# Heckington Fen Solar Park

EN010123

# Design and Access Statement

Applicant: Ecotricity (Heck Fen Solar) Limited

Document Reference: 7.4

Pursuant to: APFP Regulation 5(2)(q)

February 2023

Planning Act 2008

# DESIGN AND ACCESS STATEMENT

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“Applying ‘good design’ to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible.”
(Para.4.5.1, NPS EN-1)

“The creation of high quality, beautiful and sustainable buildings and places is fundamental to what the planning and development process should achieve. Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities…”
(Para. 126, NPPF 2021)

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DESIGN | ECONOMICS | ENVIRONMENT | HERITAGE | LAND & PROPERTY | PLANNING | TRANSPORT & INFRASTRUCTURE

# Contents



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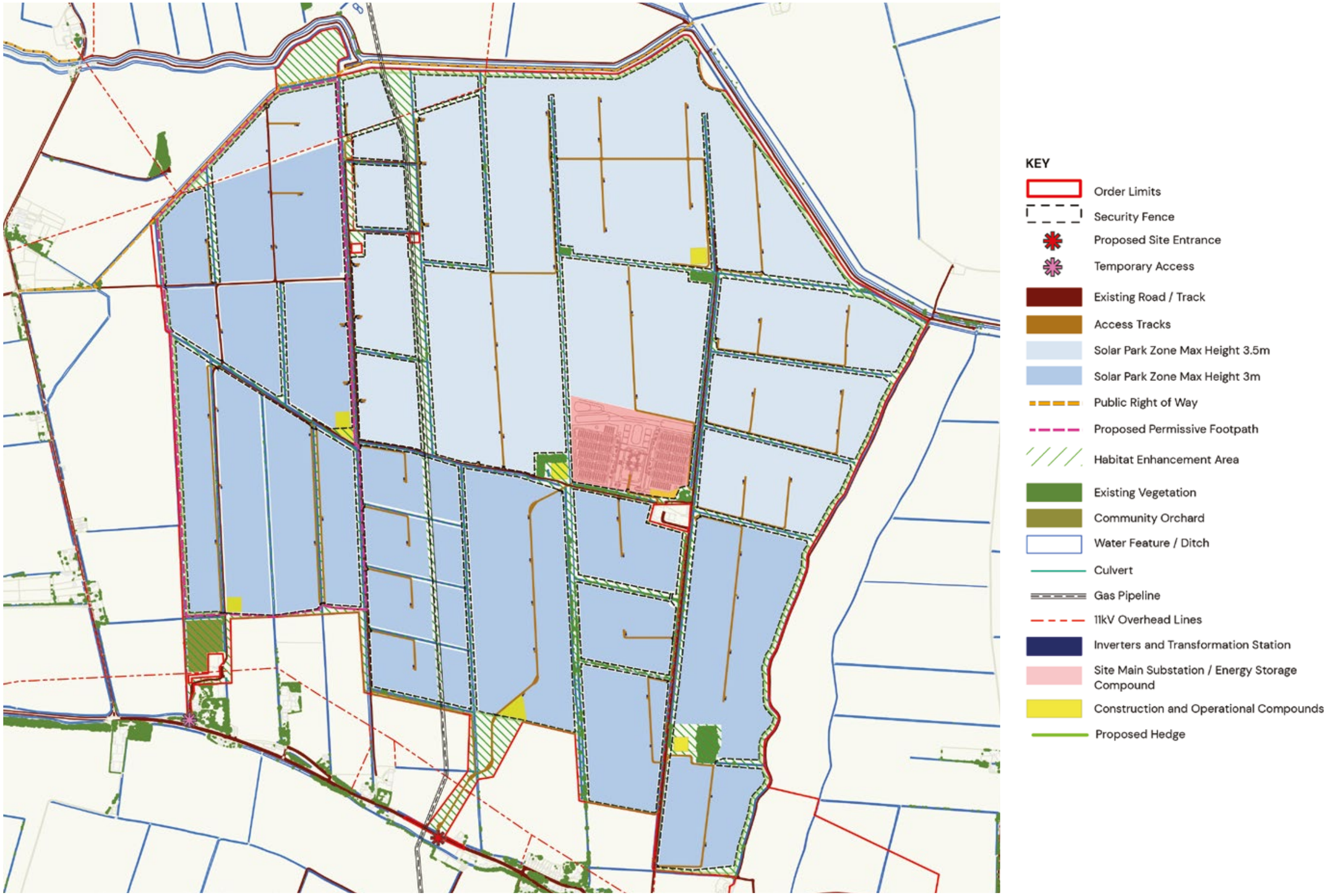
Prepared by Pegasus Group on behalf of Ecotricity (Heck Fen Solar) Limited

February 2023 Project code P20-2370




**Indicative Site Layout**

# 1 | Introduction

1.1 This Design and Access Statement (DAS) supports an application for a Development Consent Order ('DCO') for the construction, operation (including maintenance) and decommissioning of a ground mounted solar park with an intended design capacity of over 50MWp (megawatts peak) with associated infrastructure including energy storage (known as the 'Energy Park'). The 'Proposed Development' comprises the Energy Park, cable route to, and above and below ground works at National Grid Bicker Fen Substation. The Energy Park is located on land at Six Hundreds Farm, East Heckington. The DCO Application is being submitted on behalf of Ecotricity (Heck Fen Solar) Limited ('the Applicant'). An operational lifespan of 40 years would be sought linked to the first export date from the development.

1.2 The Energy Park is located north of the A17 near East Heckington, with the cable route and works at National Grid Bicker Fen Substation extending south, comprising a total of some 644 hectares (ha) of land within the district of North Kesteven and the borough of Boston, within the county of Lincolnshire.

1.3 The Application for a DCO must be submitted to and determined by the Secretary of State for Business, Energy and Industry Strategy (BEIS) because the Development is classified as a Nationally Significant Infrastructure Project (NSIP) under the Planning Act 2008, with a total capacity exceeding 50MW.

1.4 The Proposed Development would provide a clean, low carbon, renewable and sustainable form of electricity in the context of an urgent national need for this and would also make a valuable contribution to the generation of electricity at a local level. It would also contribute significantly to North Kesteven District Council's progress in meeting its renewable energy objectives.

1.5 This DAS should be read in conjunction with the accompanying Statement of Need and Planning Statement (document reference 7.3) which sets out the planning policy context relating to the design and access issues of the Proposed Development.

1.6 The Proposed Development comprises the installation of solar photovoltaic (PV) arrays, energy storage and a grid connection to National Grid Bicker Fen Substation. The principal components are the solar modules; mounting structures; inverters; transformers; switchgear; energy storage; low voltage distribution cables; grid connection cables; fencing, security and ancillary infrastructure; and access tracks.

1.7 To maintain flexibility in the design a number of parameters such as maximum heights and extents have been set for the Proposed Development, as described in the Environmental Statement (document reference 6.1.1) and Outline Design Principles document (document reference 7.1).

1.8 Several other documents have also been produced to ensure both the construction of, and operation and maintenance of the Proposed Development is to high standards, including:

- an Outline Construction Environmental Management Plan (document reference 7.7);
- an Outline Construction Traffic Management Plan (document reference 7.10);
- an Outline Landscape and Ecology Management Plan (document reference 7.8)];
- an Outline Decommissioning and Restoration Plan (document reference 7.9);
- an Outline Energy Storage Safety Management Plan (document reference 7.11); and
- a Mitigation Schedule (document reference 7.2).

# 2 | Good Design

2.1 Good design matters and has a direct effect on the quality of people's lives. It has been a core consideration at Heckington Fen throughout the two years of scheme evolution and consultation prior to the DCO submission. This DAS explains how the design of the Heckington Fen Energy Park has been an iterative process, with the proposed design responding to constraints and opportunities throughout the technical assessment work and consultation. From the outset, full consideration has been given to the Government's policy statements on the importance of good design in the process of delivering national infrastructure projects.

2.2 The Overarching National Policy Statement (NPS) for Energy (EN- 1) (2011) [1] sets out the Government's policy for the delivery of major energy infrastructure. This is to help deliver the Government's climate change objectives by clearly setting out the need for new low carbon energy infrastructure to contribute to climate change mitigation.

2.3 EN-1 sets out criteria for good design for energy infrastructure. Paragraph 4.5.1 states that "Applying "good design" to energy projects should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation, matched by an appearance that demonstrates good aesthetic as far as possible."

2.4 Paragraph 4.5.3 states that whilst applicants may have very limited choice in the physical appearance of some energy infrastructure, given the importance the Planning Act 2008 places on good design and sustainability, the Secretary of State need to be satisfied that energy infrastructure development are as attractive, durable and adaptable as they can be.

