
EAST YORKSHIRE SOLAR FARM

East Yorkshire Solar Farm
EN010143

Outline Design Principles Statement

Document Reference: EN010143/APP/7.4

Regulation 5(2)(q)
Infrastructure Planning (Applications: Prescribed Forms and Procedure)
Regulations 2009

November 2023
Revision Number: 00

2009

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Prepared for:

East Yorkshire Solar Farm Limited

Prepared by:

AECOM Limited

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1.1 Introduction

- 1.1.1 This Outline Design Principles Statement (ODP Statement) has been prepared to accompany the Development Consent Order (DCO) Application for East Yorkshire Solar Farm ('the Scheme'). It provides the guiding principles for the detailed design of the Scheme and is secured by a requirement in the **Draft DCO [EN010143/APP/3.1]**. When the detailed design for the Scheme is submitted for approval to the relevant planning authorities, those details must be in accordance with the design principles set out in this ODP Statement.
- 1.1.2 Securing the detailed design post-consent is necessary to achieve technological and design flexibility for the Scheme because solar photovoltaic (PV) technology is rapidly evolving. The Scheme seeks to allow provision in the DCO for the technological innovation and improvements that may be realised at the time of procurement and construction, in order to ensure that the Scheme can be constructed taking advantage of innovation and cost efficiencies.
- 1.1.3 That necessary flexibility has been facilitated by the adoption of the 'Rochdale Envelope' approach in the Environmental Statement (ES) which is explained in **Chapter 2: The Scheme, ES Volume 1, [EN010143/APP/6.1]**. The Rochdale Envelope approach ensures the maximum parameters and realistic worst case have been assessed, and that envelope is defined by the design principles set out in this document. Therefore, by requiring that the detailed design of the Scheme must be in accordance with the design principles, there can be confidence that the environmental effects would be the same as or no worse than those assessed and reported in the ES.

1.2 Design Principles

- 1.2.1 The Scheme is described in Schedule 1 to the **draft DCO [EN010143/APP.3.1]** where the different components of the Scheme are divided into works which correspond with the work number areas shown on the **Works Plan [EN010143/APP/2.3]** which would be subject to differing levels of development and/or management. For the purposes of the EIA, the Scheme is described in **Chapter 2: The Scheme, ES Volume 1 [EN010143/APP/6.1]**.
- 1.2.2 The works include Work No.1 for a generating station with a generating capacity of over 50 Megawatts (MW) which is the Nationally Significant Infrastructure Project (NSIP).
- 1.2.3 Work No.5 and parts of Work Nos.3 and 4 include temporary construction and decommissioning compounds. The parameters for these temporary construction and decommissioning compounds are provided for on the **Works Plan [EN010143/APP/2.3]** and in the **Framework Construction Environmental Management Plan [EN010143/APP/7.7]** and **Framework Decommissioning Environmental Management Plan [EN010143/APP/7.9]**. The temporary construction and decommissioning elements of Work Nos. 3, 4 and 5 are not therefore included in **Table 1** of this ODP Statement.
- 1.2.4 Work No. 7 relates to works to facilitate access. The parameters for access works are set out in the **Framework Construction Traffic Management**

