

# West Burton Solar Project

## Environmental Statement Chapter 5: Alternatives and Design Evolution

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## Issue Sheet

Report Prepared for: West Burton Solar Project Ltd.  
DCO Submission

### Environmental Statement Chapter 5: Alternatives and Design Evolution

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## 5 Alternatives and Design Evolution

### 5.1 Introduction

5.1.1 This chapter of the Environmental Statement (ES) describes the consideration of alternatives and design evolution in relation to the Scheme. It has been prepared by Lanpro Planning Consultants and is supported by Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1].

### 5.2 Legislation, Policy and Advice Notes

5.2.1 Schedule 4 (2) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref 5-1) (EIA Regulations) requires “A *description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*” to be presented in the ES.

5.2.2 National Policy Statement (NPS) EN-1 (Ref 5-2) paragraph 4.4.1 states that ‘*as in any planning case, the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives to a proposed development is in the first instance a matter of law, detailed guidance on which falls outside the scope of this NPS*’. The NPS confirms that from a policy perspective there is no general requirement to consider alternatives, or to establish whether a development represents the best option. However, in paragraph 4.4.2 of NPS EN-1 it is noted:

- a. *“applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility;*
- b. *in some circumstances there are specific legislative requirements, notably under the Habitats Directive, for the IPC1 to consider alternatives. These should also be identified in the ES by the applicant; and*
- c. *in some circumstances, the relevant energy NPSs may impose a policy requirement to consider alternatives (as this NPS does in Sections 5.3, 5.7 and 5.9)*”.

5.2.3 Adopted NPS EN-5 includes the following relevant policies on alternatives at paragraphs 2.2.3 – 2.2.4:

*“Applicants should bear in mind that the connection between the initiating and terminating points of a proposed new electricity line need not go via the most direct route. Indeed, engineering, environmental, and community constraints may make this infeasible or unsuitable.*

*There will usually be a degree of flexibility in the location of the development’s associated substations, and applicants should consider carefully their placement in*

*the local landscape. In particular, the applicant should consider such characteristics as the local topography and/or the possibilities for screening of the infrastructure. (See Section 2.11 below and Section 5.10 in EN-1.).”*

- 5.2.4 *Draft NPS EN-3 sets out at paragraph 2.48 the factors that a likely to influence the key considerations involved in the siting of a solar farm. These include irradiance and site topography, proximity of a site to dwellings, capacity of a site, grid connection, agriculture land classification and land type and accessibility.*
- 5.2.5 The Planning Inspectorate’s (PINS) Advice Note 7 sets out that PINS considers that a good ES is one that, amongst other things: *“explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment”.*
- 5.2.6 In light of the above, a description of the alternatives considered by the Applicant, in arriving at the Scheme which is in the form as submitted in the DCO application, is necessary.
- 5.2.7 There are also other specific legislative requirements and policy circumstances which require the consideration of alternatives. These include a requirement under the Habitats Directive, as transposed into UK law by the Conservation of Habitats and Species Regulations 2017, and also in relation to avoiding significant harm to biodiversity and geological conservation interests; flood risk; and development within nationally designated landscapes set out in sections 5.3, 5.7 and 5.9 of NPS EN1. (Notwithstanding this, the Scheme has considered these factors and is not considered to give rise to any impacts in respect of the Habitats Directive; nor is it situated within a national landscape designation).
- 5.2.8 Paragraph 4.4.3 of EN-1 states *“where there is a policy or legal requirement to consider alternatives the applicant should describe the alternatives considered in compliance with these requirements”.* Paragraph 4.4.3 goes on to set out the principles that should guide the decision maker when considering the weight that should be given to alternatives. These principles are:
- *“the consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner;*
  - *the [Secretary of State] should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development;*
  - *where (as in the case of renewables) legislation imposes a specific quantitative target for particular technologies or (as in the case of nuclear) there is reason to suppose that the number of sites suitable for deployment of a technology on the scale and within the period of time envisaged by the relevant NPSs is constrained, the [Secretary of State] should not reject an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should*

*have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals;*

- *alternatives not among the main alternatives studied by the applicant (as reflected in the ES) should only be considered to the extent that the [Secretary of State] thinks they are both important and relevant to its decision;*
- *as the [Secretary of State] must decide an application in accordance with the relevant NPS (subject to the exceptions set out in the Planning Act 2008), if the [Secretary of State] concludes that a decision to grant consent to a hypothetical alternative proposal would not be in accordance with the policies set out in the relevant NPS, the existence of that alternative is unlikely to be important and relevant to the IPC's decision;*
- *alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the [Secretary of State's] decision;*
- *alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the [Secretary of State's] decision; and*
- *it is intended that potential alternatives to a proposed development should, wherever possible, be identified before an application is made to the [Secretary of State] in respect of it (so as to allow appropriate consultation and the development of a suitable evidence base in relation to any alternatives 50 Overarching National Policy Statement for Energy (EN-1) which are particularly relevant). Therefore where an alternative is first put forward by a third party after an application has been made, the [Secretary of State] may place the onus on the person proposing the alternative to provide the evidence for its suitability as such and the IPC should not necessarily expect the applicant to have assessed it."*

5.2.9 Draft NPS EN-1 further adds that *"only alternatives that can meet the objectives of the proposed development need be considered"*.

5.2.10 Taking into consideration the policy and legal requirements as well as the iterative approach to the design to date, the following alternatives have been considered for the Scheme and are discussed in this chapter:

- Alternative sites;
- Alternative technologies;
- Alternative design/layouts; and
- Alternative cable route corridors.

5.2.11 A 'no development' scenario as an alternative to the Scheme has not been considered further. This is because 'no development' is not considered to be a

reasonable alternative to the Scheme as it would not deliver the additional electricity generation and energy storage proposed. NPS EN-1 at paragraph 4.4.3 states *“alternative proposals which mean the necessary development could not proceed can be excluded on the grounds that they are not important and relevant to the [Secretary of State’s] decision.”*

5.2.12 A ‘smaller development’ in terms of energy generating capacity has not been considered further as an alternative to the Scheme, as NPS EN-1 at paragraph 4.4.3 states that the decision maker: *“...should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development”*. Although the overall land area of the Scheme has reduced in size since PEIR stage (see Tables 5.8 – 5.9 below for design evolution) the ability of the Scheme to generate 480MW based on the grid connection offer made by National Grid has been retained. However, reducing the size of the Scheme even further would not deliver the same 480MW generation capacity or energy security and climate change benefit as the Scheme, and as such would not represent a reasonable alternative as explained further at Table 5.9. A Statement of Need [EN010132/APP/WB7.11] has been submitted with the DCO Application which set out the need for the large scale solar assets.

### 5.3 Stakeholder engagement

5.3.1 The Applicant has carried out an EIA Scoping exercise (EIA Scoping Opinion received March 2022 [EN010132/APP/WB6.3.2.2], and statutory consultation in accordance with the Planning Act 2008 which is described in detail in the Consultation Report submitted as part of the DCO application [EN010132/APP/WB5.1].

5.3.2 Table 5.1 summarises the matters raised in relation to alternatives at the EIA Scoping and statutory consultation stage.

**Table 5.1 Summary of Matters Raised in Relation to Alternatives at the EIA Scoping and Statutory Consultation Stage**

Consultee	Main matter raised	How the matter has been addressed
EIA Scoping Stage: Bassetlaw District Council	It is encouraging that the ES will contain a chapter that will consider alternative sites. This overall section of the EIA Scoping Report however is thin in detail as to what the alternative sites will be. Given that the site for the main development has already been selected, it would have been preferable if some consideration had already been given to this.	This Chapter of the ES has been prepared in response to this. Section 5.5 sets out how alternative sites have been considered.

Consultee	Main matter raised	How the matter has been addressed
<p>EIA Scoping Stage: Lincolnshire County Council</p>	<p>In this section consideration needs to be given to looking at the benefits of keeping the land, subject of this project, in agricultural use and the impact on food production in the region.</p> <p>Schedule 4 (2) of the EIA Regulations states that an ES must include ‘a description of the reasonable alternatives for example, ‘in terms of development design, technology, location, size and scale studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects’.</p> <p>In the context of agricultural land impacts ‘location’, ‘size’ and ‘scale’ are key factors which, in the Council’s opinion, suggest that applying a relatively narrow search area (reflecting the equivalent cable connection distance) for the assessment of alternative sites is likely to be significantly narrow, skewing the site selection process artificially in favour of the application site.</p> <p>A county-level alternative assessment area should be applied which as a minimum should consider scope for connection into the National Grid at the locations proposed by the registered NSIP solar projects, and with specific consideration of agricultural land impacts.</p>	<p>This Chapter of the ES has been prepared in accordance with the EIA Regulations.</p> <p>In addition, Chapter 19 of the ES, Soils and Agriculture [EN010132/APP/WB6.19] considers the impacts of the Scheme on agricultural land.</p>



Consultee	Main matter raised	How the matter has been addressed
	<p>Without prejudice to that higher level alternative assessment, the regulations also require an indication of the main reasons for selecting the chosen option. In this case this this should include alternative site layout/s (and reduced MW generating capacity as necessary) to reflect the location of known Best and Most Versatile (BMV) land within the site.</p>	
<p>EIA Scoping Stage: Natural England</p>	<p>Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, sets out the information that should be included in an Environmental Statement (ES) to assess impacts on the natural environment.</p> <p>This includes:</p> <p>An assessment of alternatives and clear reasoning as to why the preferred option has been chosen.</p>	<p>This Chapter of the ES has been prepared in accordance with the EIA Regulations (as opposed to the Town and Country Planning (Environmental Impact Assessment) Regulations 2017).</p>
<p>S42 Statutory Consultee: Bassetlaw District Council</p>	<p>There are no further comments to be made at this stage as the main justification for this was set out in the original EIA Scoping Report. However, it is considered optimal that a full consideration of alternative sites should be provided prior to the submission of the ES, although it acknowledged that this to some extent is carried out through the initial stages of the proposal (even before the process enters the pre-application stage in some instances) in order to 'screen out' in order to find some of the least constrained parcels of</p>	<p>The Applicant has followed a step by step site selection process which confirms the location of the Scheme is suitable for a large scale solar farm.</p> <p>Details of the process are set out in Appendix 5.1: Site Selection Assessment of this ES <b>[EN010132/APP/WB6.3.5.1]</b>, and include consideration of alternative sites.</p>

Consultee	Main matter raised	How the matter has been addressed
	land that are appropriate for solar development	
S42 Statutory Consultee: West Lindsey District Council	It is noted that an assessment of commercial rooftops was undertaken (5.2.10) and a high level review of lower grade agricultural land (5.2.11). These should be detailed in order that the site selection can be properly understood. For instance, as noted above, it would appear that development is still being proposed on best and most versatile agricultural land?	An assessment of commercial rooftops in the host authorities of West Lindsey and Bassetlaw Districts identified no rooftops or combined premises of an adequate area to facilitate a large-scale solar project or provide a viable network of sites. See Appendix 5.1: Site Selection Assessment of this ES [EN010132/APP/WB6.3.5.1].  Chapter 19 Soils and Agriculture [EN010132/APP/WB6.19] (and associated Appendices) of the ES provides detailed assessments of agricultural land grading for the Scheme. Tables 5.6-5.9 below detail the design evolution that has led to the majority of BMV land being removed from the Scheme. The finalised Scheme contains only 26.24% Best and Most Versatile land and clear justification for why these small areas remain within the Scheme is set out at Tables 5.6 - 5.9.
S42 Statutory Consultee: West Lindsey District Council	It is recognised that the site layout is still evolving (paragraph 5.4) – design iterations should be set out in the ES, and how known parameters have influenced the design (for instance – the location of known high grade ALC land).	See Tables 5.6-5.9 relating to design iterations for the Sites.
S42 Statutory Consultee: Lincolnshire Police	Land selected should aim to avoid affecting the visual aspect of landscapes, maintain the natural beauty and should be predominantly flat, well screened by hedges, tree lines, etc. and not cause undue impact to nearby domestic properties or roads.	The Applicant has followed a step by step site selection process which confirms the location of the Scheme is suitable for a large scale solar farm. This has included the avoidance of sensitive landscape and environmental designations in