2.5 In September 2021, the Government published revised energy National Policy Statements for consultation. The draft revised EN-1[2] scoped in solar development as an urgently needed generating technology to meet the Government's energy objectives. Paragraph 4.6.2 of the draft revised EN-1 states that design principles should be established from the outset of the project to guide the development from conception to operation. Footnote 61 of the draft revised EN-1 states that "Design principles should take into account any national guidance on infrastructure design, this could include for example the Design Principles for National Infrastructure published by the National Infrastructure Commission".

2.6 NPS EN-3 [3] also sets expectations on 'good design'. Section 2.5 states:

***"Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the Project to mitigate impacts such as noise and effects on ecology.***

***The IPC [Secretary of State] should be satisfied that the design of the proposed generating station is of appropriate quality and minimises adverse effects on the landscape character and quality.***

***Good design that contributes positively to the character and quality of the area will go some way to mitigate adverse landscape/visual effects. Development proposals should consider the design of the generating station, including the materials to be used in the context of the local landscape.***

***Mitigation is achieved primarily through aesthetic aspects of site layout and building design including size and external finish and colour of the generating station to minimise intrusive appearance in the landscape as far as engineering requirements permit. The precise architectural treatment will need to be site-specific."***

2.7 The draft revised NPS EN-3[4] was also published for consultation in September 2021, scoping in and providing technology specific policy guidance on solar developments. Draft revised EN3 reaffirms the need for good design at paragraph 2.4.2 noting "Proposals for renewable energy infrastructure should demonstrate good design in respect of landscape and visual amenity, and in the design of the project to mitigate impacts such as noise and effects on ecology".

2.8 Supporting consideration of good design for infrastructure projects, and as referred to in the draft revised EN- 1, the National Infrastructure Commission's (NIC) 'Design Principles for National Infrastructure'[5] identified the purposes of the design process is to bring together engineering, environmental and creative expertise to shape and deliver a development project.

2.9 The document notes that "design is as much about process as it is product. Imaginative thinking about design should be embedded at every step of planning and delivery. The principles ensure a good process leads to a good design outcomes." The document set out four thematic principles to shape the design of nationally significant infrastructure projects. These are:

- **Climate -** Mitigate greenhouse gas emissions and adapt to climate change.
- **People -** Reflect what society wants and share benefits widely.
- **Places -** Provide a sense of identity and improve our environment.
- **Value -** Achieve multiple benefits and solve problems well.

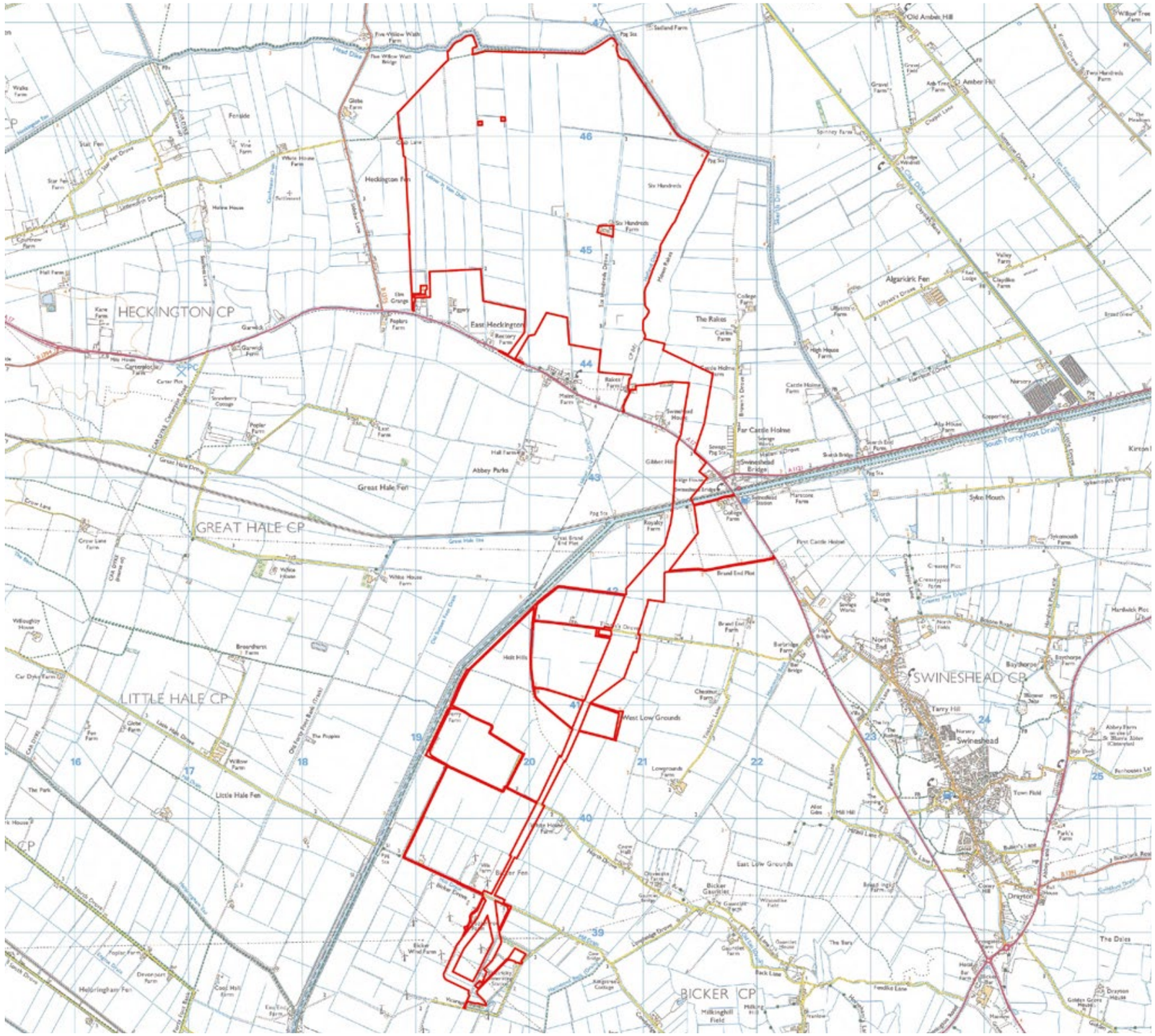
1 Overarching National Policy Statement (NPS) for Energy (EN- 1) dated 2011, available at: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure

2 Draft Overarching National Policy Statement (NPS) for Energy (EN- 1) dated 2021, available at: https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-review-of-energy-national-policy-statements

3 Overarching National Policy Statement (NPS) for Renewable Energy Infrastructure (EN- 3) dated 2011, available at: https://www.gov.uk/government/publications/national-policy-statements-for-energy-infrastructure

4 Draft Overarching National Policy Statement (NPS) for Renewable Energy Infrastructure (EN- 3) dated 2021, available at: https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-review-of-energy-national-policy-statements

5 National Infrastructure Commission's (NIC) 'Design Principles for National Infrastructure accessed January 2023, available at: [redacted]




**KEY**

Order Limits

**Site Location Plan.**

# 3 | The Order Limits and Context - Site Assessment

3.1 The Energy Park is located within the Lincolnshire fens, north of the A17 at East Heckington, approximately 3.7km east of the village of Heckington and 8.9km west of Boston. The Energy Park extends to approximately 524ha hectares (ha).

