Tween Bridge Solar Farm

5.6.1 Appendix A: Parameters Document

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

APFP Regulation 5(2)(q)

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APPENDIX A: DESIGN PARAMETERS DOCUMENT

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1 Introduction

1.1.1. This Design Parameters document has been prepared on behalf of RWE Renewables UK Solar and Storage Ltd (the Applicant) in support of an application for a Development Consent Order (DCO) (the DCO Application) made to the Secretary of State (the SoS) for the Department for Energy Security and Net Zero, pursuant to the Planning Act 2008 (PA 2008).

1.1.2. The DCO Application would provide consent for the Applicant to construct, operate (including maintain) and decommission Tween Bridge Solar Farm, a solar photovoltaic (PV) array electricity generating facility, Battery Energy Storage System (BESS) and associated infrastructure (the Scheme) which would allow for the generation and export of over 50MW of electricity. The **Environmental Statement (ES) Figure 1.1 Order Limits [Document Reference 6.4.1.1]** shows the Order Limits (the Order Limits) for the Scheme, which is approximately 1,831~~50~~ hectares of land located within the administrative areas of both City of Doncaster Council (DC) and North Lincolnshire Council (NLC) (the Host Authorities).

1.1.3. The Scheme is a Nationally Significant Infrastructure Project as it includes a generating station capable of generating more than 50 megawatts (MW) of renewable energy.

1.1.4. This document will become a certified document through the DCO should it be granted consent. Under Schedule 2 (Requirements) to the DCO it places a duty on the Applicant to ensure that the detailed design and associated infrastructure is delivered in accordance with the parameters outlined in the table below and subsequently secured by this document.

1.1.5. This document should be read alongside the **Draft DCO [Document Reference 3.1]**, the **Design and Access Statement [Document Reference 7.2],** which sets out the main design principles and design process undertaken for the Scheme, and the **ES Chapter 2 Scheme Description [Document Reference 6.1.2].**

1.1.6. The Environmental Impact Assessment presented in the ES has been undertaken based on the maximum (or minimum where appropriate) extents of the parameters set out within this document which reflect the worst-case scenario for the Scheme. This approach is known as the use of the 'Rochdale Envelope' which is described in footnote 106 to paragraph 4.3.12 of NPS EN-1 as being an

assessment "sufficient to fully assess the project's impact on the environment and establish clearly defined worst case parameters for the assessment". As the detailed design of the Scheme will come within these assessed parameters, the conclusions of the ES will be upheld.

1.1.7. Paragraph 4.3.11 of EN-1 recognises that in some instances, it may not be possible at the time of the application for development consent for all aspects of the proposal to have been settled in precise detail. Paragraph 4.3.12 continues that where some details are still to be finalised, the ES should set out to the best of the applicant's knowledge, what the likely worst-case environmental, social, and economic effects of a project may be and assess on that basis to ensure that the impacts, as it may be constructed, have been properly assessed.

1.1.8. Paragraph 2.10.70 of NPS EN-3 also accepts that not all aspects of a project may have been settled in precise detail at the point of application. For instance, the type, number and dimensions of panels, layout and spacing are among aspects of the Scheme which are not settled for the purposes of the DCO Application and this will be done at final design stage.

1.1.9. The Applicant wishes to retain flexibility regarding the design detail of certain components of the Scheme, as is acknowledged in NPS EN-1 Paragraph 4.3.11 and Paragraph 2.10.70 of NPS EN-3. The extent of flexibility sought by the Applicant is described in **ES Chapter 4 Approach to the Environmental Impact Assessment [Document Reference 6.1.4]**.

1.1.10. Due to the rapidly evolving technology within the solar photovoltaics and energy storage system sectors, the in-built flexibility allows for the most up-to-date technology to be utilised for the Scheme. The full detailed design at the point of construction will be managed post-consent through the requirements set out in Schedule 2 to the **Draft DCO [Document Reference 3.1]**.

1.1.11. The Design Parameters have been set out in **Section 2** of this document, organised in accordance with the description of the Works Numbers as set out in Schedule 1 to the **Draft DCO [Document Reference 3.1]**. The spatial extents of each Work Number are set out in the accompanying **Works Plans [Document Reference 2.3]**.

1.1.12. For each component of the Scheme outlined in **Section 2**, the parameter has been defined by its:

- Location – the location of the components within the Scheme as assessed within the ES;
- Scale – either a minimum or maximum parameter which has been assessed in the ES; and
- Design – relevant design parameter or principle which has been assessed in the ES.