- Plan (CTMP) (Appendix 13-5, ES Volume 2 [EN010143/APP/6.2])** with the parameters for their ongoing use during operation included for in the **Framework Operational Environmental Management Plan (OEMP) [EN010143/APP/7.8]**. Access works in relation to Work 7 are therefore not included in **Table 1** of this ODP Statement.
- 1.2.5 The design principles which apply to the Scheme for the Works are set out in **Table 1**. Further associated development in connection with the above works (as listed in the final paragraph of Schedule 1 to the Draft DCO) may be necessary across the Order limits and would be subject to the design principles where they are applicable.
- 1.2.6 Construction activities will be subject to the controls included in the:
- a. Construction Environmental Management Plan which would be substantially in accordance with the **Framework CEMP [EN010143/APP/7.7]**;
 - b. Construction Traffic Management Plan which would be substantially in accordance with the **Framework CTMP (Appendix 13-5, ES Volume 2 [EN010143/APP/6.2])**;
 - c. Public Rights of Way (PRoW) Management Plan which would be substantially in accordance with the **Framework PRoW Management Plan [EN010143/APP/7.13]**; and
 - d. Soil Management Plan (SMP) which would be substantially in accordance with the **Framework SMP [EN010143/APP/7.10]**.
- 1.2.7 Decommissioning activities will be subject to the controls included in the Decommissioning Environmental Management Plan (DEMP) which would be substantially in accordance with the **Framework DEMP [EN010143/APP/7.9]**.
- 1.2.8 The operation of the Scheme will be subject to the controls included in:
- a. Operational Environmental Management Plan (OEMP), which would be substantially in accordance with the **Framework OEMP [EN010143/APP/7.8]**;
 - b. Landscape and Ecological Management Plan (LEMP) which would be substantially in accordance with the **Framework LEMP [EN010143/APP/7.14]**;
 - c. Surface Water Drainage Strategy which would be substantially in accordance with the **Framework Surface Water Drainage Strategy (Appendix 9-4, ES Volume 2 [EN010143/APP/6.2])**;
 - d. **Works Plan [EN010143/APP/2.3]**; and
 - e. **Streets, Rights of Way and Access Plans [EN010143/APP/2.4]**.
- 1.2.9 These documents and plans are secured by requirements in the **Draft DCO [EN0101043/APP.3.1]**. The controls in these framework documents and plans are therefore not duplicated in this ODP Statement.

Table 1. Design Principles

Element of Scheme	Parameters Type	Design Principle
Work No. 1		
— a ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts including—		
(a) solar panels fitted to mounting structures; and		
(b) field stations;		
Solar Array	Location	The Solar Array would be located as shown as Work No. 1 on the Works Plan [EN010143/APP/2.3]
	Scale	The maximum total land area occupied by the Solar Array as Work No. 1 on the Works Plan [EN010143/APP/2.3] will be up to 749 hectares (ha)
Solar panels fitted to mounting structures (collectively referred to as “Solar PV Tables”)	Location	The Solar PV Tables would be located within the areas shown as Work No. 1 on the Works Plan [EN010143/APP/2.3]
	Scale	The solar panels would be secured on single axis trackers that are configured north-south.
	Scale	The maximum height of the highest part of the Solar PV Tables will be 3.5 m above ground level (AGL) (existing levels)
	Scale	The installation depth of mounting structures would be a minimum of 3.0 m below ground level (existing levels) subject to archaeological and geotechnical surveys.
	Scale	The solar panels would have a tracker tilt range of plus or minus 60 degrees from horizontal to the east and west (except in Flood Zone 3 where it is set to ensure a 300 mm freeboard above 1-in-100 year (1% likelihood) plus climate change flood level scenario is maintained at all times).

Element of Scheme	Parameters Type	Design Principle
	Scale	The maximum height of Solar Tables when panels are horizontal (night-time storage position) would be 2.3 m.
	Scale	The minimum clearance of solar PV panels from the ground (existing levels) at maximum tracker tilt would be 1.0 m (except in Flood Zone 3 where it is set to ensure a 300 mm freeboard above 1-in-100 year (1% likelihood) plus climate change flood level scenario is maintained at all times).
	Design	The mounting structures would be a galvanised metal appearance.
	Design	The solar panels would be dark blue, grey, or black in colour.
Field Stations comprising Field Station Units or Field Station Substations or Inverter Arrangements (see definition in Schedule 1(1) of Draft DCO [EN010143/APP/3.1])	Location	All Field Stations will be located within the areas marked as Work No. 1 on the Works Plan [EN010143/APP/2.3]
	Location	To avoid adverse noise effects on residential properties in close proximity to the Scheme, Field Stations would not be located within 250 m of a residential property.
	Location	To avoid adverse noise effects on a specific sensitive receptor in Spaldington, Field Stations would not be located within the exclusion area shown in Appendix A of this ODP Statement.
	Scale	There will be up to four Field Station Units or Field Station Substations or Inverter Arrangements at each Field Station.
	Design	Field Stations would contain hardstanding comprising crushed stone/compacted gravel over geotextile.