Consultee	Main matter raised	How the matter has been addressed
	(BRE. Planning guidance for the large-scale ground mounted solar PV systems)	confirming site suitability and consideration of alternative sites.  Details of the process are set out in Appendix 5.1: Site Selection Assessment of this ES [EN010132/APP/WB6.3.5.1].
S42 Statutory Consultee: Fillingham Parish Council	<p>The assessment of rooftop solar as a viable alternative is particularly weak:</p> <p>The developer has limited the search area and pre-determined the approximate size</p> <p>There are only around 3% of the UK's households with solar panels on the rooftops, and no figures readily available for commercial warehousing. There has been no assessment to explore the extent to which the Government's policy objectives could be pursued through a combination of new mandatory planning requirements and retro-fit.</p> <p>The PIER provides insufficient evidence to conclude that a large-scale solar deployment could be facilitated in combination across premises using rooftops.</p>	<p>The Applicant does not consider that multiple smaller rooftop sites are a reasonable alternative to the Scheme. The site selection process and the reasons for discounting rooftop solar are set out in Appendix 5.1: Site Selection Assessment of this Environmental Statement [EN010132/APP/WB6.3.5.1]. This explains the rationale behind the chosen search area.</p> <p>The Statement of Need [EN010132/APP/WB7.11] explains that large single solar assets bring carbon savings and economic benefits in line with government policy, versus developing combinations of smaller independent schemes. Larger singular schemes attract some cost efficiencies as a result of their increased scale, for example unit procurement costs, or annual maintenance costs. Such efficiencies of scale are less apparent in smaller schemes. Small scale solar typically connects to the lower voltage distribution networks rather than the centralised network (connecting to the national grid - the high voltage transmission system). This means that the Scheme would maximise the supply of low-carbon power across the widest possible geography,</p>

Consultee	Main matter raised	How the matter has been addressed
		which would not be the case with smaller schemes.
S42 Statutory Consultee: Fillingham Parish Council	<p>The developer appears to have commenced the concept from two fixed points:</p> <ul style="list-style-type: none"> <li>- Having been notified of grid capacity at Cottam, West Burton and High Marnham, no other options appear to have been explored (e.g. other coal closure sites at Fiddler’s Ferry, Eggborough, Ferrybridge, Didcot, West Thurrock, Aberthaw, Drakelow, Kingsnorth, Ironbridge for example). A broader range of sites could have provided an opportunity to use more brown-field options or to mitigate the impact by disaggregation of the project scale across different areas.</li> <li>- The developer also seems to have commenced from a position of absolutely maximising grid connection capacity as a limiting factor – thereby pre-determining the approximate size (land use) for the proposed scheme. In this way the developer has severely limited their consideration of alternative proposals.</li> </ul>	<p>Options to use the coal closure plants listed have not been examined because grid capacity has not been identified in these areas. Decommissioning of coal fired power stations does not automatically equal available grid connection capacity at these locations, often due to the fact that grid connection offers may already have been offered to others. It would not be reasonable nor proportionate for the Applicant to have to assess alternative locations throughout the country to this level of detail.</p> <p>NPS EN1 requires that the consideration of alternatives to comply with policy requirements should be carried out in a proportionate manner. It also states that <i>“alternative proposals which are vague or inchoate can be excluded on the grounds that they are not important and relevant to the [Secretary of State’s] decision”</i>.</p> <p>Smaller development’ as an alternative to the Scheme does not need to be considered , because NPS EN-1 at paragraph 4.4.3 states that the decision maker: <i>“...should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development”</i>.</p>

Consultee	Main matter raised	How the matter has been addressed
		<p>A smaller scheme would not deliver the same generation capacity or energy security and climate change benefit as the Scheme, and as such would not represent a reasonable alternative.</p> <p>The Statement of Need submitted with the DCO Application <b>[EN010132/APP/WB7.11]</b> explains the need for large scale solar assets.</p>
<p>S42 Statutory Consultee: Fillingham Parish Council</p>	<p>Existence of alternatives to the proposed development is beyond NPS1 – it is “in the first instance, a matter of law”. This is understood to mean that it is mandatory to explore alternatives. Applicants are obliged to include in their Environmental Statement information about the main alternatives they have studied. In the PIER, the exploration of alternatives is very limited, leading to a very narrow consideration of alternatives that fulfil the developer’s pre-determined geographic and scale decisions.</p>	<p>This Chapter of the ES has been prepared in accordance with the EIA Regulations and builds on the preliminary information set out in the PEIR.</p> <p>NPS EN-1 states: <i>“Applicants are obliged to include in their ES, as a matter of fact, information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility.”</i></p> <p>This Chapter supported by Appendix 5.1: Site Selection Assessment of the ES <b>[EN010132/APP/WB6.3.5.1]</b> undertakes this exercise in accordance with the above requirements.</p>
<p>S42 Statutory Consultee: Fillingham Parish Council</p>	<p>The implied conclusion is that, in the fight for available brownfield sites, the economics of solar energy are outweighed by all other development options – e.g. housing, commercial. Given the Government’s clear direction that solar should be placed on</p>	<p>The Statement of Need submitted with the DCO Application <b>[EN010132/APP/WB7.11]</b> explains the reasons for the Scheme being large scale solar generation. It is not considered that small scale</p>

Consultee	Main matter raised	How the matter has been addressed
	<p>previously developed land, the developer has simply shifted the “battle ground” to agricultural land, where it would appear that the economics of solar outweigh the economics of farming (which is perhaps more indicative of a problem with the economics of farming).</p>	<p>generation is an alternative to this, rather it complements it.</p> <p>A search for suitable brownfield land has been undertaken as part of Appendix 5.1: Site Selection Assessment of the ES <b>[EN010132/APP/WB6.3.5.1]</b>.</p> <p>As explained at paragraph 5.2.6 above, draft NPS EN-3 sets out the factors that are likely to influence the key considerations involved in the siting of a solar farm These include irradiance and site topography, proximity of a site to dwellings, capacity of a site, grid connection, agriculture land classification and land type and accessibility. These factors have been considered in the Site Selection Assessment and no suitable brownfield sites were identified when all these factors have been taken into account.</p>
<p>S42 Statutory Consultee: Fillingham Parish Council</p>	<p>Given the very low energy density of solar, the scheme needs a colossal amount of land. Proposing to have sought a brownfield site of the size necessary, in an area that is predominantly agricultural is disingenuous. I would no more expect to find space available for agriculture in the centre of London than brownfield space in farmland. The situation is falsely created by not having broadened the potential range of grid connections (see above). It is striking that, despite proposing two schemes, at over 5000 acres, the developer does not appear to have included any brown field sites in its schemes,</p>	<p>A search for brownfield land has been undertaken as part of Appendix 5.1: Site Selection Assessment of the ES <b>[EN010132/APP/WB6.3.5.1]</b>. The site was chosen to support the grid connection offer made at West Burton Power Station. Therefore, brownfield sites were assessed within the 20km Search Area identified in the Site Selection Assessment but ultimately did not meet the size or locational requirements of the Scheme as detailed at Table 2.2: PDL Sites from Brownfield Registers of Bassetlaw and West Lindsey (Appendix 5.1: Site Selection</p>

Consultee	Main matter raised	How the matter has been addressed
	demonstrating a clear disregard for planning guidance.	Assessment of the ES [EN010132/APP/WB6.3.5.1]).
Section 47 Responses Residents' comments	Use RAF Scampton as an alternative site.	RAF Scampton is located beyond the 15km search area set out within Appendix 5.1: Site Selection Assessment of the ES [EN010132/APP/WB6.3.5.1]. It has not therefore been assessed because suitable land closer to the POC has been identified.  Nevertheless, the Applicant notes that West Lindsey District Council has submitted an expression of interest in acquiring the RAF Scampton site for redevelopment. The site is allocated as an "opportunity area" in the Draft Local Plan. The Applicant therefore considers that this site would not be available for solar development.
Section 47 Responses Residents' comments	There would not be the need for the cable routes if these were on the existing brownfield sites that are currently the power stations.  Use available brownfield sites (non-specific) or commercial rooftops as alternative sites.	Appendix 5.1: Site Selection Assessment of the ES [EN010132/APP/WB6.3.5.1] considers the suitability of land at the West Burton and High Marnham power stations and discounts this land as unsuitable as an alternative to the Scheme.  It also considers brownfield sites and commercial rooftops as an alternative to the Scheme and concludes that they are of insufficient size, either individually or as a linked network of sites to provide a viable alternative to the Scheme.
Section 47 Responses Residents' comments	Alternative sites have not been seriously considered. Once the willing landlord is found, the solar (gravy) train is set in motion and remorselessly railroads through all other considerations and	Alternative sites are considered within Appendix 5.1: Site Selection Assessment of the ES [EN010132/APP/WB6.3.5.1].

Consultee	Main matter raised	How the matter has been addressed
	<p>concerns. We were told High Marnham was dismissed because of flood risk: it is identified as Bassetlaw's "green hub" and has not flooded in living memory. Clayworth village houses have been flooded out twice in the last 15 years from run-off from the WB4 site yet this risk is hardly mentioned in the PEIR and completely dismissed without any examination.</p> <p>There is no consideration about alternative forms of "non-renewable" energy generation. Wind scores over solar in every regard: lifetime lower carbon footprint; not built by slave labour; more reliable and higher power output per area of land; far less impact on the environment, agriculture, drainage and flood and fire risk; no loss of habitat or wild corridors; no blocked access for amenity use, much less visual impact (you can still see all the fields, hedgerows, wildlife). If the plan were for a wind project on WB4, I would find little evidence of sufficient adverse effect to oppose it. But WB4 is entirely the wrong place for mega-solar for all these reasons.</p>	<p>Alternative forms of renewable energy are considered within Section 5.6 of this ES Chapter.</p> <p>West Burton 4 has been removed from the Scheme.</p>

## 5.4 Need for the Scheme

5.4.1 The case for the need for the Scheme is centred on its significant contribution to the three important national policy aims of decarbonisation, which are:

- Net Zero and the importance of deploying zero-carbon generation assets at scale.
- Security of supply (geographically and technologically diverse supplies).



- Affordability.

5.4.2 The Statement of Need [EN010132/APP/WB7.11] accompanying the DCO application sets out a detailed compelling case for why the Scheme is urgently required at the location and scale proposed.

## 5.5 Alternative Sites

5.5.1 The selection of the Scheme's location has followed a systematic step-by-step process. This process and confirmation of its suitability when considered against potential alternative sites is summarised in the following sections and set out in detail in Appendix 5.1: Site Selection Assessment of this ES [EN010132/APP/WB6.3.5.1]. In addition, the Sequential Test has been carried out as part of site selection and is set out within ES Appendix 10.6 FRA Sequential Test [EN010132/APP/WB6.3.10.6].

### Stage 1 – Identification of the Area of Search

5.5.2 Irradiation (sunlight) levels and topography are key factors when determining the location of solar development. Solar developments are currently found across the UK; however, their efficiency is determined by the levels of irradiation at their location. The whole of England is well located geographically for solar gains. The Applicant had no restrictions on where development should be located in relation to irradiation levels.

5.5.3 The preference is for a flat site or a site with a southerly aspect. If a site with another aspect is pursued there is likely to be a need to increase the overall development footprint as there would be an operational need to increase the distance between arrays to avoid overshadowing.

5.5.4 A viable grid connection is an essential material consideration for proceeding with a development and is instrumental in defining the search area. During discussions with National Grid in 2019, the Applicant was notified of grid capacity at West Burton, Cottam, and High Marnham Power Stations. This capacity was available at these locations due to the closures of the coal fired elements of those sites. Due to the immediate availability of these Points of Connection (POCs), the Applicant did not consider any further alternative grid connection points. Through further discussion with National Grid on the West Burton POC, National Grid advised at that stage that a connection at West Burton would be preferred over connection at High Marnham because fewer upgrade works to National Grid's transmissions assets would be required at the POC and it would therefore be more straightforward, quicker to deliver and more economical. The Applicant therefore made a grid connection application to National Grid for connection at West Burton Power Station and an offer was made by National Grid for 480MW.