2 Design Parameters and Principles

Table 2-1: Work No.1 – Ground Mounted Solar Photovoltaic Generating Stations

Element of Scheme	Parameter Type	Design Parameter and Principles
General	Location	The location of Work No.1 will be as shown on the **Works Plans [Document Reference 2.3].**
Solar modules, being solar PV panels fitted to mounting structures	Location	Solar PV modules will be located at least 50m from residential dwellings.
	Scale	For fixed array, the maximum height of the solar panels will be 3.6m above ground level. For a tracking array, the maximum height of the solar panels will be 3.6m. The height of those panels will vary throughout the day, up to that maximum height.
	Scale	The minimum height of the lowest part of the solar panels (i.e. not including the mounting structure) will be 0.8m AGL (above ground level) for both fixed array and tracking array.
	Scale	The mounting structures will be fixed to the ground by galvanized steel or other material poles which are ~~typically~~ driven into the ground to a maximum depth of 3m. Where further work identifies the need for archaeological protection, an

		alternative mounting structure will be proposed, in the form of ballast slabs which sit on the surface rather than penetrating the ground.
	Design	For fixed array there will be a distance between 4m to 10m between the panels of each row. For tracking array there will be a distance between 4m to 6m between the axis of each row.
	Design	The solar PV modules will be positioned on the mounting structures at an angle of: +/- 10° to 30° for a fixed array; and +/- 60° for a tracking array.
	Design	For fixed array the rows of solar PV modules will be aligned in east-west rows with panels facing south.
	Design	The mounting structure for the solar PV modules will be a metal frame (usually coated steel).
	Design	Solar PV modules which are affected by simulated fluvial flooding will be raised to mitigate against fluvial flood risk. All proposed solar panels and associated infrastructure within the Order Limits will be raised above the modelled 1 in 1,000 year fluvially dominated flood levels on site plus a 100mm allowance for freeboard. These areas are shown

		in Appendix A of this document (Scheme Infrastructure Heights). With any raising that may be required as a result, the maximum heights of the Solar PV Modules will remain at 3.6m.
Solar stations	Design	The solar stations which are affected by simulated fluvial flooding will be raised to mitigate against fluvial flood risk. These will be raised a minimum of 100mm freeboard above the modelled 1-in-1000 year plus climate change flood level (the design event flood level) and also be above the maximum flood level predicted by the simulated breach scenarios during a 1 in 1000 year plus climate change event. These areas are shown in Appendix A of this document (Scheme Infrastructure Heights). With any raising that may be required as a result, the maximum heights of the solar stations will remain at 3.6m.
	Location	Inverters will be located a minimum of 300m from existing ~~sensitive~~ residential receptors unless it can be demonstrated to the satisfaction of the Host Authorities that the location of inverters within 300m of existing residential receptors, would not give rise to materially new or materially different noise effects compared to those reported within **ES Chapter**

		13 Noise and Vibration [Document Reference 6.2.13].

Table 2-2: Work No.2 – Electrical Underground Cabling

Element of Scheme	Parameter Type	Design Parameter and Principles
General	Location	The location of Work No. 2 will be as shown on the **Works Plans [Document Reference 2.3].**
Electrical cabling	Scale	The dimensions of any 33kV cable trench will be: - a minimum depth of 1.2m - a maximum depth of 1.5m - a maximum width of 1.2m The final dimensions, up to the minimum and maximum figures shown above, will be subject to ground conditions at the point of construction.
	Scale	The dimensions of any 132kV cable trench will be: - a minimum depth of 1.2m - a maximum depth of 1.6m - a maximum width of 2m The final dimensions, up to the minimum and maximum figures shown above, will be subject to ground conditions at the point of construction.
	Scale	The dimensions of any 400kV cable trench will be: - a minimum depth of 1.2m

		- a maximum depth of 1.6m - a maximum width of 2m The final dimensions, up to the minimum and maximum figures shown above, will be subject to ground conditions at the point of construction.
	Scale	Maximum working width for installation of any 33kV cable will be 15m.
	Scale	Maximum working width for installation of any 132kV cable will be 30m.
	Scale	Maximum working width for installation of any 400kV cable will be up to 30m.
	Design	Cable ploughing will be utilised where ground conditions and other site factors allow. Where this is not possible, other methods such as open cut trenching ~~or horizontal directional drilling (HDD)~~ will be used. The areas where it is anticipated that horizontal directional drilling (HDD) will take place has been shown on **ES Figure Indicative HDD Crossing Plan [Document Reference 6.4.2.4].**
	Design	Cables will be located in existing gaps in hedgerows where reasonably practicable.
Trenching tunnelling, boring and drilling works	Location	Drilling launch/reception pits will not be located: - within 50m of a Motorway (M180)

		- within 50m of a bank of the Sheffield and South Yorkshire Navigation Canal - within 50m of railway infrastructure. within 20m of the bank of all other watercourse under which the HDD will take place.
	Location	Drilling launch/reception pits will not be located within 10m of a highway verge.
	Scale	The launch/reception pits dug for HDD of crossings will be a maximum of 7m by 3m in area and 1.5m in depth.
	Scale	HDD will be a minimum depth of 7m below the bed of the Sheffield and South Yorkshire Navigation Canal. HDD will be a minimum depth of 7m below railway lines. HDD will be a minimum depth of 5m below any public highways.
Fencing, gates, boundary treatment	Scale	The maximum height of access gates will be 2m with a maximum width of 10m.
	Scale	The maximum height of perimeter security fencing will be 2m.
	Design	The perimeter security fencing will be either wire mesh or deer fence.
	Design	The perimeter security fencing will include small mammal gates.

Security equipment	Scale	The maximum height of the poles for the mounting of the security detection cameras will be 3m.
	Design	The security detection cameras will be pointed directly within the Order Limits and away from any land outside of the Order Limits.
Access tracks	Design	Access tracks will be constructed of permeable materials to allow water to filtrate through and maintain greenfield runoff rates.
	Design	Internal access tracks will have a maximum width of 4m with the exception of internal access tracks leading to the on-site substations which will have a maximum width of 4.5m.
Columns and lighting	Design	On-site lighting will be sensor triggered infrared security lighting to be located around key electrical infrastructure and will not be continuous.
Permissive paths	Design	Width of permissive paths to be between 2m and 5m.

Table 2-3: Work No.3 – Green Infrastructure and Habitat Management

Element of Scheme	Parameter Type	Design Parameter and Principles
General	Location	The location of Work No. 3 will be as shown on the **Works Plans [Document Reference 2.3].**
Fencing, gates, boundary treatment	Scale	The maximum height of access gates will be 2m with a maximum width of 10m.
Fencing, gates, boundary treatment	Scale	The maximum height of perimeter security fencing will be 2m.
Fencing, gates, boundary treatment	Design	The perimeter security fencing will be either wire mesh or deer fence.
Fencing, gates, boundary treatment	Design	The perimeter security fencing will include small mammal gates.
Permissive paths	Design	Width of permissive paths to be between 2m and 5m.

Table 2-4: Work No.4 – On-site Substations

Element of Scheme	Parameter Type	Design Parameter and Principles
General	Location	The location of Work No. 4 will be as shown on the **Works Plans [Document Reference 2.3].**

132kV on-site substations	Location	The seven on-site substations will be located a minimum of 200m from existing dwellings.
	Location	The seven on-site substations will be located a minimum of 100m from any existing environmental designated sites.
	Location	The seven on-site substations will be located a minimum of 10m from any existing trees, shrubs and hedges.
	Scale	The footprint of the seven on-site substations will each be a maximum of 60m by 110m.
	Scale	The highest electrical equipment will have a maximum height of 8m.
	Scale	The communications towers will have a maximum height of 15m.
	Scale	Any control building or container housing offices to be a maximum height of 4m above ground level.
132kV substation fencing	Scale	The maximum height of palisade security fencing will be 2.4m and enclosed by a 1.2m high stock fence.
	Design	The fencing around on-site substations will be palisade security fencing.
400kV on-site substation	Location	The main on-site substation will be located a minimum of 300m from existing dwellings.

	Location	The main on-site substation will be located a minimum of 300m from any existing environmental designated sites.
	Location	The main on-site substation will be located a minimum of 10m from any trees, shrubs and hedges.
	Scale	The footprint of the main substation will be a maximum of 156m by 220m.
	Scale	The highest electrical equipment will have a maximum height of 13m above ground level.
	Scale	The lightning conductor towers will have a maximum height of 15m above ground level.
	Scale	Any control building or container housing offices to be a maximum height of 6.3m above ground level.
	Location	The main on-site substation will be located a minimum of 300m from existing dwellings.
400kV substation Fencing	Scale	The maximum height of palisade security fencing will be 2.4m with an electrical fence backing of 3m from ground level.

Table 2-5: Work No.5 – Battery Energy Storage Systems

Element of Scheme	Parameter Type	Design Parameter and Principles

General	Location	The location of Work No. 5 will be as shown on the **Works Plans [Document Reference 2.3].**
Battery energy storage system (BESS)	Location	The BESS will be located into up to four compound areas with a storage capacity of 100MW for each BESS.
	Location	BESS will be raised to mitigate against fluvial flood risk. These will be raised a minimum of 100mm freeboard above the modelled 1-in-1000 year plus climate change flood level (the design event flood level) and also be above the maximum flood level predicted by the simulated breach scenarios during a 1 in 1000 year plus climate change event.
	Design	The footprint of the BESS will be a maximum of 6.5 by 2.5m.
	Design	The BESS will have a maximum height of 3.6m.
	Design	The BESS will require heating, ventilation and cooling systems which will be integrated within the individual containers.
	Design	The BESS units will be raised on reinforced concrete slabs, concrete piling or concrete pads or plinths on a permeable foundation..
	Design	Containers will be light grey, white, dark green or similar in colour.

Water storage structure	Design	The footprint of each of the water storage containers will be a maximum of 12.5m by 2.5m.
	Design	The water storage containers will have a maximum height of 3.6m.
	Design	The water storage containers will have a minimum capacity of 228m^3
Spares containers	Design	The footprint of the spares containers will be a maximum of 12.5m by 2.5m.
	Design	The spares containers will have a maximum height of 3.6m.

Table 2-6: Work No.7 – Temporary Construction and Decommissioning Laydown Areas and Access Tracks

Element of Scheme	Parameter Type	Design Parameter and Principles
General	Location	The location of Work No. 7 will be as shown on the **Works Plans [Document Reference 2.3].**
Temporary construction compounds	Scale	Each compound will have a footprint of up to 6000m^2.
	Scale	There will be up to 31 construction compounds
Security equipment	Scale	The maximum height of the poles for the mounting of the security detection cameras will be 3m.

Security equipment	Design	The security detection cameras will be pointed directly within the Order Limits and away from any land outside of the Order Limits.
Access tracks	Design	Access tracks will be constructed of permeable materials to allow water to filtrate through and maintain greenfield runoff rates.
Access tracks	Design	Internal access tracks will have a maximum width of 4m with the exception of internal access tracks leading to the 132kV and 400kV substations which will have a maximum width of 4.5m.
Lighting	Design	On-site lighting will be sensor triggered infrared security lighting to be located around key electrical infrastructure and will not be continuous.

Table 2-7: Work No.8 –Facilitating Access to Works No.1 to No.7

Element of Scheme	Parameter Type	Design Parameter and Principles
General	Location	The location of Work No. 8 will be as shown on the **Works Plans [Document Reference 2.3].**
Work accesses	Design	Creation of access from the public highway to be constructed in accordance with the Department for Transport's Manual for Street and where appropriate the relevant local highway authority's adoption standards to enable

		these areas to be adopted by that relevant highway authority.
Passing Places	Design	Where passing places are proposed on public highways, these will be designed to provide a minimum of 5.5m and a maximum of 8.5m in width. Passing places will be 20m in length with the provision of 10m tapers at each end.

APPENDIX A: SCHEME INFRASTRUCTURE HEIGHTS

LEGEND

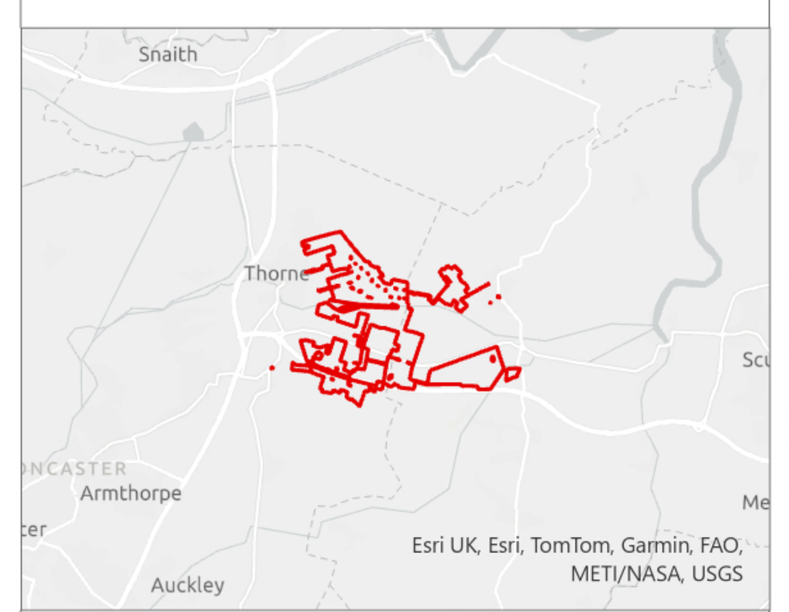
- Order Limits
- Up to 3.6m height (Solar PV Modules and Inverters)
- Up to 15m height (Onsite 400kV Substation: electrical equipment 13.0m)
- Up to 15m height (Onsite 132kV Substation: electrical equipment 8.0m)
- Up to 3.6m height (BESS)

1 in 1,000 year Fluvially Dominated Flood Depths plus 100mm Freeboard

Depth (m)

- <= 1.0
- 1.00 - 1.20
- 1.20 - 1.40
- 1.40 - 1.60
- > 1.80

Notes
N/A



Tween Bridge Solar Farm

Appendix A Scheme Infrastructure Heights

0 195 390 Metres

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936

Scale: 1:11,000	Paper Size: A0	Sheet: 1 of 1

RWE

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