Element of Scheme	Parameters Type	Design Principle
	Design	External finishes for all containers used in Field Stations would typically be in keeping with the prevailing surrounding environment, likely to be a grey or green painted finish.
	Scale	The containerised Field Station Units would have a maximum footprint of 12.5 m by 2.5 m and would be up to 3.5 m in height.
	Scale	For Field Substations or Inverter Arrangements there would be up to 100 centralised inverters required.
	Scale	For the Inverter Arrangement and Field Substations, string inverters would be either mounted parallel to the array or at the end of the mounting structure
	Scale	For the Inverter Arrangement and Field Substations, the string inverters would typically be up to 1.5 m length by up to 0.5 m wide by up to 1.0 m in height.
	Design	Single containers used at Field Stations would be located on concrete foundations (blocks or plinths), ground screws, reinforced concrete piles, or compacted stone/gravel. Land beneath and around the containers would be crushed stone/compacted gravel over geotextile.
	Design	For the Inverter Arrangement and Field Substations string inverters would likely be grey coloured.
	Scale	For the Inverter Arrangement, transformers would be external and have a maximum footprint of 4.0 m by 4.0 m and with a maximum height of 2.4 m.
	Scale	For the Inverter Arrangement, centralised transformers would be housed in containers with a maximum footprint of up to 12.5 m by 2.5 m and a height of up to 3.5 m.
	Scale	For the Inverter Arrangement, switchgear would be housed in a cabin with maximum dimensions of 6.0 m long by 2.5 m wide and up to 3.5 m high.

Work No. 2

— development of onsite substations and associated works including—

(a) substations, switch room buildings and ancillary equipment including reactive power units and harmonic filters; and

(b) monitoring and control systems housed within a control building or located separately in their own containers or control rooms, with welfare facilities.

Onsite substations referred to as Grid Connection Substations	Location	All Grid Connection Substations are located within the area marked as Work No. 2 on the Works Plan [EN010143/APP/2.3]
	Scale	The electrical infrastructure would be outside and therefore not contained within a building. The maximum height of the electrical infrastructure would be 6.0 m.
	Scale	The footprint for each of the Grid Connection Substation compounds is estimated to be up to 60 m wide by 65 m long.
	Scale	The maximum footprint of the hardstanding for the Grid Connection Substation compounds would be 160 m by 100 m.

Work No. 3

— works to lay electrical cables and compounds for the electrical cables including—

(a) works to lay 132kV electrical cables connecting Work No. 2 to the National Grid Drax Substation, including link boxes and tunnelling, boring and drilling works for trenchless crossings;

(b) electrical engineering works within or around the National Grid Drax Substation including the laying and terminating of the electrical cables and ancillary equipment; and

(c) construction and decommissioning compounds, including site and welfare offices and areas to store materials and equipment.

132kV electrical cables referred to as Grid Connection Cables	Location	All Grid Connection Cables are located on areas marked as Work No. 3 on the Works Plan [EN010143/APP/2.3]
	Location	All Grid Connection Cables would be installed at a minimum distance of 10 m from the façade of any residential dwelling.

	Scale	The Grid Connection Cables between the Grid Connection Substations (located at area marked as Work No. 2 on the Works Plan [EN010143/APP/2.3]) and the National Grid Drax Substation would be underground and installed to a minimum depth of 0.9 m (to top of cable).
	Scale	The Grid Connection Cables would consist of two circuits. Each circuit will comprise three 132 kV single core cables plus associated cabling such as a bare copper earth cable and fibre optic cable.
	Scale	Where the Grid Connection Cables are not installed in the same trench as the Interconnecting Cables the cable trench would be up to 1.5 m wide and to a minimum depth of 1.2 m, except at watercourses. The trench would be up to 4.0 m wide and 2.0 m deep where link boxes are installed.
	Scale	Where HDD is used to install the Grid Connection Cables beneath watercourses, installation would be a minimum of 1.5 m below the bed of the watercourse except for the River Ouse and River Derwent where the minimum installation depth would be 5.0 m below the bed.
Link boxes	Scale	Link boxes would be below ground and would be a maximum of 2.0 m long by 2.0 m wide and 2.0 m deep. Above ground features would comprise manhole covers with maximum dimensions of 2.0 m by 2.0 m, and marking posts.

Work No. 4

— works including—

- (a) electrical cables, including but not limited to electrical cables connecting Works No.1, 2 and 3 to one another and connecting solar panels to one another and the field stations including tunnelling, boring and drilling works for trenchless crossings;
- (b) landscaping and biodiversity mitigation and enhancement measures including planting;
- (c) earthworks;
- (d) laying down of temporary footpath diversions, permissive paths, signage and information boards;
- (e) hardstanding and parking areas;
- (f) sustainable drainage systems including ponds, runoff outfalls, general drainage and irrigation infrastructure, systems and improvements or extensions to existing drainage and irrigation systems;
- (g) fencing, gates, boundary treatment and other means of enclosure;

- (h) works for the provision of security and monitoring measures such as CCTV columns, cameras, lighting columns and lighting, weather stations, perimeter fencing and communication infrastructure;**
- (i) improvement, maintenance and use of existing private tracks;**
- (j) laying down of internal access tracks, ramps, means of access, footpaths, crossing of watercourses and roads, including the laying and construction of drainage infrastructure, signage and information boards;**
- (k) construction and decommissioning compounds, including site and welfare offices and areas to store materials and equipment; and**
- (l) works to divert and underground existing electrical overhead lines.**

Electrical cables referred to as Interconnecting Cables	Location	All Interconnecting Cables are located within areas marked as Work No. 4 on the Works Plan [EN010143/APP/2.3]
	Location	The Interconnecting Cables would be installed within or adjacent to the trenches for the Grid Connection Cables for Work No.3 on the Works Plan [EN010143/APP/2.3] where these overlap and where practicable.
	Design	All Interconnecting Cables would be buried within underground trenches.
	Design	All Interconnecting cables would be medium Voltage (MV) 33 kV cables with earthing and communication cables.
	Design	Where trenches hold Interconnecting Cables only, the maximum trench width would be 2.0 m.
	Location	All Interconnecting Cables would be installed at a minimum distance of 10 m from the façade of any residential dwelling.
	Design	Where Interconnecting Cables are laid in agricultural land and highways the trench depth would be up to 1.4 m unless there are watercourse crossings or existing services or other obstacles requiring a greater depth.
	Scale	Where Interconnecting Cables are laid within Solar PV Areas the trench depth would be typically 0.8 m.

Electrical cables referred to as Onsite Cabling	Location	All Onsite Cabling are to be located on areas marked as Work No. 4 on the Works Plan [EN010143/APP/2.3]
	Design	Onsite Cabling between solar PV panels and inverters would be above ground level (typically along the row of racks fixed to the mounting structure or fixed to other parts of nearby components) and then underground if required (between racks and into the inverter's input). All other on-site electrical cabling will be routed underground.
Auxiliary cables	Design	Low voltage auxiliary cabling would be underground.
Access tracks	Location	All access tracks would be located within areas marked as Work No. 4 on the Works Plan [EN010143/APP/2.3] .
	Scale	Internal access tracks would have a maximum width of 6 m.
	Scale	Internal passing places would be typically 20m in length.
	Design	Internal access tracks (where new or upgraded) would be compacted stone (Type 1 aggregate) over appropriate geotextile with gradient slopes (where required).
Fencing and Security	Location	All Fencing and Security measures would be located within areas marked as Work No. 4 on the Works Plan [EN010143/APP/2.3]
	Design	The Grid Connection Substations would be securely fenced with galvanised palisade security fencing. The fencing would be at a maximum height of 2.4 m.
	Design	Fencing around the Solar Array would be a stock proof mesh-type security fence with wooden posts up to 2.2 m in height.
	Design	If standalone transformers are used at Field Stations, they would be surrounded by a secure wire mesh fence. This fence would be up to 2.4 m in height.
	Design	The distance between perimeter fence posts would be designed to best avoid Root Protection Zones and fit the shape of the field.
	Design	The security system would comprise pole mounted internal facing closed circuit television (CCTV) systems around the perimeter of the operational areas of the Solar PV Site.