5.5.5 IGP also made an application for a grid connection at Cottam Power Station for 600MW and as noted in the ES, this is the subject of a separate DCO application, including its associated land parcels.

- 5.5.6 As the grid connection offer at West Burton POC was not site-specific, the Applicant proceeded to look at sites that could accommodate a solar project to support the grid capacity available at West Burton. A land area of approximately 75ha of solar panels and associated infrastructure (100ha including landscaping and ecology mitigation land) is required to provide an NSIP solar scheme with a generating capacity of 50MW. For a grid connection of 480MW, a site size of approximately 960 ha (excluding cable route) was preferred. The Applicant generally seeks to find a site which is around 10% larger than is needed for the grid connection offer (up to 1100ha). This principle applies to solar projects with a generating capacity of under 50MW and NSIP scale solar projects. This larger site size allows flexibility for the accommodation of additional mitigation measures and other constraints that may become known through the design development process. It was considered that it would be highly unlikely that a single site of this size would be available within sufficient proximity to the West Burton POC.
- 5.5.7 As shown in Figure 1, Annex D of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1] West Burton Power Station is identified as a location which has the available grid capacity for a large scale solar farm. It is also within sufficient proximity of lower grade agricultural land and land which is available to construct a large scale solar farm. West Burton POC was therefore deemed to be a suitable location to be the POC for a large scale solar farm. This initial feasibility exercise narrowed down the area of search to the vicinity of West Burton for the location of the Scheme.
- 5.5.8 In addition to the broad considerations set out above, an initial search area was identified at a 5km radius from the POC, however this was later expanded with the clear preference of identifying land as close to the POC as possible, the search area was enlarged incrementally until suitable options were found within a 15km radius which is considered by the Applicant to be a viable cable connection distance for a solar project of this scale.

[Stage 2 – Exclusion of Planning, Environmental and Spatial Constraints](#)

- 5.5.9 Stage 2 of the Site Selection Assessment [EN010132/APP/WB6.3.5.1] has included the mapping of planning, environmental and spatial constraints which have been identified through a review of relevant national planning policies. The constrained areas have been excluded from the area of search identified at Stage 1 and are therefore not considered as suitable locations for the Scheme. The following spatial constraints have been mapped and excluded from further consideration. Table 5.2 below sets out the constraints that were mapped and considered.

**Table 5.2: Planning and Environmental Constraints Considerations**

Consideration	Discussion
Agricultural Land Classification and Land type	Planning policy seeks to minimise impacts on the best and most versatile agricultural land (defined as grades 1, 2 and 3a) and preferably use land that is not classified as best and most versatile (grades 3b, 4 and 5) and where possible utilise previously developed

	land, brownfield land, contaminated land or industrial land (see Table 2.2: PDL Sites from Brownfield Registers of Bassetlaw and West Lindsey (Appendix 5.1: Site Selection Assessment of the ES [EN010132/APP/WB6.3.5.1] for previously developed land sites considered).
Designated international and national ecological and geological sites	The following designations were identified and any land covered by these designations was excluded: Sites of Special Scientific Importance (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), SPA protection buffer, Ramsar sites and National Nature Reserves (NNR)
Nationally designated landscapes	The presence of any areas of Outstanding Natural Beauty or National Parks were considered and excluded from the area of search.
Proximity to sensitive human receptors	Consideration was given to the proximity of nearby sensitive human receptors which include residential dwellings, populated areas/villages.

- 5.5.10 Following the initial assessment of the 5km search area using the above constraints, it became clear that sites outside of this area would need to be assessed as insufficient land was available. As noted above, the Applicant's preference is for the land to be as close to the POC as possible, so the search area was enlarged incrementally until suitable options were found within a 15km radius.

#### **Agricultural Land Classifications**

- 5.5.11 Planning policy seeks to minimise impacts on the best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification) and preferably use land that is not classified as best and most versatile (grades 3b, 4 and 5).
- 5.5.12 Solar farms are temporary structures and unlike most built development and other renewable energy proposals (such as energy from waste plants) they do not constitute significant permanent development resulting in the permanent loss of agricultural land. Nevertheless, the site selection process has sought to exclude land that the best available data identifies as being within an agricultural land classification category that is, or includes, best and most versatile land.
- 5.5.13 At stage 2 of the site selection assessment the sources that were relied upon were data from the Natural England Agricultural Land Classification (ALC). The Natural England maps do not differentiate between grades 3a and 3b. Therefore, at Stage 2 all land in Grades 1, 2 and 3 was excluded and the focus was on trying to identify suitable sites within areas of Grade 4, 5 or unclassified land outside of other identified planning and environmental constraints.

#### [Stage 3 – Identifying Potential Solar Development Areas](#)

- 5.5.14 Stage 3 of the assessment then applied key operational criteria for large scale solar development - site size and land assembly; and site topography to further refine the unconstrained areas identified at Stage 2.
- 5.5.15 Large areas of land are required for large scale solar development as they have less vegetation to be removed for easy installation of the solar infrastructure. This also reduces the amount of buffering required for tree root protection, avoidance of shading compared to small fields and can reduce the solar development's impact on vegetation such as hedgerows and trees.
- 5.5.16 The Applicant's analysis regarding the minimum area for large scale solar to be economically viable identified a threshold of at least 40ha of contiguous land for an individual site. This is the minimum site size threshold considered by the Applicant to be viable (based upon the balance of costs of connecting infrastructure between individual sites and electricity losses from the multiple connection cabling necessary) to form part of a network of sites, making up an NSIP scale scheme, in close proximity covering an area of approximately 1100ha. This is the maximum approximate land area (excluding cable route) considered to be required to support the 480MW grid capacity available at West Burton POC.
- 5.5.17 Individual site size and development area thresholds were identified by the Applicant following economic analysis of the MW output per hectare, taking into consideration infrastructure costs and the need for land to provide appropriate environmental mitigation. This resulted in a site threshold of 40 ha being applied. A smaller development area results in higher unit costs and an assessment was made as to the maximum cost and therefore minimum site area threshold that would be viable for the Scheme to hit the target financial metrics. Topographical constraints were also identified and mapped with all land with a 3% or less gradient, which is considered to be very flat and optimal for solar generation, being considered as potential solar development areas.
- 5.5.18 Figure 5, Annex D of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1] illustrates the unconstrained land identified from the mapping at Stage 2 with a slope gradient of 3% or less.
- 5.5.19 The use of previously developed (brownfield) land, commercial rooftops and alternative locations proposed by consultees through the statutory consultation stage (as discussed above) were also considered. No brownfield land or commercial rooftops that meet the minimum individual site size threshold or the area of approximately 1100ha required for a network of sites in close proximity for the whole Scheme were identified within the 15km search area. Figure 4, Annex D of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1] shows the brownfield land locations considered.
- 5.5.20 No commercial rooftops or combined premises of an adequate area to facilitate a large-scale solar project or provide a viable network of sites in close proximity covering an area of approximately 1100ha were identified.

- 5.5.21 Individual commercial rooftops do not meet the minimum 40 ha site threshold as described above. This is the minimum viable site size threshold (based upon the balance of costs of connecting infrastructure between individual sites and electricity losses from the multiple connection cabling necessary) to form part of a network of sites in close proximity.
- 5.5.22 The number of commercial rooftops required would mean multiple land ownerships and the legal complexities and costs involved in combining multiple sites of this nature is not viable.
- 5.5.23 The government has promoted financial incentives to encourage homeowners to install solar PV systems, so rooftop solar is clearly desirable both on residential and commercial premises. However, this is not considered as an alternative to the Development. Commercial premises and houses are both consumers and generators of electricity, and therefore do not help provide low carbon and renewable alternatives to conventional sources of electricity production at grid scale. In essence, roof-mounted solar panels should be deployed in addition to large scale solar farms, rather than instead of them.
- 5.5.24 There is a clear and urgent need for further renewable energy capacity, and this will likely include more distributed generation across the electricity distribution network, however the Scheme presents a single, large-scale generating asset which addresses the project aims of delivering clean, cheap electricity to the consumer whilst making a significant contribution to the fulfilment of the UK's legally binding climate change commitments. More, smaller-scale solar PV developments therefore are indeed required, however they do not represent an alternative to the Development. Larger scale solar projects provide increased decarbonisation benefits and commercial benefits to consumers as set out at section 10.4 of the Statement of Need [EN010132/APP/WB7.11].
- [Stage 4 – Evaluation of Potential Solar Development Areas \(PDAs\)](#)
- 5.5.25 Stage 4 then assessed the 1 potential development area (PDA 1) identified in Stage 3. The PDA is shown on Figure 8, Annex D of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1]. Constraints are presented on Figure 9.
- 5.5.26 The PDA was evaluated against planning, environmental and other operational assessment indicators which were derived from national and local planning and environmental policy objectives and the operational requirements of the Scheme (see Annexes B and C of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1].
- 5.5.27 The indicators included biodiversity, landscape and visual amenity, cultural heritage, flood risk, land use, access for construction, as well as operational factors related to deliverability such as grid connection feasibility, topography and shading to consider the suitability of these areas for large scale solar development.
- 5.5.28 Ultimately, following the evaluation stage, PDA 1 on Grade 4 and 5 agricultural land and unclassified land proved unsuitable for development due to significant constraints being identified. These constraints include land use, ecological and

landscape factors and are detailed at paragraphs 3.2.8 – 3.2.13 of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1] and within Annex E of the same document.

- 5.5.29 The assessment then proceeded to consider potential areas of Grade 3 Agricultural land as set out at Stage 5 below.

[Stage 5 – Widening the Search to consider Grade 3 agricultural land](#)

- 5.5.30 Following the discounting of PDA 1 on Grade 4 and 5 agricultural land and unclassified land, the site search focused on the areas of Grade 3 agricultural land within the search area. Residual Grade 3 areas were identified following the exclusion of the same high-level constraints previously considered for the Grade 4,5 and unclassified land at stages 2 and 3 above.
- 5.5.31 Other proposed solar NSIP projects located on Grade 3 land within the 15km search area were discounted from further assessment because they were not available to accommodate the Scheme. These include Cottam Solar Project; Gate Burton Energy Park; and Tillbridge Solar. IGP is the developer progressing Cottam; Gate Burton and Tillbridge are separate developers. At the time of site selection not all the proposed solar NSIPs were in the public domain, however, they were already subject to early work, discussions and agreement with landowners and therefore the land areas were not all identified as potentially available land through enquiries with land agents.
- 5.5.32 Land agents were contacted regarding potentially willing landowners within the area. The availability of willing landowners is an important consideration because it is typical for the land to be leased rather than permanently acquired due to solar farms consisting of temporary structures. It is desirable to compile a site in as few land ownerships as possible to minimise project complexities (including engineering, design and mitigation measures), legal complexities and project costs. For this reason and due to the land take required for the Scheme, land agents used their professional knowledge to provide details of potentially willing landowners with large scale landholdings within the 15km search area.
- 5.5.33 These were assessed against the same detailed range of planning, environmental and operational considerations used to assess the Stage 4 PDA. Other areas of Grade 3 land within the 15km search area either did not have willing land owners (sometimes due to early progression of other NSIP projects), were in smaller land ownerships which would add to project complexity (including engineering, design and mitigation measures) and cost, or were shown to be subject to a range of constraints when the planning and environmental considerations were mapped over the land agent enquiry areas. They were not, therefore, investigated any further.

[Results of Assessment](#)

- 5.5.34 The results of the assessment for PDA 1 identified on Grade 4 and 5 agricultural land and unclassified land are shown at Annex E: Table 1 of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1]. Its performance against a range of

planning, environmental and operational criteria is shown relative to the original draft site area including the Scheme's location. PDA 1 was discounted as unsuitable following this process because it scored poorly in the assessment. Potential sites on Grade 3 agricultural land were then considered.

