Preliminary Environmental Information Report

Volume 2: Main Text and Figures

Chapter 3: Site & Development Description

October 2023

3. Site and Development Description

3.1.1. The purpose of this chapter of the PEIR is to provide an overview of the Site and surrounding area, and the Proposed Development.

3.1.2. Helios Renewable Energy Project is a proposed solar farm that will connect to the National Grid (the 'Proposed Development'). The Proposed Development comprises the construction, operation and maintenance, and decommissioning of a solar photovoltaic ('PV') array electricity generating facility with a total capacity exceeding 50MW across 475.68 ha of land within the administrative boundary of North Yorkshire Council ('NYC') (a unitary authority). A full description of the Proposed Development is provided below. The main objective for the Proposed Development is to generate low-carbon renewable energy, that can be used to contribute to addressing the urgent need to decarbonise the UK's energy supply.

3.1.3. This chapter is supported by the following figures:

- Figure 3.1 Field Boundaries Plan;
- Figure 3.2 Parameter Plan;
- Figure 3.3 Indicative Design;
- Figure 3.4 Solar PV Panel Elevations;
- Figure 3.5 Inverter Stations;
- Figure 3.6 132 kV Substation;
- Figure 3.7 BESS Battery Container Elevations;
- Figure 3.8 BESS Control Room Elevations;
- Figure 3.9 BESS Inverter/ Transformer;
- Figure 3.10 BESS Switchroom;
- Figure 3.11 Underground Grid Connection Cable Area;
- Figure 3.12 Fence and Gate;
- Figure 3.13 BESS Battery Fence and Gate;
- Figure 3.14 CCTV Elevations;

- Figure 3.15 Construction Vehicle Route;
- Figure 3.16 Internal Access Road Detail;
- Figure 3.17 Landscape Strategy Plan;
- Figure 3.18 Elevations with Archaeological Mitigation; and
- Figure 3.19 Access Road with Archaeological Mitigation.

3.1.4. This chapter is supported by the following appendix:

- Appendix 3.1 BESS Safety Management Plan.

3.2. Site Context and Description

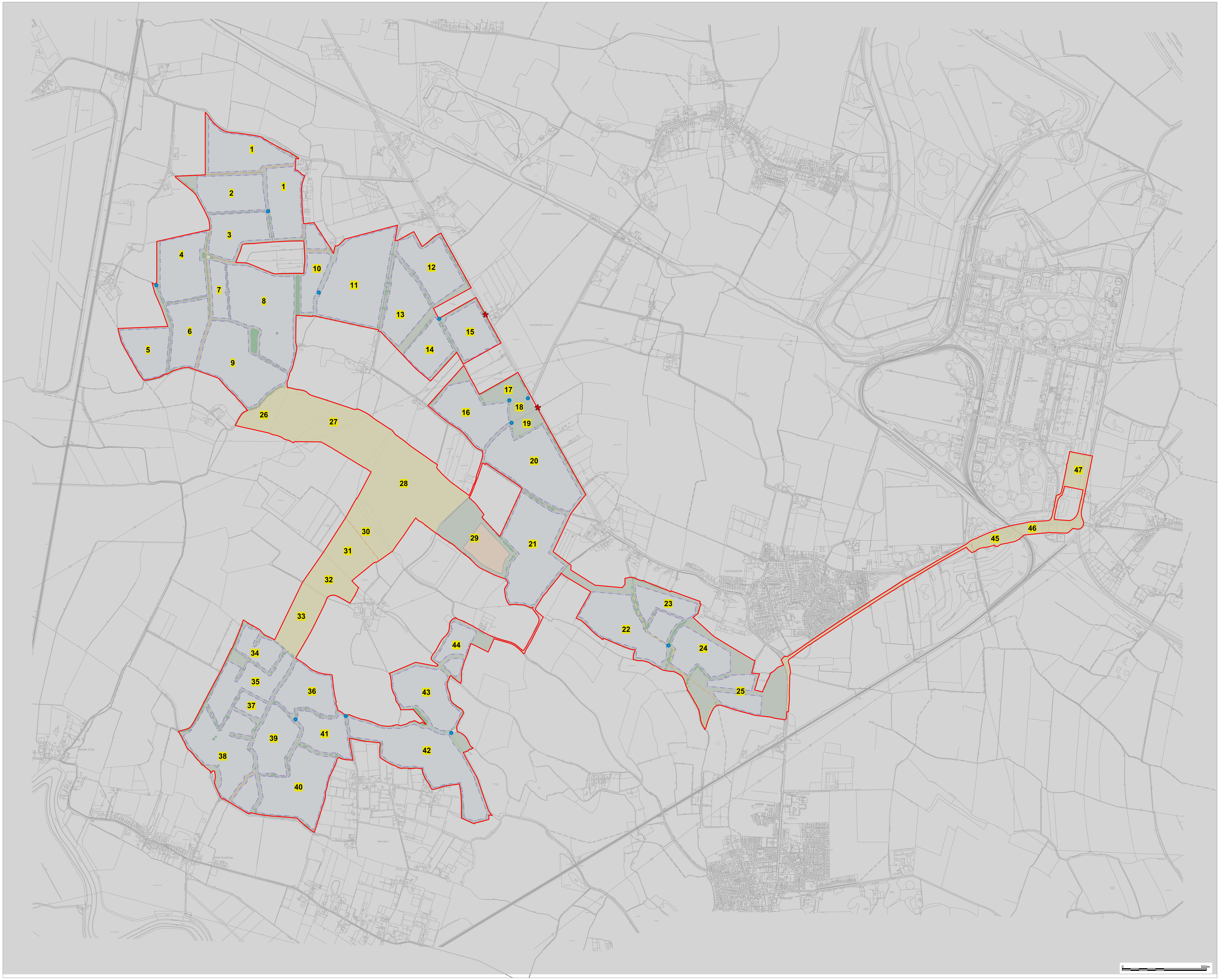
3.2.1. The Site (refer to Figure 1.1 Site Location Plan) predominantly comprises agricultural land, consisting of fields used for grazing and arable farming. It extends to 475.68ha of land to the south-west of the village of Camblesforth and to the north of the village of Hirst Courtney. The underground grid connection cable route extends to the Point of Connection ('PoC') at Drax National Grid Substation on the eastern boundary of the Drax Power Station site.

3.2.2. The Site contains 47 fields, as shown on Figure 3.1 Field Boundaries Plan (refer to Chapter 3). The main part of the Site sits within a wider area of land bounded to the north-east by the A1041, to the west by agricultural fields between the Site and the Selby Branch of the East Coast Mainline railway further west, and to the south by agricultural fields and agricultural and horticultural development surrounding Moss Green Lane. The surrounding landscape is characterised by large, irregular-shaped fields delineated by partially denuded hedgerows or drainage ditches. Occasional woodland blocks and tree belts are also present, but the landscape is primarily flat and open.

3.2.3. Transport routes are a notable feature in the vicinity of the Site, with the M62 and A63 extending on east – west alignments beyond the southern and northern extents of the Site, respectively. Public Rights of Way ('PRoW') cross the Site and the wider landscape, often following farm tracks or rural lanes. The Trans Pennine Trail long-distance walking and cycling route extends south from Selby and in proximity to the western and southern parts of the Site boundary, adjacent to the western boundary at the closest point.

3.2.4. Selby is the principal settlement closest to the Site, approximately 1.5km to the north at the closest distance. Several smaller settlements are dispersed throughout the area, including Camblesforth (immediately north of the Underground Cable Corridor in the north-eastern part of the Site shown on Figure 3.2 Parameter Plan), Hirst Courtney (approximately 400m to the south), Temple Hirst (approximately 600m to the south west), Carlton (approximately 900m to the south), Drax (approximately 500m to the east of the Underground Cable Corridor in the north-eastern part of the Site), Barlow (approximately 1.4km to the north east) and Burn (approximately 1.7km to the west). The industrial complexes of Drax (immediately north of the Underground Cable Corridor in the north-eastern part of the Site) and Eggborough Power Stations (approximately 3.3km to the south west) form prominent features in the surrounding landscape. A disused airfield (RAF Burn) is located approximately 300m to the west of the Site at Burn.

Figure 3.1 Field Boundaries Plan



KEY

Site Boundary

15 Field Number

Revisions:
First Issue- 23/05/2023 JS
01 - (13/07/2023 JS) Background plan updated
02 - (24/07/2023 JS) Background plan updated
03 - (04/08/2023 AD) graphical changes

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Project Title:

Helios Renewable Energy Project

Drawing Title:

Field Boundaries Plan

DRWG No:	Rev:	Sht no:
DX-01-P44	03	-

Drawn by :	Checked by:
AD	KL

Scale:	Date:
1:10,000 @ A1	04/08/2023

3.3. Use of the Rochdale Envelope

3.3.1. The development of the design of the Proposed Development has been an iterative process, based on preliminary environmental assessments and consultation with statutory and non-statutory consultees.

3.3.2. It is important to note that the exact details of all elements of the design of the Proposed Development cannot be confirmed until the tendering process for the design has been completed and the detailed design has been approved in advance of the Proposed Development commencing (or phase thereof). This is to allow for flexibility to accommodate changes in technological advancements. For example, the enclosure or building sizes may vary depending on the contractor selected and their specific configuration and selection of plant.

3.3.3. In order to maintain flexibility in the design and layout at this stage in the process, the assessment of the Proposed Development adopts the Rochdale Envelope approach, as described in the *PINS Advice Note Nine: Rochdale Envelope* (July 2018). This involves specifying parameter ranges, including details of the maximum, and where relevant the minimum, size (footprint, width, and height relative to above ordnance datum ('AOD')), technology, and locations of the different elements of the Proposed Development.

3.3.4. The use of the Rochdale Envelope approach has therefore been adopted to present a reasonable worst-case assessment of the potential environmental effects of the Proposed Development. The list of parameters for each of the components described below are presented in tabular form within Table 3.2.

3.3.5. To assist with the interpretation of the Rochdale Envelope, parameter plans have been created for the construction and operational phases to provide a visual representation of the areas for development, within the Order limits in accordance with the parameters set out within this chapter.

3.3.6. It is the establishment of the maximum parameters which enables a robust assessment of likely significant effects to be undertaken within this PEIR, for topics where the nature of the assessment requires a specific level of details, such as maximum heights, massing or noise levels and thus form the basis of assessment.

3.3.7. Each environmental topic has assessed the maximum parameters within the

Rochdale Envelope to determine the potential for significant effects and to identify suitable mitigation measures.

3.4. Proposed Development Overview

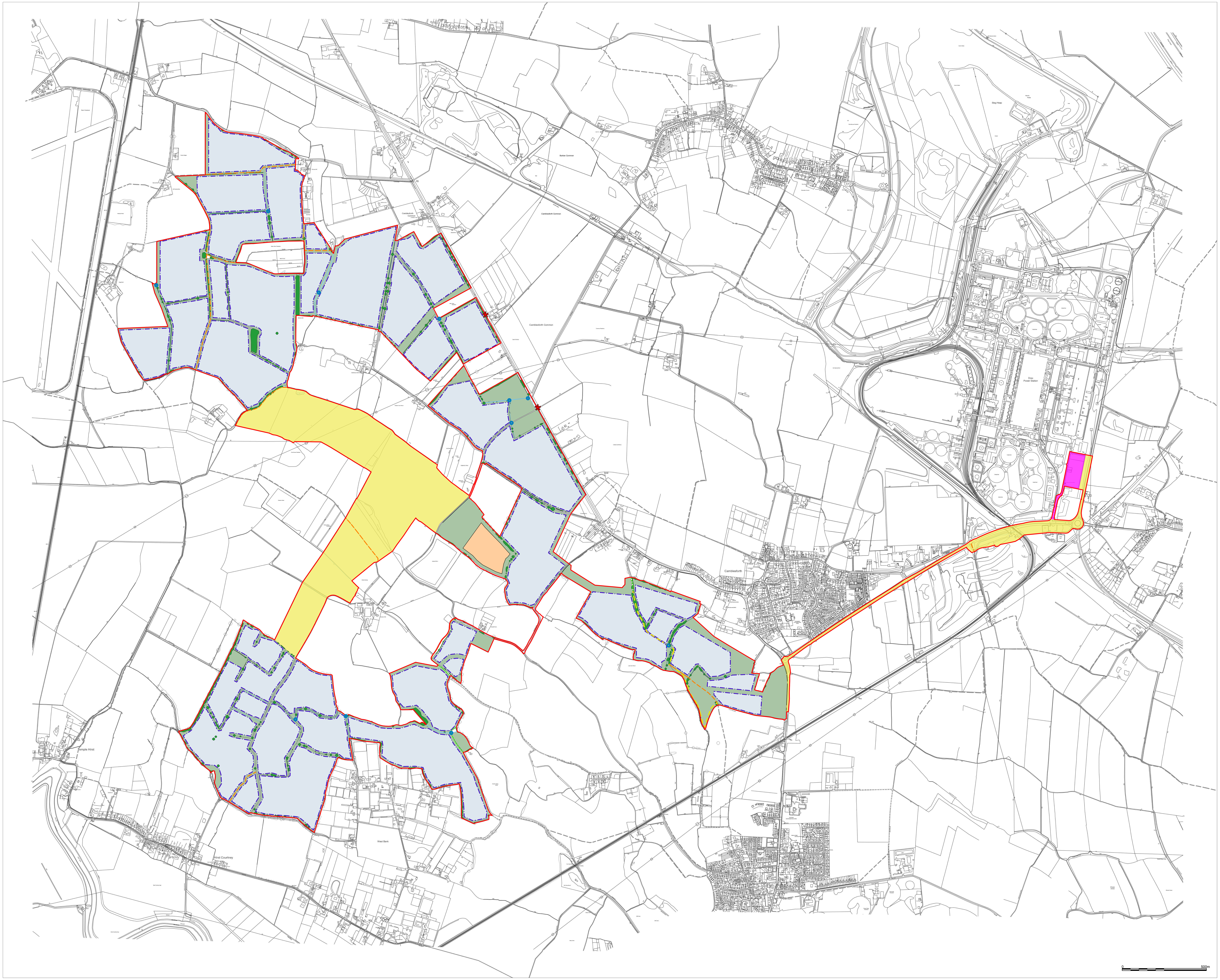
Overview

3.4.1. The design of the Proposed Development is expected to evolve throughout the assessment process, with infrastructure located to avoid significant impact on any specific designations or assets and, where appropriate, to respond to feedback from consultees. The technologies proposed (solar PV and energy storage) are rapidly evolving. Any flexibility sought will be defined within the DCO. This PEIR sets out the preliminary design parameters for the Proposed Development and adopts a parameter-led assessment that considers the 'worst case', having regard to the Inspectorate's *Advice Note Nine: Rochdale Envelope* (July 2018) and paragraph 4.2.8 of NPS EN-1.

3.4.2. The area subject to the DCO application comprises the Solar Farm Zone and the Underground Cable Corridor, of which the principal components comprise the following (shown on Figure 3.2 Parameter Plan):

- Solar PV modules;
- Mounting structures;
- Field stations;
- On-Site Substation and battery energy storage system (‘BESS’) compound;
- Distribution cables;
- Grid connection cables;
- Fencing, security and ancillary infrastructure;
- Access;
- Landscape and ecological enhancements; and
- Archaeological mitigation.