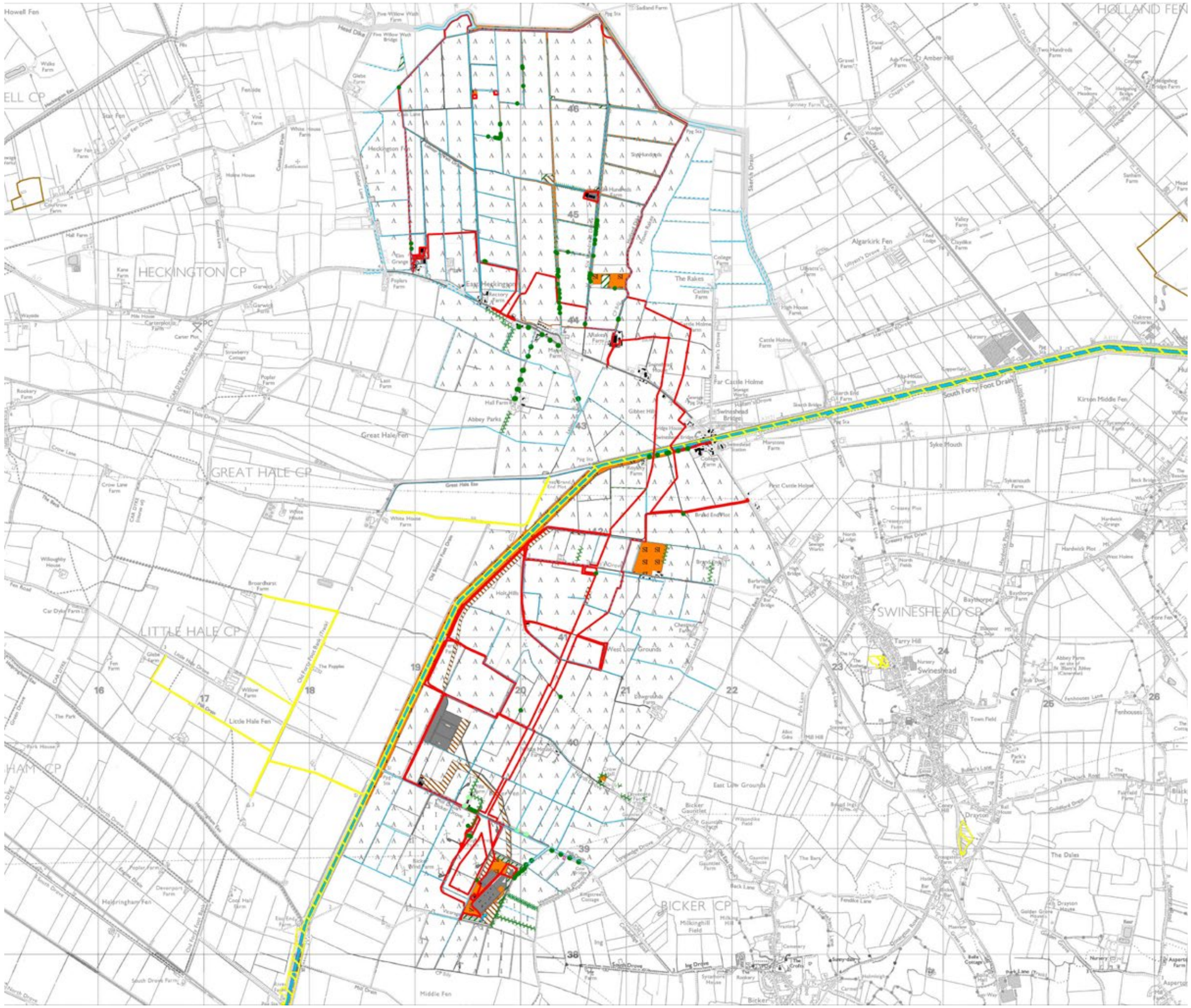
3.2 The Energy Park site lies wholly within the district of North Kesteven, with its eastern boundary abutting the borough of Boston. The Cable Route Corridor spans both administrative areas, running from the central Onsite Substation through the Energy Park site and then offsite whereby it crosses the boundary into Boston borough. (The Environmental Statement (document reference 6.1.1) refers to the Offsite Cable Route Corridor once it has left the Energy Park).

3.3 The Energy Park site comprises arable, agricultural land subdivided into rectilinear parcels by long linear drainage ditches that lie principally north-south, connected east-west by shorter ditches including Labour in Vain Drain. The Energy Park is bounded by Head Dike to the north, a smaller watercourse to the east, agricultural land to the south and B1395 Sidebar Lane and further agricultural land to the west.

3.4 The main vehicular access points are provided off the A17 frontage at Rectory Farm and at Elm Grange, with tracks connecting to Crab Lane toward the northwest corner of the Energy Park site, and then to Sidebar Lane. A third access point is off the A17 towards Six Hundreds Farm which occupies the eastern third of the Energy Park site.

3.5 The Energy Park site falls within National Character Area 46: The Fens. There are no nationally designated landscape areas within North Kesteven. The North Kesteven Landscape Character Assessment (2007) identifies that the Energy Park Site is within the 'Fens Regional Landscape Type' and the Fenland Landscape Character Sub-Area.

3.6 The National Grid Bicker Fen Substation, into which the Offsite Cable Route would connect, lies within the borough of Boston. Boston Borough Council's Landscape Character Assessment (2009) identifies the substation as lying within the Landscape Type 'Reclaimed Fen' and more specifically its Landscape Character Area A1: 'Holland Reclaimed Fen'.




**Nature Conservation Plan**

## Biodiversity Features and Environmental Designations

3.7 There are no non-statutory designations within the Energy Park site, which comprises open, arable farmland divided by a network of drains and ditches. The arable fields are generally cultivated right up to the field margins resulting in very few areas of botanical or ecological importance. The long linear drainage ditches have an engineered profile and are colonised in part by emerging aquatic plant species. A 9m setback from Internal Drainage Board ditches has been incorporated into the design to enable ongoing maintenance throughout the operational lifetime of the Energy Park.

3.8 The Energy Park site includes one pond surrounded by bankside trees and scrub, with an area of wet grassland to the immediate west and north. There are a small number of hedgerows on the Energy Park site which are used by a variety of breeding and over-wintering birds. Field boundary hedgerows are generally species-poor although the hedgerows vary in height, length, condition and management.

3.9 Approximately 10.5ha of the Energy Park site is managed under agri-environmental schemes in the form of enhanced 'headlands' buffer strips.

3.10 The Offsite Cable Route Corridor passes across farmland, rather than passing along highway verge. The farmland over which the Offsite Cable Route Corridor passes is all used within arable farming, although different crops are cultivated various parcels.

3.11 There are no European statutory designated sites (Ramsar, Special Areas of Conservation (SAC) & Special Protection Areas (SPA)) or national sites (Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Local Nature Reserve (LNR)) within 10km of the Energy Park site.

3.12 The Offsite Cable Route Corridor passes through the South Forty Foot Drain Local Wildlife Site (LWS) located approximately 1km to the south of the Energy Park site. This is a man-made watercourse with bankside vegetation comprising rough neutral grassland, scrub, and trees. All works within this area will be below ground.

3.13 Cole's Lane Ponds LWS is located 6km southeast of the Energy Park site and 1.9km from the Offsite Cable Route Corridor, and Heckington Grassland Site of Nature Conservation Interest (SNCI) is located approximately 5km to the west of the Energy Park site and 5.5km of the Offsite Cable Route Corridor.

KEY

- Order Limits
- Scheduled Monuments

Listed Building Grade

- I
- II

- Bicker Conservation Area
- Swineshead Conservation Area
- Heckington Conservation Area
- Non-Designated Heritage Asset: Mill Green Farmhouse
- Lincolnshire HER Monument Point
- Lincolnshire HER Monument Line
- Lincolnshire HER Monument Polygon

**Historic Environment Plan**

## Cultural Heritage

3.14 There are no designated archaeological remains (such as Scheduled Monuments) located within the Energy Park site. Known and potential non-designated built and archaeological remains located within the Energy Park site comprise:

- Upstanding post-medieval/modern buildings of Six Hundreds Farm;
- Upstanding post-medieval/modern brick boundary wall to the west of Elm Grange;
- Upstanding remains of a post-medieval/modern drainage pump close to Head Dike to the north-east;
- Buried remains of a post-medieval duck decoy to the east;
- Buried remains of former outfarms and field boundaries in various locations, some but not all of which are shown on historic maps;
- Buried remains of a possible enclosure of uncertain origin to the west of centre; and
- Buried remains of a possible enclosure and circular and linear features of uncertain origin to the east.

3.15 One Scheduled Monument to the west and four Grade II Listed Buildings lie within a 2km radius of the Energy Park site, as shown on the Environmental Designations Plan.

3.16 There are no Listed Buildings or other known heritage assets in close proximity to the Offsite Cable Route Corridor.