- 5.5.35 Annex E: Table 2 of Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1] shows the results of the assessment of each PDA identified on Grade 3 land against the same planning, environmental and operational criteria. It also assesses the original draft site area including the Scheme which was identified at this stage as part of the Grade 3 land assessment. At this stage the original draft site area included four sites; West Burton 1-4 and a main substation site. Three PDA's are described and evaluated alongside the original draft site area including the Scheme. Three of the PDAs performed worse than the original draft site area including the Scheme and one (Site 4) performed equally well. Site 4 is immediately adjacent to High Marnham Power Station where a grid connection was not offered by National Grid at the time of the site selection process as it was considered to be less favourable due to required upgrade works. This POC is likely to be the most sensible and cost effective POC for Site 4 in the future. These sites were therefore discounted in favour of the original draft site area including the Scheme.
- 5.5.36 The individual sites comprising the original draft site area including the Scheme were chosen following the RAG assessment work (which considered a range of planning, environmental and operational criteria) and through discussion with the landowners regarding areas of their land holdings that they were prepared to allow solar development on. The Scheme is within four land ownerships, and this small number of landowners is advantageous in terms of minimising project complexity, legal complexity and cost. The landowners' ongoing operational requirements for farming and other diversified uses within their land holdings meant that not all the land was suitable, or available, for solar development. The combined factors of constraints assessment and landowner requirements influenced the choice and configuration of the original draft site area including the Scheme within the landholdings.
- 5.5.37 Detailed ALC surveys and environmental surveys were subsequently undertaken to validate the RAG assessments and help to refine the chosen site areas further. Following detailed ALC assessment (see ES Appendix 19.1 [EN010132/APP/WB6.3.19.1], the original draft site area red line boundary was reduced, most notably to remove West Burton 4 and the main substation site, to ensure that within the finalised Scheme, the majority of the Sites, some 73.76%, are located on agricultural land that is not classified as best and most versatile.
- 5.5.38 The Applicant worked closely with the landowners in relation to BMV land to be included and excluded from the Order Limits, alongside the ALC survey. The Applicant has sought to exclude Grade 2 and 3a land from the Scheme so far as is practicable, and to keep good quality land in agricultural use. In terms of the specific areas of BMV land that are retained within the Scheme, these are justified by factors

related to their location and context within the Scheme, the wider landholdings, and in relation to adjacent and surrounding land.

- 5.5.39 Details of specific changes made to finalise the Scheme in order to reduce the amount of BMV land to a minimum following the detailed ALC assessments and discussion with farmers are set out in Table 5.9 below.
- 5.5.40 The Site Selection Assessment [EN010132/APP/WB6.3.5.1] explains at paragraph 3.3.34 that it was not proportionate to consider in detail every piece of unconstrained Grade 3 agricultural land within the 15km search area identified through the site selection process due to the amount of land involved. Instead, for the reasons set out above, the focus was on the large-scale landownerships which were identified by agents as having potentially willing landowners.
- 5.5.41 Details of all the constraints researched during the site selection process were, nevertheless, mapped over the whole of the 15km search area as shown on Figure 18, Annex D of Site Selection Assessment [EN010132/APP/WB6.3.5.1] to sense check the chosen location for the original draft site area including the Scheme. This shows that there are few extensive areas of Grade 3 land outside of the land already considered, that are constraint free. The general area east of Gainsborough and west of the Lincoln Ridge where the Scheme is located, is clearly less constrained in terms of flood risk, gradient, the density of settlements, heritage assets, landscape and ecology designations than other parts of the 15km search area. The location of a number of other NSIP scale solar projects within this area illustrates this. Figure 18 Annex D shows that there are no other parts of the 15km search area that would provide a more suitable location than the Scheme Sites for the siting of a 480MW solar project taking into account these constraints.

#### Summary

- 5.5.42 The Site Selection process took a sequential approach to the consideration of potential sites in terms of agricultural land classification. The Site Selection Assessment [EN010132/APP/WB6.3.5.1] details the five stage process that the Applicants undertook in order to select the location of the original draft site area including the Scheme and this process is summarised above. It explains that following identification of the 15km radius search area, all land in Grades 1, 2 and 3 was excluded from the search and the focus was first on trying to identify suitable sites within areas of Grade 4, 5 or unclassified land outside of other identified planning and environmental constraints. One potential site within this area was initially identified but was later discounted following further detailed assessment of constraints. Only then, did the assessment consider potential areas of Grade 3 agricultural land. The location of the original draft site area including the Scheme was ultimately chosen following a RAG assessment of a further three sites within the Grade 3 land.
- 5.5.43 The finalised Scheme maximises the utilisation of low grade, non best and most versatile (BMV) agricultural land with 73.76% of the land being classified as non BMV land. In terms of the specific areas of the BMV land that are included within the Scheme, these are justified by particular factors related to their location and context



within the Scheme, the wider landholding, and in relation to adjacent and surrounding land. Table 5.9: Stage 4 – Design Updates up to DCO Submission (August-November 2022) below sets out the changes made to the original draft site area to refine the Scheme following detailed ALC assessment and provides the detailed justification for retaining small areas of BMV land and an explanation as to why others were removed. The reasons why small areas are retained is generally because they form small parts of larger fields of lower grade land and it would not be practical to remove these from the Scheme from a Site layout perspective, or to continue to farm them as small, isolated land parcels surrounded by the Scheme. Where BMV land formed the whole or majority of fields that could continue to be viably farmed, they were removed.

5.5.44 The land for the Scheme has been demonstrated to perform better than 3 of the assessed PDAs and equal to the remaining one following the site selection process. There are no more suitable locations for the Scheme within the Search Area.

5.5.45 The Scheme is located predominantly within Lincolnshire, an optimal region within the UK to locate a large scale solar farm. This is due to good irradiation levels and suitable topography, which is predominantly made up of and characterised by large flat open land. In addition, the decommissioning of large coal fired power stations within the region has led to the availability of significant grid capacity at available and accessible connection points. As such, the selection of the Sites as the preferred locations for the Scheme can be summarised by the points below:

- The land maximises the utilisation of low grade, non best and most versatile (BMV) agricultural land with 73.76% of the land being classified as non BMV land. This is not the case for the other PDAs which have not been subjected to detailed ALC assessment and may contain greater proportions of BMV.
- The land is not located within internationally and nationally designated biodiversity sites and can avoid direct impact on locally designated biodiversity sites;
- The land is not located within or adjacent to Areas of Outstanding Natural Beauty or designated areas of local landscape value;
- The land can avoid direct physical impact on designated heritage assets;
- The land is predominantly within Environment Agency flood zone 1 and has been demonstrated to be at a low risk of flooding;
- The land has good transport access for construction and operational maintenance, with good links to the strategic road network (the A15, A46, M180) via the A1500, A156, and A57.
- The land is of a suitable size and has excellent topographical characteristics which meet the requirements of the Scheme to generate 480MW of electricity; and,

- There is available capacity for the Scheme to connect to the NETS at West Burton Power Station that can be completed within a reasonable timeframe and cost;
- The Sites are within four land ownerships, and this small number of landowners is advantageous in terms of minimising project complexity, legal complexity and cost.
- The land has limited land use conflicts with respect to local development plan allocations and displacement of existing businesses.

5.5.46 There are no obviously more suitable locations for the Scheme within the Search Area.

## 5.6 Alternative Technologies

5.6.1 Alternative types of low-carbon forms of electricity generation for utilising the existing West Burton Power Station POC capacity were not considered by the Applicant, who is a solar PV and energy storage developer. However, notwithstanding this, it is not considered that the Order limits would be suitable for other forms of renewable generation at the same scale as the Scheme.

5.6.2 Tidal power, offshore wind and hydroelectric storage are not possible due to the location of the POC which is located approximately 70km from the coast and within an area of low, flat topography. The Lincolnshire Wolds AONB lies between the POC and the Lincolnshire coast making overhead lines prohibitive through this sensitive area and underground cabling costly over the required distance.

5.6.3 The Order Limits are not considered suitable for onshore wind due to the significant visual impacts that this type of development would have in this low-lying area including from distant views from higher land to the east (Lincoln Ridge) where turbines would be visible in views towards the horizon. It is not expected that the Order limits would have been able to host an economically viable and successful onshore wind farm without causing significantly greater environmental consequences than the Scheme.

5.6.4 Nuclear power was not considered as an alternative because of the high cost of electricity and the lengthy planning and development timeframe; circa 20 years, that such a project would involve. The Scheme will be able to start generating electricity much more quickly with a grid connection anticipated in 2028.

5.6.5 It is therefore considered that solar PV is the best renewable energy generating solution for the Order limits.

### Solar Technology

5.6.6 As described in ES Chapter 4: Development Description [EN010132/APP/WB6.2.3], the parameters of the Application will maintain some degree of design flexibility under the Rochdale Envelope to allow the latest technology to be utilised at the time of construction. Notwithstanding this, several technological design options have

been considered and preferred options taken forward taking into consideration environmental effects and the Scheme's objectives and need for optimal functionality.

5.6.7 As described in Schedule 1 of the Draft DCO [EN010132/APP/WB3.1], and Chapter 4: Scheme Description [EN010132/APP/WB6.2.4], the design elements have been placed within discrete Work Numbers. These are:

**Work Nos.1A-1C** — ground mounted solar photovoltaic generating station with a gross electrical output capacity of over 50 megawatts;

**Work No.2**— an energy storage facility (sometimes referred to as a 'BESS');

**Work Nos. 3A – 3C**— works in connection with onsite substations;

**Work No.4**— works to the existing National Grid West Burton Power Station 400kV substation site to facilitate connection of the Scheme to the National Grid;

**Work No.5**— works in connection with electrical cabling

**Work No 6**— works including:

- (i) fencing, gates, boundary treatment and other means of enclosure;
- (ii) works for the provision of security and monitoring measures including CCTV columns, lighting columns and lighting, cameras, weather stations, communication infrastructure, and perimeter fencing;
- (iii) landscaping and biodiversity mitigation and enhancement measures including planting;
- (iv) improvement, maintenance and use of existing private tracks;
- (v) laying down of internal access tracks, ramps, means of access and footpaths;
- (vi) temporary footpath diversions;
- (vii) earthworks;
- (viii) sustainable drainage system ponds, runoff outfalls, general drainage and irrigation infrastructure and improvements or extensions to existing drainage and irrigation systems;
- (ix) electricity and telecommunications connections; and
- (x) secondary temporary construction laydown areas.

**Work No.7**— temporary construction and decommissioning laydown areas;

**Work No.8**— works to facilitate access to Work Nos.1 to 7 and 10 to 11;

**Work No.9**— works to create and maintain habitat management areas;

**Work No.10**— works to create and maintain a habitat management area; and,

**Work No.11**— creation of a new permissive footpath to run from the track off Sykes Lane along the Codder Lane Belt and then south and west to re-join Sykes Lane

opposite Hardwick Scrub, including landscaping and biodiversity mitigation and enhancement measures.

5.6.8 There are many alternative types of technology available for consideration when designing a solar farm, and technology is constantly evolving and changing such that it is expected that other alternatives may become available during the Application process and prior to construction. Therefore, there is a need for flexibility and this ES takes a 'Rochdale Envelope' approach to the assessment. Each chapter in the ES assesses the realistic 'worst case' scenario for the environmental topic.

5.6.9 The text below sets out the design elements and alternatives considered throughout the design process relative to Work Numbers 1 and 2, which are the ground mounted solar photovoltaic generating station and energy storage facility. There were few substantial technological alternatives considered for Work Numbers 3-11, other than the potential for an overhead line instead of a buried POC route and minor iterations of the design for supporting infrastructure.

[Ground mounted solar photovoltaic generating station No.1A-1C](#)

5.6.10 Work No. 1A-1C comprises elements such as solar modules fitted to mounting structures, DC electrical cabling, conversion units including inverters, transformers, switchgear, and monitoring and control systems. To maintain flexibility in the assessment and within the Application, both tracker and fixed panels have been considered within the ES, as have either standalone transformers, inverters and switchgear or integrated conversion units. These allow for changes in technology and efficiencies.