Figure 3.2 Parameter Plan



KEY

- Site Boundary
- Existing Vegetation
- Public Footpath
- Other Route with Public Access
- Trans Pennine Way
- Permissive Footpath
- Security Fence
- Solar Farm Zone
  Includes:
  - Solar PV Modules
  - Inverters/Transformers
  - Access Tracks
  - Access Gates
- Substation and Battery Energy Storage System (BESS) Compound
  Includes:
  - 132kV Substation
  - BESS and associated infrastructure
  - Access Tracks
  - Access Gates
  - Fencing
  - Earth Flood Defence Bund
  - Attenuation Ponds
- National Grid Substation and Access
- Existing Culvert
- Green Infrastructure
  Includes:
  - Habitat Areas
  - Access Track Crossings
- Proposed Site Entrance
- Underground Cable Corridor

Revisions:
First Issue- 21/04/2023 JS
01 - (28/04/2023 JS) Revised boundary
02 - (12/06/2023 JS) Revised boundary
03 - (15/06/2023 JS) Revised layout
04 - (20/07/2023 JS) Revised layout and boundary
05 - (04/08/2023 AD) Key and graphical changes
06 - (30/08/2023 JS) Revised layout and key updates

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Project Title:

Helios Renewable Energy Project

Drawing Title:

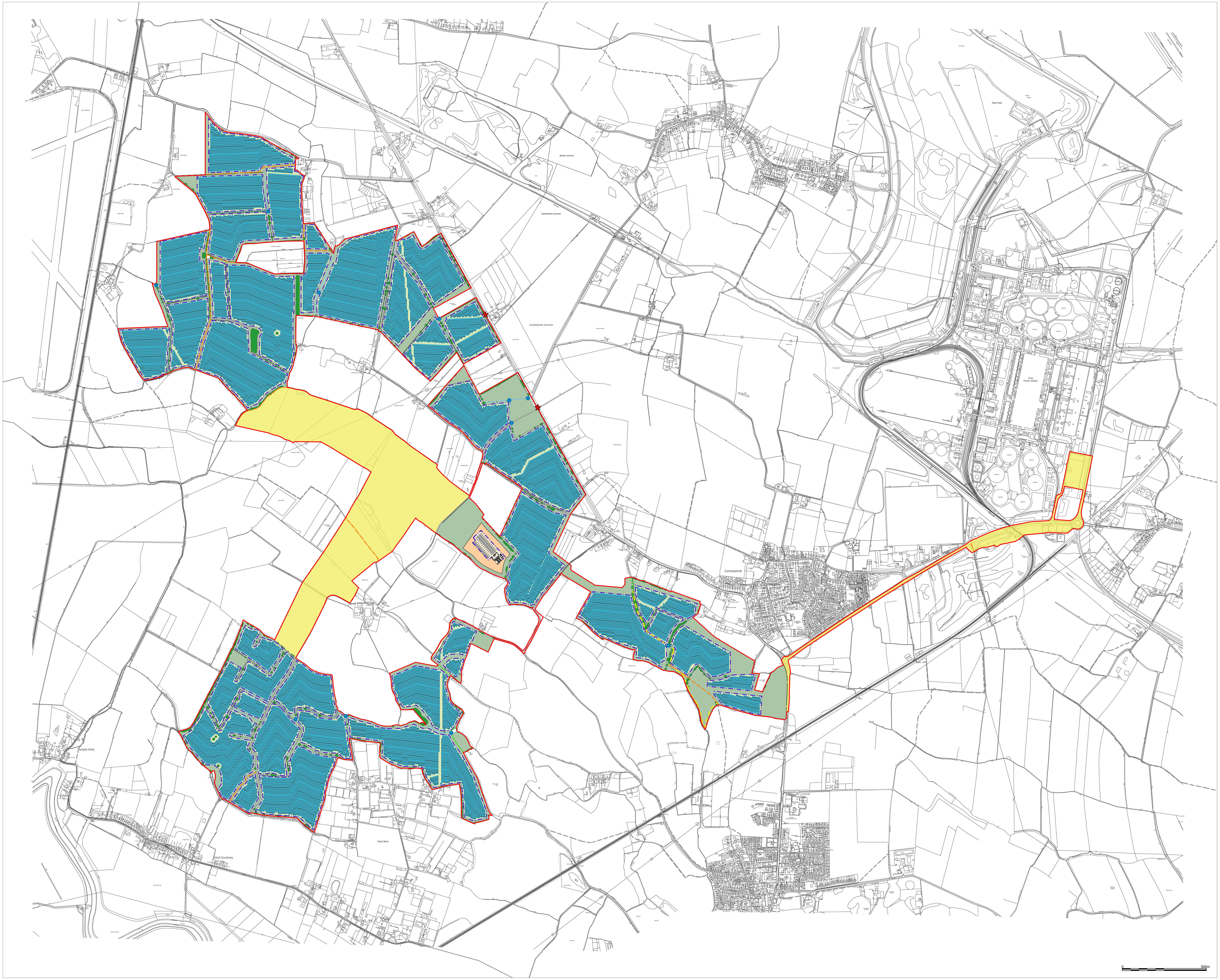
Parameter Plan

DRWG No:	Rev:	Sht no:
DX-01-P02	06	-

Drawn by :	Checked by:
AD	KL

Scale:	Date:
1:10,000 @ A1	30/08/2023

Figure 3.3 Indicative Design



KEY

- Site Boundary
- Existing Vegetation
- Public Footpath
- Other Route with Public Access
- Trans Pennine Way
- Permissive Footpath
- Security Fence
- Solar Panels
- Substation and Battery Energy Storage System (BESS) Compound
  Includes:
  - 132kV Substation
  - BESS and associated infrastructure
  - Access Tracks
  - Access Gates
  - Fencing
  - Earth Flood Defence Bund
  - Attenuation Ponds
- Existing Culvert
- Green Infrastructure
  Includes:
  - Habitat Areas
  - Access Track Crossings
- Proposed Site Entrance
- Underground Cable Corridor

Revisions:
First Issue- 05/07/2023 JS
01 - (24/07/2023 JS) Revised layout and substation location
02 - (07/08/2023 AD) update to parameter base

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Drawing Title:

Indicative Design

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Development Components

3.4.3. A summary of the following parameters and design considerations is provided at Table 3.2.

Solar PV Modules

3.4.4. The Proposed Development will consist of solar PV modules placed on mounting structures arranged in rows (known as 'solar PV tables'). The solar PV array is a distinct group of PV tables which are grouped together. A group of solar PV modules that are connected to one another are known as 'solar PV strings'.

3.4.5. Individual solar PV modules consist of a series of monofacial or bifacial, mono-crystalline cells. The solar PV panels will be made of silicon glass and include an anti-reflective coating.

3.4.6. Solar PV modules convert sunlight into electrical current (as direct current ('DC')). The DC generating capacity of each solar PV module will depend on advances in technological capabilities at the time of construction. Bifacial modules have a clear backing which allows the solar cells to absorb light on the underside/rear of the panel to increase energy generation.

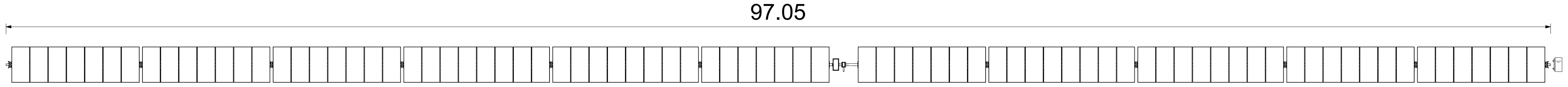
3.4.7. The DCO application will seek flexibility for different configurations of solar PV modules. The final elevations of the solar PV modules will be influenced by various design factors such as local topography, selection of solar PV module type and configuration. The gap between the rows of solar PV tables will vary responding to local topography, but will have a minimum separation distance of 2m, to minimise effects of shadowing and to ensure optimal efficiency.

Mounting Structures

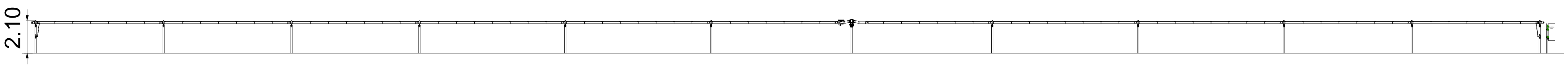
3.4.8. The panels will utilise a Single Access Tracker ('SAT') system, oriented north-south and will tilt east-west. Panel framework (refer to Figure 3.4 Solar PV Panel Elevations) at its highest point (when tilted at 60^{o}) will be up to 3m above existing ground levels and at the lowest point up to 900mm above existing ground levels to allow for movement of grazing sheep underneath.

3.4.9. The solar PV modules will be ground mounted to a piled metal frame of anodised aluminium alloy or galvanized steel with rough matte finish. The framework posts will be pile driven, up to 2.5m below ground level, depending on ground conditions.

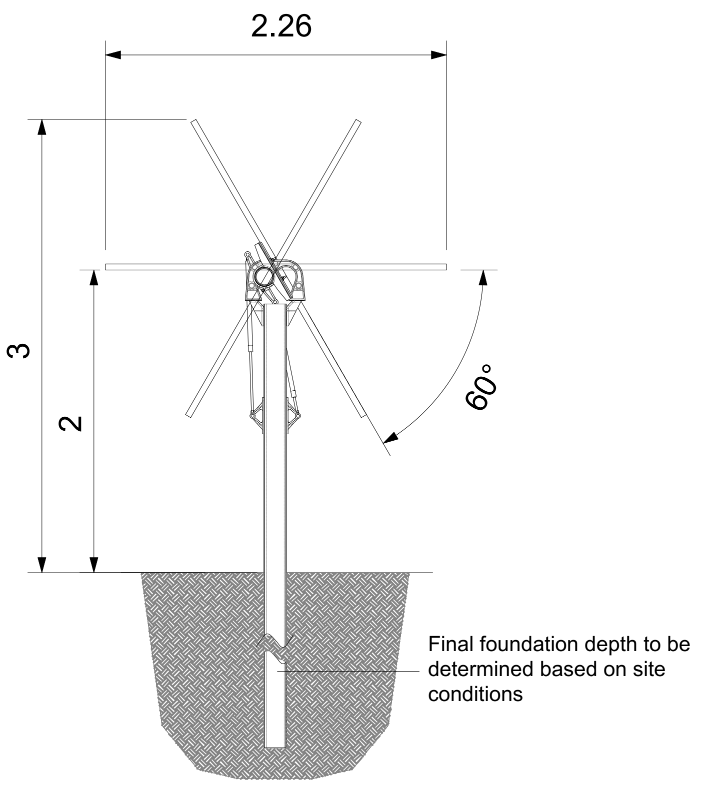
Figure 3.4 Solar PV Panel Elevations



PLAN VIEW (not to scale)



FRONT ELEVATION (not to scale)



SIDE ELEVATION (Scale 1:50)

GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

2) FINAL DIMENSIONS MAY VARY DEPENDING ON MODULE TYPE

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Drawing Title:
PV Elevations

DRWG No:	Rev:	Sht no:
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JS	KL
Scale: As noted @ A3	Date: 30/03/2022

Field Stations

3.4.10. As a 'worst-case scenario', central inverters have been assumed instead of a string system for the Proposed Development. Should string inverters be progressed, the central inverters would not be required.

Inverter Stations

3.4.11. In order for the energy produced by the solar PV modules to be delivered to the on-Site Substation, supporting infrastructure is provided in the form of central containerised inverter stations which house an inverter, transformer and switchgear, or these elements may stand alone.

- Inverters are required to convert the DC electricity collected by the solar PV modules into alternating current ('AC') which allows the electricity generated to be exported to the national grid;
- Transformers are required to step up the voltage of the electricity generated by the PV modules before it reaches the on-Site Substation;
- "Switchgear" is the combination of electrical disconnect switches, fuses or circuit breakers used to control, protect, and isolate electrical equipment; and
- Switchgear is used both to de-energise equipment to allow work to be done and to clear faults downstream.

3.4.12. The field stations comprise up to 100 stations, with each unit measuring up to 12.2m in length x 2.4m in width x 3.5 in height, including concrete supports 600mm in height, above a 300mm permeable deep gravel sub-base within a defined energy storage area (refer to Figure 3.5 Inverter Stations). The container or cabinet will be externally finished to be in keeping with the prevailing surrounding environment, often utilising a green painted finish.

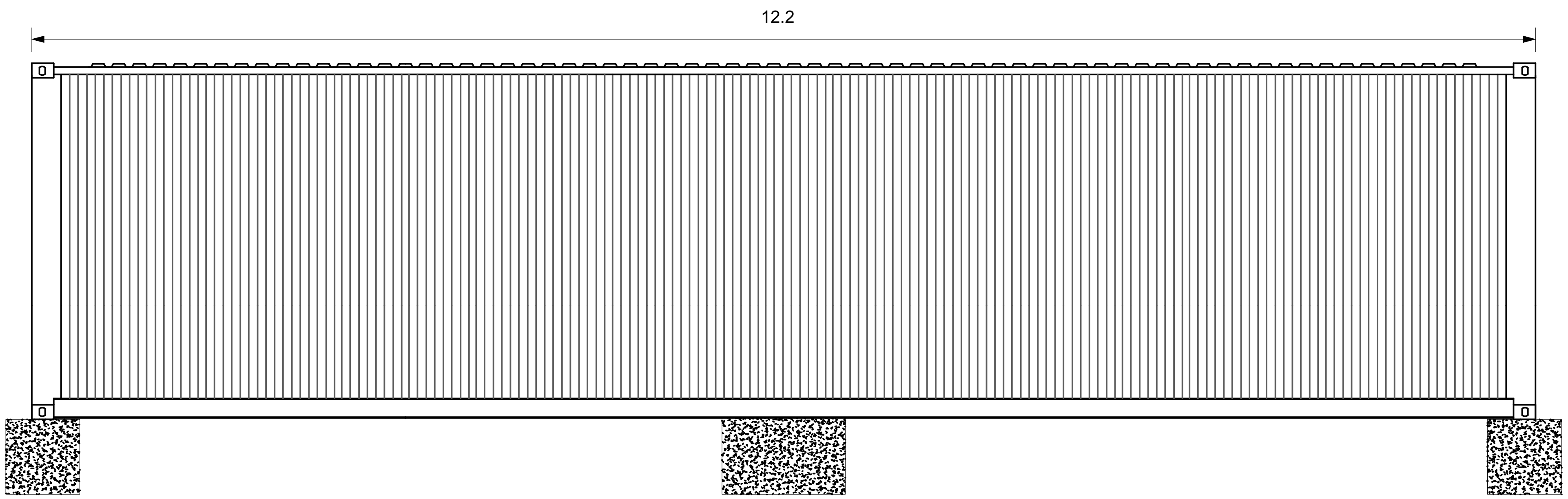
String Inverters

3.4.13. String inverters are small enough to be mounted to the mounting structures underneath the solar PV infrastructure. A string inverter is required for every solar PV string and will be sited within the footprint of the solar PV tables.

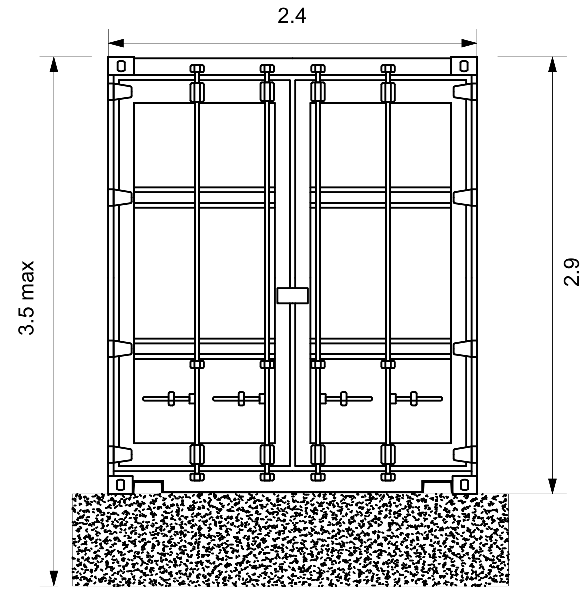
3.4.14. Where string inverters are used, string transformers are required and would be distributed throughout the Solar Farm Zone within containers. Switchgears would be housed in these same containers or integrated with other components within the Solar Farm Zone.

