internal access track and parking, and fencing and secure access points.

The proposed battery technology is Lithium Iron Phosphate ($LiFePO_4$, or LFP).

2 INDICATIVE CONSTRUCTION METHODOLOGY

2.1 General Approach

Construction is expected to use conventional civil, structural, mechanical and electrical methods. Works would be undertaken within the approved construction area and coordinated with the solar farm, substation and grid connection works. Temporary works, sequencing and plant selection would be developed by the appointed contractor through task-specific method statements and risk assessments.

2.2 Indicative sequence of Works

1. Site mobilisation, surveys, setting-out, temporary welfare, security, compounds and environmental controls.
2. Formation or upgrade of site access, internal haul routes, working platforms and temporary drainage.
3. Site clearance as required, localised earthworks and preparation of formation levels.
4. Installation of drainage, attenuation, and relevant pollution-control measures.
5. The BESS units are intended to be supported on concrete rails, with localised concrete slabs where required.
6. Installation of ducts, cable trenches, earthing, auxiliary services and communications infrastructure.
7. Delivery and placement of BESS units, PCS units, auxiliary transformer, switchgear, and ancillary equipment using suitable lifting plant.
8. Electrical and mechanical completion, testing, energisation and commissioning in accordance with an approved energisation plan.
9. Removal of temporary facilities, reinstatement of disturbed areas and completion of landscaping and permanent security measures.

2.3 Construction Materials

Construction materials will primarily comprise aggregates, concrete, steel, cabling, ducting, BESS units, PCS units, transformers, switchgear units, fencing and landscaping materials.

2.4 Excavation Depths

Excavation depths will be determined during detailed engineering design and are expected to be limited to those required for foundations and buried cables.

2.5 Volumes of Material to be removed

Excavated material volumes will be confirmed during detailed design, with suitable material reused on site wherever practicable and only surplus material removed if required.

2.6 Construction Duration

An overall construction period of approximately 18 months is presently assumed for planning purposes, potentially overlapping with other elements of the wider development. Activity levels would vary, with shorter periods of concentrated civil works, equipment delivery and commissioning.

Construction working hours will comply with those considered in the Construction Environmental Management Plan.

Expected workforce and vehicle movements and management measures are outlined in Transport and Traffic Assessment and Outline Construction Traffic Management Plan.

2.7 Access, Deliveries, and Lifting

Construction traffic would use the access route and remain within the traffic and delivery parameters assessed in the Transport and Traffic Assessment and Outline Construction Traffic Management Plan. Supplier-specific delivery dimensions and axle loads, together with final lifting and temporary traffic-management arrangements, would be verified before mobilisation.

Equipment would normally be delivered substantially assembled and transferred directly to prepared foundations where practicable, minimising on-site storage and handling. Crane type, outrigger arrangements and lift plans would be determined by the appointed contractor after confirming equipment weights, ground-bearing capacity and safe clearances.

2.8 Earthworks, Foundations, and Buried Services

Excavations would be localised to formation preparation, drainage, concrete-rail foundations, localised equipment slabs, cable routes and earthing, within the development footprint and parameters assessed in the planning application. Final foundation dimensions, reinforcement, cable-trench depths and cut-and-fill quantities would be determined during detailed design based on verified site levels, ground conditions and equipment loads. Suitable excavated material would be retained and reused where technically and environmentally appropriate.

Unsuitable or surplus material would be managed in accordance with the project waste and materials management arrangements. Measures would be used to protect excavations, manage groundwater and avoid uncontrolled sediment release.

2.9 Materials and Temporary Storage

Typical materials may include graded aggregates, concrete or precast products, reinforcement and structural steel, geotextiles, drainage products, ducting, cabling, earthing materials, fencing and landscape materials. Construction consumables may include limited quantities of fuels, oils, lubricants, paints, resins and cleaning products. Storage would be within designated areas, with segregation, weather protection and secondary containment appropriate to the material. BESS units and major electrical equipment would preferably be installed during delivery; any temporary storage would follow supplier requirements, including security, temperature, state-of-charge and safety controls.

3 CONSTRUCTION INTERFACES

3.1 Environmental Controls

The BESS works would be incorporated into the project Outline Construction Methodology and will align with the controls enclosed to address, as relevant, surface-water and sediment management, spill prevention and response, concrete washout, dust, noise and vibration, working hours, waste segregation, invasive species, ecology, archaeology, lighting and protection of nearby receptors.

3.2 BESS, Electrical, and Fire Safety

BESS units would be transported, stored (if necessary), installed, and commissioned in accordance with applicable legal requirements, supplier instructions, and project-specific safety procedures.

Civil works and balance of plant would be completed before delivery of the BESS units which would be installed as they arrive on site to limit the need to store units on site.

Damaged, dropped, wet, overheated or otherwise suspect equipment would be quarantined and assessed. Access to installed equipment would be controlled, and energised work would be governed by permit-to-work, isolation, lock-out/tag-out and authorised-person procedures.

3.3 Drainage and Water Management

Temporary and permanent drainage would be implemented in accordance with the Drainage Management Plan and the drainage parameters assessed in the planning application to maintain controlled runoff and avoid adverse effects on receiving waters. The final sizing, specification and configuration of individual drainage components would be completed during detailed design without changing the approved drainage strategy, discharge limits or attenuation requirements.

3.4 Construction Stage Stored Materials

During construction, materials temporarily stored on site are expected to include aggregates, concrete products, reinforcing steel, cabling, ducting, pipes, fencing materials, and electrical equipment, together with fuel, oils, lubricants and other consumables required for construction plant and activities. Key equipment (BESS units, PCS, switchgear units) are expected to be installed on their foundations on delivery.

3.5 Testing, Commissioning, and Handover

Commissioning would proceed in controlled stages and may include inspection, insulation and continuity testing, protection and control testing, communications checks, functional testing of safety systems, transformer and switchgear tests, energisation of auxiliary supplies, staged BESS energisation and performance testing.

3.6 Reinstatement and Operations

Temporary works and surplus materials would be removed following construction. Disturbed areas would be reinstated, stabilised and landscaped in accordance with the approved scheme. During operation, no substantial routine stock of consumables is anticipated. Limited maintenance materials, such as approved coolants, transformer oil and dry spares, may be brought to or securely held on site as required, with suitable containment and inventory controls