**Table 5.3 Solar Farm Works Areas 1A-1C**

Design Element	Configuration	Alternatives Considered
Solar PV panels	Mono- or bifacial panels	The application allows for use of single (mono) facing or bifacial panels, with the latter being typically slightly more transparent and with the ability to absorb sunlight on the underside of the panel. It was not considered that this option would affect the EIA as the maximum design scenarios for both are equivalent (see <b>Section 4.3 of ES Chapter 4: Scheme Description</b> ) [EN010132/APP/WB6.2.4] for further detail of assessment process and the Rochdale Envelope)
	Colour of panels	The solar PV modules are likely to be either black or dark blue. This will be fixed during detailed design. It was not considered that this option would affect the EIA as the maximum design

Design Element	Configuration	Alternatives Considered
		scenarios for both are equivalent (see <b>Section 4.3 of ES Chapter 4: Scheme Description</b> ) [EN010132/APP/WB6.2.4] for further detail of the assessment process and the Rochdale Envelope)
Solar PV modules	Angle of panels	Flexibility for either tracker or fixed panels has been built into the EIA.  Trackers incline to the east or west up to a maximum inclination of 60 degrees from horizontal. Fixed panels slope towards the south at a fixed slope of 15 to 35 degrees from horizontal.
	Orientation	Flexibility for either tracker or fixed panels has been built into the EIA.  The tracking solar PV modules would be aligned in north-south rows.  The fixed solar PV modules would be aligned in east-west rows.
	Height	Flexibility for either tracker or fixed panels has been built into the EIA.  The maximum height of the highest part of the tracking solar PV modules at its greatest inclination will be 4.5m.  The maximum height of the highest part of the tracking solar PV modules when horizontal will be 2.5m.  The maximum height of the highest part of the fixed solar PV modules will be 3.5m.
	Foundations	Foundations are most likely to be galvanised steel poles driven into the ground. These will either be piles rammed into a pre-drilled hole, or a pillar attaching to a steel ground screw.  Foundations in areas of archaeological interest where archaeology is to remain in situ will be concrete feet onto which the mounting structures

Design Element	Configuration	Alternatives Considered
		will be affixed. Concrete feet will be set directly on the topsoil with no excavation.
Conversion Units	Standalone transformers, inverters and switchgear or integrated conversion units	Consideration of conversion units consisting of standalone transformers, inverters and switchgear, or of integrated containerised conversion units have been considered. The DCO application is retaining the flexibility to consider both options prior to construction of the Scheme due to anticipated technical advances.

Energy Storage Facility (or 'BESS') – Work No 2

5.6.11 Energy storage is a rapidly evolving technology and improvements to factors such as cost, efficiency, duration, and safety are expected between the time of submission and construction. The Application therefore seeks to keep the technological possibilities open so far as reasonable.

**Table 5.4 BESS – Work No 2**

Design Element	Configuration	Alternatives Considered
Type of energy storage technology: battery storage with DC coupling (decentralised) or AC coupling (centralised)	Centralised BESS	The installation of a centralised AC-coupled BESS has been selected due to the consideration that a single location for the BESS allows for structural planting to provide landscape and visual screening and enhancement measures, avoiding the introduction of large units throughout the Order limits (decentralised) which would be more unsightly and more difficult to screen.
BESS Compound	Height	Double stacking of battery containers was considered to reduce land area but was discounted on the basis that it would have a greater visual impact.
	Monitoring and Control System	The monitoring and control system will be housed either in an adapted container or built from glass reinforced plastic (GRP). The system will be within the same container or

Design Element	Configuration	Alternatives Considered
		<p>room as the HVAC or in its own container or control room. It was not considered that this option would affect the EIA as the maximum design scenarios for both are equivalent (see Section 4.3 of ES Chapter 4: Scheme Description) <b>[EN010132/APP/WB6.2.4]</b> for further detail of the assessment process and the Rochdale Envelope)</p>
Fire suppression	Water Storage	<p>Water will be required to be stored on site in close proximity to the energy storage systems. This water will be stored in either above ground tanks or open water bodies. EIA assessed on the basis of worst-case scenario tanks. It was not considered that this option would affect the EIA as the maximum design scenario of above ground tanks has been assessed in the ES (see Section 4.3 of ES Chapter 4: Scheme Description) <b>[EN010132/APP/WB6.2.4]</b> for further detail of the assessment process and the Rochdale Envelope)</p>
	Integrated fire suppression location	<p>Fire suppression systems will be integrated into the design of each BESS container and will be located either within or outside the BESS container. If located outside, the suppression systems will either be decentralised and located at each container or centralised. It was not considered that this option would affect the EIA as the differences between each design scenario are minimal (see Section 4.3 of ES Chapter 4: Scheme Description) <b>[EN010132/APP/WB6.2.4]</b> for further detail of the assessment process and the Rochdale Envelope)</p>
Cabling	Above or below ground	<p>Cabling between battery containers and battery stations will be above ground in cable trays or laid in an underground trench. It was not</p>

Design Element	Configuration	Alternatives Considered
		considered that this option would affect the EIA.

## 5.7 Alternative Layouts for Solar Panel Areas

### Layout Parameters and Considerations

- 5.7.1 The layout of the solar panel areas has been informed by the matters set out in Table 5.5. below. These considerations were implemented as blanket parameters across the development site to ensure consistency of approach. Parameters such as offset distances were informed by the technical consultant team based on their professional judgement and previous experiences. Once applied, the remaining site area was designated the “developable area” for the solar array, inverters, substation, and access roads. Security fencing was able to be placed along the perimeter boundary. Areas between the fencing and the development site boundary were made available for ecology and landscape mitigation or enhancement.

**Table 5.5: Design Parameters for Site Panel Areas**

Criteria	Consideration	Parameters
Planning, policy and legislation	Planning applications and allocations	Avoidance of any land subject to pending planning applications and site allocations.
Technical and engineering requirements	Access	Accessibility by vehicle to all field parcels for maintenance access Accessibility by vehicle to all inverters Accessibility by vehicle to site substation
	Electrical Design	Conversion units will be required on each Site at a maximum rate of one conversion unit per 2.5 MW of peak solar energy generation.
Environmental constraints	Landscape and Visual	Proximity of residential properties – minimum 50m offset to curtilage boundary Identification of key visual receptors and key views
	Ecology and Biodiversity	Avoidance of national ecological designations Proximity to local ecological designations and sensitive ecological receptor – minimum 20m offset to designated area Proximity to major watercourses – minimum 20m offset



Criteria	Consideration	Parameters
		<p>Proximity to minor watercourses and ditches – minimum 8m offset</p> <p>Proximity to badger setts – minimum 30m offset</p> <p>Proximity to GCN sites – minimum 50m offset</p> <p>Proximity to trees with low, medium or high bat roost potential – minimum 8m, 12m, 20m offset</p>
	Hydrology, Flood Risk, and Drainage	<p>Avoidance of flood storage areas</p> <p>Avoidance of areas of surface water flooding greater than 1m depth</p>
	Mineral Resources	Avoid creating an obstruction to the future exploitation of mineral resources subject to minerals resource safeguarding.
	Cultural Heritage	<p>Avoidance of national cultural heritage designations</p> <p>Areas of significant archaeology to be avoided</p> <p>Areas of moderate archaeology to be limited to restricted loading and non-penetrative foundations</p> <p>Context of cultural heritage assets to be considered</p>
	Transport and Access	<p>Sensitivity of watercourse crossings for construction traffic</p> <p>Consideration of existing access points and local highway network</p> <p>Accessibility by vehicle to all field parcels for maintenance access</p> <p>Accessibility by vehicle to all inverters</p> <p>Accessibility by vehicle to site substation</p>
	Glint and Glare	Consideration of panel backtracking or additional mitigation to screen glint and glare
	Agricultural Land Classification	Consider avoidance of best and most versatile land
	Telecommunications, Utilities, and Television Receptors	<p>Avoidance of underground utilities – subject to easement widths</p> <p>Avoidance of overhead power lines – subject to easement widths, 15m minimum to pylons</p>

Criteria	Consideration	Parameters
Land use and ownership constraints		<p>Seeking to use land in the same ownership for each site to minimise project and legal complexities.</p> <p>Where possible reducing interaction on rail network, strategic road infrastructure, utilities and other infrastructure.</p>

Main Design Iteration for the Solar Array Sites

5.7.2 Prior to determining the proposed Order Limits, there were several stages of design evolution, during which the original area of the Scheme was refined. That process of design evolution has been informed by ongoing environmental assessments, engineering and design considerations, as well as engagement with stakeholders.

**Stage 1 – Non-Statutory Consultation November-December 2021**

5.7.3 The initial phases of the Scheme design were developed through Applicant and landowner parameters, set against desk-based assessment work to determine outline design objectives and identify areas of required preliminary investigation.

5.7.4 The primary site selection stage was undertaken by the Applicant following the establishment of the grid connection offer at West Burton Power Station. At this early stage, four linked sites (West Burton 1, 2, 3 and 4) were chosen following the site selection process set out in Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1] on the basis that they were a suitable proximity to the point of connection, avoided relevant planning, heritage and ecological designations, areas with greater than 3% gradient and areas known to be of Grade 1 and 2 Agricultural land according to Natural England mapping. The Site Selection Assessment explains that potential Grade 4, 5 and unclassified land within the Search Area was discounted through the site assessment process as it was assessed to be unsuitable for a large scale solar scheme.

5.7.5 Cable routes were selected on the basis of using the shortest possible routes avoiding relevant planning, heritage and ecological designations and with a large amount of optionality available.

5.7.6 During this phase, on-site options for the locations of substations and energy storage area were explored in tandem with the non-statutory consultation using a desk-based approach. The proposed locations of these pieces of on-site infrastructure were at an early stage during the Stage 1 Consultation and as such were not included in the consultation materials that were published for the Consultation.

5.7.7 For field numbering please refer to field numbering plans at Figures 3.1 – 3.3 of Chapter 3 of the ES [EN010132/APP/WB6.2.3].

Table 5.6: Stage 1 – Non-Statutory Consultation (November-December 2021)

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
<p>Site Selection Assessment Early feasibility work including site identification and the consideration of constraints and opportunities.</p>	<p>ALL SITES Four Principal Sites covering approximately 1069ha (Sites only). West Burton 1 –90ha West Burton 2 –347ha West Burton 3– 380ha West Burton 4 – 252ha</p>	<p>Scheme design initially developed through Applicant and landowner parameters (see Table 5.5), set against desk-based assessment work to determine outline design objectives and identify areas of required preliminary investigation.</p> <p>The sites were selected on the basis of the site selection process set out in <b>Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1]</b>. The selection criteria ensured that they are a suitable proximity to the point of connection, avoid specific planning, heritage and ecological designations, land with a gradient greater than 3%, extensive areas of high flood depth and areas known to be Grade 1 and 2 agricultural land according to Natural England mapping. The Site Selection Assessment explains that potential Grade 4, 5 and unclassified land within the Search Area was discounted through the site assessment process as it was assessed to be unsuitable for a large scale solar scheme.</p> <p>On site options for the locations of substations and battery storage area were explored in tandem with the non-statutory consultation using a desk-based approach.</p>

### Stage 2 – EIA Scoping January 2022

- 5.7.1 At this stage, the outline design of the Scheme published at non-statutory consultation was presented alongside desk-based and initial field assessments of the proposed Scheme.
- 5.7.2 Internally, a maximum capacity layout was produced to help the project team identify where predicted areas of key concern, or of anticipated minimal impacts were going to be on the Scheme. These findings were then presented to PINS and the notified statutory bodies to comment on the scope of assessment required for the proposals through the submission of the EIA Scoping Request. Where field reference numbers are used, refer to the Field Numbering Plans in Appendix 3.2 of the ES [EN010132/APP/WB6.4.3.1].