## Hydrology

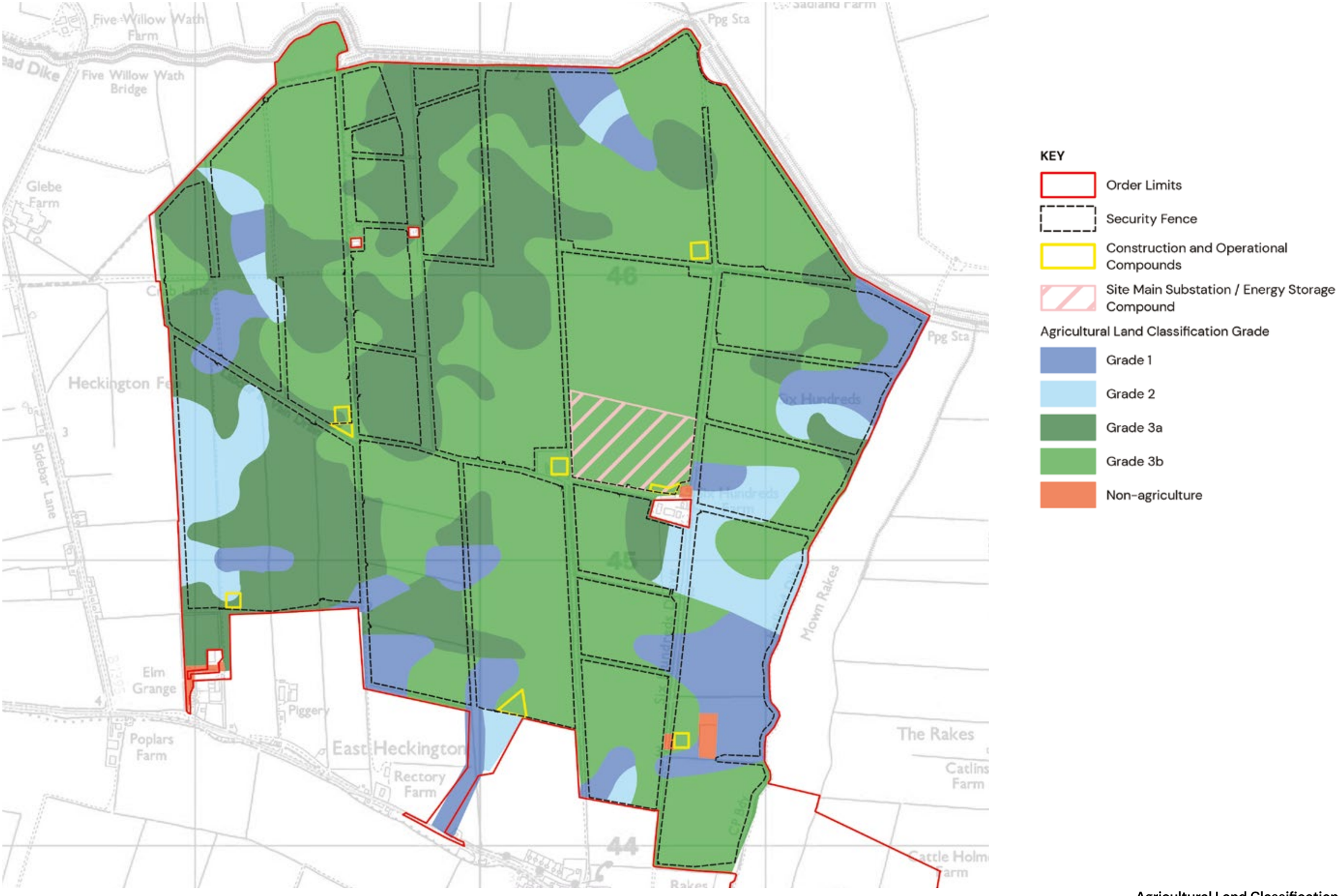
3.17 The Proposed Development is level and low-lying at between 1m and 3m above Ordnance Datum (AOD). The majority of the Energy Park site is within Flood Zone 3, with areas within Flood Zone 2 and Flood Zone 1.

3.18 Source Protection Zones (SPZs) are used to protect areas of vulnerable groundwater that is used for abstraction and where water quality is of high importance (such as drinking water abstractions). SPZs are categorised into three zones, 1-3, with 1 being of highest risk of contamination, and 3 representing the lowest risk but still within the groundwater catchment. There are no SPZs recorded within 2 km of the Energy Park site or Offsite Cable Route Corridor. The closest is located approximately 8.5 km to the west.

## Ground Conditions

3.19 The bedrock geology of the Energy Park comprises mudstone and siltstone of the West Walton Formation (in the south-western half) and mudstone of the Ampthill Clay Formation (in the north-eastern half). The superficial geology comprises tidal flat deposits of clay and silt.

3.20 The upper and midsections of the Offsite Cable Route Corridor are characterised by the same bedrock geology as the Energy Park, but the southernmost 2km section comprising mudstone of the Oxford Clay Formation. The superficial geology is recorded as tidal flat deposits of clay and silt.




**Agricultural Land Classification Plan**

## Agricultural Land

3.21 Agricultural land can be graded according to its inherent limitations for agricultural use. Grade 1 is excellent quality and Grade 5 is very poor quality. Grade 3 is divided into subgrades 3a “good” and 3b “moderate” quality land. Grades 1, 2 and 3a are defined as the “best and most versatile” in the NPPF (2021). An Agricultural Land Classification Assessment (ALC) was undertaken in two stages.

3.22 The Energy Park is utilising an area of over 524ha of agricultural land, with 50.6% of the assessed at Grade 3b land and therefore considered to be poorer quality land. The remaining 49% of the Energy Park is a combination of Grade 3a (30.5%), Grade 2 (7.4%), Grade 1 (11.1%), and Non-Agricultural land (0.4%).

3.23 The area proposed for the onsite substation and energy storage is Grade 3b, the lowest quality land onsite. Onsite tracks, so far as possible have also sought to avoid best and most versatile land.

# 4 | Design Approach

4.1 This section details how the development addresses the site context in respect of its use, location, materials, appearance, landscaping and access.

## USE

4.2 The main element of the proposal is the construction, operation (including maintenance) and decommissioning of a ground mounted solar park with an intended design capacity of over 50MWp (megawatts peak) with associated development including energy storage.

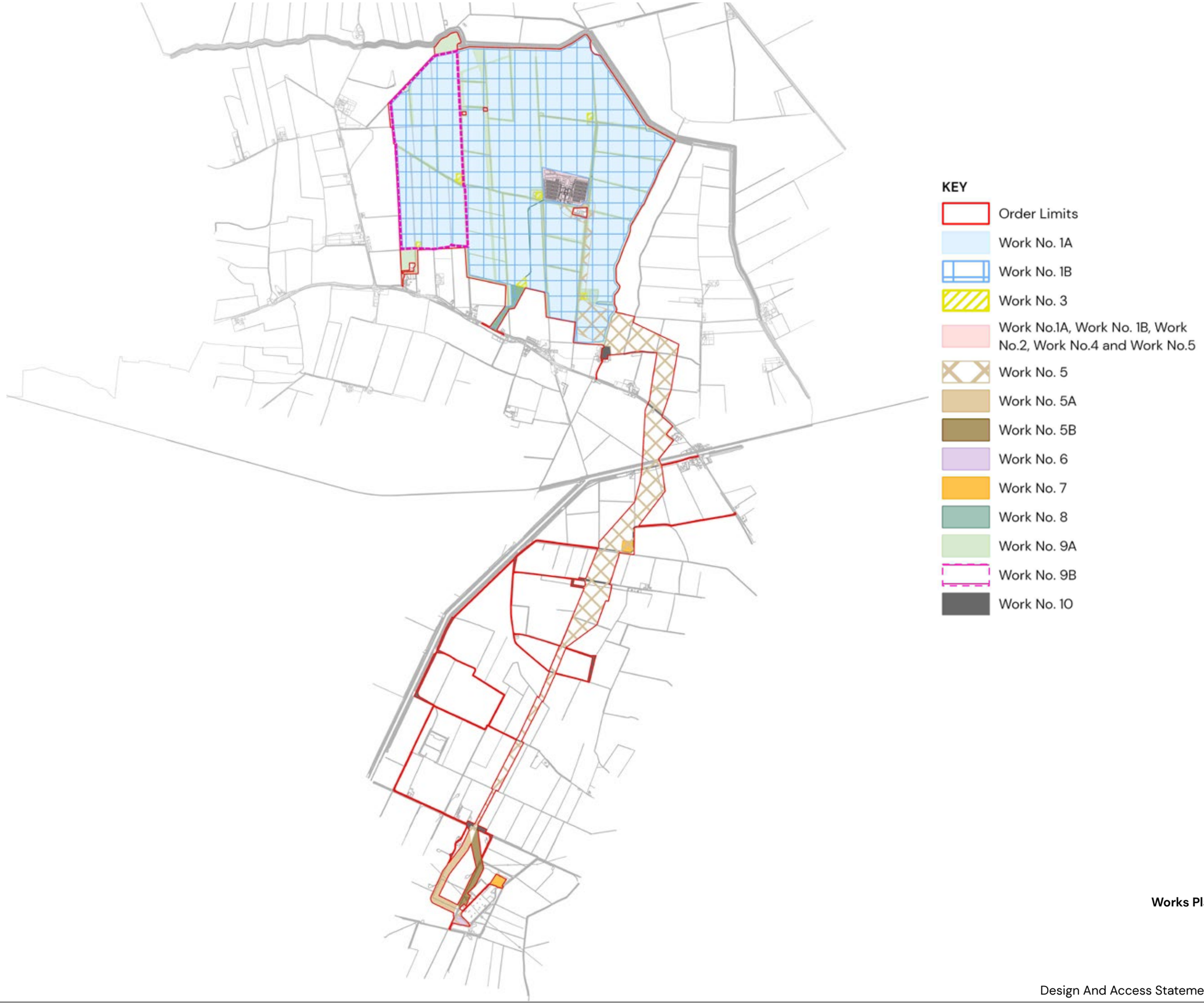
4.3 An operational lifespan of 40 years would be sought linked to the first export date from the development. The development will progress in accordance with a phasing plan. A single substation compound (located with the Energy Storage Compound) will serve the whole development and this will be required for the duration of the development.

4.4 The need for flexibility in design, layout and to address uncertainties in developing technology is acknowledged within the relevant National Policy Statements. This is particularly pertinent to the solar and energy storage sector which continues to see constant advancement in technology. Accordingly, the Applicant is seeking to ensure a degree of flexibility (through the accepted 'Rochdale Envelope' approach) within the DCO to allow for changes in equipment and materials.

4.5 In this regard, the Applicant proposes the imposition of a pre-commencement requirement for the submission of a phasing plan and detailed design plan to the Local Planning Authority for approval. The purpose of this submission would be to:

- Clarify the construction and operational sequencing of the development;
- Demonstrate compliance with the requirements included in the DCO; and
- Demonstrate that the final detailed design remains within the parameters of the design principles set out in this document and the Environmental Statement (document reference 6.1.1).

## THE WORKS




**Works Plan**

**WORK No. 1— a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts including—**

(a) solar modules;

(b) solar stations;

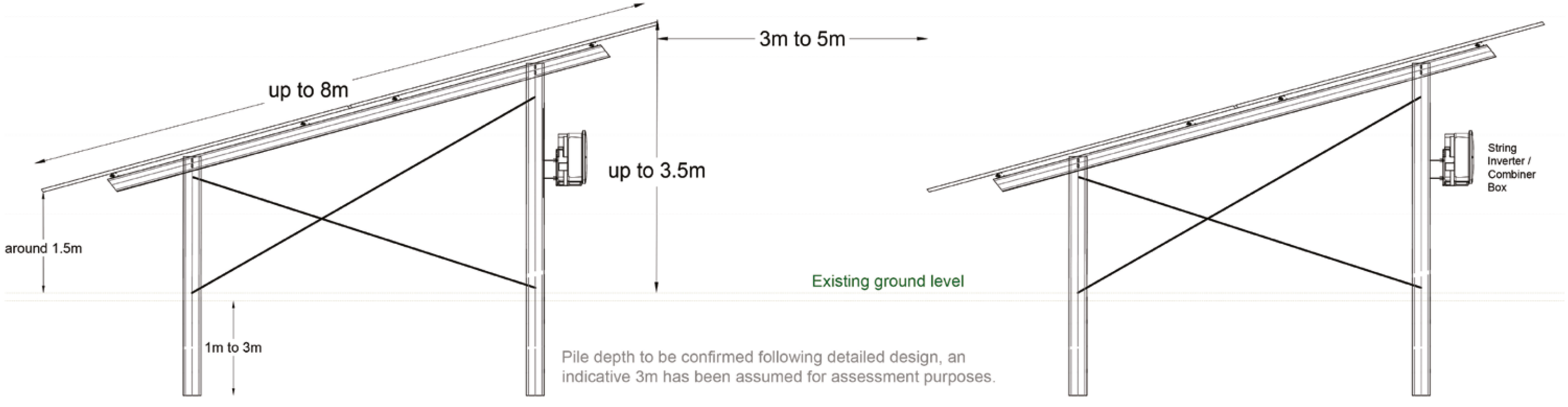
(c) solar module mounting structure;

(d) inverters;

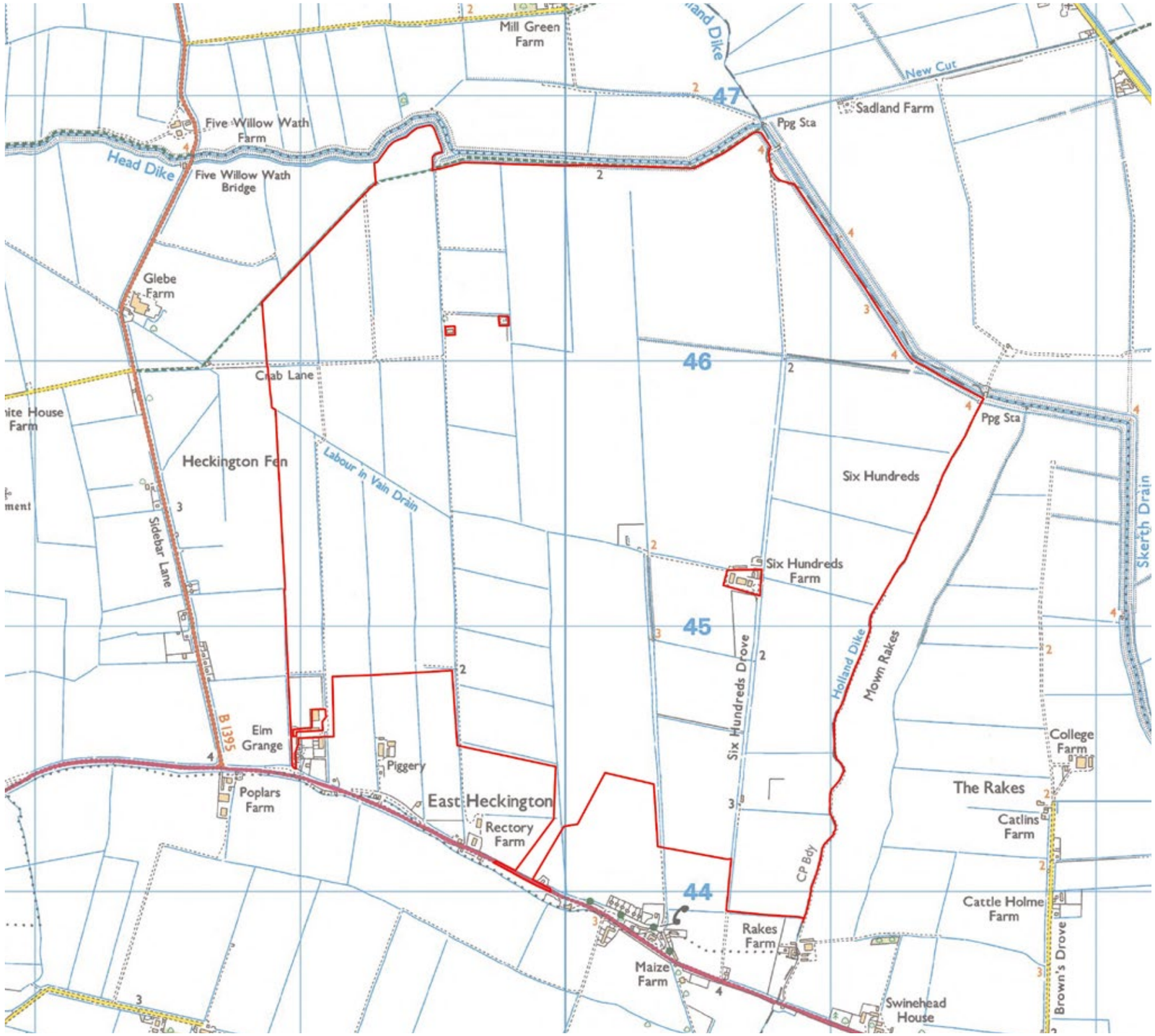
(e) switchgear; and

(f) a network of electrical cables including electrical cables connecting to Work Nos. 2 and 4.

4.6 And associated development within the meaning of section 115(2) of the 2008 Act.




**Solar Panel Elevations**




**KEY**

Energy Park Boundary

**Energy Park Site Plan**

4.7 The design principles of the solar modules are:

- All solar panels will be located within the Work No 1 area as defined on the Works Plan (document reference 2.2);
- Total land coverage of the solar PV array would be 292 ha. Subject to the wattage output of the solar panel selected for construction, the potential maximum range for energy generation is between 400 MWp and 600 MWp;
- An array is a galvanised steel and anodised aluminium mounting structure with the solar panels attached to it;
- The maximum top height of the arrays will be 3.5m AGL;
- The minimum height of the lowest part of the arrays will be 1.0m AGL;
- Solar panels will be blue or black in colour;
- The solar panels will slope towards the south, at a fixed slope of 10 to 20 degrees from horizontal;
- Typical minimum distance between edge of the arrays to the 1.8m high perimeter fencing would be 3m;
- Biodiversity would be promoted within and around the arrays; and
- Planting and ecological works incorporating the biodiversity objectives and management prescriptions in accordance with the Outline LEMP.

4.8 The design principles of the solar stations (comprising inverters, transformers, switchgear and associated ancillary and control equipment) are:

- A maximum of 127 solar stations will be located within the limits of deviation of Work No 1 as shown on the Works Plan (document reference 2.2);
- The maximum parameter of each solar station will be 13m by 4m footprint and 4m in height;
- External finish of green, light grey or white paint;
- There will be between one and eight inverters per solar station;
- The maximum parameters of the inverters will be 6m length, 4m width and 4m. height;
- There will be one transformer per solar station;
- The maximum parameters of the transformers will be 13m length, 3m width and 3m. height;

4.9 The design principles of the switchgear are:

- The maximum parameters of the switchgear will be 13m length, 4m width, and 4m height.

4.10 The design principles of the electrical cabling are:

- The onsite electrical cabling will be located within the limits of deviation of Work No.1, Work No.2 and Work No.4 as shown on the Works Plan (document reference 2.2);
- Cabling between the PV modules will be above ground, fixed to the mounting structure along the row of racks;
- Cabling between the solar PV modules and the solar stations, and between the solar stations and the onsite substation will be underground;

**WORK No. 2— an energy storage facility comprising—**

(a) energy storage;

(b) transformers;

(c) switchgear and ancillary equipment;

(d) a network of electrical cable circuits;

(e) electrical cables connecting to Work Nos. 1 and 4;

(f) a structure protecting the energy storage cells and ancillary equipment, being either one container or multiple containers joined to each other, mounted on a reinforced concrete foundation slab or concrete piling;

(g) heating, ventilation and air conditioning (HVAC) or liquid cooling systems

(h) energy storage stations;

(i) monitoring and control systems;

(j) fire safety infrastructure comprising fire suppression system; and

(k) storage structures for the purposes of firefighting comprising containment tanks or a concrete water storage basin for the purpose of firefighting.

4.11 The design principles of the energy storge facility are:

- The energy storage compound will be located within the limits of deviation of Work No.2 as shown on the Works Plan (document reference 2.2);
- The compound will have a maximum footprint of 78,400m2 and infrastructure within the compound will be no higher than 6m;
- The compound will include energy storage containers and stations (containing batteries, inverters, transformers, and switchgear). Energy storage will be grouped in racks, protected by structures / containers;
- The design of ESS includes a number of design elements to both prevent, detect and control a fire should one occur (for example, a 5m spacing between containers);
- There will be a maximum of 100 inverters within the compound, with maximum dimensions of 6m length, 3m width and 6m height;
- There will be a maximum of 100 transformers within the compound, with maximum dimensions of 5m length, 3m width and 4m height;
- There will be a maximum of 200 energy storage containers housing the battery energy storage cells within the compound, with maximum dimensions of 13m length, 4m width and 6m height;
- The monitoring and control system will be housed in a building or container within the compound, with maximum dimensions of 12m length, 9m width and 6m height.
- External finish of green, light grey or white paint.

4.12 The design principles of the fire suppression and water containment system are:

- The tanks storing up to a maximum of 2000 cubic metres of water will be locate in the energy storage compound, in up to eight cylindrical tanks with a diameter of 10m and height of 4m;
- A further two tanks of the same dimensions will be available to store potentially contaminated water in the event of a fire.
- A firefighting water containment lagoon will be located within the compound to capture water run-off during a fire incident. The lagoon will have a maximum footprint of 3,600 sq.m contained within a 1m height earth bund.

**WORK No. 3— reception areas, temporary cabins, temporary construction compounds, gatehouse(s) and service areas in connection with Work No. 1, Work No. 2, and Work No. 4.**

4.13 The design principles of the temporary construction compound are:

- The temporary construction compounds will be located within the limits of deviation of Work No.3 and as shown on the Works Plan (document reference 2.2);
- There will be a maximum of 6 temporary construction compounds, with maximum dimension of 50m x 50m;
- The base will comprise crushed aggregate.

**WORK No. 4— an onsite substation and works in connection with the onsite substation including—**

(a) transformers, including associated cooling equipment, bunding and blast walls;

(b) switchgear, including circuit breakers, disconnectors and earth switches;

(c) substation electrical apparatus, including bus-bars, steel supports, insulation posts, cable sealing ends, surge arrestor, instrument transformers;

(d) harmonic filtering reactive power compensation equipment;

(e) substation buildings;

(f) control buildings or containers;

(g) welfare facilities and hardstanding areas;

(h) a network of cable circuits;

(i) electrical cables connecting to Work No. 1 and Work No. 2; and

(j) flood protection measures.

4.14 The design principles of the onsite substation compound are:

- The onsite substation compound will be located within the limits of deviation of Work No.4 as shown on the Works Plan (document reference 2.2);
- The compound will have a maximum footprint of 20, 350sqm, and dimensions of 185m x 110m;
- Infrastructure within the compound will have a maximum height of 15m AGL;
- The compound will include up to four substations, transformers, switchgear, substation control buildings, welfare facilities, hardstanding areas, and electric cabling;
- The substation control buildings will be constructed of block (painted in keeping with the other infrastructure) with have a footprint 20m x 10m and a height of 4m;
- The three main step-up transformers will have a footprint of 15m x 10m and a height of 12m, and with a likely finish of grey galvanised steel;
- The four auxiliary transformers will measure 4m x 4m, with a height of 4m in height., and with a likely finish of grey galvanised steel;
- The distribution substations will measure 15m x 5m, with a height of 4m, with a finish of either grey galvanised steel or construction blocks;
- The substation control room will be located either within the substation control building or in a sperate building measuring 12m x 5m and with a height of 4m;
- As a flood protection measure, the floor levels will be set at 2m AGL, or a alternatively the compound will be within a bund.

**WORK No. 5— works to lay electrical cables between Work No. 4 and Work No. 6.**

**WORK No. 5A— works to lay electrical cables from Work No. 5 to Work No. 6.**

**WORK No. 5B— works to lay electrical cables from Work No. 5 to Work No. 6.**

4.15 The design principles of the cable route corridor connecting the Energy Park to the National Grid Bicker Fen Substation are:

- The electrical cabling will be located within the limits of deviation of Work No.4, Work No.5 and Work No.6 as shown on the Works Plan (document reference 2.2);
- The electrical cabling will comprise one 400kV cable circuit underground alongside communication and control cabling;
- The laying of the cabling requires a swathe of land approximately 25m in width. A wider corridor is being considered to ensure flexibility within the design including 'micro siting' to allow for ground conditions or other environmental constraints;
- Open cut trenching will be primarily utilised for crossings, but with the use of Horizontal Directional Drilling (HDD) or similar technology will be used to install the 400kV cables beneath areas of engineering difficulties (watercourses, high-pressure gas pipeline, South Forty Foot Drain, the railway and Black Sluice Internal Drainage Board ditches);
- A minimum buffer of 8-9m around watercourses (measured from the water /channel edge under normal flows) will be maintained within which there will be no built development (other than essential works such as watercourse crossings or drainage etc.) to avoid disturbance of the watercourse bed and banks;
- At each jointing bay along the cable route corridor between the Energy Park and the Bicker Fen substation, earthing link boxes (for access) will be installed above ground, within field margins where possible.

**WORK No. 6— an extension to the existing substation, including—**

(a) electrical bays to connect into the existing network within the existing substation, including associated switchgear and electrical apparatus;

(b) switchgear, including circuit breakers, disconnectors and earth switches;.

(c) substation electrical apparatus, including bus-bars, steel supports, insulation posts, cable sealing ends, surge arrestors, instrument transformers;

(d) control building; and

(e) underground and above ground electrical cables, including cables for power, control and communication electrical bays to connect into the existing network within the existing substation, including associated switchgear and electrical apparatus.

4.16 The design principles of the extension to the existing Bicker Fen substation are:

- The National Grid Bicker Fen Substation Extension will be located within the limits of deviation of Work No.6 as shown on the Works Plan (document reference 2.2);
- The maximum footprint for the substation extension is 145m by 45m, with a height of 15m in height from AGL. All of the infrastructure including the electrical bay, electrical bay control room, perimeter access road will be in this area;
- The footprint of the main electrical bay sitting within the extension area will be limited to a maximum of 1,650m$^2$ (probably with dimensions of 55m x 30m), with a height of 15m above from AGL.

**WORK No. 7— two temporary laydown areas in connection with Work No. 5 and Work No. 6 including—**

(a) areas of hardstanding, compacted ground or tracking matting;

(b) car parking and access;

(c) area to store materials and equipment, including electrical cables;

(d) site and welfare offices and cabins;

(e) security infrastructure, including cameras, perimeter fencing and lighting;

(f) site drainage and waste management infrastructure (including sewerage); and

(g) electricity, water, waste water and telecommunications connections.