Scale	CCTV would be mounted on wooden posts approximately 2.5 m high. Post would be positioned at every change in direction to the fence and approximately every 50 m on a straight run.
Scale	The CCTV would use Infrared (IR) lighting to provide night vision functionality meaning that no visible lighting would be needed for security.

Works No. 6

- works to develop operations and maintenance buildings including—

- (a) demolition and alteration of existing structures;**
- (b) offices, security and welfare facilities;**
- (c) storage facilities; and**
- (d) parking areas.**

Temporary Welfare Units	Scale	Double storey portable temporary welfare facility units would be up to 9.6 m long by 3.5 m wide and a maximum height of 5.7 m.
Permanent Offices, security and welfare facilities	Scale	The office accommodation and welfare facilities at Johnson’s Farm would occupy a footprint no greater than the footprint of the existing derelict farmhouse. The existing farmhouse is an L-shaped structure which has a width of 4.6 m increasing to 8.6 m, and a maximum length of 10.3 m. The maximum height of the structure (to the roofline at the gable) is 6.1 m.
Storage	Design	Should the single storey brick barn in the west of the Johnson’s Farm site be rebuilt following demolition, the footprint of the new building would not exceed those of the existing structure (24.0 m by 4.4 m). The new structure would be single storey.

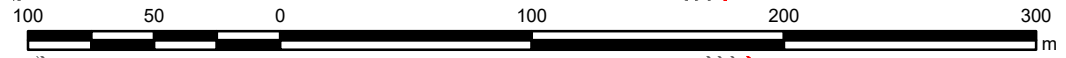
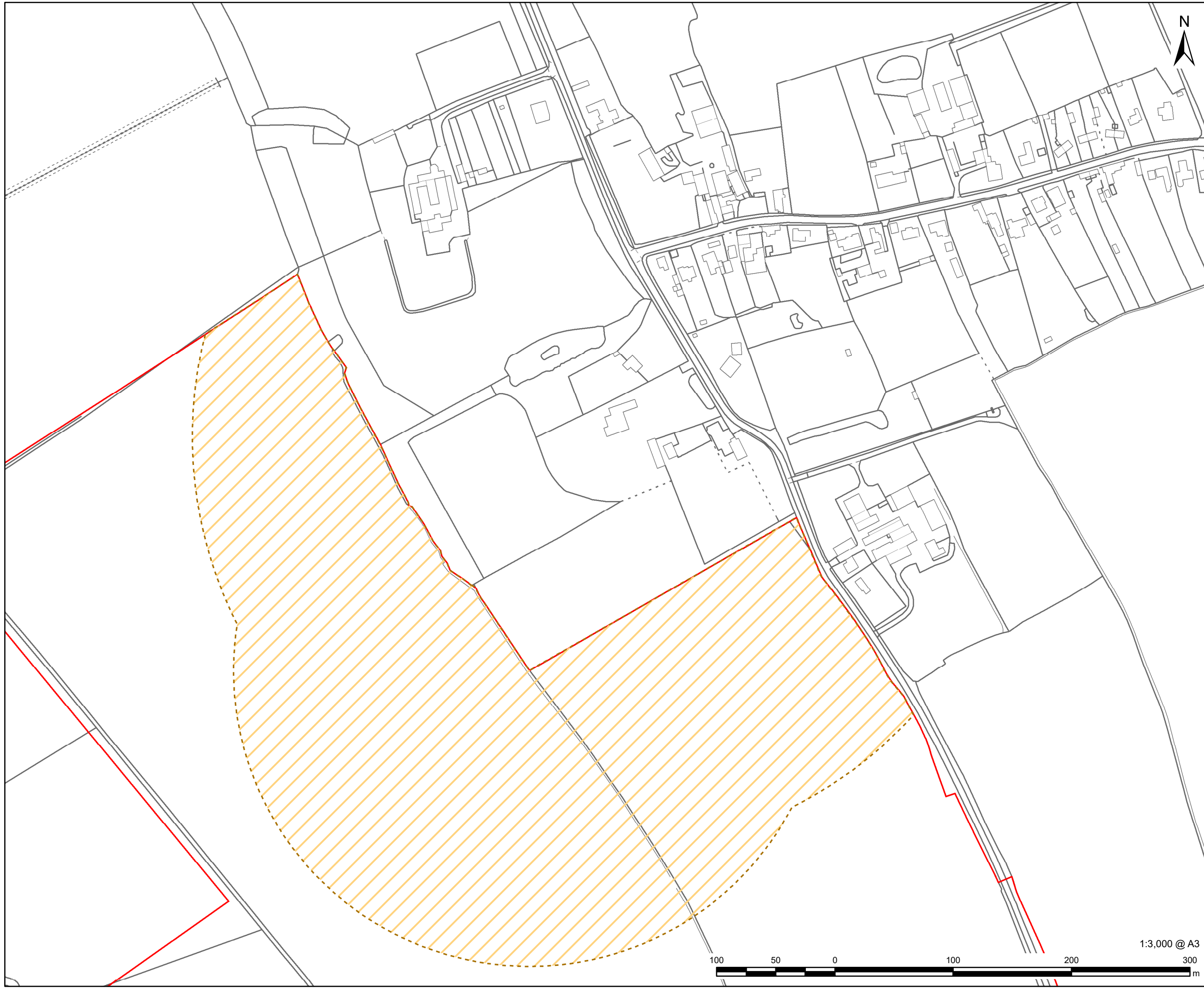
Works No. 8

– areas of habitat management including—

- (a) landscape and biodiversity enhancement measures;
- (b) habitat creation and management including earthworks and landscaping, signage and information boards;
- (c) construction of drainage infrastructure and means of access;
- (d) laying down of internal access tracks, means of access and crossing of watercourses, permissive paths; and
- (e) fencing gates boundary treatment and other means of enclosure.

Area of habitat management	Location	The areas of habitat management would be located as marked as Work No. 8 on the Works Plan [EN010131/APP/2.3] .
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Appendix A



PROJECT

East Yorkshire Solar Farm



CLIENT

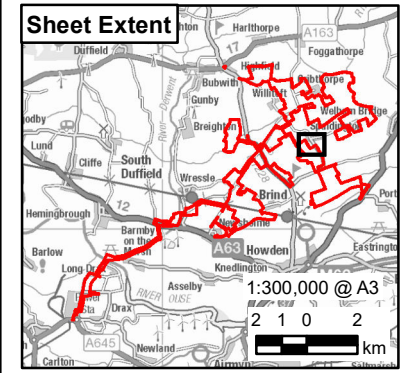
East Yorkshire Solar Farm Limited

CONSULTANT

AECOM Limited
Midpoint,
Alencon Link
Basingstoke, RG21 7PP
www.aecom.com

LEGEND

-  Order limits
-  Exclusion Area for Field Stations



NOTES

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ISSUE PURPOSE

Outline Design Principles Statement

PROJECT NUMBER

60683115

FIGURE TITLE

Exclusion Area for Field Stations

FIGURE NUMBER

Figure 1

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