**Table 5.7: Stage 2 – EIA Scoping and Ongoing Consultation (January-May 2022)**

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
EIA SCOPING		
Desk-based and initial field assessments of the proposed Scheme including preliminary minerals resource assessment undertaken.	<p>ALL SITES</p> <p>Four Principal Sites covering approximately 1035.67ha (sites only).</p> <p>West Burton 1 – 90.38ha</p> <p>West Burton 2 – 328.36ha</p> <p>West Burton 3 – 369.63ha</p> <p>West Burton 4 – 247.3ha</p> <p>Drawing Ref: Fig 3.1 Site Plans (see WB6.3.2.1 ES Appendix 2.1 EIA Scoping Report)</p>	<p>A maximum capacity layout was produced to help the project team identify where predicted significant effects with respect to all ES chapters were likely to be generated as a result of the Scheme, or if the anticipated effects were expected not to be significant, thus allowing for the relevant topic or assessment area to be requested to be scoped out of the ES. These findings were then presented to the Planning Inspectorate (PINS) and the notified statutory bodies to comment on the scope of assessment required for the proposals, through the submission of the EIA Scoping Request.</p> <p>Two options for cable crossing of River Trent were identified: 1) Between Gate Burton and Knaith, and 2) North of Marton to Littleborough,</p>

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
VERSION 1 SITE LAYOUT PLANS		
Feedback from Planning Inspectorate Statutory body consultation from EIA Scoping Non-statutory consultee feedback Ongoing stakeholder engagement Ongoing focussed consultation with residents	ALL SITES 1035.67ha	A full solar PV layout across the whole Scheme area was produced based on consultation, initial survey data, and the implementation of key parameters. Aimed as a capacity maximisation study. Key constraints regarding ecological, flooding, and landscape comments were used to inform development parameters. Consultation with parish councils and statutory bodies helped to identify areas of greatest impact that can be revised, redefined within the DCO, or mitigated.
Environmental surveys	West Burton 1 90.38ha	Additional offsetting along the River Till tributary due to flood risk and its designation as major watercourse. Area in M1 removed entirely due to designation as River Till flood storage area. Additional offsets to 132kV OHLs in M2 and M3 Option between 2P tracker panels and fixed panels explored.
	West Burton 2 328.36ha	Fields N24-31, plus eastern portions of N19-20 and N22-23 excluded due to River Till flood storage area. N15-16 removed due to association with Ingleby mediaeval village. N11 and N17 excluded due to landscape impact on Ingleby Road. Options for 2P tracker panels and fixed panels explored.
	West Burton 3 369.63ha	Offsets to 132kV OHL (P2, Q13) and 400kV National Grid OHL (Q7, Q15-16, Q19, and Q22-23). Q2 excluded due to landscape impact on Poplar Farm. Q1 truncated at line of PRow. Topographic ridge along Q5-8 implemented at panel area edge due to long views.

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
	West Burton 4 247.3 ha	Implementation of key parameters. Sensitive landscape views considered through removal of panels from north halves of R1 and R3, all of R4-10, and south of R13 R7-10 also removed due to containing highest agricultural land quality. R23-24 removed due to proximity and views from Mill Lane R33-34 removed due to due to location next to crossing of a Public Right of Way (Clayworth BW7), and the Trent Valley Path (variant route) (Clayworth FP9/Gringley on the Hill FP16). Options for 2P tracker panels and fixed panels explored

### Stage 3 – Preliminary Environmental Information Report (PEIR)/Statutory Consultation June-July 2022

5.7.1 Following feedback from the Planning Inspectorate and statutory consultees during the EIA Scoping stage, the design of the scheme evolved in tandem with further desk-based and field assessments. Consultation with neighbouring residential properties was undertaken during this period to determine any direct impacts and suitable mitigation measures. The preliminary designs produced during February to April 2022, along with the Preliminary Environmental Information Report, were presented to the public and statutory consultees for statutory consultation in June-July 2022. The consultation period was extended through to 23<sup>rd</sup> August 2022 to enable the results of detailed Agricultural Land Classification Assessment in relation to West Burton 4 to be shared.

**Table 5.8: Stage 3 – PEIR and Statutory Consultation (June-July 2022)**

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
Feedback from statutory consultees through EIA Scoping process	ALL SITES 1035.67ha	Implementation of key parameters to regularise the solar array across the Sites by providing buffers for hydrological features e.g. ditches, drains and ponds, ecological features, utilities and telecoms.

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
<p>Environmental surveys including landscape and visual, ecology, heritage, noise, transport, agriculture and soils, and other topics forming the PEIR e.g. Mapping of minerals safeguarding areas and areas of search</p> <p>Feedback from landowners.</p> <p>Ongoing focussed consultation with residents</p> <p>Applicant's internal design process.</p>		<p>Critical infrastructure within the Scheme (substation and energy storage compounds) has been sequentially located within Zone 1, an area with a "Low probability of flooding" and therefore in land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (&lt;0.1%).</p> <p>The majority of conversion units have been located within Flood Zone 1, where this is not feasible, the conversion units will be raised 0.6 m above the 0.1% AEP + CC flood level or where this is not possible as high as practicably possible.</p> <p>Offsets from important roads and railways were introduced to reduce potential glint and glare impacts or provide space to allow for mitigation measures to be installed.</p> <p>Introduction of a minimum 50m setoff from the curtilage boundaries of residential properties.</p> <p>Amendments to ecology offsets to hedgerows and trees were embedded in the design parameters following onsite detailed ecology surveys.</p> <p>Access tracks and strategy reformulated following detailed environmental surveys including removal where possible from ecology offset areas.</p> <p>The chosen panel design across the Scheme was presented as a split-type design with both tracker panels and fixed panels presented. This was presented to provide a maximum design scenario for the purpose of assessment, retaining flexibility for future changes provided they fell within the maximum parameters set out, whilst also responding directly to known locational constraints. At this stage, the Sites at West Burton 1 and 3 were presented as likely to be tracker panels, whilst West Burton 2 and West Burton 4, the use of fixed panels was presented.</p> <p>Across the three Sites, noise barriers were introduced around conversion units where potential impacts on residential amenity were found through detailed assessment work.</p>

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
		<p>Checks to ensure the majority of the land within the Sites is located outside any minerals safeguarding areas. Only small areas of land within the Sites are subject to sand and gravel safeguarding (See <b>ES Chapter 12: Minerals [EN010132/APP/WB6.2.12]</b>). The scheme has a lifespan of 40 years and due to the Scheme being decommissioned at the end of its operational life, any minerals would not be permanently sterilised and would be available to exploit if required at a future date.</p> <p>The siting of the Scheme substations was provided in compliance with the location provisionally determined through a desk-based “RAG” rating, taking into account technical constraints and electrical design requirements (See <b>Section 5.8</b>).</p> <p>Agricultural Land Classification Reports prepared for PEIR confirmed the Sites contained only 26.24% Best and Most Versatile (BMV) land.</p>
	<p>West Burton 1 90.38ha</p>	<p>Amendments to ecology offsets to hedgerows and trees including offsets from the 132kV overhead lines. Access tracks removed from ecology offset areas 50m wide landscape and ecology buffer introduced along the field boundaries of M2-3 near residences.</p>
	<p>West Burton 2 328.36ha</p>	<p>Amendments to ecology offsets to hedgerows and trees following updates to ecology surveys. Badger setts surveyed and offset. Areas adjacent to the River Till were excluded from the solar array area due to its designation as flood water storage, and the depth of water storage being far too great for panels to be located thereon. This therefore affected fields N24-31, plus the eastern portions of fields N19-20 and N22-23. Underground utilities locations confirmed by geophysical surveys (N1, N5, N9-10, N14). Extent of mediaeval village archaeology measured by geophysical surveys – solar panels removed from rest of N15, N18 and part of N20.</p>



Consultation, Surveys, and Design Influence	Site Area	Design Evolution
		<p>Fields N11 and N17 were excluded from the siting of solar panels as agreed with Saxilby and Ingleby Parish Council, due to landscape impact on Ingleby Road and the preservation of views between Ingleby mediaeval village and the church in Saxilby Buffers to residences extended in N13-14.</p> <p>Access point to N21-23 moved southwards.</p> <p>Codder Belt permissive path options explored.</p>
	<p>West Burton 3 369.63</p>	<p>Offsets to overhead and underground infrastructure were implemented, affecting fields P2, Q7, Q13, Q15-16, Q19, and Q22-23.</p> <p>Amendments to ecology offsets to hedgerows and trees following updates to ecology surveys.</p> <p>Security fencing moved to clear ecological offset areas.</p> <p>Offsets to trees with high bat roosting potential have been set at 20m.</p> <p>Seasonal ditch between Q25 and Q26 reconsidered.</p> <p>Reintroduction of panels to west of ridge in Q5-8 subject to landscape mitigation planting regime.</p> <p>The location of panels in field Q1 was truncated at the public right of way to avoid enclosing the footpath, and provide additional offsetting from residences in Marton. Field Q2, and a wedge of field Q18 adjacent to Brampton village were removed from the solar panel area for the benefit of residential amenity.</p> <p>Noise buffers added to inverters and substation where directed by noise impact modelling.</p> <p>The western extent of panels in fields Q5-8 was amended and moderated with a prospective landscaping mitigation planting regime due to potential impacts of long views of the Site due to the location of a ridge through these fields.</p> <p>Updated flood modelling required optioneering programme to be undertaken to determine if raised mounting structures or fixed panels through centre of site could be used to retain solar array coverage in these areas.</p>
	<p>West Burton 4</p>	<p>Amendments to ecology offsets to hedgerows and trees.</p> <p>Badger setts surveyed and offset</p>

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
	247.3ha	Substation moved from R19 to R15, R19 fully panelled. Old hedgerow across R35 reintroduced Options for surface water flow rate reduction features were explored as potential community benefit measures. This was in response to public comments regarding floodwater originating from the Site and Toft Dyke.

#### Stage 4 – DCO Submission October 2022

- 5.7.2 Stage 4 of the design process took into account the feedback received during the statutory consultation, including feedback from members of the public, statutory consultees and final design requirements from landowners. The development of the Environmental Impact Assessment has also had a reciprocal impact on the design, as mitigation requirements for hydrology, landscape, ecology and other environmental topics were fed back into the overall Scheme design. A final review of the scheme to minimise the amount of BMV agricultural land was also undertaken prior to submission. The changes are set out in the table below. The development of the design through Stage 4 has culminated in the design masterplan included in the DCO Application.
- 5.7.3 Where field reference numbers are used, refer to the Field Numbering Plans in Appendix 3.2 of the ES [EN010132/APP/WB6.4.3.1].

**Table 5.9: Stage 4 – Design Updates up to DCO Submission (August-November 2022)**

Consultation, Surveys, and Design Influence	Site Area	Design Evolution
Statutory consultation feedback Final design feedback from landowners	ALL SITES The Scheme comprises 3 combined Sites connected by a series of Cable Route Corridors and	On all sites, the buffer zones to ecological receptors, watercourses, and utilities were remodelled and regularised following completion of baseline surveys, and updated information from key service providers. Site accesses were included.  The solar array area has been designed to accommodate onsite substations, battery storage, temporary construction compounds, and any permanent supporting infrastructure.