Figure 3.5 Inverter Stations

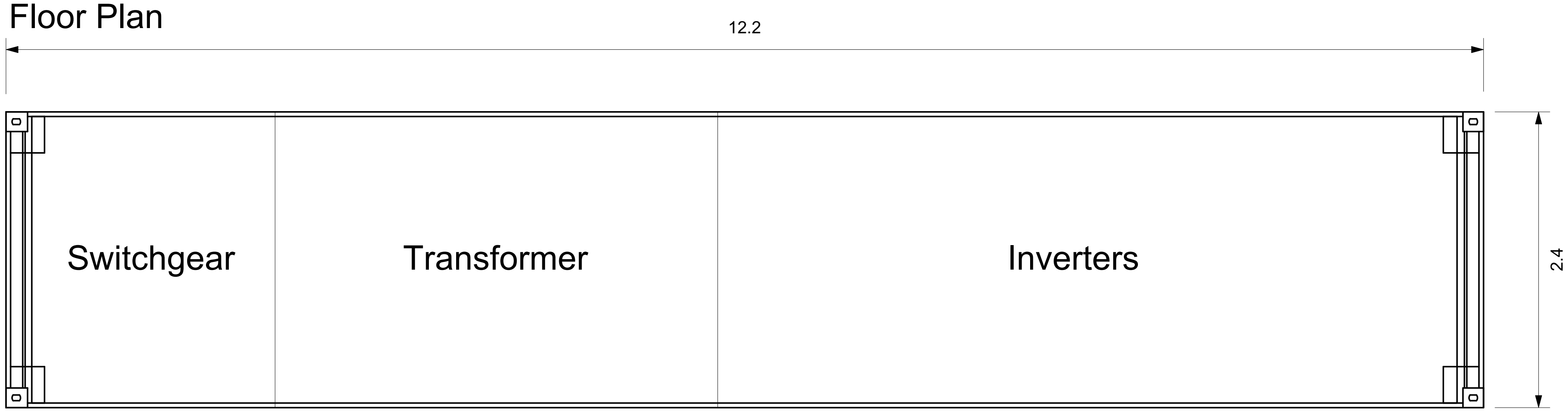
Side Elevation



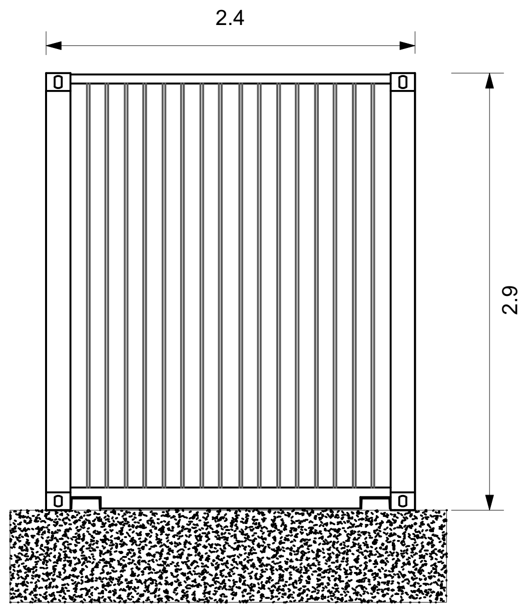
Front Elevation



Floor Plan



Rear Elevation



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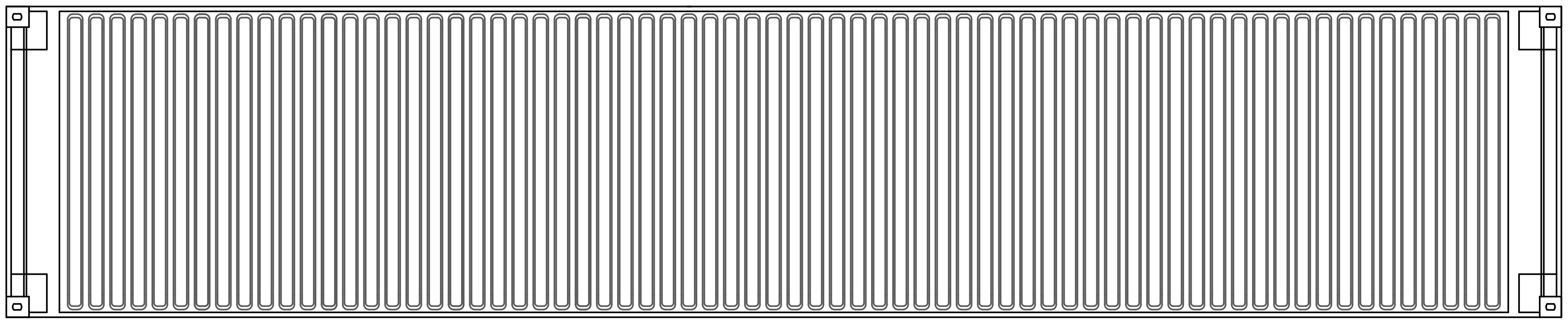
Roof Plan



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Project Title:
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Drawing Title:
Inverter/Transformer Stations

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DX-01-P04	-	-

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JS	KL
Scale: 1:50 @ A3	Date: 30/03/2022

GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

2) INVERTER STATIONS TO BE PAINTED RAL6005

3) FOUNDATIONS SHOWN INDICATIVELY ONLY. DIMENSIONS TO BE CONFIRMED BASED ON SITE CONDITIONS.

On-Site Substation and Energy Storage Compound

3.4.15. The on-Site 132 kilovolt (‘kV’) Substation and the BESS will be housed together in a compound.

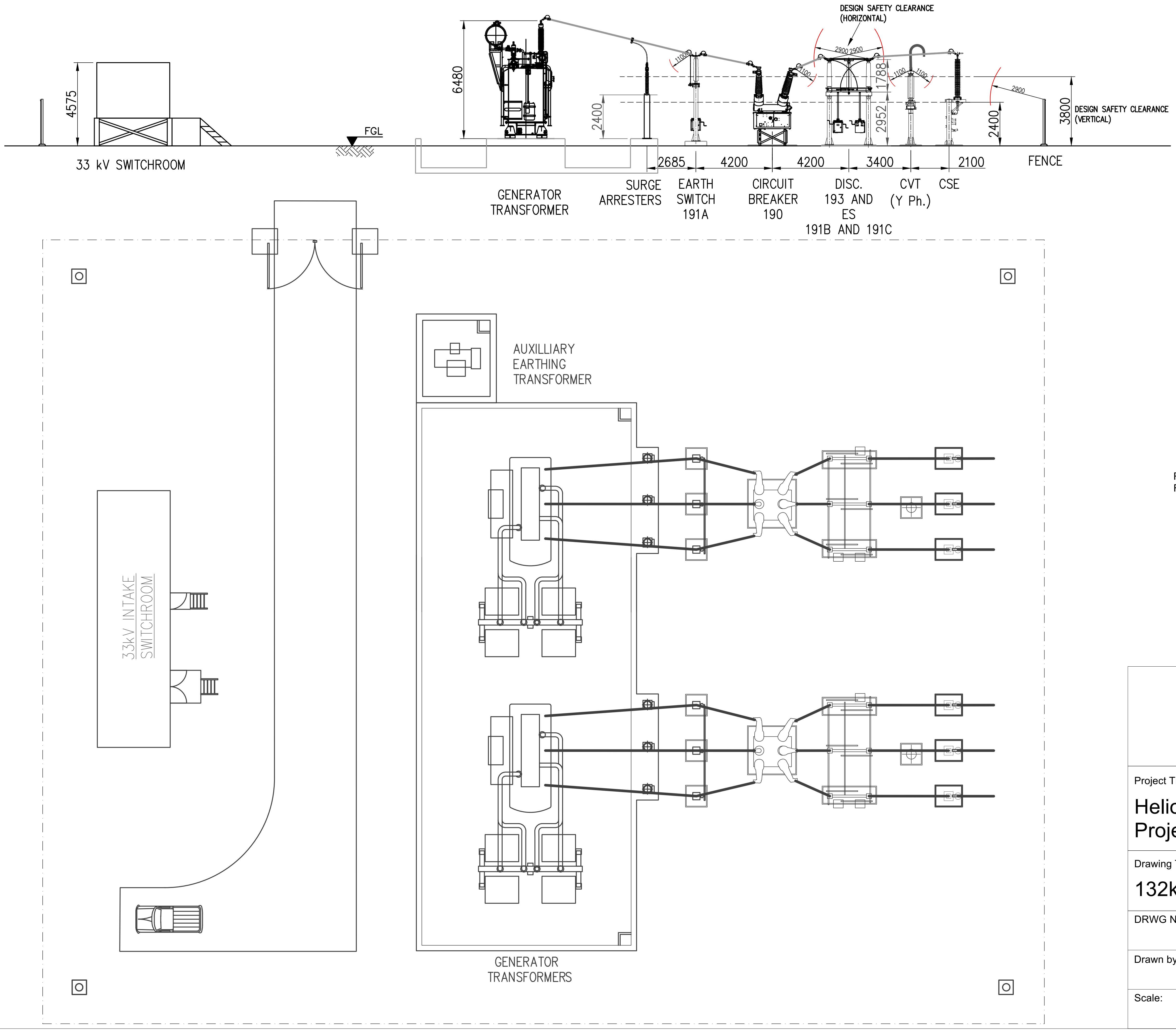
3.4.16. The Substation will comprise an earthing transformer, surge arresters, earth switch, circuit breaker, 33kV intake switch room and generator transformers. The component of the greatest height within the substation is the generator transformer, standing up to approximately 6.5m (as shown in Figure 3.6 132 kV Substation).

3.4.17. The BESS will include the following:

- Battery containers of up to 12.2m in length x 2.4m in width x 3.5m in height, including concrete supports 600mm in height (refer to Figure 3.7 BESS Battery Container Elevations);
- Control room (including a weather station, wifi antenna and satellite aerial) of up to 6m in length x 3m in width x 5.7m in height (Figure 3.8 refer to BESS Control Room Elevations);
- Inverter-transformers of up to 6.1m in length x 2.4m in width x 3.5m in height, including supports 600mm in height (refer to Figure 3.9 BESS Inverter/ Transformer); and
- Switchroom of up to 11.7m in length x 4m in length x 3.8m in height (refer to Figure 3.10 BESS Switchroom).

3.4.18. Due to the flood risk identified in Chapter 9 Water Environment of the PEIR, the compound will be surrounded by an earth flood defence bund. The proposed earth flood defence bund will be raised at least 600mm above the combined fluvial and tidal design flood level to protect the equipment from inundation.

Figure 3.6 132 kV Substation



GENERAL NOTES:

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First Issue- 17/04/2023 JS

0 — 10m

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Project Title:	Helios Renewable Energy Project
Drawing Title:	132kV Substation
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Drawn by : JS	Checked by: KL
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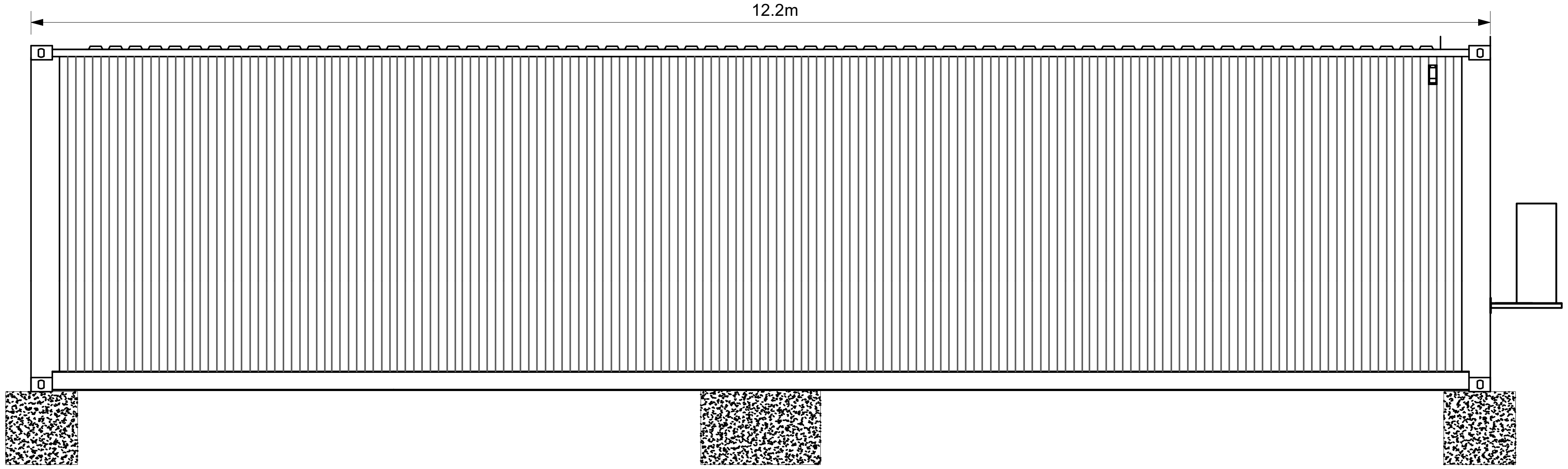
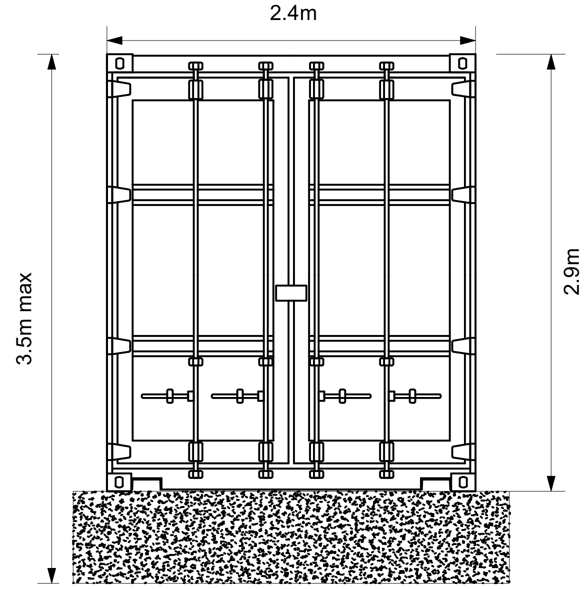
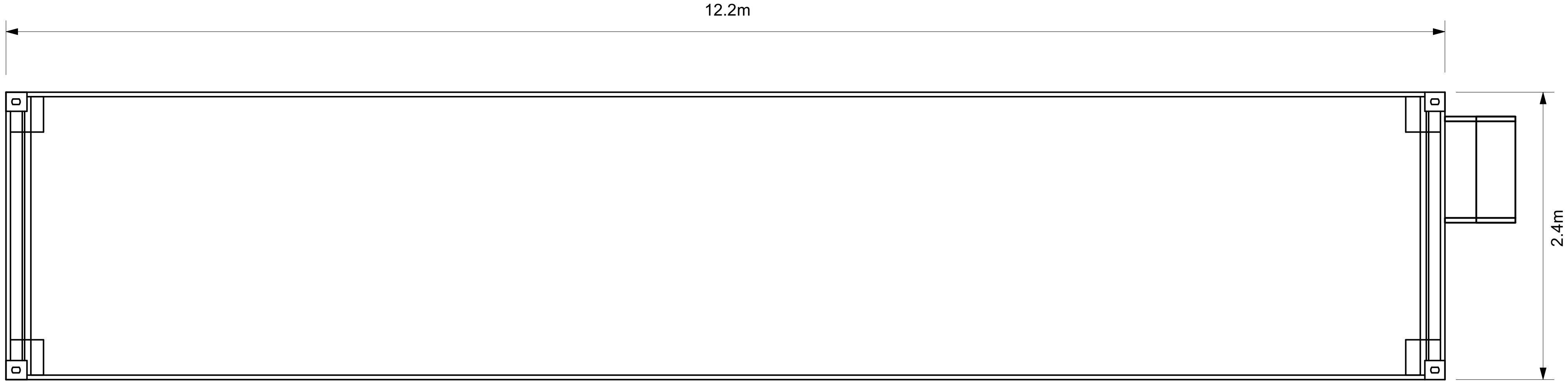
Figure 3.7 BESS Battery Container Elevations



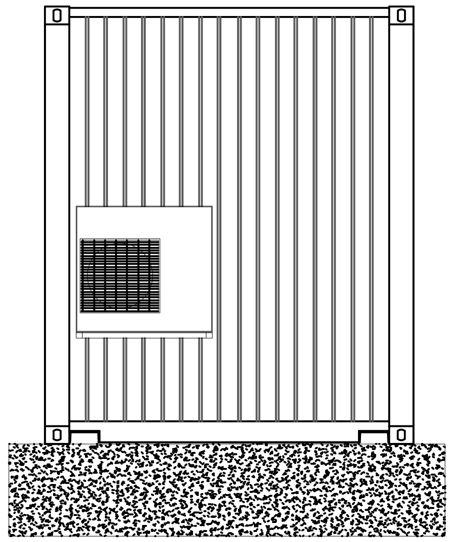
Side Elevation



Front Elevation



Floor Plan



Rear Elevation

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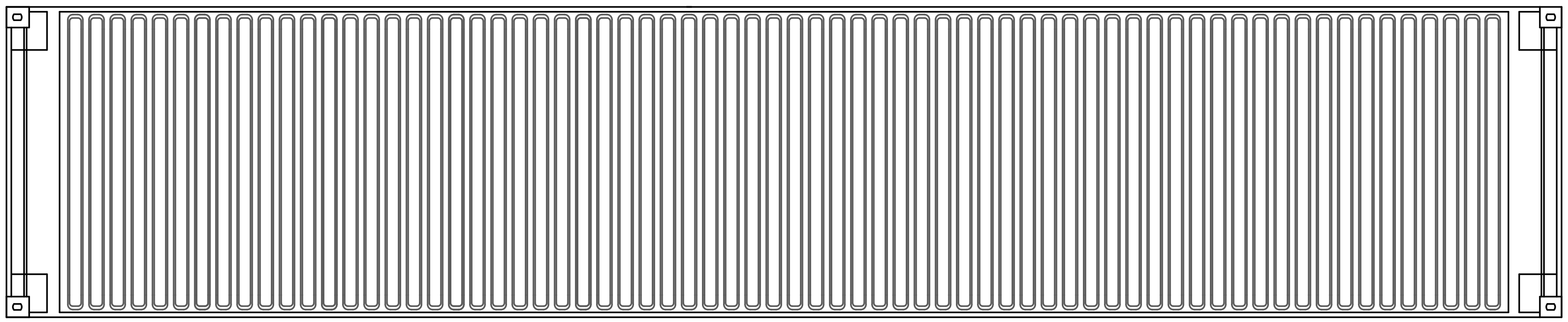
First Issue- 30/03/2022 JS



Roof Plan

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Project Title:

Helios Renewable Energy Project

Drawing Title:

BESS Battery Container Elevations 40ft

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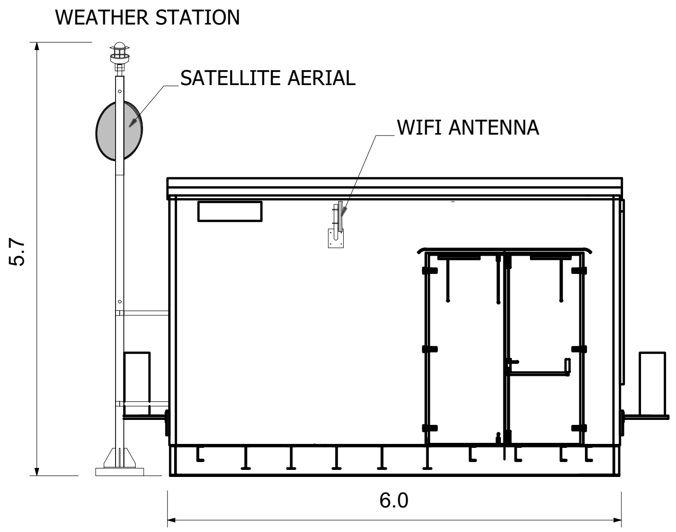
GENERAL NOTES:

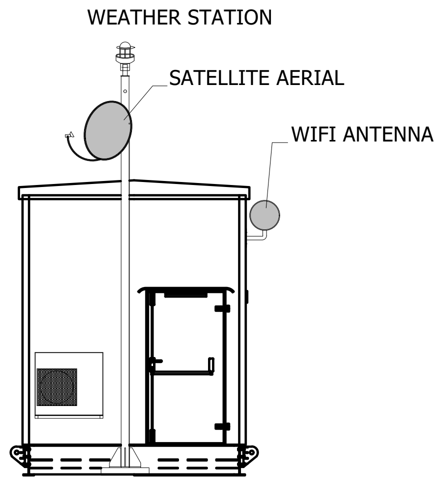
1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

2) BATTERY CONTAINERS TO BE PAINTED RAL6005

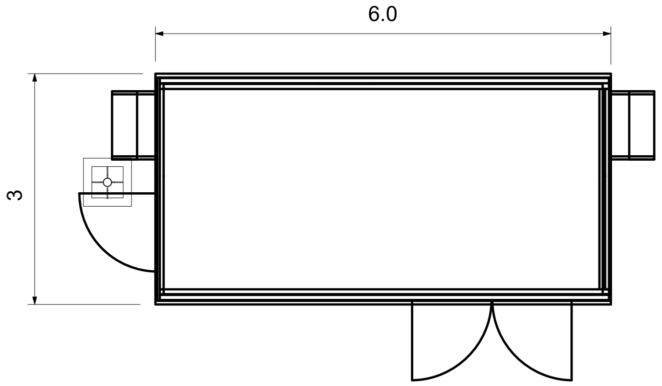
Figure 3.8 BESS Control Room Elevations



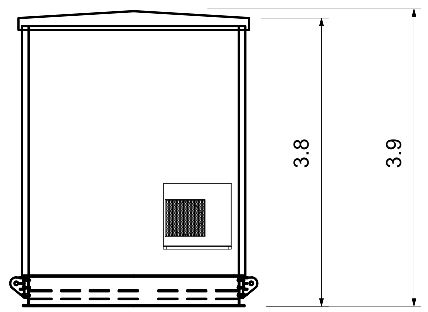
SIDE ELEVATION



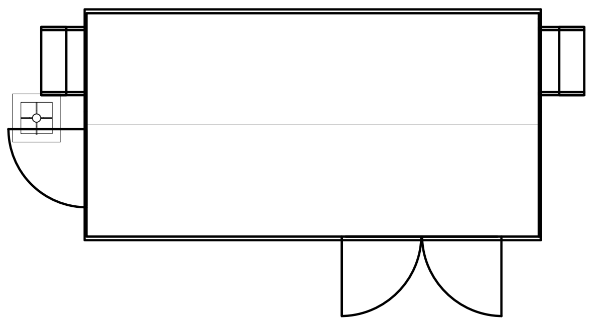
FRONT ELEVATION



FLOOR PLAN



REAR ELEVATION



ROOF PLAN

0 5m

GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

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Helios Renewable Energy Project

Drawing Title:

BESS Control Room Elevations

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DX-01-P09	-	-

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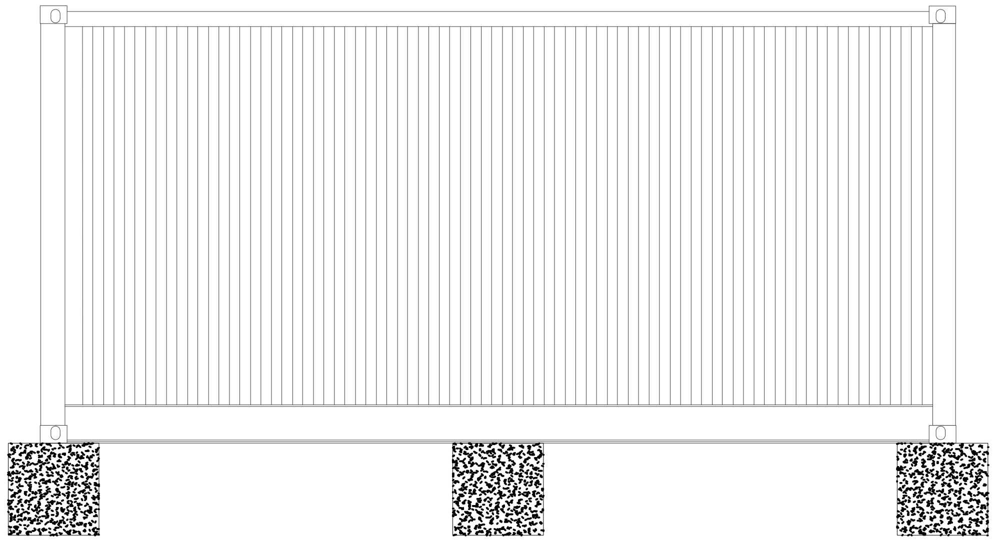
1:100 @ A3	30/03/2022

Figure 3.9 BESS Inverter/ Transformer

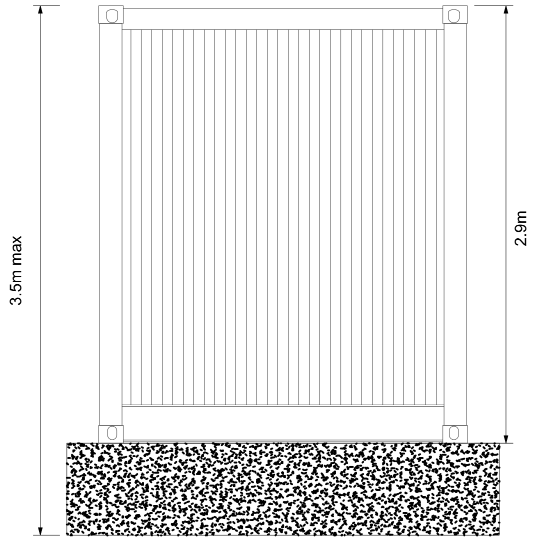
GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

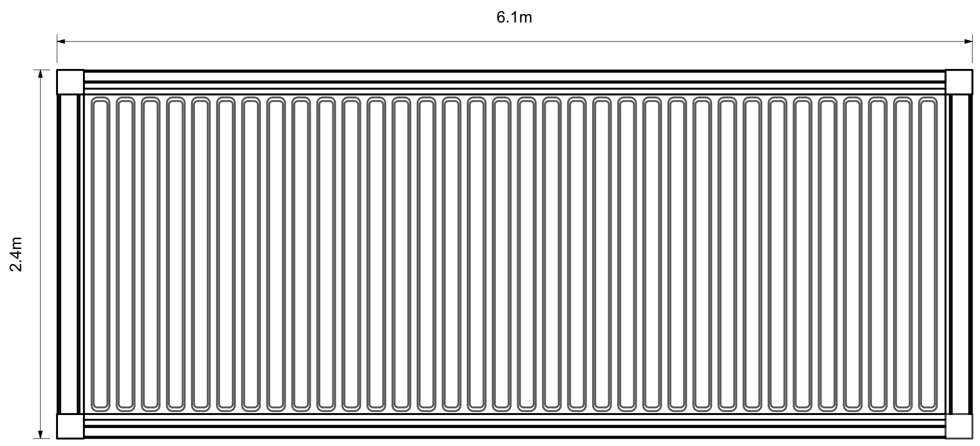
Side Elevation



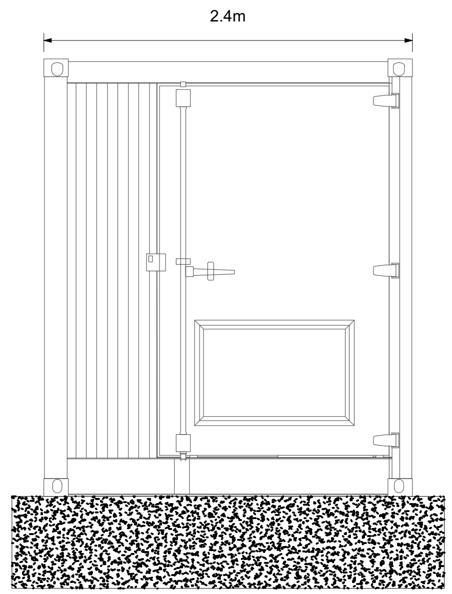
Rear Elevation



Roof Plan



Front Elevation



0 2m

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First Issue- 02/05/2023 JS

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Project Title:

Helios Renewable Energy Project

Drawing Title:

BESS Inverter/Transformer

DRWG No:	Rev:	Sht no:
DX-01-P40	-	-

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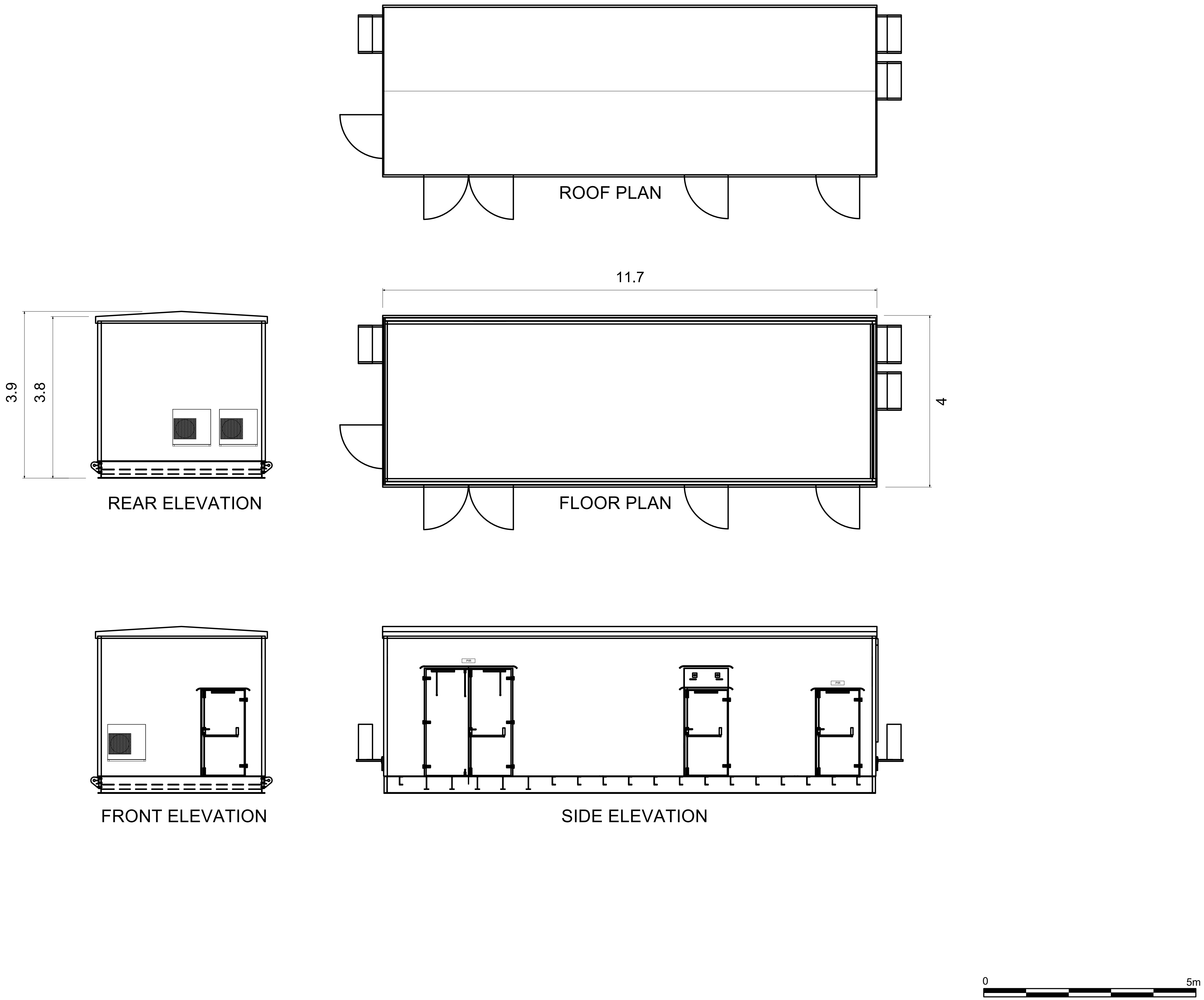
JS	KL

Scale:	Date:
1:50 @ A3	02/05/2023

Figure 3.10 BESS Switchroom



GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

2) CONTAINERS TO BE PAINTED RAL6005

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Project Title:

Helios Renewable Energy Project

Drawing Title:

BESS Switchroom

DRWG No:	Rev:	Sht no:
DX-01-P41	-	-

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JS	KL

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1:100 @ A3	02/05/2023

Distribution Cables

3.4.19. Low voltage distribution cabling between solar PV modules and the inverters will typically be located above ground level fixed to the mounting structure, and then trenched underground between the solar PV tables and the field stations. The dimensions of trenching will vary subject to the number of underground cables and the number of ducts they contain but will typically be up to 1.5m wide with a minimum depth of 0.9m, dependent on the method of installation and ground conditions.

3.4.20. Higher rated voltage cables (33kV) are required between field stations and the on-Site substation. The 33kV cables will be buried underground in a trench typically up to 1.5m wide with a minimum depth of 0.9m. The flexibility to locate electrical and other cables within the Solar Farm Zone (as shown on Figure 3.2 Parameter Plan) is required to ensure that the Proposed Development can be implemented as efficiently as possible.

3.4.21. The existing above-ground and below-ground utilities across the Site are not proposed to be altered by the Proposed Development. Information on the easements relating to these assets has been obtained and incorporated into the design of the Proposed Development as part of the design process and are set out in Figure 2.1 Utilities Plan. Cables will cross existing below-ground utility infrastructure at 90 degrees (perpendicular) to the alignment of the utility infrastructure. The cable crossings will be at least 600mm above or below the existing below ground utility infrastructure, in line with National Grid guidance[1]. There may be a requirement for horizontal directional drilling ('HDD') within the Solar Farm Zone to cross beneath existing belowground utility infrastructure and watercourses; HDD will have a maximum working width of up to 30m.

3.4.22. Data cables will be required throughout the Solar Farm Zone to allow for the monitoring during operation, such as the collection of data on solar irradiance from pyranometers. The data cables would be installed within the same trench as the electrical cables.

Grid Connection Cables

3.4.23. The Site will connect to the National Grid substation at the Drax Power Station via

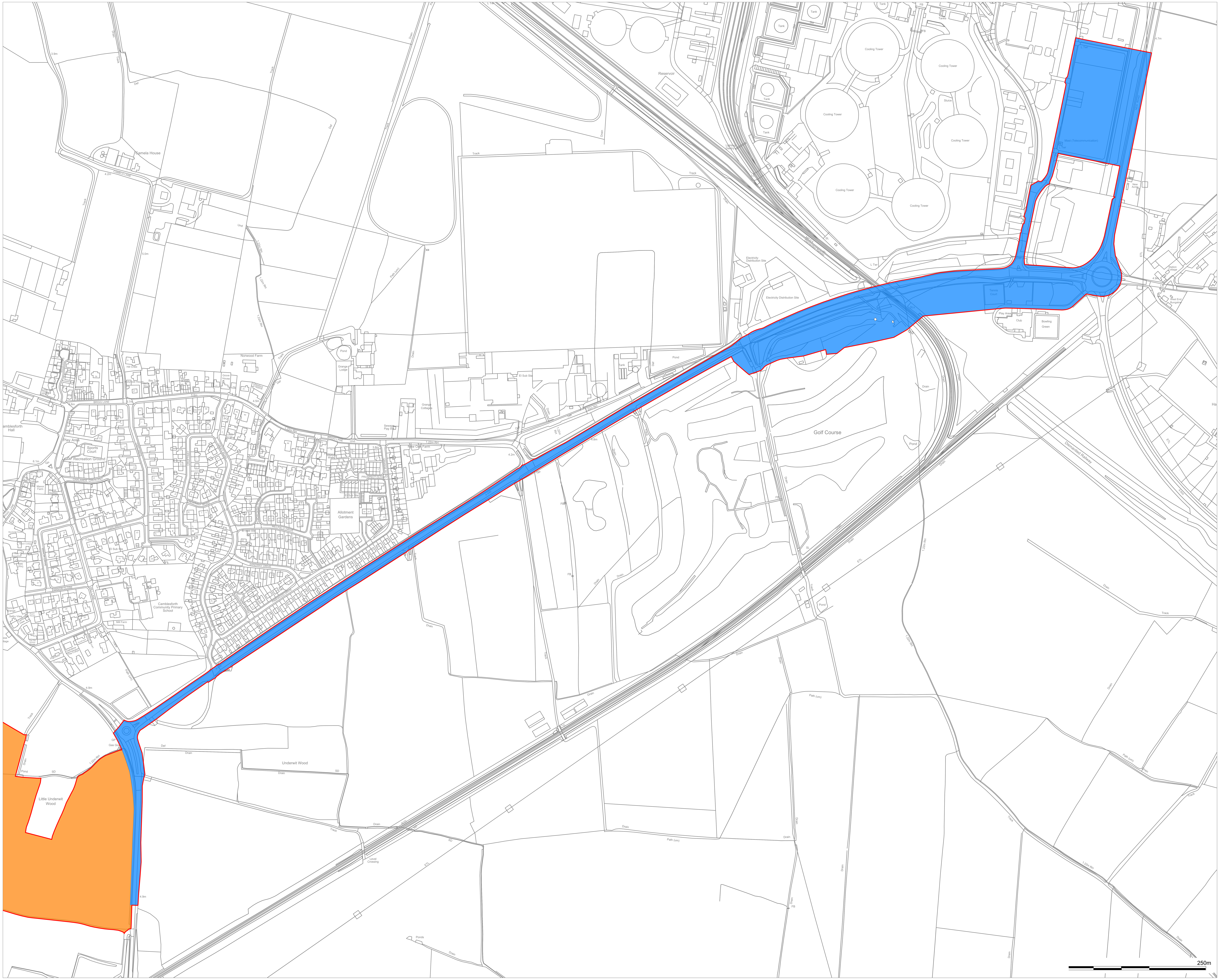
[1] National grid T/SP/SSW/22

underground cabling (refer to Figure 3.11 Underground Grid Connection Cable Area). The voltage for the underground grid connection cable will be up to 132kV. The grid connection route will be included in the DCO application and the ES will identify the likely significant environmental effects of the entire Proposed Development, including the grid connection. The dimensions of trenching will vary subject to the number of underground cables and the number of ducts they contain but open trenching will typically be up to 1.5m wide with a minimum depth of 0.9m, dependent on the method of installation and ground conditions.

3.4.24. HDD will be required to allow the grid connection cables to be installed under the railway near Drax Power Station. The width of the HDD is expected to be 1.2m subject to ground conditions. The maximum depth of the HDD is dependent on ground conditions, borehole entry and exit positions and requirements of the railway owner/operator. The contractor will establish a 30m x 30m working compound on each side of the HDD section.

3.4.25. The Proposed Development will have an export capacity of 190MW.

Figure 3.11 Underground Grid Connection Cable Area



KEY

- Site Boundary
- Underground Grid Connection Cable
- Development Area

N

Revisions:
First Issue- 03/05/2022 JS
01 - (12/07/2022 JS) Revised boundary
02 - (21/02/2023 JS) Revised boundary
03 - (20/04/2023 JS) Revised boundary
04 - (28/04/2023 JS) Revised boundary
05 - (12/06/2023 JS) Revised boundary

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Project Title:
Helios Renewable Energy Project

Drawing Title:
Site Location Plan (Zoomed in)

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DX-01-P01	05	3/3

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1:3000 @ A1	12/06/2023

Utilities

3.4.26. As advised, utilities identified on-Site in Figure 2.1 Utilities Plan will not require diversion. The design process has accounted for the easements identified in Table 3.1.

Table 3.1 – Summary of Utilities and Required Easements

Provider	Utility	Easement
Yorkshire Water	Water main	6m either side of centre line of pipe
	Sewer	6m either side of centre line of pipe
BT	Openreach Fibre	Along boundary
National Grid	NG Gas Pipeline	1.22m either side of centre line
Northern Powergrid	11kV Overhead Line	No structural planting below overhead line
	LV Overhead Line	No structural planting below overhead line
	66kV Overhead Line	No structural planting below overhead line
	400kV Overhead Line	No structural planting below overhead line

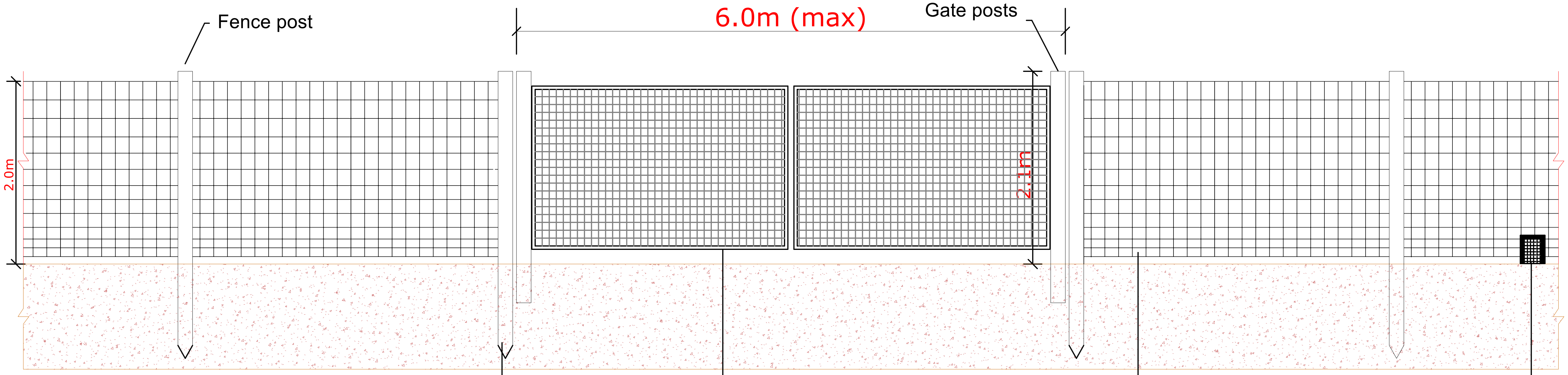
Fencing, Security and Ancillary Infrastructure

Fencing

3.4.27. As shown in Figure 3.12 Fence and Gate, the Proposed Development will be surrounded by plain wire deer fencing to a maximum height of 2.1m to the top of the gate post. Badger/fox/small mammal gates will be fitted at appropriate points to enable free access if required.

3.4.28. The BESS will be surrounded by a welded steel wire mesh fence, at a maximum height of 2.4m, as shown in Figure 3.13 BESS Battery Fence and Gate.

Figure 3.12 Fence and Gate



Revisions:
First Issue- 30/03/2022 JS

GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

2) DISTANCES BETWEEN FENCE POSTS WILL VARY.

0 2m

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Drawing Title:

Fence and Gate Elevations

DRWG No:	Rev:	Sht no:
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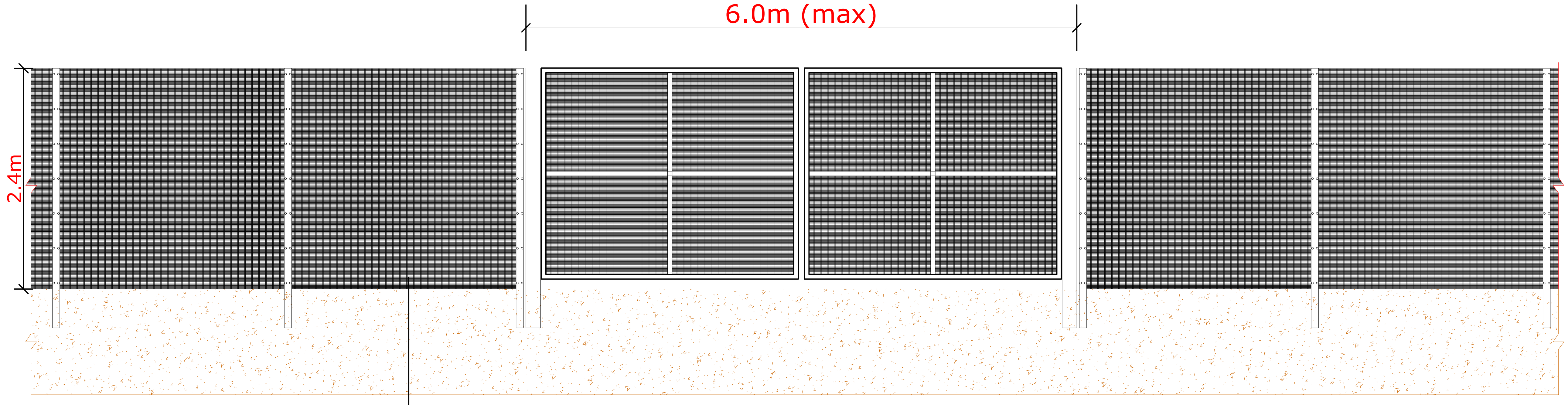
JS	KL
Scale: 1:50 @ A3	Date: 30/03/2022

Figure 3.13 BESS Battery Fence and Gate



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First Issue- 30/03/2022 JS

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Drawing Title:
BESS Battery Fence and Gate Elevations

DRWG No: DX-01-P14	Rev: -	Sht no: -
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GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

2) COLOUR OF THE FENCE WILL BE GREEN

0 2m

Construction Compounds

3.4.29. During the construction and decommissioning phases, one or more temporary compound(s) will be required, as well as temporary access tracks, to allow access to all land within the Site.

3.4.30. A single primary compound will be located within the Site, adjacent to the Site access/ egress points on the north-eastern boundary, to limit the distance travelled by delivering vehicles after arriving at the Site. The compound will cover a total area of up to 4ha and will provide 80 employee parking spaces and a full heavy goods vehicle ('HGV') turning circle. The base material will be crushed stone. The compound will provide storage for construction materials, equipment and plant, and for machinery including excavators, piling rig and dumper trucks. Welfare facilities (changing rooms, toilets and canteen) and office units will also be provided.

3.4.31. Up to five secondary compounds will be provided, each up to 1ha in area. The secondary compounds will provide up to 10 parking spaces and a full HGV turning circle. These compounds will also be based on crushed stone, and will provide welfare facilities (changing rooms and toilets), and a small storage area for equipment.

3.4.32. Foul water for both primary and secondary compounds will be stored and collected from Site, for removal to an off-site disposal facility.

CCTV and Lighting

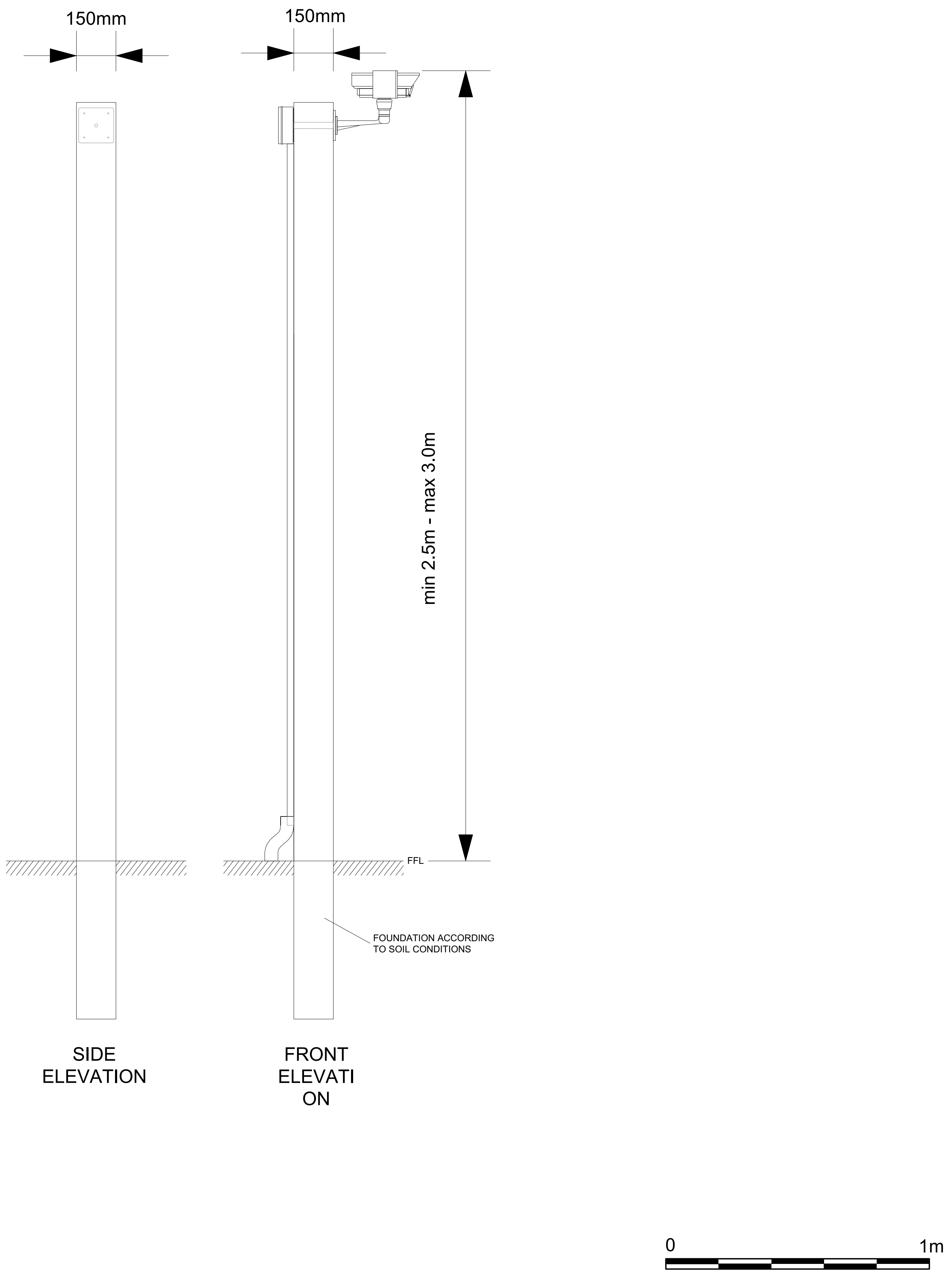
3.4.33. Pole mounted internal facing closed circuit television ('CCTV') will stand at a minimum of 2.5m to a maximum of 3m as shown in Figure 3.14 CCTV Elevations.

3.4.34. CCTV cameras would use night-vision technology, which would be monitored remotely and avoid the need for night-time lighting. No areas of the solar PV arrays are proposed to be continuously lit. For security requirements, passive infra-red detector ('PID') systems (or similar) will be installed around the perimeter of the solar PV arrays to provide night vision functionality for the CCTV.

3.4.35. During construction, lighting will be limited to the construction compounds only, with temporary lighting at the grid connection works. The lighting of the on-Site Substation would be in accordance with Health and Safety requirements, particularly around any emergency exits.

3.4.36. Lighting would be designed to limit any impact on sensitive receptors by directing lighting downward and away from the Order Limit boundaries and existing vegetation. During operation, no part of the Proposed Development would be continuously lit; manually operated and motion detection lighting would be utilised for operational and security purposes.

Figure 3.14 CCTV Elevations



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Project Title:

Helios Renewable Energy Project

Drawing Title:

CCTV Elevations

DRWG No:	Rev:	Sht no:
DX-01-P11	-	-

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JS	KL
Scale:	**Date:**
1:20 @ A3	30/03/2022

Access Tracks

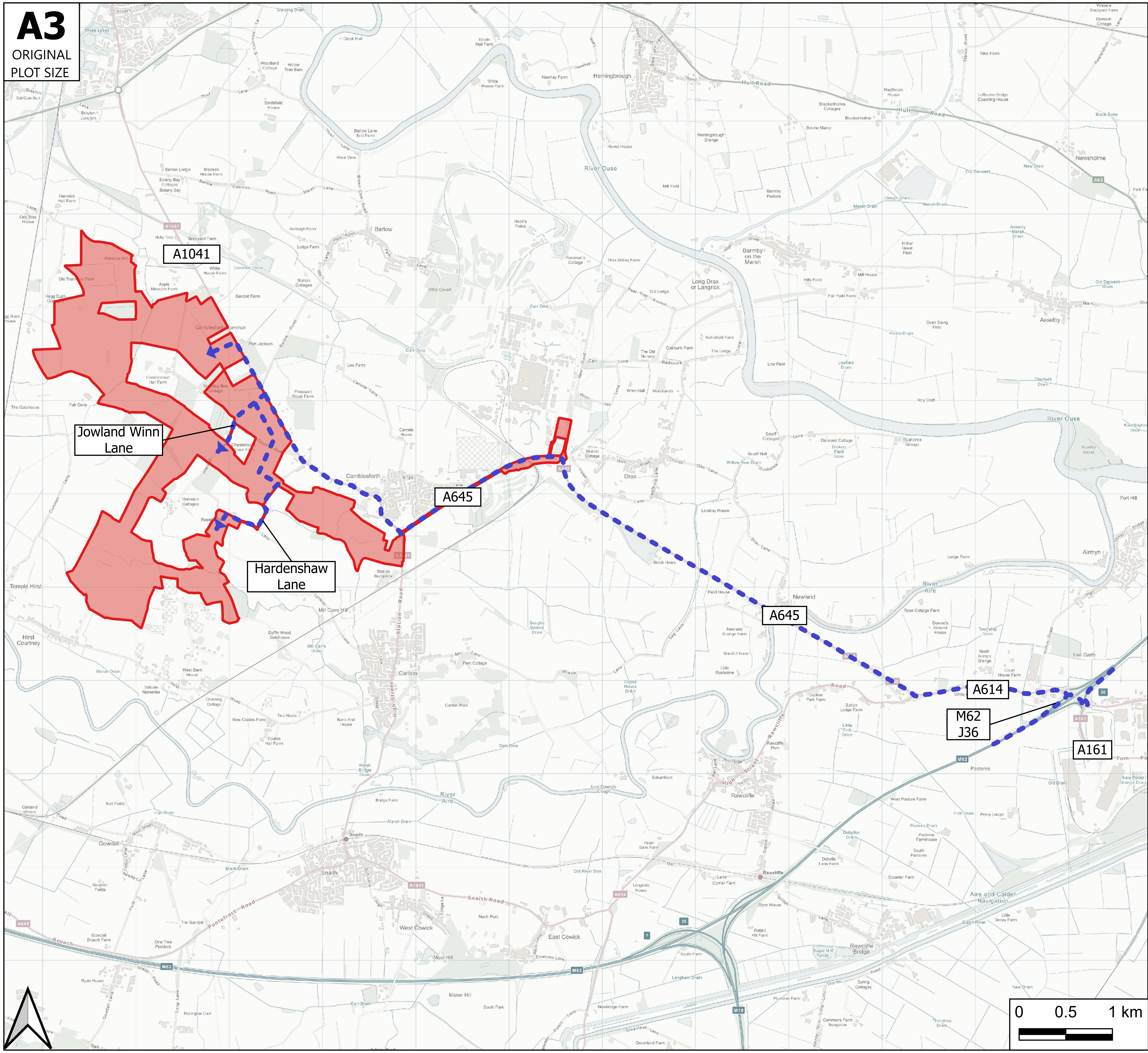
3.4.37. As shown on Figure 3.15 Construction Vehicle Route, vehicular access to the Site during the construction and decommissioning phases of the Proposed Development will be taken from two access/ egress points (at fields 15 and 18/19 as shown on Figure 3.1 Field Boundaries Plan) on the A1041 at the eastern boundary of the Site, as shown in Figure 3.2 Parameter Plan. Although not yet determined, access to the grid connection cable corridor is anticipated from the A645.

3.4.38. During the operational phase, vehicular access will be limited to maintenance visits and is anticipated to remain from the M62/ A645/ A1041 via the access/egress points identified above. Figure 3.16 Internal Access Road Detail shows the track cross-section.

3.4.39. Internal access tracks will cover a width of up to 6m and be constructed of permeable aggregate to enable drainage. Passing places will be provided to enable HGVs to pass, the location of these will be confirmed along the tracks.

Figure 3.15 Construction Vehicle Route

A3
ORIGINAL
PLOT SIZE



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Key

Site Boundary
Study Area

Rev	Date	Details	Drawn by	Checked by	Approved by

Bristol
Cambridge
London
Oxford
Welwyn Garden City

tpa Transport Planning Associates

25 King Street
Bristol
BS1 4PB

0117 925 9400
www.tpa.uk.com

CLIENT:
Enso Green Holdings D Limited

PROJECT:
Helios Renewable Energy Project

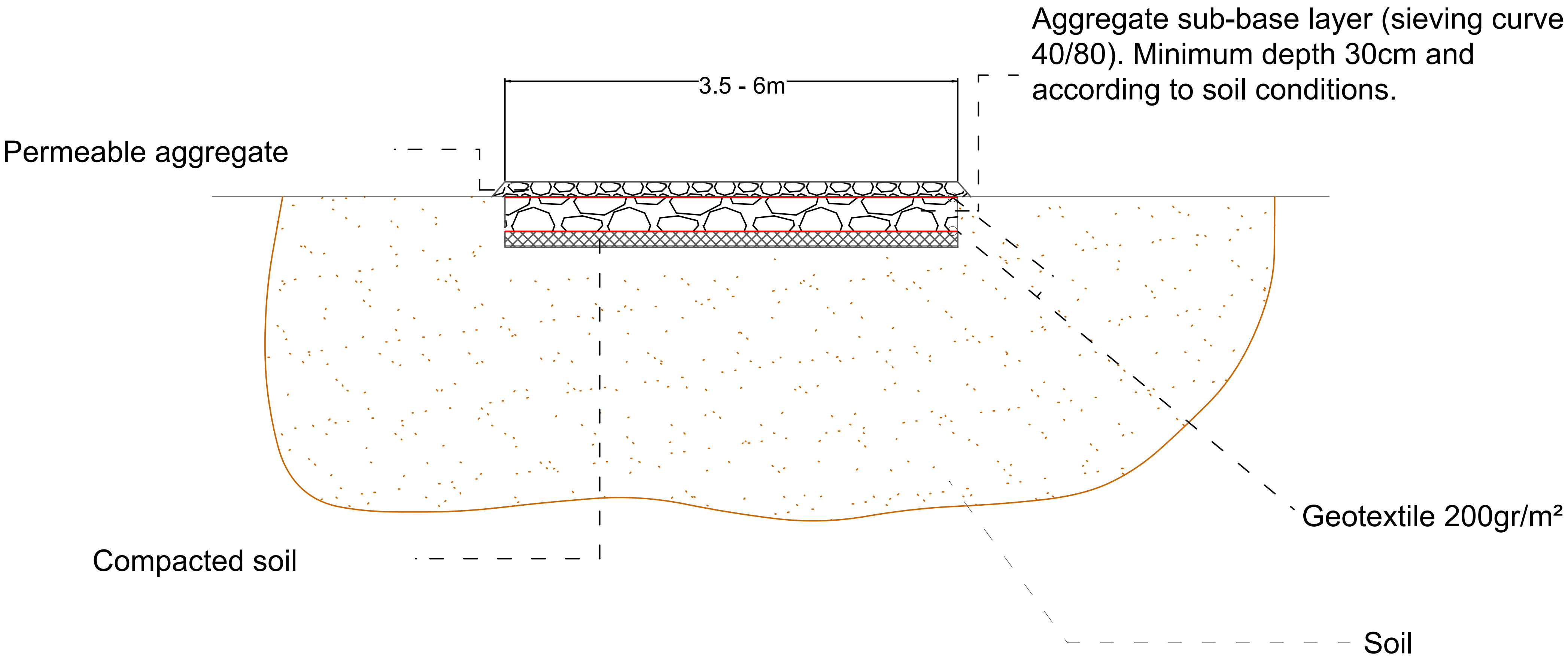
TITLE:
Construction Vehicle Route

STATUS:
FOR INFORMATION

SCALE:	DATE:	DRAWN:	CHECKED:	APPROVED:
NTS	04/10/23	AC	RR	JD

JOB NO:	DRAWING NO:	REVISION:
2104-025	Figure 3.15	-

Figure 3.16 Internal Access Road Detail



0 2m

GENERAL NOTES:

1) ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED.

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First Issue- 30/03/2022 JS

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Project Title: Helios Renewable Energy Project	
Drawing Title: Internal Access Road Detail	
DRWG No: DX-01-P05	Rev: - / Sht no: -
Drawn by : JS	Checked by: KL
Scale: 1:50 @ A3	Date: 30/03/2022

Landscape and Ecological Enhancements

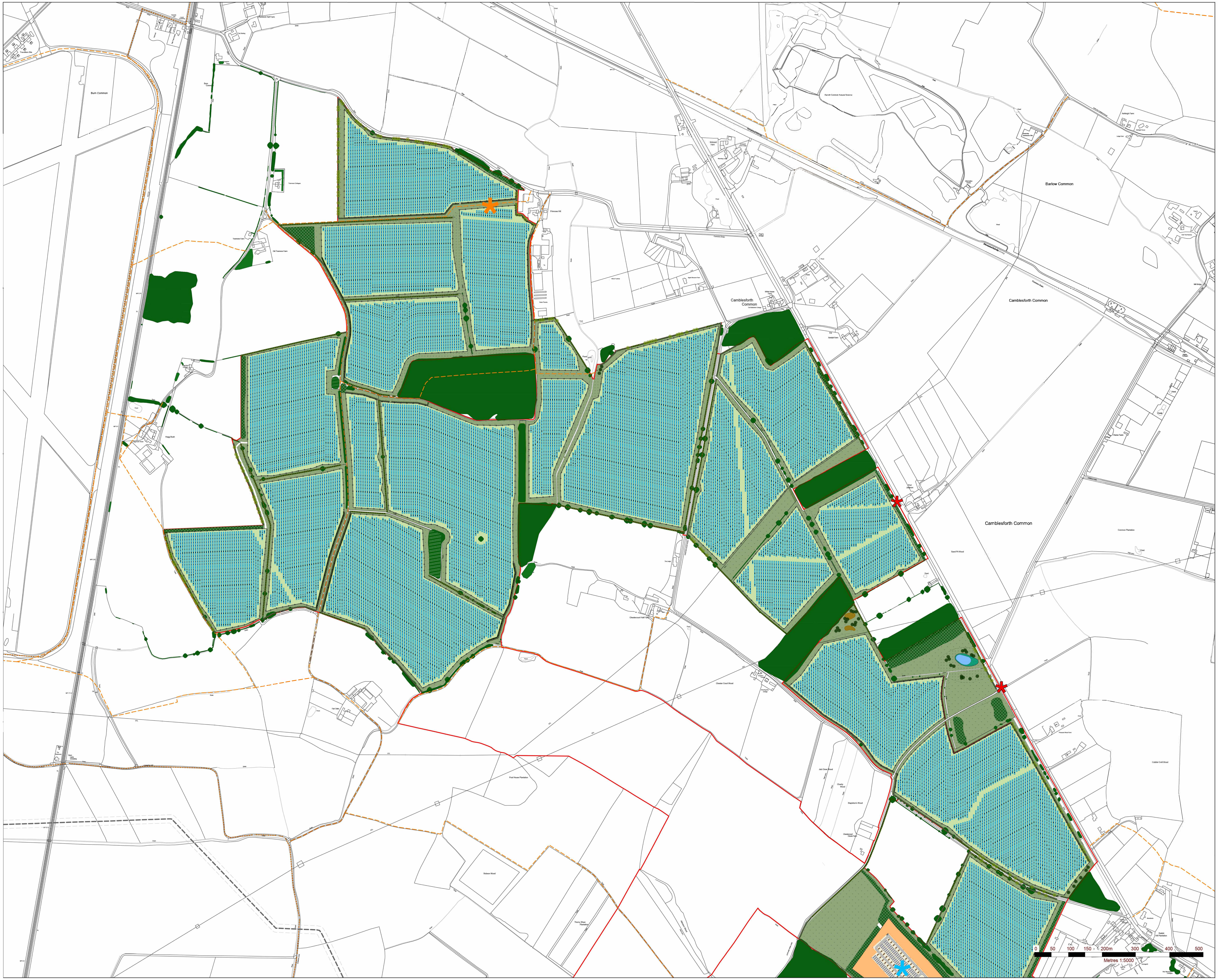
3.4.40. The existing hedgerows, woodland, ditches and ponds within the Site will be retained, with the exception of small breaks for new access tracks, security fencing and cable routing. Any hedgerow or watercourse crossings will be kept to a minimum width. Where a cable route crosses a hedgerow, the hedgerow will be reinstated after construction. The minimum offsets have been set out in Table 3.2, providing a minimum distance from features within the Site from which to implement additional planting.

3.4.41. Figure 3.17 shows the proposed Landscape Strategy Plan. Further details are provided in Chapter 7 Landscape and Views and Chapter 8 Biodiversity of this PEIR.

Archaeological Mitigation

3.4.42. The Proposed Development's development areas have evolved alongside the baseline assessment undertaken for the assessment of Cultural Heritage in order to ensure the potential effect to heritage assets is reduced. The mitigation proposed is as set out in the Archaeological Mitigation Strategy (Appendix 6.2 of the PEIR) and Chapter 6 Cultural Heritage of the PEIR. Within areas of archaeological potential, solar PV modules will be on ground mounted footings (with a maximum depth of up to 0.15m), with the cables raised up and clipped beneath the solar PV panels to avoid any requirement for a cable trench in these locations. CCTV mounts and fencing posts will also be ground footed mountings to a maximum depth of up to 0.15m (refer to Figure 3.18 Elevations with Archaeological Mitigation). Where access tracks are required over areas of archaeological potential, these will be raised above ground level, with a maximum topsoil strip depth of up to 30mm (less than plough depth) (refer to Figure 3.19 Access Road with Archaeological Mitigation).

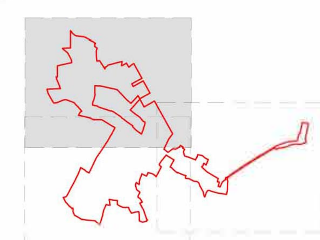
Figure 3.17 Landscape Strategy Plan



KEY

- Site Boundary
- Existing surveyed trees and vegetation
- Existing watercourse/ ditches
- Existing Public Rights of Way retained
- Physical route of PRoW 18/16/1
- Proposed Permissive Path
- Existing gas line and buffer
- Indicative proposed pv arrays
- Indicative proposed sub-station/battery storage area
- Proposed perimeter security fence (post and wire deer fence)
- Existing woodland to be reinforced with native planting where appropriate
- Proposed native woodland planting
- Proposed native scrub planting
- Proposed individual tree planting
  - -T1: Canopy Trees
  - -T2: Hedgerow Trees
- Existing field boundary hedgerow to be reinforced
- Historic field boundary hedgerow to be reinstated
- Proposed hedgerow
- Existing arable land within perimeter fence seeded with Emorsgate grazing mixture EG27 or similar (sheep grazed or mown on a regular basis)
- Proposed grassland outside perimeter fence: Emorsgate Tussock Mixture EM10, or similar
- Proposed wet grassland outside perimeter fence: Emorsgate Meadow Mixture for Wetlands EM8 or similar
- Proposed wildflower grassland: Emorsgate General Purpose Meadow Mixture EM1
- Proposed habitat ponds: Provided with native aquatic planting and 2m margin of Emorsgate Pond Edge Mxture EP1 or similar
- Proposed habitat scrapes: Emorsgate Meadow Mixture for Wetlands EM8 or similar
- Potential location for interpretation boards
- Proposed access

KEY PLAN



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Project Title:
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Drawing Title:
Landscape Strategy
Sheet 1 of 3

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Figure 7.8	0	-

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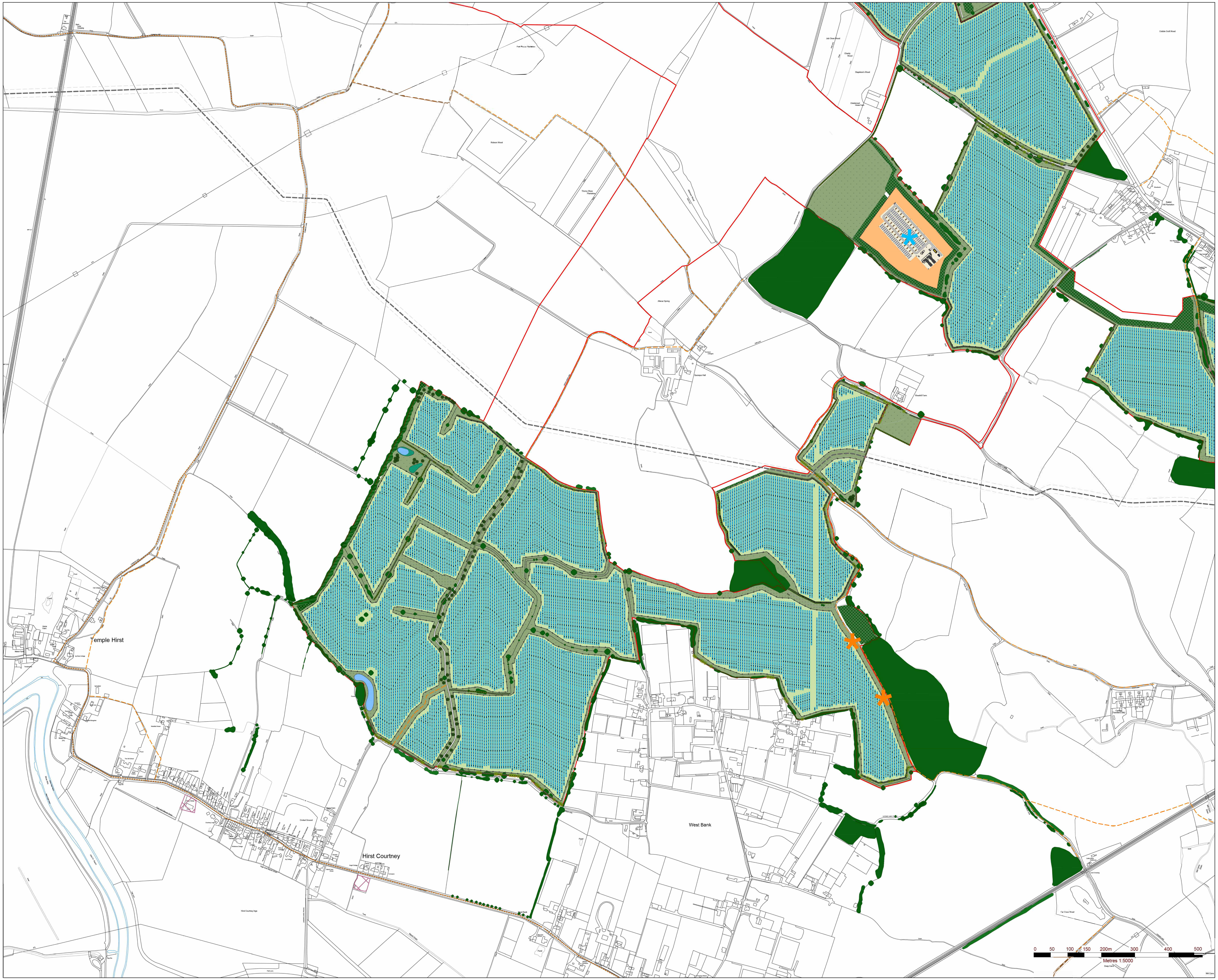

KEY

- Site Boundary
- Existing surveyed trees and vegetation
- Existing watercourse/ ditches
- Existing Public Rights of Way retained
- Physical route of PRoW 18/16/1
- Proposed Permissive Path
- Existing gas line and buffer
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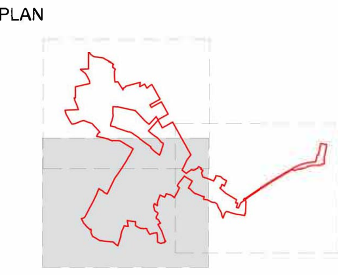
- Proposed habitat scrapes: Emorsgate Meadow Mixture for Wetlands EM8 or similar
- Potential location for interpretation boards
- Proposed access

KEY PLAN



N

HELIOS RENEWABLE ENERGY PROJECT

Project Title:
Helios Renewable Energy Project

Drawing Title:
Landscape Strategy
Sheet 2 of 3

DRWG No:	Rev:	Sht no:
Figure 7.9	0	-
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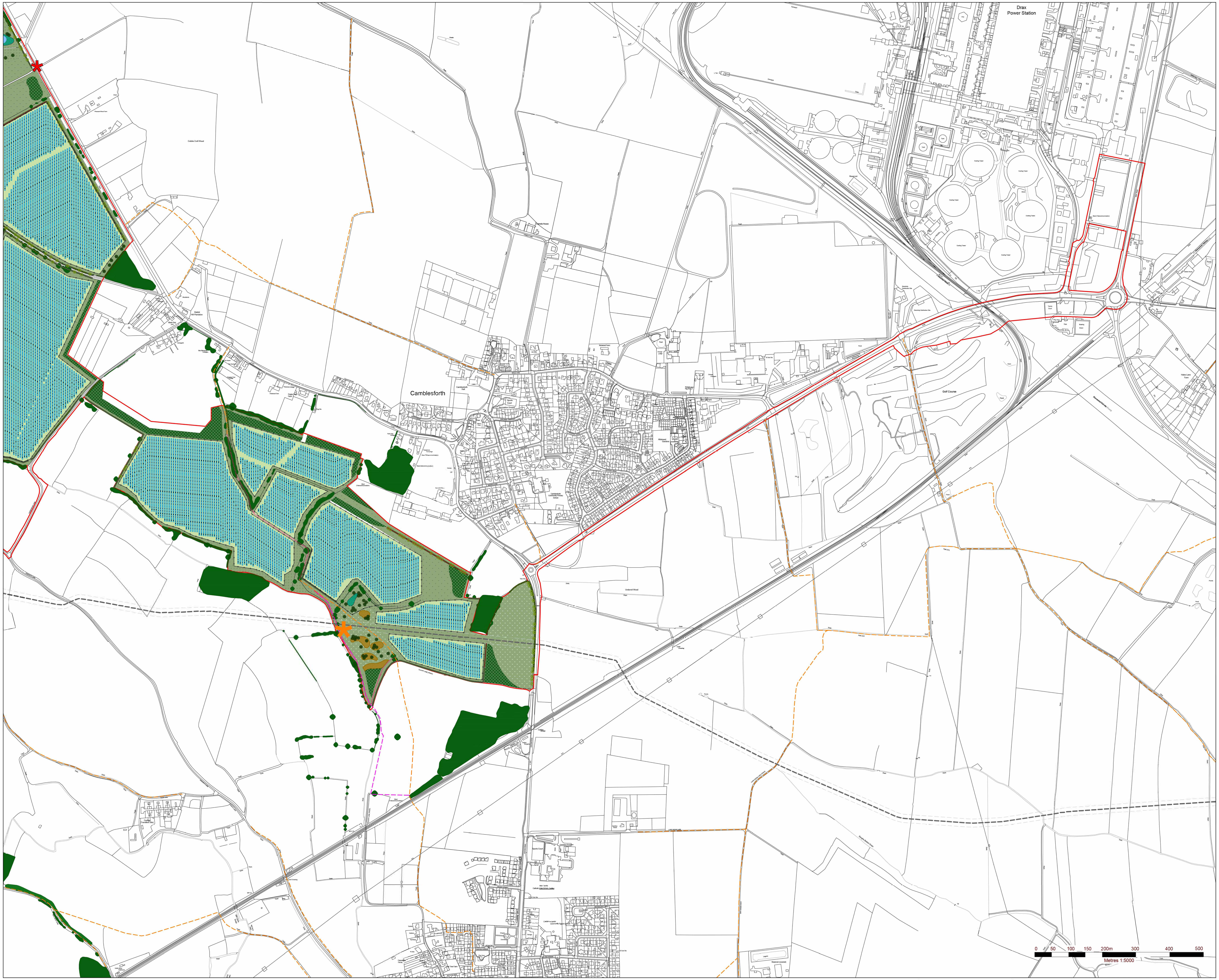
Metres 1:5000



KEY

- Site Boundary
- Existing surveyed trees and vegetation
- Existing watercourse/ ditches
- Existing Public Rights of Way retained
- Physical route of PRoW 18/16/1
- Proposed Permissive Path
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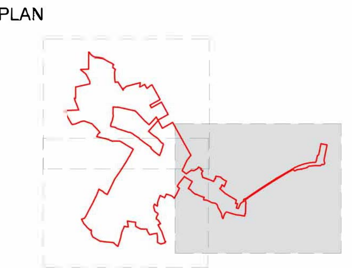
KEY PLAN



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Project Title:
Helios Renewable Energy Project

Drawing Title:
Landscape Strategy
Sheet 3 of 3

DRWG No:	Rev:	Sht no:
Figure 7.10	0	-
Drawn by : HD	Checked by: JM	
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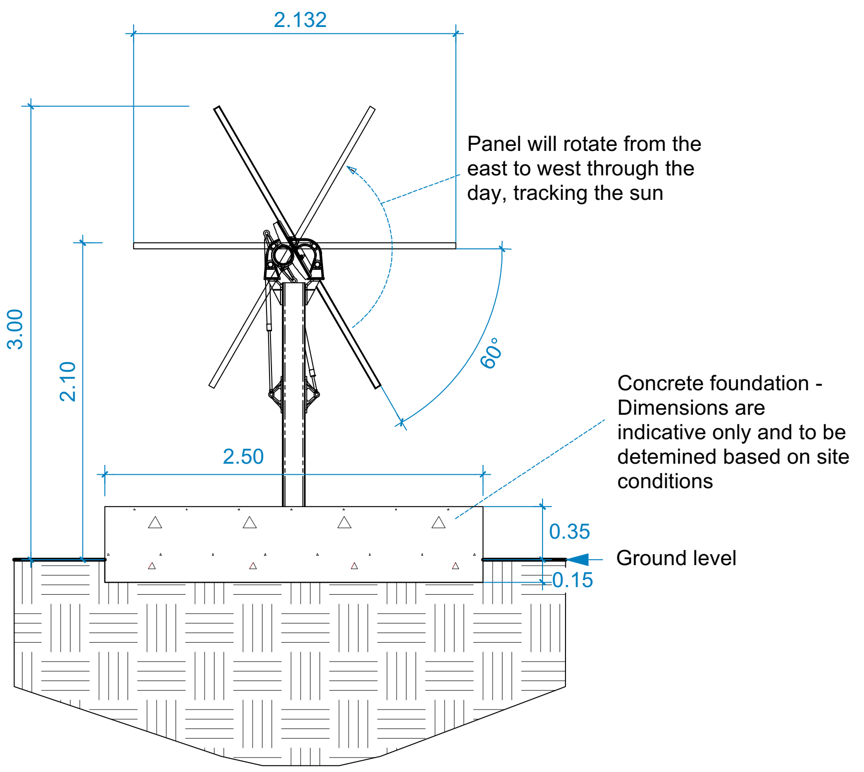
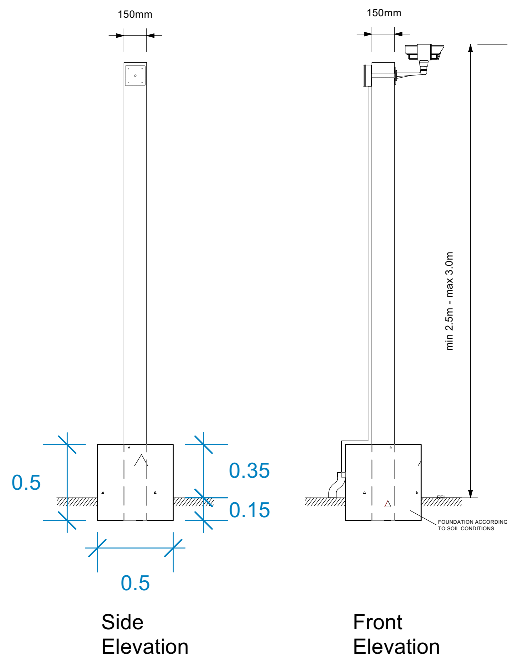
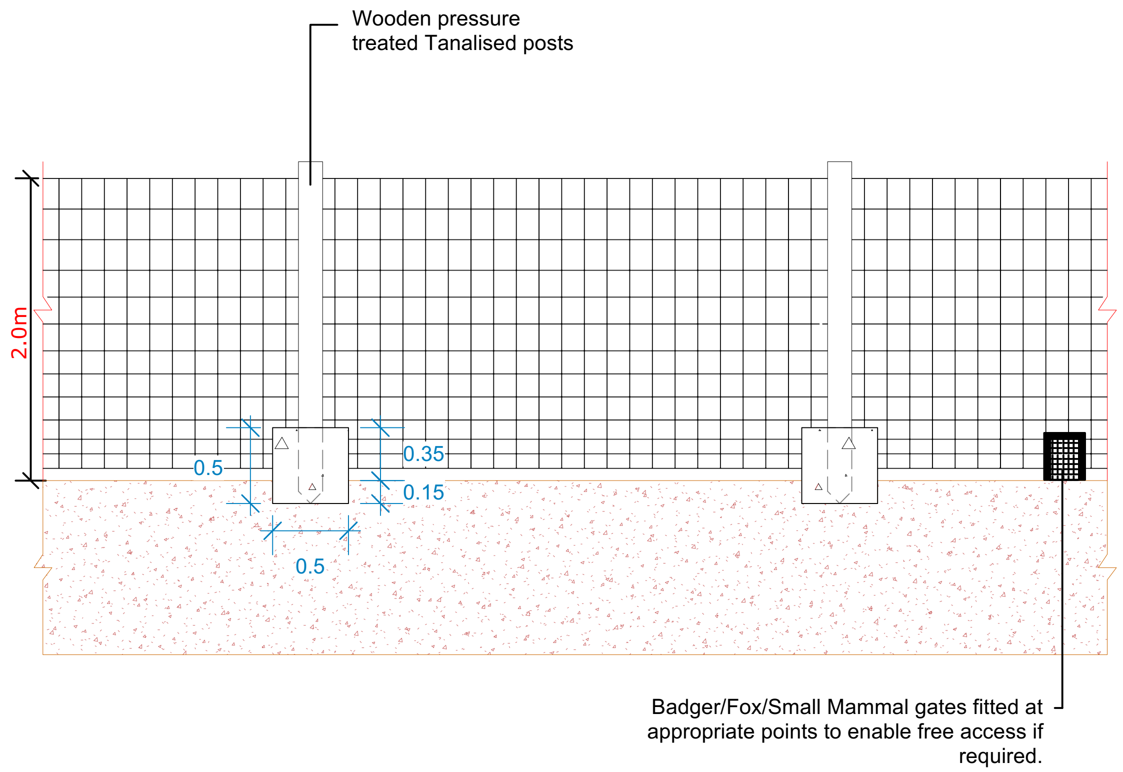
Figure 3.18 Elevations with Archaeological Mitigation



Solar Panel Side Elevation



CCTV Elevation



Fence Elevation

0 2.5m

GENERAL NOTES:

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Revisions:
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Project Title:
Helios Renewable Energy Project

Drawing Title:
Elevations with Archaeological Mitigation

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DX-01-P37	-	-

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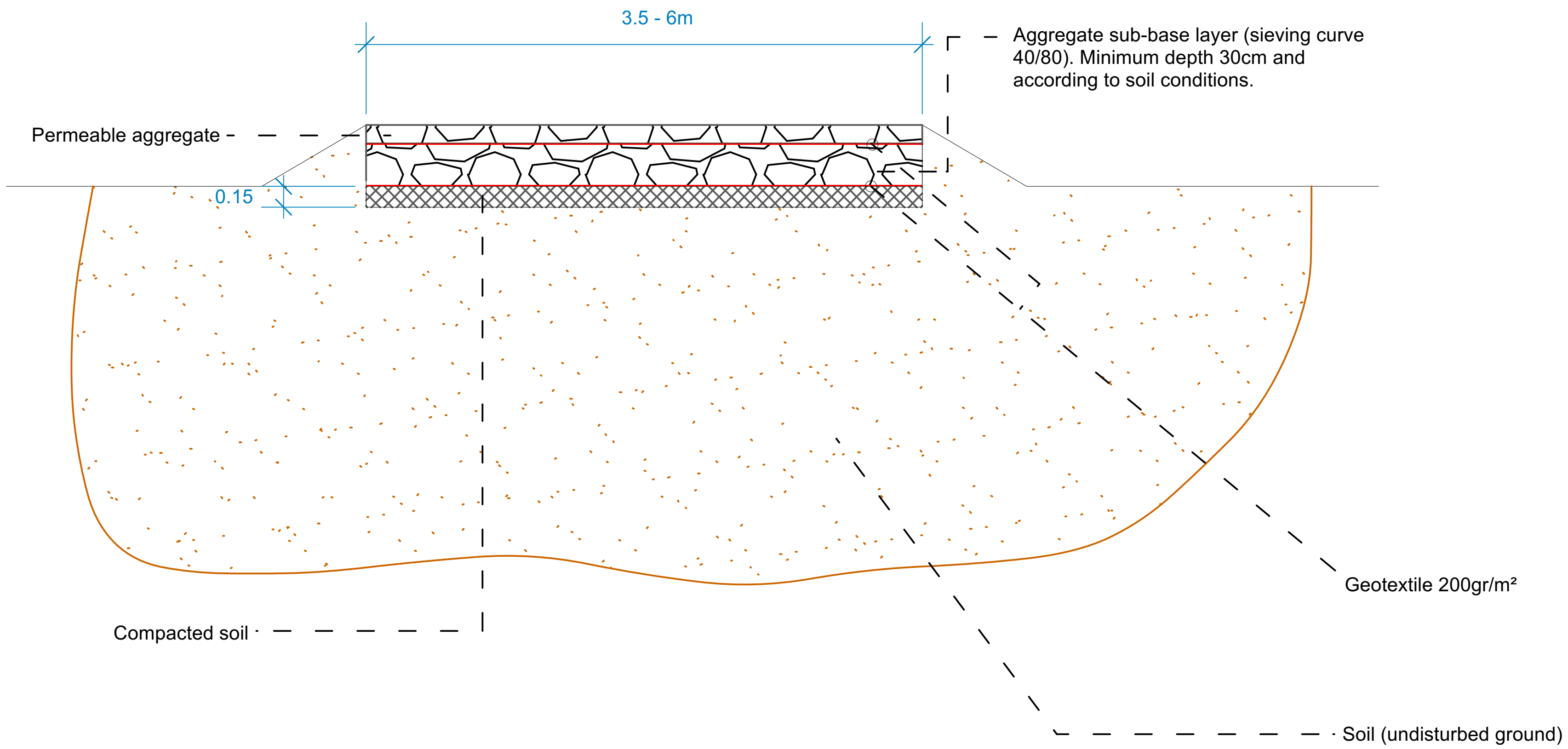
JS	KL

Scale:	Date:
1:50 @ A3	12/04/2023

Figure 3.19 Access Road with Archaeological Mitigation



Access Road Section

0 2.5m

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Revisions:
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Project Title:
Helios Renewable Energy Project

Drawing Title:
Access Road with Archaeological Mitigation

DRWG No:	Rev:	Sht no:
DX-01-P38	-	-

Drawn by :	Checked by:
JS	KL
Scale:	**Date:**
1:50 @ A3	12/04/2023

Operation, Maintenance and Restoration Phase

3.4.43. The Proposed Development will have a modelled operational lifespan of up to 40 years (excluding decommissioning), for the purposes of the assessments in the PEIR.

3.4.44. During the operational phase, the activities on-Site are expected to consist of maintenance activities, including servicing of plant and equipment and vegetation management.

3.4.45. Upon cessation of the modelled operational 40-year lifespan, the Proposed Development will be decommissioned, and the Site returned to arable use.

3.4.46. Temporary decommissioning compounds will be created to house necessary plant and equipment, and to provide areas for parking for employees. These would be removed upon completion of the decommissioning phase. All the solar infrastructure including solar PV modules, mounting structures, cabling on or near to the surface, inverter stations, fencing and ancillary infrastructure, and the substation and BESS compound would be removed and recycled or disposed of in accordance with good practice following the waste hierarchy, with materials being reused or recycled wherever possible. All waste will be disposed of in accordance with the legislation at the time of decommissioning.

3.4.47. The Site will be decommissioned in line with a Decommissioning Environmental Management Plan (‘DEMP’), which will be prepared to support the DCO application.

3.4.48. Decommissioning is estimated to take approximately 12 months.

3.4.49. The effects of the decommissioning phase are often similar to, or of a lesser magnitude than, the effects generated during the construction phase and have been considered in the relevant sections of the PEIR. There is a degree of uncertainty regarding decommissioning, as engineering approaches and technologies will evolve over the operational life of the Proposed Development, and assumptions based on the reasonable worst-case scenario have therefore been made where appropriate, as discussed in the technical chapters.

Table 3.2 Summary of Parameters and Indicative Design Features for Assessment

Component		Parameter/ Design Guidance
Solar PV Modules		
Maximum Height of Panels	Up to 3m above existing ground levels	Parameter
Minimum Height of Panels	Up to 900mm above existing ground levels	Parameter
Minimum gap between panels	2m	Parameter
Maximum slope of PV Modules from the Horizontal	60º	Parameter
PV Module Material	Silicon glass and include an anti-reflective coating	Design Guidance
Mounting Structure Material	Anodised aluminium alloy or galvanized steel with rough matte finish	Design Guidance
Foundation Type	Piling and concrete feet	Design Guidance
Maximum Depth of Piles	Up to 2.5m	Parameter
Field Station		
Maximum container dimensions	up to 12.2m in length x 2.4m in width x 3.5 in height, including supports 600mm in height, above a 300mm deep gravel sub-base	Parameter
Indicative foundations	Concrete feet on a gravel sub-base	Design Guidance
Indicative colour	In keeping with the prevailing surrounding environment, painted dark green/ light grey	Design Guidance
On-Site Substation and Energy Storage Compound		
Maximum On-Site 132kV Substation dimensions	up to 12.2m in length x 2.4m in width x 3.5 in height, including supports 600mm in height	Parameter
Maximum height of BESS	Up to 6.48m	Parameter
Maximum Battery Container dimensions	up to 12.2m in length x 2.4m in width x 3.5 in height, including supports 600mm in height	Parameter
Maximum Control Room dimensions	up to 6m in length x 3m in width x 5.7m in height	Parameter
Maximum Inverter/Transformer dimensions	up to 6.1m in length x 2.4m in width x 3.5 in height, including supports 600mm in height	Parameter
Maximum Switchroom dimensions	up to 11.7m in length x 4m in length x 3.8m in height	Parameter
Maximum flood bund dimensions	at least 600mm above the combined fluvial and tidal design flood level	Parameter
Distribution and Grid Connection Cables		
Trench Dimensions for Distribution Cables	Typically 0.9m in depth and 1.5m in width (typically 20m working width for HDD)	Parameter
Trench Dimensions for Grid Connection Cables	Typically 0.9m in depth and 1.5m in width (typically 20m	Parameter

Component		Parameter/ Design Guidance
	working width for HDD)	
Fencing		
Fence Type (Solar PV Site)	Plain wire, deer fencing	Design Guidance
Maximum Fence Post Height	Up to 2.1m	Parameter
Maximum Fence Height	Up to 2m	Parameter
Mammal gates	Included	Design Guidance
Fence Type (Onsite Substation and Energy Storage Compound)	Welded steel wire mesh	Design Guidance
Maximum Fence Post Height	Up to 2.4m	Parameter
Maximum Fence Height	Up to 2.4m	Parameter
Construction Compounds		
Maximum Primary Construction Compound	One x compound	Parameter
Primary Construction Compound footprint	Up to 4ha	Design Guidance
Primary Construction Compound material	Crushed stone	Design Guidance
Maximum Secondary Construction Compound	Up to five x compounds	Parameter
Secondary Construction Compound footprint	Up to 1ha	Parameter
Secondary Construction Compound material	Crushed stone	Design Guidance
Security		
CCTV Type	Night-vision technology	Design Guidance
CCTV Support Column Material	Wooden Pole	Design Guidance
Maximum CCTV Support Column Height	Up to 3m	Parameter
Lighting	PID, pole-mounted internal facing	Design Guidance
Internal Access Road		
Maximum internal width	Up to 6m	Parameter
Material	Permeable aggregate	Design Guidance
Drainage	Permeable aggregate	Design Guidance
Landscape and Ecological Enhancements		
Minimum offset from woodland to solar infrastructure	15m	Design Guidance per Natural England guidance
Minimum offset from Site boundary hedgerows (internal and external) to solar infrastructure	5m	Design Guidance per Natural England guidance
Minimum offset from ponds to solar infrastructure	30m	Design Guidance per Natural England guidance
Minimum offset from watercourse to solar infrastructure	7m	Design Guidance per Selby Internal Drainage Board
Minimum offset from ditches to solar infrastructure	6m	Design Guidance per Natural England guidance

Component		Parameter/ Design Guidance
Archaeological Mitigation		
Ground footed mountings for solar PV modules, fence posts and CCTV posts where over an area of archaeological potential	Up to 0.15m	Parameter
Maximum topsoil strip depth of access road where over an area of archaeological potential	up to 30mm	Parameter