4.17 There are no design principles established for this temporary infrastructure.

**WORK No. 8— works to create and maintain a permanent means of access from the A17 to Work No. 1, Work No. 2, Work No. 3 and Work No. 4.**

4.18 The design principles of the permanent means of access from the A17 are:

- The site access from the A17 will be located within the limits of deviation of Work No.8 as shown on the Works Plan (document reference 2.2);
- The new access from the A17 will be 7m wide to accommodate two HGVs simultaneously;
- The internal access tracks will be located within the limits of deviation of Work No. 1, 2, 3, 4 and 8 as shown on the Works Plan.

**WORK No. 9A— works to create, enhance and maintain green infrastructure and create biodiversity net gain areas, including—**

(h) soft landscaping and planting, including tree planting;

(i) landscape and biodiversity enhancement measures;

(j) earth works;

(k) hard standing and hard landscaping;

(l) drainage and irrigation infrastructure and improvements or extensions to existing irrigation systems;

(m) fencing, gates, boundary treatment and other means of enclosure; and

(n) improvement, maintenance and use of existing private tracks.

**WORK No. 9B— works to create a permissive path, including installing up to two footbridges, fencing, gates, boundary treatment and other means of enclosure.**

4.19 The design principles of the green infrastructure and biodiversity net gain areas are:

- The green infrastructure will be located within the limits of deviation of Work No.9A as shown on the Works Plan (document reference 2.2);
- The green infrastructure will be designed as per the Outline LEMP (reference 7.8) in accordance with the requirements of the DCO.
- The biodiversity net gain areas will be located within the limits of deviation of Work No.9A as shown on the Works Plan (document reference 2.2);
- A minimum of 16.5ha of biodiversity net gain areas will be located within the limits of deviation of Work No.9A as shown on the Works Plan (document reference 2.2);
- There will be no built development associated with the Proposed Development within Work No. 9A (with the exception of any stock proof fencing used to control conservation grazing and any conservation related surface water control structures).

4.20 The design principles of the permissive path are:

- A permissive path will be located within the limits of deviation of Work No.9B as shown on the Works Plan (document reference 2.2);
- The permissive path will link into the Public Right of Way Heck/15/1 to form a looped route, in part through the site;
- The permissive path will open to the general public once construction of the Energy Park site is completed. It will remain open for the 40 year lifetime of the Energy Park (under a legal agreement between the Applicant and the Landowner) but will not become an adopted Public Right of Way;
- During the construction phase, site security fencing will be installed along the boundary between the HECK/15/1 right of way and the Energy Park site.

**WORK No. 10— works to existing streets to facilitate access to Work Nos. 1–9B.**

4.21 The design principles of the works to existing streets are:

- The Access EP/A will only be used for a temporary period of time during the construction phase until such time that the Access EP/B is complete;
- The Access EP/B is the primary access to the Energy Park and will be used during all phases;
- The access locations across the Cable Run will be re-instated to their existing condition following the construction phase; however, the rights to utilise these access points will be retained during operation and secured through the DCO to allow access for maintenance, if required. Access to the Cable Run is not required during decommissioning as the cable and infrastructure will remain in-situ.

## FURTHER ASSOCIATED DEVELOPMENT

4.22 The design principles of the associated development in addition to Work Nos. 1 to 10 are:

- Fencing will be located within the limits of deviation of Work No.1- 10 as shown on the Works Plan (document reference 2.2);
- Fencing to be a metal mesh 'deer fence' design, with wooden post supports and metal stock fencing, not exceeding 3m in height AGL;
- All fencing will be a minimum of 15m from all National Grid overhead line (OHL) tower bases.
- Internal access track of permeable construction;
- Security measures will be located within the limits of deviation of Work No.1- 10 as shown on the Works Plan (document reference 2.2);
- Up to 620 CCTV installations will be positioned along the perimeter of the arrays on 3m high poles;
- CCTV lighting will be infrared (not visible) during hours of darkness; there will be no permanent lighting on site.

## OUTLINE LANDSCAPE AND ECOLOGICAL MANAGEMENT PLAN

4.23 The development proposal presents considerable opportunity for landscape and biodiversity mitigation and enhancement. The Landscape and Biodiversity proposal are discussed in detail in the supporting Outline Landscape and Ecological Management Plan (document reference 7.8), the purpose of which is to:

- To ensure that clear objectives for this new solar park at Heckington Fen are agreed;
- To set clear standards for the performance of landscape maintenance work prior to the handover to the operations and maintenance team;
- To develop work programmes and schedules for maintenance staff for the first year after completion and thereafter for a period of 40 years;
- To preserve and enhance the site biodiversity;
- To help in the allocation of financial resources for landscape maintenance;
- To help monitor success and progress against management targets.

4.24 The main aims for the site landscape and ecological management and maintenance are:

- To assimilate the solar park into the local landscape, thereby minimising any effects on local landscape character, landscape elements and visual receptors;
- To manage operational activities associated with the solar park so as to protect existing retained trees and hedgerows and prevent short term damage and longer term adverse impacts;
- To manage existing trees so as to minimise any unacceptable risks that they may present for operational staff associated with the solar park;
- To maintain new hedgerows and grassland in order to maximise their landscape and ecological benefits; and
- To provide new foraging, nesting, roosting and sheltering opportunities for a range of wildlife species.

4.25 In terms of requirements, prior to commencement of each phase of the authorised development, a LEMP covering that phase of authorised development and in accordance with the outline LEMP would be submitted to and approved by the local planning authority.

## OPERATIONAL LIFESPAN

4.26 An operational lifespan of 40 years would be sought, starting from the first export date of the development.

4.27 During the operational phase, the activities on site would amount to servicing and maintenance of plant and equipment associated with the development, including solar panels, inverters, transformers, energy storage facility, substation compound and vegetation management in accordance with the Outline LEMP (document reference 7.8).

## STATUTORY UNDERTAKERS

4.28 The provision of easements for the existing services that traverse the site are incorporated into the layout design (Indicative Site Layout at document reference 6.2.2). No arrays will be erected within the agreed easements, allowing access to the statutory undertakers at all times. Whereby internal access tracks cross any existing underground services the crossing method will be agreed with the asset owner in advance including the agreement of Risk Assessments and Method Statements.

## ROUTING

4.29 An Outline Construction Traffic Management Plan accompanies the DCO (document reference 7.10).

4.30 It is anticipated that construction materials could arrive via Immingham Port, and arrive at the site via the A17. Should vehicles arrive from the east, on the A17, they will be required to use the roundabout at the A15 and A17 to turn around to enter the Energy Park from the west.

4.31 Access to the Energy Park during the construction and operational phases is proposed from the A17 at the site's southern frontage, approximately 900 metres northwest of the junction with Six Hundreds Drove. Whilst the proposed access is under construction, a temporary construction access will be provided via an existing junction with the A17, approximately 600 metres southeast of B1395 Sidebar Lane junction.

4.32 Access for the construction of the cable route is proposed in three locations. Access from the north of the South Forty Foot drain is proposed via an existing junction with the A17 located approximately 430 metres north of the junction with the A1121. Access to the south of the drain is proposed via the Triton Knoll access with the A17, with some localised access is also proposed via Royalty Lane and Timms Drove.

## DECOMMISSIONING

4.33 Following a 40 year generation period, the development would then enter a single decommissioning stage.

4.34 Within six months of cessation a decommissioning strategy would be submitted to the relevant planning authority for approval. The decommissioning strategy would detail how plant and machinery located within the Order Limits would be removed, in accordance with the principles laid out in the Outline Decommissioning and Restoration Plan (document reference 7.9).

## REQUIREMENTS

4.35 The application includes various outline management plans and documents that are intended to be detailed and finalised post-consent and these would be secured through the discharge of various proposed requirements.

4.36 The suggested requirements are laid out in the draft Development Consent Order (document reference 3.1), these cover:

- Time limit to implement development (5 years);
- Expiry of development consent;
- Decommissioning and site restoration;
- Phases of authorised development – The authorised development must not be commenced until a written scheme setting out the phases of construction of the authorised development has been submitted to and approved by the local planning authority;
- Detailed Design Approval – No phase of the authorised development may be commenced until written details of the following for that phase have been submitted to and approved by the local planning authority;
- Energy Storage Safety Management Plan (ESSMP);
- Construction Environmental Management Plan (CEMP);
- Construction Traffic Management Plan (CTMP);
- Landscape and Ecological Management Plan (LEMP);
- Construction hours;
- Surface and foul water drainage details;
- Archaeology;
- Protected Species – No work to commence in any phase until final pre-construction survey work has been carried out for that phase to establish whether a protected species is present on any of the land affected, or likely to be affected, by the authorised development or in any of the trees to be lopped or felled as part of that state of the connection works.

# 5 | Design Evolution

5.1 Over the course of the design process, the project team have continuously refined the scheme's design, informed by consultation and findings of technical analysis as they became available, within an iterative design process. The evolution of the design of the Proposed Development are also set out within Chapter 3 – Site Description, Site Selection and Iterative Design Process of the Environmental Statement (document reference 6.1.3), with the main components described below.

## Solar Panels and Associated Equipment

5.2 Solar panels that are fixed and those that rotate to follow the sun were both considered in earlier iterations of the Proposed Development, with the latter discounted following the Preliminary Environmental Report (PEIR) assessment due to flood risk. A maximum height of 4.5m was originally considered due to the potential flood risk, plus 20% for climate change. Following specialist hydraulic modelling, the maximum height of the solar panels is now split into two different heights, at 3m and 3.5m maximum respectively, split broadly between the north and south of the Energy Park to ensure flood waters do not touch the leading edge of the panels.

5.3 A maximum of 127 central are assessed. The control, switchgear equipment and transformer would be within containers (13m x 4m x 4m maximum dimensions) distributed throughout the Energy Park site. Depending on the final site configuration each unit would be typically rated around 3 to 9MW. An alternative site design would use smaller string inverters mounted to the module supports, allowing units with a smaller footprint of the units (containing only transformers and switchgear). Under these two scenarios, the Energy Park site would have either around 60 x 7MW or 100 x 4MW inverter and transformer stations.

5.4 Following comments received during the Statutory Consultation the Order Limits were reduced so the land could remain solely in agricultural use. Site infrastructure was set back from the A17 and Sidebar Lane with the area to be set aside as potential biodiversity net gain.

## Onsite Substation and Energy Storage

5.5 Following the PEIR and statutory consultation the onsite substation and energy storage were relocated further north to reduce the visual and noise impact on nearby residents. Furthermore, the series of 132kV substations (six assessed in the PEIR) and overhead lines onsite were also removed.

## Offsite Cable Route Corridor

5.6 The Offsite Cable Route Corridor covered a much wider corridor in the non-statutory consultation, Scoping Report, the Statutory Consultation and the PEIR. The initial design options predominantly comprised of a Western Route and an Eastern Route, named in relation to their geographical positioning relative to the South Forty Foot Drain. This was eventually refined to a single route, with the exception of the most southern section near the National Grid Bicker Fen Substation where two corridors remained as options during the consultation and detailed assessments through 2022.

5.7 A report on the Off-Site Grid Connection options was completed by a specialist design consultant in the first stage of design work. This work supported the selection of a preferred connection design and route corridor. One of the outcomes of this report identified technical and practical benefits for the Eastern Route, with an Alternative Route also identified. These two routes were known as the Eastern Route and the 50-50 Route (or Eastern Route B) and were presented in the PEIR.

5.8 Eastern Route B would have seen the connection leaving the Energy Park close to the new entrance off the A17 (near the Farm Shop) and the existing gas main, crossing the South Forty Foot Drain and the railway before going south on the eastern side of the South Forty Foot Drain to Bicker Fen Substation. Further design reviews enabled the corridor to be refined to the single route assessed within this Environmental Statement (document reference 6.1). More detail of the Offsite Cable Route Corridor selection process is set out within the Grid Route Selection Report as an appendix to the Statement of Reasons (document reference 4.1).

5.9 The offsite cable route was confirmed as underground early in the process. This is due to the precedent set by other developments in the area which are also underground (for example Triton Knoll offshore wind farm and Viking Link interconnector to Denmark). An overhead line was considered to be a greater consenting risk, with increased visual impact, difficulty in securing easements with local landowners, the Environment Agency and Network Rail in respect of the South Forty Foot Drain and the adjacent railway line.

## Bicker Fen National Grid Substation Extension

5.10 Working with National Grid through the design process, it has been determined that the preferred location for the extension to National Grid Bicker Fen Substation is a new generator bay in the south-western corner of the Bicker Fen site.

5.11 The land for this new bay is to the immediate south-west of the existing substation. This area of land is currently an area of rough grassland with an area of woodland to the south. During the preparation of the PEIR consideration needed to be given to the potential impact on this area of amenity and screening value. Detailed assessment concluded that detrimental impact on this area could be avoided, allowing for the selection of the substation's south-westly bay for the connection point for Heckington Fen Energy Park. A connection in the north-eastern portion of Bicker Fen was also considered during the PEIR but subsequently ruled out following further discussions with National Grid.

## Landscaping and Screening

5.12 Hedgerows would be planted along the perimeter of the Energy Park and along some of the internal boundaries, as illustrated on the Landscape Strategy Plan (document reference 6.2.6). The hedgerows would be maintained at approximately 3m – 5m in height, in order to break the line of sight between the nearby visual receptors and the interior of the proposed Energy Park. Whilst some views over the maturing hedgerows may still exist at year 5, the developing tree canopies would help to break up view of the Energy Park, diminishing its scale and horizontal extent.

## Public Rights of Way

5.13 The early stages of the design process also gave considerable attention to the status, use and condition of the public rights of way (PROW) network within and adjacent to the site.

5.14 A length of the public right of way HECK/15/1 runs across the north-west of the Energy Park, and along the Head Dike which forms the northern boundary. To improve pedestrian links in this area, the Proposed Development includes a new permissive path to provide a circular walk through the site. After detailed consideration, the proposed route was increased in length to create a 4.2km loop linking both the community orchard which is in close proximity to Elm Grange and the new education facility (see below).

5.15 This permissive path will open to the general public once construction of the Energy Park site is completed. It will not become an adopted PROW but will remain open for the lifetime of the Energy Park (circa 40 years) under the legal agreement between the Applicant and the Landowner. Prior to construction, design and maintenance details will be submitted to the local planning authority for approval.

5.16 Site surveys showed that several footbridges along HECK/15/1 public right of way were no longer in existence; crucially the bridge to Head Dike had been missing since 2005, in effect terminating the footpath. During the design and consultation process, Black Sluice IDB have indicated that there are no plans to re-instate the footbridge as its presence could cause a hazard if flooding were to breach the dike. Lincolnshire County Council (LCC) requested the reinstatement of the footbridge, but the Applicant does not have control over the land needed to provide footings. A future reinstatement will therefore be subject to further discussion between LCC, the IDB, AND the Environment Agency (and potentially any presently unknown landowners), and any improvement works would be implemented independently of this DCO proposal.

5.17 On the western boundary of the Energy Park site there is another missing footbridge to enable HECK/15/1 to cross a ditch. Again, the area of land required for reinstatement of this bridge is not within the Applicant's control. A solution favoured by the neighbouring landowner is to use Crab Lane, before connecting to HECK/15/1 within the Energy Park. As access via HECK/15/1 is needed to enable use of the new permissive path proposed within the Energy Park site, this arrangement is due to be formalised through a new legal agreement between the Applicant, the landowner and LCC. However, should this permissive route not come forward the necessary land is included in the Order Limits of this proposal to enable the Applicant to install a new footbridge and reinstate the missing length of HECK/15/1.

5.18 The Proposed Development on the Energy Park site does not require the closure or diversion of HECK/15/1. During construction of the Energy Park site security fencing will be installed along the boundary between the HECK/15/1 footpath and the Energy Park site to ensure that any users of the footpath do not enter the construction site.

## Education facility

5.19 On the south-western boundary of the Energy Park site is a facility called 'Build-A-Future East Heckington' which offers educational and vocational courses for students with special educational needs[6].

5.20 Consultation with this facility has been ongoing throughout the design process. The possible needs of future students and staff has been considered, including the provision of a new access point further east, away from the facility, and the location of the Community Orchard and Permissive Path, both easily accessible from the establishment.

6 Press release, available at: [redacted]

# 6 | Conclusions

6.1 The approach to design of the Proposed Development has evolved on a constant but iterative basis over an eighteenth month period since the summer of 2021. The objectives and form of the proposal has been informed and refined by technical studies and a series of consultation phases. The sound and coherent set of detailed proposals reflect the wide and deep engagement with the local community, officers representing their elected representatives, and other important stakeholders.

6.2 The design approach has sought to avoid and reduce adverse impacts wherever possible, and identified opportunities for enhancement, whether to the biodiversity and environmental richness of the landscape (in both the short and long-term), or in the provision of a new permissive footpath. It has achieved these aims whilst balancing the competing need for both flexibility and certainty within the DCO proposal.

6.3 The detailed design process will ensure the delivery of substantial decarbonised clean, renewable energy, alongside other social and economic benefits. These will include an orchard which will be in place for at least 50 years (and beyond - subject to landowner agreement) providing a legacy for the community and North Kesteven through and beyond the 40 year operational period.

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