<p>Development of the Environmental Impact Assessment</p> <p>Additional ALC Assessment.</p> <p>Conclusion of ongoing focussed consultation with residents</p>	<p>accessed by a number of access points. The Scheme's Order Limits, which include all land falling within the DCO application, cover an area of 886.44hectares (ha). The three combined sites minus the Cable Corridors, but including Means of Access total 769.1ha. These are detailed below.</p>	<p>Accesses and visibility splays were added in to the order limits where appropriate.</p> <p>The panel design for submission is for either tracker or fixed panels. Tracker panels are aligned on a north-south axis, with a maximum height of 4.5m above ground level when the panel is at its greatest rotation – 60° from horizontal. Fixed panels are aligned in east-west rows, have a maximum height of 3.5m, and are angled facing south with a fixed slope of between 15° and 35° from horizontal. The design of the mounting structures allows for screw piles or driven piles as standard, or for shallow concrete feet where non-intrusive foundations were required for archaeological mitigation.</p> <p>A full landscaping and ecological mitigation design has been developed to supplement the design of the Scheme. These have been detailed and assessed in full in the ES Chapter 8: Landscape and Visual Impact Assessment [EN010132/APP/WB6.2.8] and Chapter 9: Ecology and Biodiversity [EN010132/APP/WB6.2.9] and their supporting technical appendices and figures, and in the associated Outline Landscape and Ecological Management Plan [EN010132/APP/WB7.3].</p> <p>On site, landscape planting was added to include low level planting such as native scrub and wildflower meadow planting. This has the triple purpose of providing biodiversity net gain, providing groundcover to let the soils underneath rest, and allowing for potential grazing options for optioned farm holdings.</p> <p>During statutory consultation, the results of further soil sampling (including in-field carbonates testing) to supplement the initial Agricultural Land Classification reports published at PEIR became available. The full suite of reports is available at [EN010132/APP/WB6.3.19]. This reconfirmed the original assessment results for West Burton 1,2 and 3 but showed a material change in respect of West Burton 4 where the proportion of BMV land increased to 100%. In order to reduce the Scheme's impact upon BMV land, a further review of all BMV land within the Order Limits was undertaken and the entirety of West Burton 4 which includes a mix of Grade 1, Grade 2 and Grade 3a land was removed from the Scheme. The removal of West Burton 4 in its entirety was weighed with and against the removal of alternative areas of BMV land within the Scheme. This led to the conclusion that:</p>
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		<ol style="list-style-type: none"> <li>1) No better alternative unconstrained areas of non BMV agricultural land have been identified outside the Scheme boundaries that could replace West Burton 4 and/or other identified BMV land within the Scheme, as demonstrated by the Site Selection Report [EN010132/APP/WB6.3.5.1].</li> <li>2) Removal of all areas of BMV land from the Scheme would not enable the Scheme to deliver the same infrastructure capacity (480MW) (including energy and climate change benefits). Some spare capacity (overplanting) was built in to the original Scheme. The reasons for and benefits of overplanting are explained at Section 7.7 of the Statement of Need [EN010132/APP/WB7.11]). Although overplanting was built into the original draft Scheme, this is not of a scale to enable removal of all BMV land areas. In addition, it is beneficial to retain an element of overplanting, as explained in Section 7.7 the Statement of Need, albeit the final Scheme includes a lesser amount than envisaged at earlier stages of the project. The relatively small amount of battery storage provision at West Burton reflects the lesser amount of overplanting as there will be less surplus energy to store.</li> <li>3) Removal of only West Burton 4 would still enable the Scheme to deliver 480MW of electricity enabled by the grid connection agreement and corresponding climate change benefits;</li> <li>4) Removal of West Burton 4 in its entirety took into account the significant objection to the West Burton 4 site from residents in Clayworth and Gringley-on-the-Hill, as well as concerns raised by Parish Councils in relation to landscape impact and BMV land.</li> <li>5) Removal of other parts of the site as an alternative, or in conjunction with parts of West Burton 4 would not have the same level of added benefit described at 3 above.</li> <li>6) Removal of a single site is preferable to removal of piecemeal fields throughout the Scheme because it helps to reduce the Scheme's environmental impacts by removing the associated cabling required to connect West Burton 4 and</li> </ol>
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		<p>removing the need for a separate stand alone substation site. There are also resulting cost savings for the project.</p> <p>7) Removal of West Burton 4 significantly reduces the amount of BMV land within the Scheme from 42.3% to 26.24%.</p> <p>8) Detailed technical assessment of the remaining land (West Burton 1-3) has demonstrated this to be sufficient to accommodate the panels and associated infrastructure required to generate 480MW of electricity, whilst also providing land to accommodate the required landscape and ecological mitigation for this particular scheme.</p>
	<p>West Burton 1 91.34ha</p>	<p>Changes to the panel arrangement have primarily been minor and in direct response to remodelled buffer zones to key site constraints. Notably, the panel area in field M1 has been recessed further from the River Till, whilst the two fenced areas within field M1 have been combined into a single fenced area.</p> <p>Parts of fields M1, M2 and M4 contain an area (18.4ha) of Grade 3a BMV land. This comprises 20.2% of West Burton 1 and has been retained within the Order Limits because it is not practical to continue farming these fragments of 3 larger fields. With the removal of West Burton 4, the alternative option of removing this field from the Scheme would not enable the Scheme to deliver the same infrastructure capacity (including energy and climate change benefits).</p>
	<p>West Burton 2 306.98ha</p>	<p>Panels were removed from field N14 due to findings of additional archaeology related to the mediaeval village at Ingleby.</p> <p>Panels were removed from N15- N18 as a result of responses to consultation identifying concerns regarding residential amenity impacts to adjacent properties.</p> <p>As a result of the removal of all panels from fields N14-N18 above, and the lack of ability to use the land for ecological mitigation due to the underlying heritage assets, these fields were then removed entirely from the Order limits.</p> <p>West Burton 2 comprises 96.7% non BMV land.</p>

		<p>Approximately half of Field N21 contains non BMV land fronting the B1241. The remainder of the field beyond this contains BMV land comprising part Grade 2 and part Grade 3a land in approximately equal proportions. The BMV land would be impractical to farm on its own due to its small size and its isolation surrounded on three sides by solar panels. Therefore, the land has been retained within the Scheme.</p>
	<p>West Burton 3 370.78ha</p>	<p>An area in fields P1 and P4, to the north of the Bishop's Palace Scheduled Monument, was removed as a result of finding significant heritage remains associated with the scheduled monument. This area, including the full extent of the scheduled area has also been removed from the Order limits.</p> <p>Following the removal of West Burton 4 and WB Sub, the area of field Q4, host to the previous 132kV substation has been reverted for the siting of solar panels (See Table 5.11 below under West Burton 3, DCO Submission for further information).</p> <p>Following removal of West Burton 4 and WB Sub (see below for details) the Energy Storage previously located on West Burton Sub has been relocated within field Q13 adjacent to the relocated 400kV substation. Water storage for firewater has been designed to retain optionality at the DCO submission stage both with regard to design and location. The sizing of water storage for firewater is set at a minimum of 228,000 litres per source as agreed with Lincolnshire Fire and Rescue Services. Water would be stored in either steel panel tanks or bunded open water areas. See Illustrative Site Layout Plans at Appendix 1: Figures 4.1c-d of the Design and Access Statement [EN010132/APP/WB7.6]. for potential locations.</p> <p>Panels in fields Q6-Q8 have been extended to be closer to the Order Limits, associated with a strengthened landscape mitigation strategy to screen long-range views of this side of the Site, secured through the strategies set out in the <b>Outline Landscape and Ecological Management Plan [EN010132/APP/WB7.3]</b>.</p> <p>The majority of West Burton 3 (54.4%) comprises non BMV land. Fields Q1, Q2, Q3, Q4, Q6, Q7, Q8, Q12, Q17, Q18, Q21, Q22 and Q24 comprise Grade 3a land. These are retained within the Scheme . With the removal of West Burton 4 (see below), the alternative option of removing these fields from the Scheme would not enable the</p>

		<p>Scheme to deliver the same infrastructure capacity (including energy and climate change benefits). They have therefore been retained.</p> <p>Small parts of fields Q5, Q13, Q14, Q15, Q16 and Q20 Comprise Grade 3a land. It would not be practical to continue to farm the BMV parts of these fields on their own and they have therefore been retained within the Scheme. With the removal of West Burton 4 (see below), the alternative option of removing these fields from the Scheme would not enable the Scheme to deliver the same infrastructure capacity (including energy and climate change benefits). They have therefore been retained.</p> <p>Field Q25 and part of field Q26 comprise Grade 1 agricultural land (19ha equating to 5% of West Burton 3). The remaining part of field Q26 is Grade 2 land. Their removal would isolate field Q27 from the remainder of the Site. With the removal of West Burton 4 (see below), removing these fields from the Scheme would not enable the Scheme to deliver the same infrastructure capacity (including energy and climate change benefits). They have therefore been retained.</p>
	<p>West Burton 4 247.3ha Site no longer included.</p>	<p>This site was removed from the Scheme to reduce the overall proportion of BMV land within the Scheme and took into account significant objection to the site from residents in Clayworth and Gringley-on-the-Hill, as well as concerns raised by Parish Councils in relation to landscape impact and BMV land.</p> <p>Removal of West Burton 4 significantly reduces the amount of BMV land within the Scheme from 42.3% to 26.24%.</p>

## 5.8 Alternative Substation Locations

5.8.1 The positioning of a substation within each of the Sites, and a main substation near to the point of connection, are requirements of the Scheme driven by electrical design. The considerations made by the Applicant and consultant team have been listed in **Table 5.10** below. Most of these considerations were implemented as blanket parameters across the development site to ensure consistency of approach, however site-specific requirements – led by the substation size – were also included. Parameters such as offset distances were informed by the technical consultant team based on their professional judgement and previous experiences. Once applied, a RAG assessment was undertaken at each of the sites to determine the most suitable areas within the developable area for the positioning of the substations.

**Table 5.10: Design Parameters for Substation Location**

Criteria	Consideration	Parameters
Planning, policy and legislation	Planning applications and allocations	Avoidance of any land subject to pending planning applications and site allocations.
	Neighbouring land use	Avoidance of location within 300m of residential properties
Technical and engineering requirements	Access	Accessibility by vehicle to site for maintenance and construction  Accessibility by oversized loads to substation site
	Site Area	Large enough size to accommodate substation design (site specific)
	Electrical Design	Proximity to cable exit point – no more than 500m
Environmental constraints	Landscape and Visual	Identification of key visual receptors and key views
	Ecology and Biodiversity	Avoidance of national ecological designations  Proximity to local ecological designations and sensitive ecological receptor  Avoidance of onsite species-rich habitat
	Hydrology, Flood Risk, and Drainage	Avoidance of Flood Zone 2 or 3  Avoidance of areas of medium or higher surface water flooding risk



Criteria	Consideration	Parameters
	Cultural Heritage	Avoidance of national cultural heritage designations Areas of significant archaeology to be avoided Context of cultural heritage assets to be considered
	Agricultural Land Classification	Consider avoidance of best and most versatile land
	Telecommunications, Utilities, and Television Receptors	Avoidance of underground utilities – subject to easement widths Avoidance of overhead power lines – subject to easement widths
	Safety	Avoidance of location within 300m of residential properties
	Noise and Vibration	Avoidance of location within 300m of residential properties Allowance for noise mitigation where within 500m of residential properties
	Ground conditions	Avoidance of unstable ground Consideration of ground capacity for heavy infrastructure

5.8.2 The assessment of the substation locations using the above parameters was used for drafting the first iteration of the site layout plans. These were then amended further by site-specific constraints and recommendations from statutory consultees, key stakeholders, and members of the public.

**Table 5.11: Design Iterations for the Substation Locations**

Site Area	Stage	Key Design Considerations
Main Sub Station Site	Non Statutory Consultation and Scoping (Nov 2021- Jan 2022)	Due to the location of West Burton 4 to the north of the POC and the other 3 sites to the south of the POC, a stand alone substation site close to the POC which the other sites could feed into was preferable from an energy generation efficiency perspective rather than locating the main sub station on either West Burton 3 or 4.

Site Area	Stage	Key Design Considerations
		<p>Implementation of key parameters for 2.0ha 400kV/132kV air insulated substation.</p> <p>Search area within 2km of West Burton POC Dwelling proximity removed 51.4% of search area.</p> <p>Field S4 (subsequently sub divided and substation site known as S1 and S2) chosen as most suitable location due to other environmental constraints.</p> <p>Two potential areas were identified as possible battery storage, one of which was field S4 alongside main substation.</p>
	Version 1 site layout (Mar 2022)	Parameters based design only. Identified underground gas pipelines and areas of surface water flooding avoided.
	V2 / PEIR site layout (Jun 2022)	Parameters based design only. Substation remains on fields S1/S2. No changes from V1 to V2/PEIR layout. Battery storage location chosen alongside substation.
	DCO Submission	Following removal of West Burton 4 the Main Sub Station Site was no longer required due to the reduced scale of the main Substation, which it was possible to locate, together with battery storage, within West Burton 3 (see below).
West Burton 1	RAG Rating (Nov 2021)	<p>Implementation of key parameters for 0.35ha 132kV air insulated substation.</p> <p>West half of field M4 identified as most suitable.</p>
	Version 1 site layout (Mar 2022)	Substation located in SW corner of M4 adjacent to Broxholme Lane and site entrance point. 25m landscape buffer to road implemented.
	V2 / PEIR site layout (Jun 2022)	Substation relocated (by 200m) to NW corner of M5 to reduce landscape impact.
	DCO Submission	Minor revision due to updated substation layout details. The position of the substation in the Site has moved approximately 20m from PEIR to allow for better access into the substation compound.
West Burton 2	RAG Rating (Nov 2021)	<p>Implementation of key parameters for 0.50ha 132kV/33kV air insulated substation.</p> <p>Fields N1-3 and parts of N4 and N8 deemed most suitable.</p>

Site Area	Stage	Key Design Considerations
	Version 1 site layout (Mar 2022)	Implementation of key parameters. Substation located in SW corner of field N2. The chosen location was a compromise between flood risk and utilities, landscape and heritage impacts.
	V2 / PEIR site layout (Jun 2022)	Substation location unchanged Flood mitigation requirements optioneered.
	DCO Submission	Substation location unchanged.
West Burton 3	RAG Rating (Nov 2021)	Implementation of key parameters for 0.6ha 132kV/33kV air insulated substation. Fields Q4, Q6, and Q13 deemed most suitable.
	Version 1 site layout (Mar 2022)	Implementation of key parameters. Substation located in SE corner of field Q4 Offsets to trees, ditches, and the underground high pressure gas line implemented.
	V2 / PEIR site layout (Jun 2022)	Substation location unchanged. Noise buffers to substation were directed by noise impact modelling.
	DCO Submission	As a result of the removal of West Burton 4 from the Scheme, the need for the Scheme's main 400kV substation and battery energy storage system to be located at a separate location (West Burton Sub) was no longer required, and as such was moved to West Burton 3, superseding the previous 132kV substation.  Due to the larger scale of the 400kV substation and battery energy storage system, these have been located in field Q13 instead of field Q4.  Field Q13 was selected due to its removed setting from residential properties, minimal landscape setting impacts, and sufficient space for siting of the substation and battery storage, avoiding constraints from flooding, overhead power lines and underground gas pipeline.

## 5.9 Alternative Cable Routes

5.9.1 The proposed Cable Route Corridor has been refined and reduced from that set out at earlier stages of the project. The guiding design parameters for definition of the cable corridors are set out in **Table 5.12** below.

**Table 5.12: Design Parameters for Cable Route Corridors**

Criteria	Consideration	Parameters
Planning, policy and legislation	Planning applications and allocations	Avoidance of any land subject to pending planning applications and site allocations.
	Minerals Resource Safeguarding	Avoid creating a future obstruction to the future exploitation of mineral resources subject to minerals resource safeguarding. Wherever possible, cable routes should follow existing infrastructure corridors such as roads, railways, drainage routes or existing pipelines or cable routes, or alternatively follow the edge of significant landscape features such as woods rather than directly crossing open fields.
Technical and engineering requirements	Electrical design	Seek to achieve the shortest route between Sites
Environmental constraints	Ecology and Biodiversity	Avoidance of national ecological designations Proximity to local ecological designations and sensitive ecological receptor Minimisation of crossings of major watercourses Consideration of particular constraints and requirements e.g. HDD drilling.
	Cultural Heritage	Avoidance of national cultural heritage designations
Land use and ownership constraints		Avoidance of residential properties and curtilage Affecting a minimum number of landowners. Where possible reducing interaction on rail network, strategic road infrastructure, utilities and other infrastructure.

5.9.2 The above key considerations for refining the Cable Route Corridor have been assessed through the various stages below to identify the final cable corridor.

5.9.3 Options for open trenching, moling, micro tunnelling and horizontal directional drilling (HDD) were explored for the watercourse crossings, with a technical preference for open trenching where possible, but HDD was eventually chosen as the best approach to minimise disturbance to habitat following further ecological survey work.

**Table 5.13: Main Stages of Refinement for the Cable Route Corridor**

Stage	Consultation and Surveys which influenced the Proposed Layout at this Stage	Key Design Considerations
Non-Statutory Consultation November-December 2021	Site Selection Assessment <b>Appendix 5.1: Site Selection Assessment</b> <b>[EN010132/APP/WB6.3.5.1].</b>  Initial assessment of opportunities and constraints.	Indicative cable routes were selected on the basis of using the shortest possible routes taking into consideration environmental designations, but with a large amount of optionality available. This resulted in a wide cable corridor search area which included whole fields at this stage with multiple river crossing options.
EIA Scoping January 2022	Feedback from Planning Inspectorate  Statutory body consultation from EIA Scoping  Non-statutory consultee feedback  Ongoing stakeholder engagement  Ongoing focussed consultation with residents  Desk-based and initial field assessments of the proposed Route including preliminary minerals resource assessment undertaken.  Regular monthly meetings between the Applicant’s technical consultants and Gate Burton applicants and technical consultants to consider a joint approach to the location, design	Two options for cable crossing of River Trent were identified: 1) Between Gate Burton and Knaith, and 2) North of Marton to Littleborough.  Residential and business properties excluded from cable corridor search area.

Stage	Consultation and Surveys which influenced the Proposed Layout at this Stage	Key Design Considerations
	<p>and assessment of constraints within the Shared Cable Corridor.</p> <p>The Applicant and Gate Burton teams committed to a joint approach for assessment work within the Shared Cable Corridor. Ecological and archaeological survey work was shared jointly between the teams to assist in selection of routes.</p>	
Version 1 site layout (Mar 2022)	<p>Ongoing focussed consultation with residents</p> <p>Statutory body consultation from EIA Scoping</p> <p>Ongoing stakeholder engagement</p> <p>Environmental surveys</p> <p>Ongoing monthly meetings with Gate Burton team and joint survey work.</p>	<p>The cable corridor presented was based on the initial cable route options from EIA Scoping, modified only with respect to land ownership along the proposed route. Optionality remained a driving factor in retaining a wide cable route, as constraints and environmental assessments were only progressed to a preliminary stage. The cable routes presented therefore consist of entire fields, with any enclaved residential or business premises excluded from further investigation.</p>
V2 / PEIR site layout (Jun 2022)	<p>Non- Statutory consultee feedback</p> <p>Feedback from statutory consultees through EIA scoping process</p> <p>Environmental surveys including landscape and visual, ecology, heritage, noise, transport, and other topics forming the PEIR.</p> <p>Landowner feedback.</p> <p>Applicant’s design process.</p>	<p>Intra-site cable routes were partially developed to demonstrate the Sites’ interconnectivity.</p> <p>Cable route options for crossing the River Trent were reduced from two to a single preferred option between Trent Port and Torksey. The option to the north of Marton was removed due to significant heritage concerns regarding impacts on Roman artifacts associated with the Roman Road and nearby Segelocum Roman Town at Littleborough. No changes</p>

Stage	Consultation and Surveys which influenced the Proposed Layout at this Stage	Key Design Considerations
	<p>Ongoing monthly meetings with Gate Burton team and joint survey work.</p> <p>Mapping of Minerals resource safeguarding and areas of search.</p>	<p>were made to the provision of the Grid Connection Point at West Burton Power Station.</p>
<p>DCO Submission November 2022</p>	<p>Statutory consultation feedback</p> <p>Feedback from landowners</p> <p>Development of the Environmental Impact Assessment. This has assessed the anticipated 5 year sequential construction of the scheme, Gate Burton and West Burton Shared Cable Corridor.</p> <p>Technical input on construction of the cable route.</p> <p>On going monthly meetings with Gate Burton team and joint survey work.</p> <p>Focussed meetings between Applicant and Gate Burton ecological, heritage and Civils teams to refine the Shared Cable Corridor.</p>	<p>Landowners covered by the PEIR cable corridor were contacted to discuss their preferred route for the cable crossing their land. These preferences were combined to form a continuous primary target route. This target route – predominantly 100m in width, was fully surveyed by geophysical surveys, ecological surveys, and landscape assessments to generate options within the target route. An optioneering workshop was undertaken to determine a final cable corridor of 50m in width over the majority of its length. Liaison with Gate Burton Civils Design Team further helped to refine the construction methodology and avoid constraints within the Shared Cable Corridor. Greater width is provided in specific locations where required for accesses and laydown areas and in the area where the route is shared with Cottam Solar and Gate Burton NSIP projects and greater working width is required.</p> <p>The final route was determined through consideration of archaeological potential, avoidance of ecological features of significance, and limiting the</p>

Stage	Consultation and Surveys which influenced the Proposed Layout at this Stage	Key Design Considerations
		<p>number of hedgerow crossings required.</p> <p>Further consideration was given to ensure the cable route largely lay alongside existing infrastructure corridors or edges of significant landscape features to minimise the impact on the future productivity and accessibility of agricultural land and mineral resources.</p>



## 5.10 Summary and Conclusions

- 5.10.1 This chapter of the ES has described the consideration of alternatives and design evolution in relation to the Scheme. Alternative Sites have been considered and the selection of the Scheme's location has followed a systematic step-by-step process as set out in detail within Appendix 5.1: Site Selection Assessment [EN010132/APP/WB6.3.5.1]. This took a sequential approach to the consideration of potential sites in terms of agricultural land classification.
- 5.10.2 The land maximises the utilisation of low grade, non best and most versatile (BMV) agricultural land with 73.76% of the land being classified as non BMV land. In terms of the specific areas of BMV land that are included within the Scheme, these are justified by particular factors related to their location and context within the Scheme, the wider landholding, and in relation to adjacent and surrounding land. Detailed justification for retaining small areas of BMV land and an explanation as to why others were removed is provided within **Table 5.9: Stage 4 – Design Updates up to DCO Submission (August-November 2022)** and within ES Chapter 19: Soils and Agriculture [EN010132/APP/WB6.2.19].
- 5.10.3 The land for the Scheme has been demonstrated to perform better than 3 of the assessed PDAs and equal to the remaining one following the site selection process. There are no obviously more suitable locations for the Scheme within the Search Area.
- 5.10.4 The Order limits would not be suitable for alternative forms of renewable generation at the same scale as the Scheme. Tidal power, offshore wind and hydroelectric storage were not possible due to the location of the POC which is located approximately 70km from the coast and due to other constraints associated with topography and visual impact. Nuclear power was not considered as an alternative because of the high cost of electricity and the lengthy planning and development timeframe; circa 20 years, that such a project would involve. The Scheme will be able to start generating electricity much more quickly with a grid connection anticipated in 2029.

Alternative layouts for the solar panel areas, alternative substation locations and alternative cable routes have all been considered from the early scoping stages of the project through to submission of the DCO application. Matters raised by stakeholders in relation to alternatives at the EIA Scoping and Statutory Consultation Stages have helped to shape the development of the Scheme. This iterative design process, has resulted in the Scheme delivering good design and meeting the requirements of the NPSs and Draft NPSs in the context of efficiently delivering large scale renewable energy infrastructure. It also provides a new network of environmental features which deliver a range of ecosystem services, incorporating biodiversity, heritage, landscape and access.

## 5.11 References

- Ref.1 HMSO (2017) The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
- Ref.2 Department of Energy and Climate Change (DECC), (2011) National Policy Statement for Energy (EN-1)
- Ref.3 Her Majesty's Stationary Office (HMSO) (2008) Climate Change Act
- Ref.4 HMSO (2009) The UK Low Carbon Transition Plan; Five Point Plan
- Ref.5 6 Intergovernmental Panel on Climate Change (October 2018) 'Special Report on the impacts of global warming of 1.5°C above pre-industrial levels'
- Ref.6 Committee on Climate Change (May 2019) Net-Zero: The UK's contribution to stopping global warming'
- Ref.7 Committee on Climate Change (June 2020) Reducing UK emissions: Progress Report to Parliament.
- Ref.8 National Grid, Future Energy Scenarios
- Ref.9 DECC (2011) National Policy Statement for Renewable Energy Infrastructure (EN-3)
- Ref.10 DECC (2011) National Policy Statement for Electricity Networks Infrastructure (EN-5)
- Ref.11 Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework