One Earth Solar Farm

Preliminary Environmental Information Report [EN010159]

Chapters 1 to 6

May 2024

One Earth Solar Farm Ltd

Contents

1. Introduction

Purpose of the PEIR

1.1. This Preliminary Environmental Information Report (PEIR) has been prepared to support our proposals for the One Earth Solar Farm Project by One Earth Solar Farm Ltd. Specifically this PEIR has been prepared to enable consultees (both specialist and non-specialist) to gain an understanding of the environmental effects that may arise as a result of the construction, operation and/or decommissioning of our Project, based upon preliminary work undertaken to date. It should be noted that the design is currently being developed and the process of gathering information and identifying how the environment might be affected by our Project is still continuing. The information contained within this document will therefore continue to evolve and will be reported on fully in the Environmental Statement (ES) that will be submitted with the forthcoming development consent order (DCO) application (see Chapter 2: Environmental Statement for further details on the ES).

Background Information

The Applicant

1.2. One Earth Solar Farm is being promoted by One Earth Solar Farm Ltd. This is a joint venture between Padero Solaer Ltd (trading as PS Renewables) and Ørsted Onshore UK Ltd.

1.3. Established in 2012, PS Renewables is one of the UK's largest privately held companies that specialises in the development and asset management of renewable energy projects including solar and BESS. PS Renewables existing solar farm portfolio totals over 300MW of electricity producing potential in the UK.

1.4. In the UK, Ørsted is a leading offshore wind developer; currently operating 12 offshore wind farms, alongside onshore wind farms in Scotland, also owning and operating sites for energy storage. Ørsted is committed to ensuring that its presence contributes to sustainable growth and development, helping to support the UK in meeting its legally binding net zero targets and benefitting the communities in which it operates.

Project Overview

1.5. The One Earth Solar Farm Project will involve the installation and operation of solar photovoltaic panels, Battery Energy Storage Systems (BESS) and associated grid connection infrastructure which will allow for the generation and export of electricity to the High Marnham substation ('our Project'). The Applicant has secured a connection agreement with National Grid which would allow export and import up to 740 megawatts (MW) of electricity to the High Marnham substation.

1.6. Our Project will be sited across approximately 1,500 hectares (ha) of land within Lincolnshire and Nottinghamshire (the 'Site'). Further details of our Project, including details on our Site access, ecological enhancements and cabling are included in **Chapter 4: Our Project**.

1.7. As our Project is an onshore energy generating station the capacity of which will exceed 50MW of electricity, it is classified as a Nationally Significant Infrastructure Project (NSIP), and therefore requires a DCO under Sections 14(1)(a) and 15(2) of the Planning Act 2008 (as amended)[1]. A DCO is required for NSIPs and if granted would authorise the construction, operation and/or decommissioning (where relevant) of the Project. As a result of their national, strategic importance, DCOs are determined at a national level with the decision whether to grant consent or not being made by the relevant Secretary of State (SoS).

This PEIR

1.8. Under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 as amended[2] (hereafter referred to as the 'EIA Regulations'), NSIPs are generally required to be subject to an Environmental Impact Assessment (EIA). EIA is a formal process that assesses relevant environmental information to identify the likely significant environmental effects of a project and potential mitigation measures for avoiding, preventing, reducing or, if possible, offsetting likely significant environmental effects. It provides decision-makers with the environmental information needed to make informed decisions when determining applications for certain projects. This includes the provision of information on the likely significant environmental effects that will occur as a result of a project to other interested stakeholders, thereby allowing them to provide informed input to the consenting process.

1.9. This PEIR is prepared in advance of the submission of the DCO application to the SoS and is part of the 'pre-application' stage for NSIPs and is required by the EIA Regulations. In respect of the EIA process for our Project, preparation of the PEIR follows submission of the request for an EIA Scoping Opinion but precedes submission of the DCO application and an Environmental Statement (ES). A diagram of the EIA Process is provided in **Figure 2-1** and the EIA Process as it relates to our Project is discussed further in **Chapter 2: Environmental Impact Assessment**. The design of our Project, as presented in this PEIR, has been informed by the ongoing environmental assessment process and consultation and engagement responses. It does not represent the final design.

1.10. To inform our PEIR and the EIA process more generally, we have been undertaking environmental surveys since May 2023 to gather baseline data, and in October 2023 we published our EIA Scoping Report which described the proposed method by which we are making an assessment of the potential effects on the existing environment (see **Volume 3: Scoping Consultation**). The conclusion of our detailed environmental assessment will be presented in an ES that will be submitted with our DCO application. The PEIR presents the findings of the surveys we have undertaken to date as well as details of the *preliminary* impact assessments, as described above, that have been made.

[2] His Majesty's Office (HMSO) (2017) Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

1.11. This PEIR uses, as far as is possible, non-technical language so as to make it accessible to the widest possible audience. It should however be understood that by its very nature, environmental assessment is a complex discipline and generally technical by nature.

Structure of this PEIR

1.12. This PEIR comprises the following volumes:

- **Volume 1: Main Report** (as presented in this document)
  - Chapter 1: Introduction
  - Chapter 2: Environmental Impact Assessment
  - Chapter 3: Description of our Site and Surrounding Area
  - Chapter 4: Our Project
  - Chapter 5: Legislative and Planning Policy Context
  - Chapter 6: Methodology for the Preliminary Environmental Information Report
  - Chapter 7: Biodiversity
  - Chapter 8: Hydrology and Hydrogeology
  - Chapter 9: Land and Soils
  - Chapter 10: Buried Heritage
  - Chapter 11: Cultural Heritage
  - Chapter 12: Landscape and Visual
  - Chapter 13: Transport and Access
  - Chapter 14: Air Quality
  - Chapter 15: Carbon and Climate Change
  - Chapter 16: Noise and Vibration
  - Chapter 17: Human Health
  - Chapter 18: Socio-Economics
  - Chapter 19: Cumulative Effects
  - Chapter 20: Conclusions of Preliminary Significance
- **Volume 2: Scoping Consultation**
- **Volume 3: Overview of Our Project and Preliminary Likely Significant Effects**

Project Team and Competency

1.13. We have assembled a team (the EIA team) that has significant experience and appropriate competence as required by Regulation 14(4) of the EIA Regulations, including for solar farms and other renewable energy projects. In **Appendix 1-1** we have provided details of our EIA team including providing details of the relevant expertise of all the senior technical specialists who have contributed to the preparation of this PEIR.

PEIR Feedback Process

1.14. We are inviting feedback on our PEIR during our statutory consultation period, which runs between 29th May and 9th July 2024. During this time, you can access our full PEIR and supporting documents on our consultation website (http://oneearthsolarfarm.co.uk/).

1.15. You can submit your written feedback on the PEIR by completing a consultation questionnaire, which is available online at our Project website, as well as in hard copy at consultation events or by request. You can also submit written feedback by email or post through the contact information below:

- Email: info@oneearthsolarfarm.co.uk
- Freepost: One Earth Solar Farm, Freepost SEC NEWGATE UK LOCAL

2. Environmental Impact Assessment

The Need for Environmental Impact Assessment (EIA)

2.1. The aim of EIA is to protect the environment by ensuring that those responsible for making decisions on whether development consent should be granted have information on whether our Project is likely to give rise to likely significant environmental effects. These decision makers can then take into account any possible significant environmental effects when considering whether to grant a consent.

2.2. The EIA Regulations set out a procedure for identifying those projects which should be subject to an EIA. Some types of development must be subject to EIA and these are listed within Schedule 1 of the EIA Regulations. Other developments may be subject to EIA if they are listed in Schedule 2 of the EIA Regulations and it is considered our Project is likely to have significant environmental effects on the environment.

2.3. Our Project does not fall under any of the types of development set out in Schedule 1 of the EIA Regulations. However, it is of a type and scale described in Schedule 2 paragraph 3 (a) of the EIA Regulations, and potentially also falls under (b) of that Schedule:

"Energy industry

a) industrial installations for the production of electricity, steam and hot water (projects not included in Schedule 1 to these Regulations);

b) industrial installations for carrying gas, steam and hot water; transmission of electrical energy by overhead cables (projects not included in Schedule 1 to these Regulations)."

2.4. Based on the above, we have considered that our Project should be subject to EIA and therefore will voluntarily submit an ES in support of the DCO Application, without going through the formal screening process.

The EIA Process

2.5. EIA is a systematic process that comprises a number of key steps. Done well, it should help ensure that the construction, design, operation, maintenance and decommissioning of a project occurs in the most environmentally sustainable way possible. Furthermore, it should be informed by a series of consultations so that a robust and detailed assessment of the likely significant environmental effects of our Project is produced using the most appropriate methods of assessment available.

2.6. **Figure 2-1** shows the steps of the EIA documentation production and also notes the work we have undertaken to date (in green), the work currently being undertaken (in dark blue) and works that will be completed in the future (in white). It also shows how the PEIR fits into the EIA process. **Figure 2-2** presents further details and shows the details to be considered in the ES, which will be submitted as part of the DCO application and which the PEIR will feed into.

Figure 2-1: Stages of the EIA Documentation Production

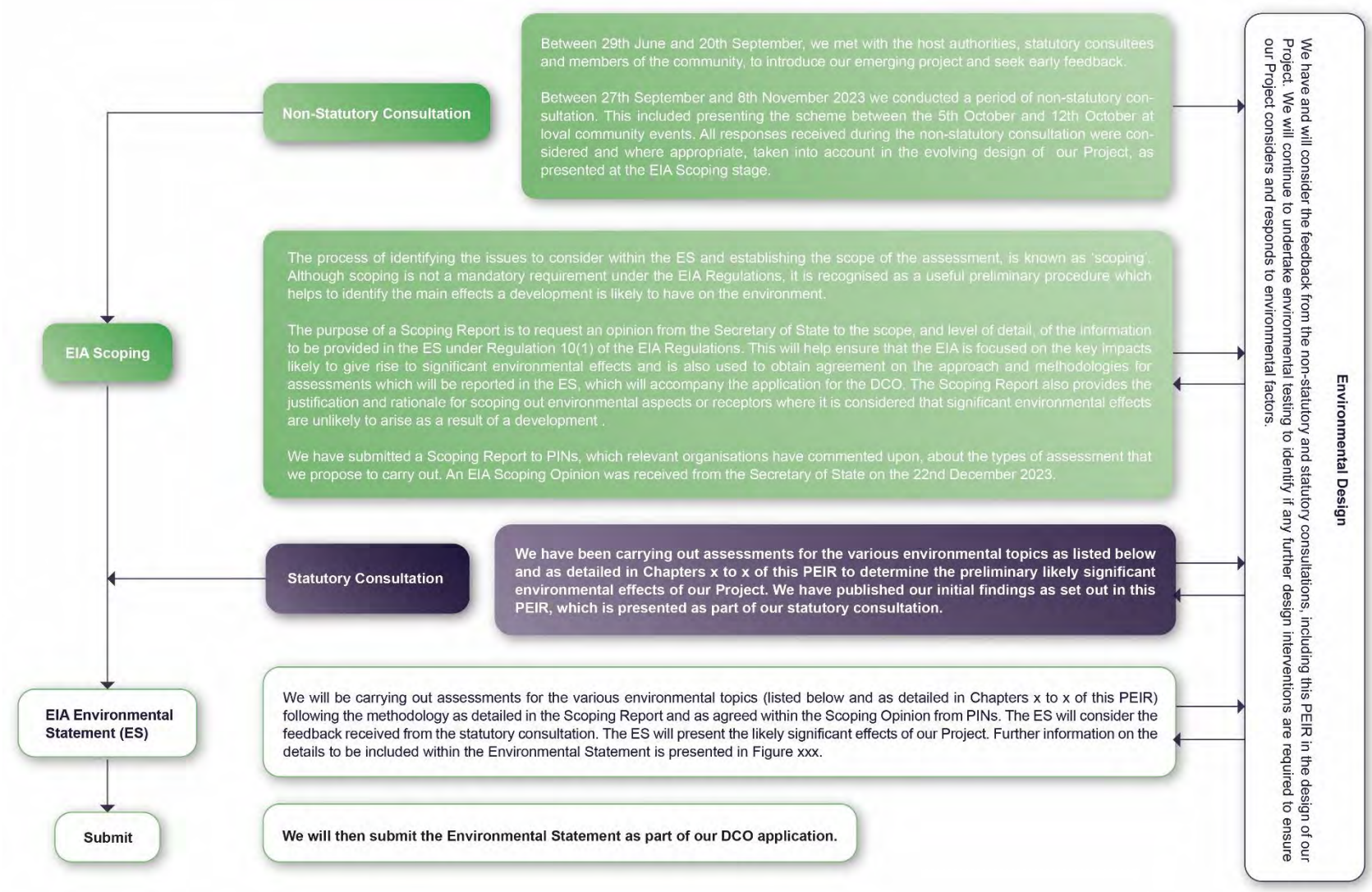
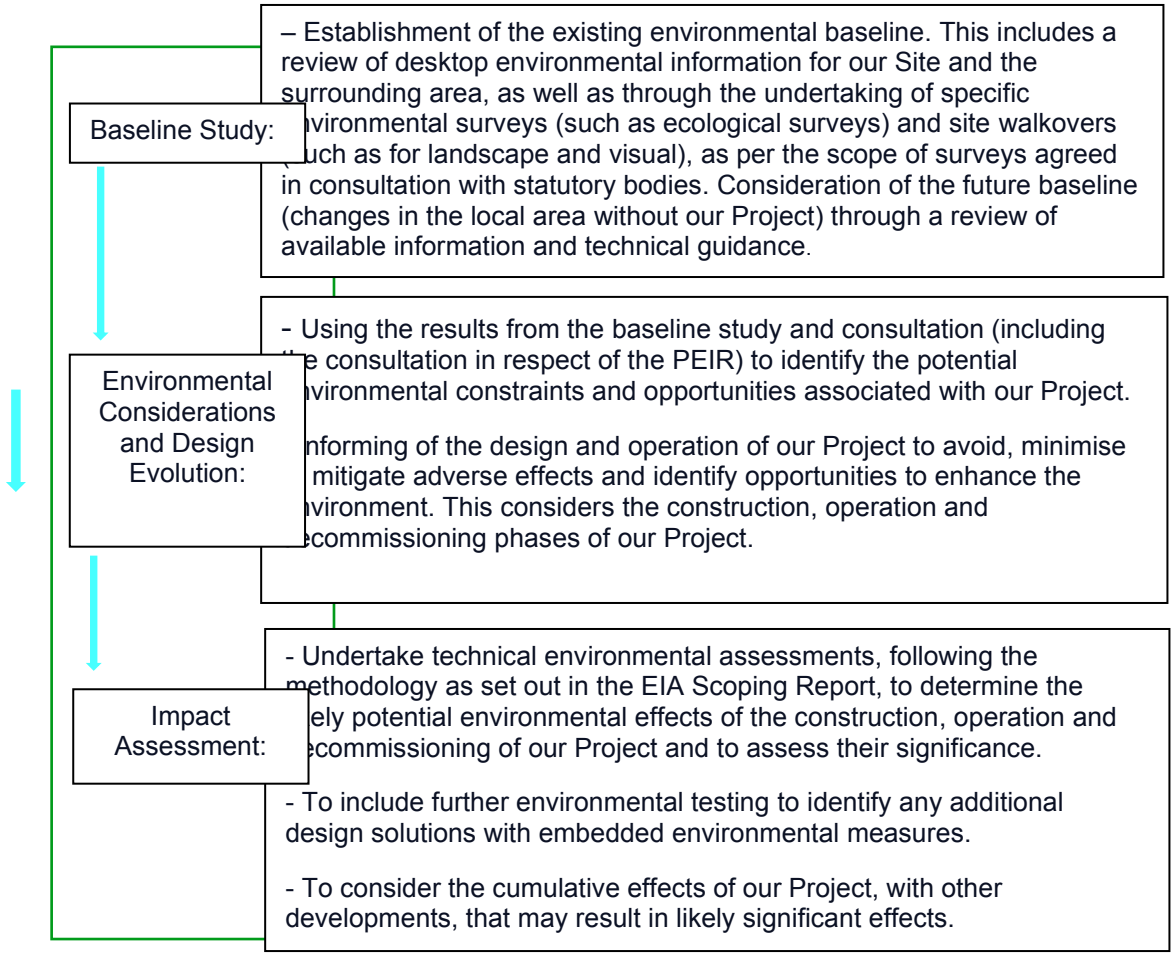


Figure 2-2: Details to be included within the Environmental Statement



2.7. The PEIR presents details on the aspects which have been scoped in and/or out, as agreed by the Planning Inspectorate (PINs) through the EIA Scoping Opinion received (see **Volume 3: Scoping Consultation**). Where relevant, further information is presented.

2.8. Regulation 5(2) of the EIA Regulations sets out the environmental factors which should be considered with the EIA. **Table 2-1** indicates where specifically our PEIR has addressed these requirements.

Table 2-1: Environmental Factors listed under Regulation 5(2) of the EIA Regulations

Schedule 5(2)	PEIR Aspect Chapters
(a) population and human health	Chapter 9: Land and Soils Chapter 12: Landscape and Visual; Chapter 13: Traffic and Transport; Chapter 14: Air Quality; Chapter 16: Noise and Vibration; Chapter 17: Health;

	Chapter 18: Socio-economics.
(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC	Chapter 7: Biodiversity
(c) land, soil, water, air and climate	Chapter 8: Hydrology and Hydrogeology; Chapter 9: Land and Soils; Chapter 12: Landscape and Visual; Chapter 14: Air Quality; and Chapter 15: Carbon and Climate Change.
(d) material assets, cultural heritage and the landscape	Chapter 3: Description of our Site and Surrounding Area; Chapter 10: Buried Heritage; Chapter 11: Cultural Heritage; Chapter 12: Landscape and Visual; Chapter 13: Traffic and Transport; and Chapter 18: Socio-economics
(e) the interaction between the factors referred to in sub-paragraphs (a) to (d)	Chapter 19: Cumulative Effects.

Consultation and Engagement

2.9. Consultation alongside the EIA process is important to the development of a comprehensive and proportionate ES. The views of statutory consultees[3] (including members of the community) and non-statutory consultees are important to ensure that the EIA from the outset focuses on specific environmental issues where there are likely significant environmental effects to occur, and where further investigation is required.

2.10. The consultation, as an ongoing process, enables environmental measures to be incorporated into our Project to avoid, prevent, reduce or, if possible, offset adverse environmental effects and to optimise environmental benefits.

[3] Statutory consultees are described in s.42 of the Planning Act (2008). Details can be found here: Planning Act 2008 (legislation.gov.uk)

2.11. We conducted a period of 'early engagement' between 29th June and 20th September 2023. This included meeting with the host authorities, statutory consultees and members of the community, to introduce the emerging scheme, seek early feedback, and develop the scope and methodology for the non-statutory consultation. On 12th September, we conducted 'door knocking' in the local area to personally introduce our Project and answer any questions in advance of our Project being publicised more widely.

2.12. Following the 'early engagement' we conducted a period of non-statutory consultation between 27th September and 8th November 2023. As part of the consultation, public exhibitions were held in Newton on Trent (5th October), South Clifton (7th October), Dunham-on-Trent (10th October) and Normanton on Trent (12th October), and one online community webinar (11th October).

2.13. All of the written feedback that we received during this period of non-statutory consultation has been recorded and considered, which will be detailed in the Consultation Report submitted with our DCO application.

2.14. All the responses we have received to date during consultation have been carefully considered and where appropriate, have been taken into account in the design of our Project (as presented in **Chapter 4: Our Project**).

Environmental Design

2.15. Our Project has undertaken to respond and understand the impacts upon environmental factors and these impacts have been factored into the design as part of an evolving process. In particular, environmental factors have directly influenced the parameters of the heights of the panels, the landscaping parameters and the location of the solar infrastructure. Details of how our Project has considered the environmental factors is detailed in **Chapter 4: Our Project**.

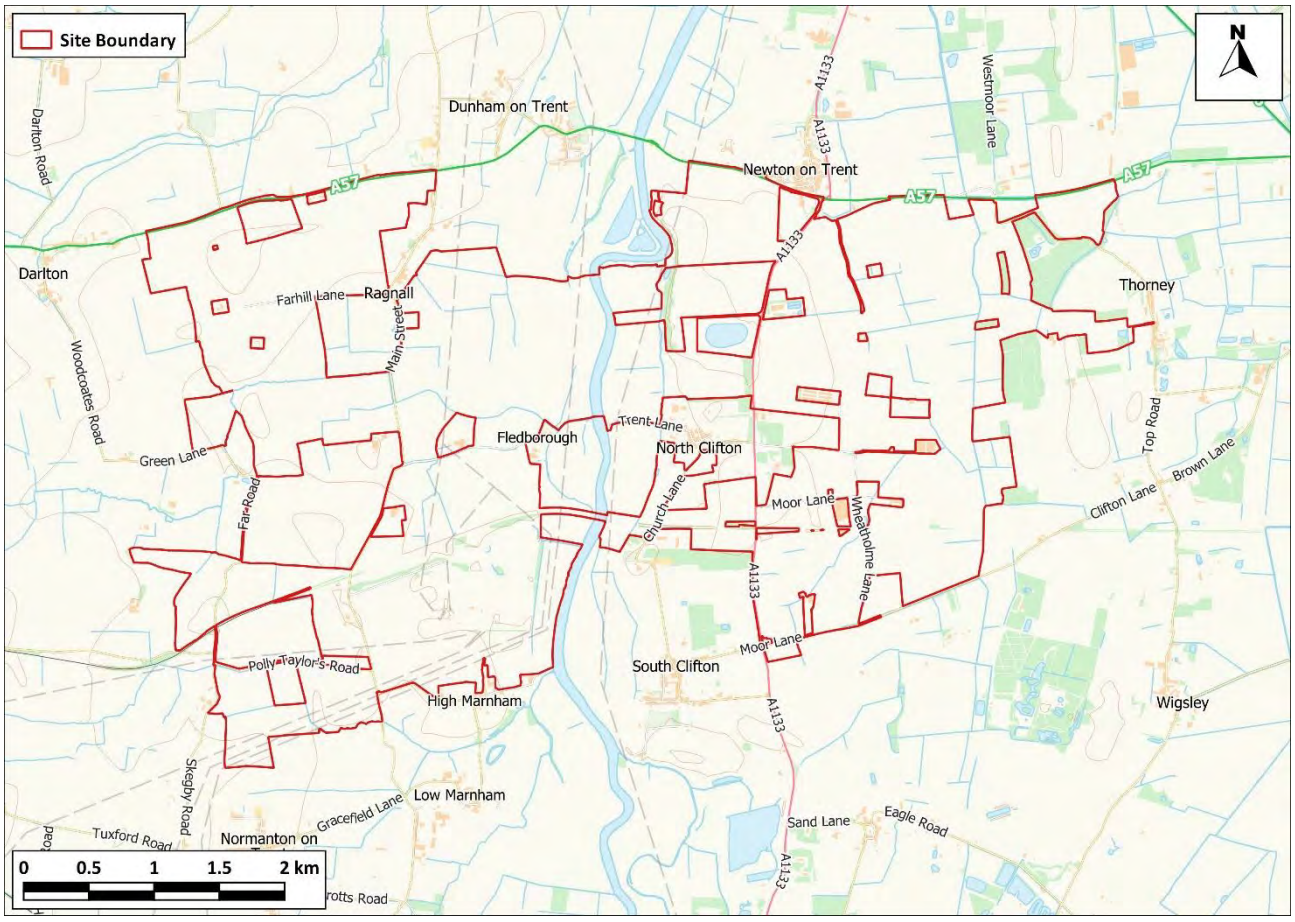
2.16. In addition, the process to get to this point has been driven by environmental testing, albeit always understanding that other factors such as operational, commercial need and safety implications need to be considered. Specific design interventions for each technical aspect can be found in the Environmental Design sections of **Chapters 7 to 18**.

3. Description of our Site and Surrounding Area

Site Location and Surrounding Area

3.1. Our Site boundary is shown in **Figure 3-1** and consists of approximately 1,500 hectares (ha) of land, comprising of agricultural fields located to the east and west of the River Trent which dissects our Site in a roughly north-south alignment. Hedgerows, trees and woodland form the boundaries to many of the fields within our Site. At its maximum, our Site extends approximately 4.5km in a north-south direction and approximately 8km in an east-west direction.

Figure 3-1 Site Boundary



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3.2. Our Site falls across two county boundaries with approximately 1,300ha of our Site falling within Nottinghamshire County Council and the remaining approximately 200ha of our Site within Lincolnshire County Council. Our Site also extends across three administrative boundaries within the County areas, these being Newark and Sherwood District Council, West Lindsey District Council and Bassetlaw District Council.

3.3. The nearest villages to our Site include:

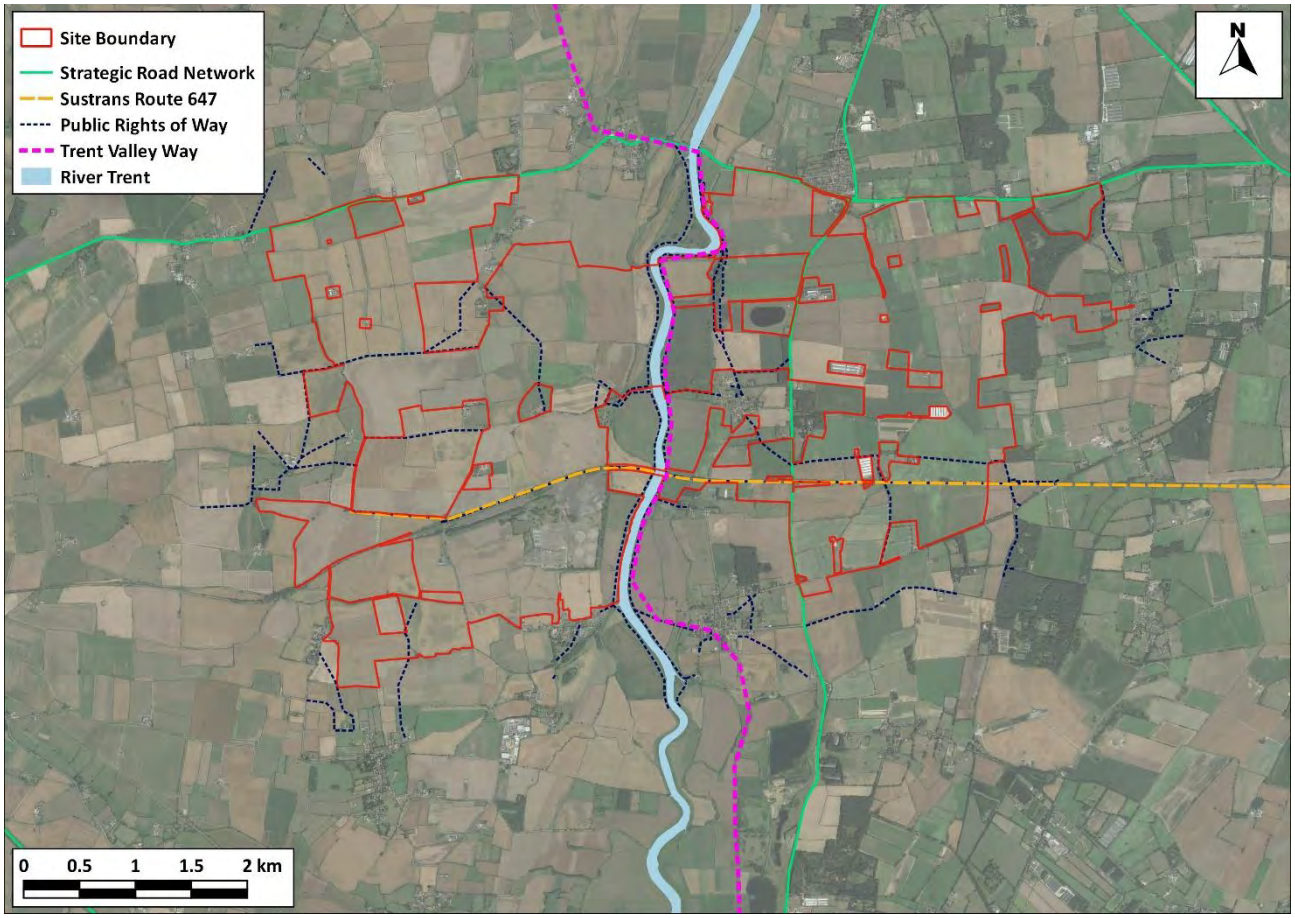
- North Clifton and South Clifton located on the eastern boundaries of our Site;
- Newton on Trent located within 50m of the nearest boundary of our Site to the north;
- Dunham located within 500m to the north of the nearest boundary of our Site;
- Fledborough located on the western boundaries of our Site; and
- Ragnall located on the western boundaries of our Site.

3.4. In addition, there are a number of isolated properties and hamlets, which are dispersed throughout the local area.

Transport and Access

3.5. The key transport features are shown in **Figure 3-2**.

Figure 3-2 Key Transport Features



3.6. Our Site is currently accessible from a number of existing field accesses that allow agricultural machinery to enter and depart its boundaries.

3.7. The A1 which connects Blyth to the north and Stamford to the south, is located approximately 8km to the east of the centre of our Site. The A1 forms a junction with the A57, which connects Markham Moor to Lincoln. The A57 runs along the northern Site boundary, thus being approximately 2.5km from the centre of our Site. The A57 runs eastwards before forming a junction with the A46 to the east of our Site. The A1133 is located within the eastern part of our Site, approximately 1.5km from the centre of our Site, and connects Torksey Lock with Winthorpe, where it then joins the A46.

3.8. The Trent Valley Way extends for 174km from Nottingham in the south, to the Humber Estuary. This long-distance footpath route follows the eastern edge of the River Trent as it runs through our Site. In addition, there are several other footpaths and also bridleways that cross our Site.

3.9. Located within our Site and approximately 500m south of its centre, is the Sustrans Cycle Route 647. This Route is part of the National Cycle Route (NCR) and is a disused railway line associated with the former Lancashire, Derbyshire and East Coast Railway, which ran east-west connecting Lincoln to the east with Tuxford to the west. Crossing over the River Trent, the Sustrans Route utilises the Fledborough Viaduct. This is one of a few river crossing opportunities in the locality.

3.10. The River Trent is classified as a freight waterway, and can accommodate large waterborne craft.

Existing Infrastructure

3.11. Our Site of the former High Marnham coal fuelled Power Station which was decommissioned in 2003, is located on the southwest boundary of our Site. This area of land has been mostly cleared with demolition of the cooling towers occurring in 2012. Remaining infrastructure comprises extensive metalled roadways, including the access road from Fledborough Road to the west, as well as the former pump house that lies adjacent to the River Trent.

3.12. On our Site of the former High Marnham Power Station remains a National Grid 400 kilovolt (kV) and 275kV substation. Our Project will connect into the 400kV and 275kV substations. It is noted that the substation may be modified by National Grid to meet the needs of other projects in the area. Should NGET decide to expand or relocate their substation, our Project has included sufficient flexibility to enable it to connect to this new substation and has been proactively engaging with NGET on this matter. As above, the Applicant has secured a connection agreement with National Grid which would allow export and import up to 740MW of electricity to the High Marnham substation (more details are provided in **Chapter 4: Our Project**).

3.13. Numerous pylons and high voltage overhead power lines occur within the localised landscape (further detail is provided in **Chapter 12: Landscape and Visual**). These include National Grid overhead power lines that are carried by pylons and which are located to the east of the River Trent travelling in a north to south direction, and also throughout land to the west of the River Trent.

3.14. Approximately 6.5km to the north of our Site is the site of the decommissioned coal-fired Cottam Power Station. In August 2023 demolition occurred of the main building, bunker bay, turbine hall and the coal conveyer.

4. Our Project

Overview of Our Project

4.1. Our Project comprises the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) array electricity generating facility allowing for the generation and export of electricity to the High Marnham substation. The Applicant has secured a connection agreement with National Grid which would allow export and import up to 740 MW of electricity to the High Marnham substation. Our Project will involve the installation and operation of solar PV modules, BESS and associated grid connection infrastructure, including a cable to cross the River Trent, to connect the solar panels and batteries east of the River Trent to the point of connection at the High Marnham substation on the west. Our Project will be located within the Site as shown in **Figure 3-1**.

4.2. An overview of our Project is presented here in respect of construction, operation and maintenance, and decommissioning, however it should also be noted that on submission of the DCO application and the associated environmental assessment, further details will be presented as the design is refined. On this basis it is therefore necessary to set parameters for the assessment.

The Need

4.3. The compelling need for global action to decarbonise continues to be reinforced. On 20th March 2023, the U.N. Intergovernmental Panel on Climate Change (IPCC) published its 2023 assessment of global climate change. The report concludes that the world is likely to pass a dangerous temperature threshold within the next 10 years, pushing the planet past the point of catastrophic warming — unless nations drastically transform their economies and immediately transition away from fossil fuels [IPCC-2023].

4.4. In the UK alone, there is an urgent and quantifiable need for the deployment of solar farms and other renewable energy generation infrastructure, which is being driven by UK Government policy at both a local and national level. Our Project therefore responds to the UK Government's support for solar energy by providing a renewable energy supply that would reduce carbon emissions and assist in establishing a greater diversity of energy sources in the UK.

4.5. In June 2019 the Government heightened the UK's ambition for tackling climate change by legislating for a net-zero greenhouse gas emission target for the whole economy by 2050. Decarbonising the power sector is integral to achieving this goal and requires major investment in proven technologies, such as solar and battery storage.

4.6. The Net Zero Strategy identifies nuclear power as another option for decarbonising the UK power system. Although nuclear power has historically met circa 20% of UK demand, existing nuclear stations began to close in 2021. Only one existing nuclear plant is scheduled to remain operational beyond 2028 and currently only one new nuclear plant is scheduled to be commissioned in the late 2020s. Any others (although noting that none are currently yet under construction) will not commission before the mid-2030s due to the long construction periods associated with the technology. Only one UK coal station, Ratcliffe Power Station, is still in commercial operation, however it is proposed to close at the end of 2024.

4.7. Carbon Capture Utilisation and Storage (CCUS) is a key plank under development to support Net Zero by facilitating the decarbonisation of the UK's thermal (carbon emitting) fleet, currently circa 40GW, decarbonising industry, producing low-emissions hydrogen and delivering greenhouse gas removal technologies. Recent progress has been made towards bringing CCUS clusters forward by the end of the decade however Government recognises that "*the technology has not been delivered at scale and significant risks remain*".

4.8. Hydrogen is another key plank, but its development is not yet guaranteed. Technological hurdles must be overcome, grid connection, funding and consents must be secured. Blue hydrogen relies on functional CCUS operating at GW-scale; pink hydrogen on abundant electricity from new nuclear facilities; and green hydrogen on abundant low-carbon electricity. Not all enablers to hydrogen production are yet guaranteed, and while the future path to a low-carbon future is incredibly uncertain, much progress has already been made in the delivery of renewable generation facilities.

4.9. The UK has substantial renewable energy resources, including 40% of Europe's wind resource and the Government is targeting 50GW of offshore wind to be operational by 2030. However, wind on its own is not sufficient to meet demand and diversify energy sources.

4.10. The development of large-scale solar in the UK (National Grid estimates up to 42GW of operational solar capacity by 2030 rising to 92GW by 2050) will provide an essential diversity to the UK's low-carbon generation portfolio, working with other technologies to deliver security of supply and value to UK consumers. The Energy Security Plan (March 2023) aims for the UK to achieve up to 70GW of solar by 2035 (a fivefold increase in solar). Solar generation is therefore a critical element of the plan to decarbonise the UK electricity sector with urgency and is already a leading low-cost generation technology in the UK.

4.11. Mission Zero, published in January 2023 by Rt Hon Chris Skidmore MP, Chair of government's Independent Review of Net Zero, finds that "*The benefits of net zero will outweigh the costs*" and believes that "*This is too important to get wrong*". Mission Zero recommends the "*Full-scale deployment of solar including a rooftop revolution to harness one of the cheapest forms of energy, increase our energy independence and deliver up to 70GW of British solar generation by 2035*" [p8].

4.12. The UK Government's Powering Up Britain strategy (updated April 2023) concludes that "We need investment at scale … to rapidly rollout existing technologies … at pace to meet our ambitions for decarbonising power and [lower] wholesale UK electricity prices" [p9] and observes that "a significant proportion of technologies we will need for 2050 are currently at the demonstration or prototype phase" [PUB-p9]. Powering Up Britain therefore concludes that an acceleration of the deployment of renewables is critical to the delivery of Government's plans: "Our goal is to develop up to 50GW of offshore wind by 2030 and to quintuple our solar power by 2035" [p7], noting that 14GW of solar was already installed in the UK at the time of writing the report [p19].

4.13. The national need for solar generation is urgent and the capacity required is significantly greater than the capacity of projects currently understood to be in development.

4.14. Solar energy generation addresses all important aspects of existing and emerging UK Government policy. It will make a critical and timely contribution to decarbonisation and the security of the energy supply in the UK. This will help shield consumer bills from volatile energy prices and fluctuations in international supply markets, and provides the potential to deliver biodiversity net gains through its development.

4.15. National Policy considers solar as being a Critical National Priority (CNP). In particular, the Overarching National Policy Statement for Energy (EN-1) states '*Wind and solar are the lowest cost ways of generating electricity, helping reduce costs and providing a clean and secure source of electricity supply (as they are not reliant on fuel for generation). Our analysis shows that a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar*". Our Project responds to this urgent national need, as set out in National policy, for this type of infrastructure.

4.16. It is therefore against the context of a clear and urgent national need for this type of infrastructure that the assessment of alternatives is set.

Alternative Renewable Technologies

4.17. Alternative types of low-carbon forms of electricity generation for utilising the existing National Grid High Marnham Substation connection capacity were not considered by the Applicant as a dedicated solar farm development company.

4.18. It should be noted that tidal power, offshore wind, and hydroelectric storage were not considered possible due to the location of the High Marnham Substation approximately 70km from the coast, and within an area of low, flat topography.

4.19. Our Site is not considered suitable for onshore wind due to the low wind yield relative to other parts of the UK, coupled with the proximity to residential dwellings which would be subject to risks associated with shadow flicker and wind turbine noise. Furthermore, it is noted that the policy context for onshore wind is currently not favourable.

Alternative Locations

4.20. Government policy clearly states solar energy is a CNP and there is an urgent need for solar farms, such as our Project, to meet net-zero by 2050. As above, alternative technologies have not been identified for the Site as for this location, it is considered that solar is the best renewable generating solution for this area.

4.21. The primary driver for the location of our Project has been the availability of significant capacity at the National Grid High Marnham Substation. This available capacity at substations should be utilised (and made the most of) when it occurs.

4.22. Our Project will be able to connect to the High Marnham National Grid Substation without the need for additional capacity improvements, therefore making efficient use of existing infrastructure. This means our Project can be completed quickly responding to the urgent need for renewable energy to address the climate crisis. We have already secured a connection agreement with National Grid which would allow export and import up to 740 MW of electricity to the High Marnham substation.

4.23. From this, a range of technical, environmental and economic factors have been considered when investigating and assessing any alternative site in proximity to the High Marnham Substation.

4.24. A search of potential locations for our Project was undertaken within 10km from the centre of the National Grid High Marnham Substation. An initial distance of 10km was used to avoid the need of a long (distance) cable connection, in order to reduce potential environmental effects during the construction of the cable and to reduce the loss in power associated with a longer cable route.

4.25. The initial search showed that there is suitable land adjacent to the National Grid High Marnham Substation with sufficient willing landowners to deliver a scheme which could deliver the MW output. This means there is no need for a long grid connection cable to connect our Project to the Grid. As above, any alternative site would unnecessarily increase the length of the grid connection cable which would likely result in greater associated environmental impacts and project delay as a result of negotiating more land interests and constructing the cable corridor.

4.26. The topography of land within the 10km study area varies from approximately 105m to 4m above sea level. The lowest topography is around the River Trent. Further to the west, the topography is higher, with the highest land within the 10 km search radius being near Laxton. The topography has been influential to the location of our Project. The land of our Site has the potential to locate a large-scale solar development, due to the existence of large open areas of undeveloped land, which is made of relatively flat topography and generally sparse settlement patterns.

4.27. Our Project is located within National Character Area (NCA) of the Trent and Belvoir Vales, which is defined as “undulating, strongly rural and predominantly arable farmland, centred on the River Trent. A low-lying rural landscape with relatively little woodland cover”. This character area includes Newark-on-Trent at the centre with Grantham, Nottingham, Lincoln and Gainsborough on the peripheries. Within this NCA the landscape, compared to other locations within 10 km, our Site has been considered suitable for our Project, as it is already characterised by energy infrastructure. This includes the now decommissioned Marnham Power Station (see **Chapter 3: Description of our Site and Surrounding Area**), which still includes remains of its industrial past within the local landscape including metalled roadways and the former pump house. In addition, there are numerous pylons and high voltage overhead power lines within the localised landscape. These include National Grid overhead power lines that are carried by pylons and which are located to the east of the River Trent travelling in a north to south direction, and also throughout land to the west of the River Trent. It is considered whilst our Site is in the Trent and Belvoir Values NCA, the use of solar is consistent with the historic energy use in the local area.

4.28. Natural England Agricultural Land Classification mapping shows our Site and land within 10 km from the centre of our Site as being Grade 3 land (good to moderate; may be considered Best Most Versatile (BMV) land). Areas of land to the south and west of our Site is classed as Grade 2 land (very good, considered to be BMV land). Natural England’s Predictive Agricultural Land Classification Map for the East Midlands also shows the majority of our Site falling within an area with low-moderate likelihood of BMV. Consequently, whilst our Site does include BMV Land this is consistent with the wider area which either has the same or higher mapped BMV land grading.

4.29. The land is not constrained by environmental designations which typically seek to protect often unique or sensitive environmental features. For instance, the land is not located within or close to internationally or nationally designated biodiversity sites. In addition, there are no Areas of Outstanding Natural Beauty or of landscape value, and there is no Green Belt Designation within the 10km study area. The nearest Special Areas of Conservation (SAC) is the Birklands and Bilhaugh SAC located beyond the 10km study area (approximately 16 km to the west of our Site). There are three Sites of Special Scientific Interest (SSSI) to the south of our Site within 10km, the closest being the Spalford Warren SSSI. These areas have therefore been avoided when locating our Project.

4.30. The study area includes a combination of local single carriageway roads and strategic routes including the A1, which bisects the western part of the study area running from south-east to north-west, and the A57 which bisects the northern part of the study area running from east to west. Our Site was identified as a potential location for our Project, as the land is relatively close to part of the Strategic Road Network (SRN) by virtue of the A57 and A1 and has good accessibility via the road network for construction; operational maintenances; and decommissioning. It avoids construction traffic going through settlements further distanced from the SRN.

4.31. Various settlements are located within the study area, including Tuxford, East Markham, Weston, Normanton on Trent, Low Marnham, Darlton, East Drayton, Sutton on Trent, Carlton-on-Trent, High Marnham, North Clifton, South Clifton and North Scarle. Our Site was chosen as there are relatively few residential properties in immediate proximity to our Site and the impact on those that are can be effectively mitigated through measures such as offsets and sensitive landscaping.

4.32. There is no land allocated for future residential development within the relevant Local Plans within the study area. The relevant Local Plans identify existing employment sites to the south east of Tuxford. Our Site was chosen as it has limited land use conflict with respect to local development plan allocations and displacement of existing businesses.

4.33. Within the 10km study area flood risk is high across the middle portion, north to south. This is due to the River Trent, along with the four main tributaries, being tidal and therefore at risk of tidal flooding. To the south west of the study area, there are areas of land outside of high flood risk. Whilst the land of our Project does lie partly within an area at risk of flooding (flood zones 2 and 3), we have followed a sequential approach to site selection which has included a balanced approach to the consideration of the above factors, whilst also ensuring development in flood zones 2 and 3 is minimised as far as possible. The design of our Project has responded our Site being within the flood zones and appropriate measures (in terms of the height of the bottom of the panels that will be installed) have been included within the design, as agreed with the Environment Agency.

4.34. As well as the above environmental considerations, we have taken account of other NSIP-scale solar farms proposed in the local area and have sought to reduce the opportunity for cumulative effects. In particular when choosing our Site we have ensured the majority of land is located within Nottinghamshire County, avoiding other NSIP-scale solar sites within Lincolnshire County (including West Burton Solar Farm, Cottam Solar Project, Steepes Renewable Project and Gate Burton Energy Park). It is noted that a cumulative effects assessment (which does still consider these projects) is detailed in **Chapter 19: Cumulative Effects**.

4.35. Further to the above, a Site Selection Report will be submitted with our DCO application, which will provide further details on how our Site was selected.

Alternative Site Layouts

4.36. Since our last consultation event we have been gathering further environmental information on our Site and in its surrounds. As detailed in **Chapters 7 to 18** further environmental information has been obtained through monitoring, surveys, consultations with relevant statutory bodies, desktop reviews and environmental modelling. The layout and extents of our Project have undergone design evolution in response to feedback from the last consultation event and ongoing survey and engineering works. It is noted that the design may further evolve between statutory consultation and submission of our DCO application, responding to consultation feedback, environmental assessment, and further technical design development.

4.37. The following changes and amendments to our Project layout have been undertaken and are described in the following points:

- All solar panels and associated infrastructure have been removed from land located between North Clifton and South Clifton to protect the setting of the villages and the visual amenity experienced by residents at home or approaching the villages;
- Further offsets have been embedded from Hollow Gate Lane, extending beyond 150m in some locations, to protect the setting of Fledborough and residents' visual amenity;
- Additional offsets and new planting have been incorporated at the southern entrance to Ragnall to protect the sense of arrival into the village along Main Street;
- The field closest to Thorney has been removed from our Project to protect the setting of the village;
- Bespoke offsets have been incorporated from individual residential properties located within, or close to, our Site;
- The use of Best and Most Versatile (BMV) land has been minimised as far as possible;
- New ecological and recreational enhancements have been added across our Project, including the proposed creation of new habitats such as beetle banks and herptile hibernacula, an enhanced green infrastructure network through the planting of new hedgerows and trees, and a new network of permissive paths for public access; and
- The height of the proposed solar PV panels have been discussed with the Environment Agency and a number of design options have been considered. The final option, as presented in our Project, includes the bottom of the flood panels to be raised up to 1.8m above ground level. This includes a 300mm freeboard (i.e. gap between the flood level and base of the panels) to allow for debris in the event of flood to pass beneath the solar panels. The heights of the panels have been staggered across our Site, limiting their height wherever possible to reduce visual impact whilst responding to the potential level of flood water, allowing for the potential impact of climate change.

4.38. At this stage of our Project we are still exploring the options for routing our cables to cross the River Trent, linking land to the east of the river with the National Grid High Marnham substation to the west of our Site. In addition, we are still considering the location of our BESS and substation compound to the west of the River Trent. These options are currently not defined as we are still gathering technical, engineering and environmental information.

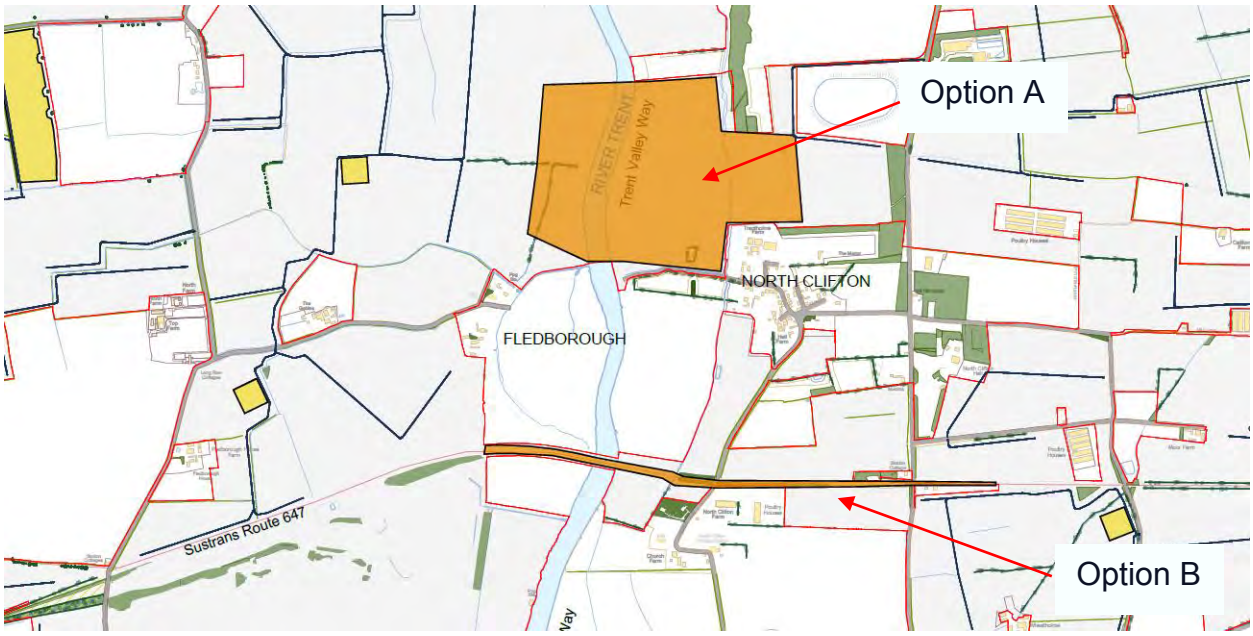
4.39. As detailed in **Chapter 6: Methodology for the Preliminary Environmental Information Report**, within the environmental assessments the options for the river crossing and the BESS and Substation locations have been considered. Each of the options for cable crossing and the locations of the BESS and substations have been assessed in **Chapters 7 to 18**. The highest level of significance from these options (or part of these options) has then been reported and represents the worst case in terms of environmental effects.

River Crossing Options

4.40. At this stage of our Project, we are currently exploring options for how the cables required would cross the River Trent. These options are shown in **Figure 4-1**, which include HDD under the River Trent (Option A) or using the existing Fledborough viaduct (Option B).

4.41. Further options were considered to cross the River Trent which included the use of Dunham Toll Bridge, a bridge or structure, and overhead lines. These options were discounted due to engineering and/or environmental considerations, as well as taking into account consultation from the Canals and River Trust, who advised they would not support a new structure over the River Trent.

Figure 4-1: Options for Cable Crossing over the River Trent



HDD under the River Trent

4.42. This option for crossing the river is to install cables below the River Trent using directional drilling techniques. The cables would be buried in trenches on the approach to the river, then pass beneath the riverbed (more than 5m below the bed of the River) via holes drilled by directional drilling.

4.43. The area identified in Option A of **Figure 4-1** takes into account the uncertainty on where the HDD would be undertaken, as the precise location will be informed by further site investigation and engagement with the Canals and Rivers Trust. **Figure 4-1** also shows the land required for construction compounds to be set up either side of the river.

Fledborough Viaduct

4.44. As described in **Chapter 3: Description of our Site and Surrounding Area**, Fledborough viaduct is approximately 0.5 miles southwest of North Clifton and is used as a public bridleway and footpath. The viaduct formed part of the former Lancashire, Derbyshire and East Coast railway line. The single-track line is now disused and forms part of The National Cycle Network known as Route 647.

4.45. This option for crossing the river is to install cables on the existing Fledborough Viaduct, as shown in **Figure 4-1** as Option B. The cabling would either be installed within the structure of the existing Fledborough Viaduct or on the external support brackets. A structural assessment of the viaduct would be undertaken to determine if this option is possible.

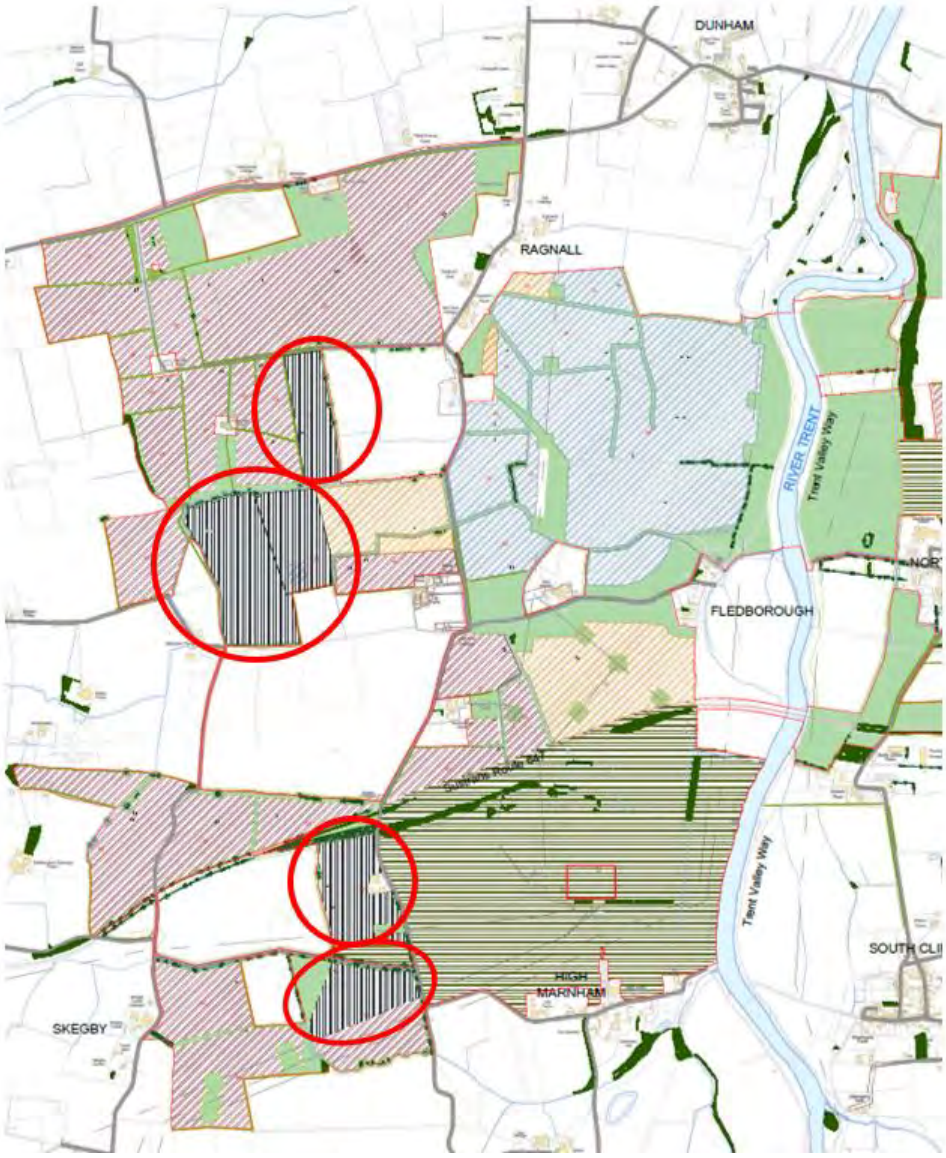
BESS and Substation Locations

4.46. There will be two BESS and substation sites within our Project, one will be located on the east and one located on the west of the River Trent. These sites will occupy up to 20ha each.

4.47. The BESS will allow the storage of energy generated by the solar panels at times of low demand and release to grid at times when demand is high or when solar irradiance is lower (known as load shifting). As a secondary function, the BESS will also have the ability to import power from the grid directly to allow the BESS system to help support the grid through grid balancing mechanisms. The substations will consist of switchgear and transformers and other power quality equipment to transform the electricity generated the PV Solar Modules into electricity for use within the National Grid. Further details on the technical dimension of the BESS and substation (such as the maximum heights) are detailed in **Appendix 4-1**.

4.48. We are considering the location of our BESS and substation compounds on the west of the River Trent. These potential areas have been identified taking into account environmental constraints, in particular ensuring the infrastructure is outside of areas within the flood zones (see **Chapter 8: Hydrology and Hydrogeology**). We will only be taking one of the locations within the west of the River Trent forward as part of our DCO Application. The potential areas are highlighted in **Figure 4-2** and will be subject to further environmental and design works.

Figure 4-2: Options for the Location of our Substation and BESS Compounds



Project Parameters and Rochdale Envelope

4.49. As set out above the development of our Project has been an iterative process, with the design evolution informed by preliminary environmental assessments and consultations to date with statutory and non-statutory consultees.

4.50. As with other projects of this type, the exact design details of our Project cannot be confirmed until the tendering process for the design has been completed and more detailed design has been approved by the relevant local planning authorities in advance of our Project commencing (or phase thereof). This is to allow for flexibility to take advantage of technological advancements. For example, the exact enclosure design or building sizes may vary depending on the contractor selected and their specific configuration and selection of plant. To ensure a robust environmental assessment is made whilst maintaining flexibility in the layout and design within the DCO application, the environmental assessments (as detailed in **Chapters 7 to 18**) are based on the principles of the 'Rochdale Envelope' in accordance with PINS Advice Note 9: Rochdale Envelope. The Rochdale Envelope involves specifying parameter ranges, including details of the maximum, and where relevant the minimum, size (footprint, width, and height relative to above ordnance datum (AOD)), technology, and locations of the different elements of our Project, where flexibility needs to be retained (see **Appendix 4-1** for the parameters of our Project).

4.51. This means that maximum design parameters (an 'envelope' within which our Project will unfold) have been adopted to provide sufficient flexibility for the later detailed design of our Project (detailed design would take place post granting of the DCO and would be subject to a requirement in the DCO for details to be approved by the relevant local planning authority), whilst also allowing for a robust assessment of environmental effects (this assessment being based on maximum 'worst case' parameters) to be made.

4.52. To assist with the interpretation of the Rochdale Envelope, parameter plans have been created, which provide details on the land where development could occur. These are described further in the below.

4.53. Further to the above, to accompany the Rochdale Envelope, a set of Design Principles have been established and will be used in the design evolution of our Project. The Design Principles consider:

- Climate - taking into account climate change as well sensitivity of the local environment;
- People – considering the impact on local communities and looking at opportunities to improve the quality of life for people who live and work nearby;
- Place - supporting the natural and built environment and enriching ecosystems; and
- Value – identifying opportunities to contribute to the local community.

4.54. Further details of the Design Principles which have been established and used for our Project are detailed in **Appendix 4-1**.

Operational Phase of our Project

4.55. Once built, the principal components of our Project comprise the following:

- PV Solar Modules;

- Mounting Structures;
- Power Conversion Stations comprising of inverters, transformers and switchgears;
- Substation and BESS;
- Low Voltage Distribution Cables;
- Grid Connection Cables;
- Fencing, security and ancillary infrastructure;
- Access tracks; and
- Green Infrastructure.

4.56. The detailed information on the components listed above, such as the number of solar PV modules, the maximum and minimum heights of the solar PV modules and the depth of the mounting equipment are set out in **Appendix 4-1**. These details have been used for the environmental assessments as detailed in **Chapters 7 to 18**.

4.57. In accordance with the Rochdale Envelope approach (as described above) a parameter plan for the operational phase of our Project is provided in **Figure 4-3**. This shows the proposed locations of the different elements of our Project, which for some elements include potential alternative site locations, for instance for batteries and substations.

Figure 4-3: Operational Parameter Plan

DUNHAM

NEWTON ON TRENT

RAGNALL

RIVER TRENT

Trent Valley Way

THORNEY

NORTH CLIFTON

FLEDBOROUGH

Sustrans Route 647

Trent Valley Way

SOUTH CLIFTON

HIGH MARNHAM

SKEGBY

LOW

Sustrans Route 647

Key

- Potential location for substation and BESS or solar PV panels
- Solar PV panels, power conversion stations and supporting infrastructure. Lowest point of PV panels is 0.7m AGL. Highest point of PV panels is 3.5m AGL.
- Solar PV panels, power conversion stations and supporting infrastructure. Lowest point of PV panels is 1.3m AGL. Highest point of PV panels is 3.5m AGL.
- Solar PV panels, power conversion units and supporting infrastructure. Lowest point of PV panels is 1.8m AGL. Highest point of PV panels is 3.8m AGL.
- Land for potential cable route
- Land for mitigation and enhancement, including new grassland, wildflower meadow, hedgerow planting and tree planting. Land may also be used for access and cable routes.

one earth solar farm

PROJECT	**One Earth Solar Farm**
DRAWING TITLE	**Parameter Plan**
CLIENT	**One Earth Solar Ltd.**

DRAWN BY **JG**	DRAWING NO.
CHECKED BY **SG**	**XX**
DATE **24/04/2024**	REV **0**

4.58. **Figure 4-3** shows the location of:

- PV Solar Modules including the differing heights across our Site;
- The potential locations for substation and BESS (see further details below on optionality);
- The land for the potential cable route (see further details below on optionality); and
- Land for mitigation and enhancement (which may also be used for cable routing).

4.59. Approximately 350 hectares of land is proposed for enhancement and mitigation and is likely to include grassland, wildflower meadows, hedgerow planting and tree planting. It is noted habitats will also be enhanced and created within land shown as having PV Solar Modules. The broad aim will be to improve connectivity, both within our Site and the wider landscape, to create a mosaic of a range of habitat types, benefitting a diverse variety of fauna as a result, and to create a landscape planting to screen the visual impact of our Project.

4.60. During operation our Project will be maintained and operated in accordance with the following management plans. These documents will be submitted as part of our DCO application:

- Outline Battery Safety Management Plan (OBSMP): this will set out the key fire safety provisions for the BESS proposed to be installed in our Project including measures to reduce fire risk and fire protection measures. The OBSMP will take into account good practices for battery fire detection and prevention, in addition to setting an emergency response plan.
- Outline Landscape and Ecology Management Plan (oLEMP): this will set out the short and long-term measures and practices that will be implemented to establish, monitor, and manage landscape and ecology mitigation and enhancement measures embedded in the design. An oLEMP is presented in **Appendix 12-5**.
- Outline Operational Phase Environmental Management Plan (oOEMP): this oOEMP will identify how commitments made in the ES will be translated into actions and includes a process from implementing the actions through to the allocation of key roles and responsibilities for the appointed contractor(s). It will be designed and operated with the objective of compliance with the relevant environmental legislation and mitigation measures set out within the ES.

4.61. Our Project will be operational for 60 years. It is assumed that the Solar PV modules will be replaced once during the operational phase. Where possible, the likely estimates, type and quantities of waste generated during the operational phase of our Project as well as the measures to reduce waste will be presented in the ES.

4.62. Further details on the measures included within our Project to reduce any risks of major accidents and disasters, as well as the inclusion of air quality modelling relating to any unplanned atmospheric emissions from the BESS will be included within the ES.

Construction Phase

4.63. At this stage it is anticipated that the construction phase will commence in 2027 and will be completed in 2029.

4.64. Construction working hours will be 7.00 - 19.00 hours Monday to Saturday with allowance for occasional, overnight working where operations cannot be paused, for example completion of the Horizontal Directional Drilling (HDD).

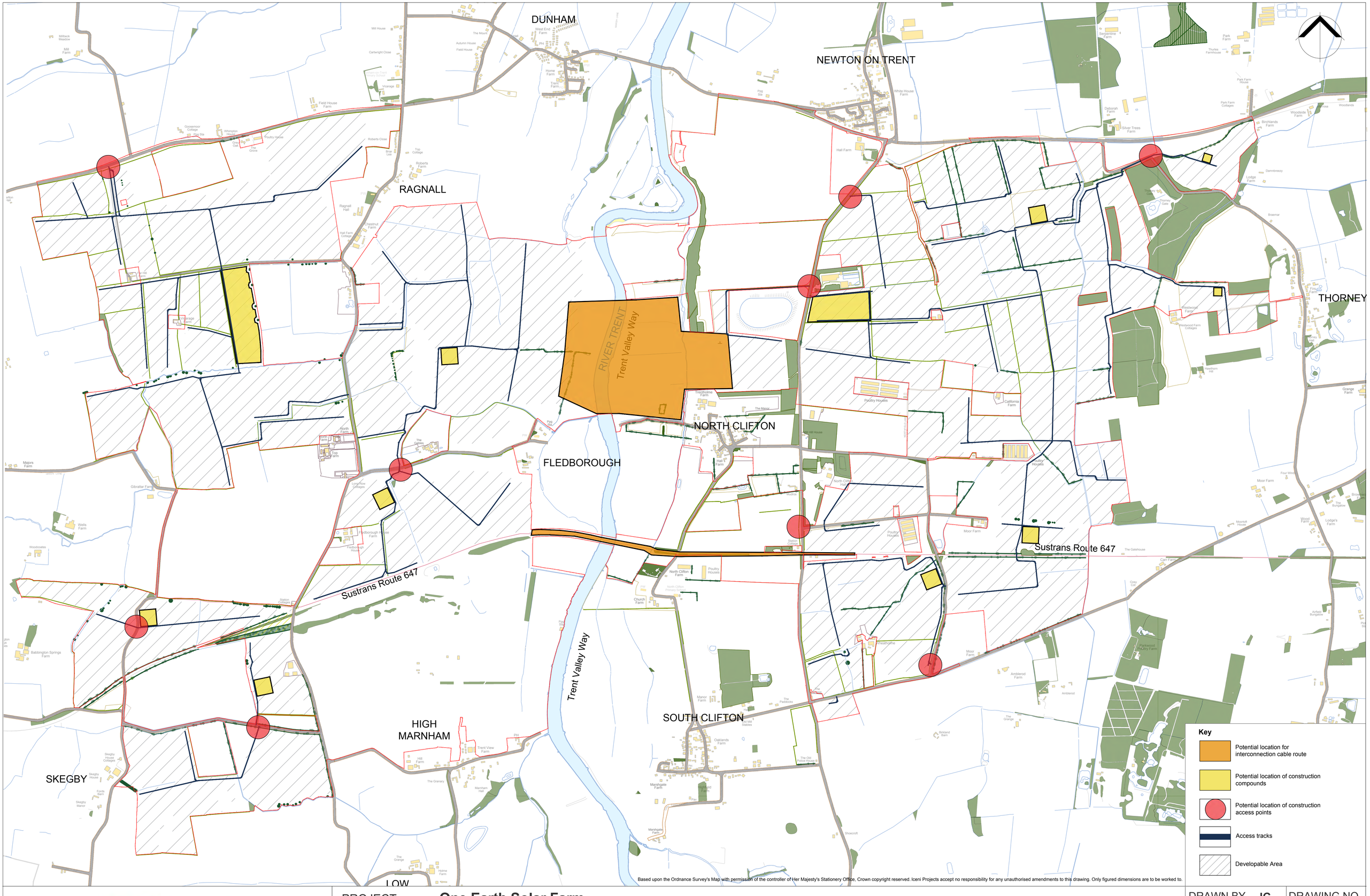
4.65. Construction activities will include:

- Site preparation, such as targeted site clearance and creation of access points:
- Transportation of construction materials, plant and equipment;
- Set up of temporary on-site construction compounds and security fencing;
- Road access upgrade and new road construction including haul roads;
- Construction of cable crossing points over the River Trent;
- Upgrading existing tracks and construction of new access roads within our Site;
- Marking the location of infrastructure components; and installation such as:
  - assembling module mounting structures and then mounting the modules themselves;
  - Installation of electric cabling, substations, inverters, transformer cabins, and battery storage units;
  - Construction of the Substation compounds, BESS compounds, Power Conversion Stations and installation of equipment;
- Landscaping and habitat enhancement; and
- Testing and commissioning.

4.66. Details on the likely duration of the construction activities and the likely construction plant to be used within the construction phase are provided in **Appendix 4.1**.

4.67. As above, in accordance with the Rochdale Envelope approach a parameter plan for the construction phase of our Project is provided in **Figure 4-4**.

Figure 4-4: Construction Parameter Plan



one earth solar farm

PROJECT	**One Earth Solar Farm**
DRAWING TITLE	**Construction Parameter Plan**
CLIENT	**One Earth Solar Ltd.**

DRAWN BY **JG**	DRAWING NO.
CHECKED BY **SG**	**XX**
DATE **24/04/2024**	REV **0**

4.68. **Figure 4-4** shows the location of:

- the likely areas of construction compounds;
- the preliminary construction routes; and
- the cabling options across the River Trent (see further details below on optionality).

4.69. During construction our Project will be subject to the following management plans:

- Outline Construction Environmental Management Plan (oCEMP): the oCEMP will set out the effective, site-specific procedures and mitigation measures to monitor and control environmental impacts throughout the construction phase of our Project. This will ensure that construction activities so far as is practical do not adversely impact amenity, traffic or the environment in the surrounding area. The oCEMP also sets out the monitoring and auditing activities designed to ensure that such mitigation measures are carried out, and that they are effective. For the purposes of the PEIR, measures that are considered to be included within our Project and which ensure there will not be likely significant effect (for example the use of wheel washing to stop construction dust on the local roads) are set out in a Construction Environmental Measures Register within **Appendix 4-2**. These documents will be submitted as part of our DCO application:
- Construction Traffic Management Plan (CTMP): the purpose of the CTMP is to propose how construction traffic including site personnel movements will be safely controlled at our Site by the developer and its sub-contractors. This will include:
  - routing of construction vehicles;
  - access arrangements to our Site;
  - details of the vehicle holding area(s);
  - details of any diversion, disruption or other abnormal use of the public highway or public right of ways during construction works;

- Outline Soils Management Plan (oSMP): this will manage any potential impacts to the soil (and agricultural land) during and on completion of our Project (considering the construction, decommissioning and operational phases). The oSMP will identify those areas within our Site which may be more susceptible to damage, for example, the temporary access tracks, construction compounds and steep slopes; and will set out details of when soil handling should be avoided (for example when it is wet or after periods of heavy rainfall or high winds) and it will advise on when soils are suitable for being handled or trafficked. The oSMP will also detail measures for soil management and follow the principles of best practice to maintain the physical properties of the soil, with the aim of restoring the land to its pre-construction condition following the temporary construction use and at the end of the lifetime of the Proposed Development, after decommissioning. Further details are provided in **Appendix 9-3**.
- Outline Employment Skills and Supply Chain Management Plan (OESSMP): the OESSCMP sets out measures to maximise opportunities to promote economic benefits in relation with skills, supply chains, and employment in the local region, which is required to deliver the entirety of our Project. For example, how our Project will develop essential skills which would benefit the local population through apprenticeships and workforce training.

4.70. Where possible, details on the potential waste generated during the construction phase of our Project as well as the measures to reduce waste, will be presented in the ES.

Decommissioning

4.71. As above, our Project will be operated up to 60 years after which it will be decommissioned. For the purposes of this PEIR, the technical assessments presented in **Chapters 7 to 18** consider a 60 year lifespan. Decommissioning will include the removal of all above ground infrastructure with the exception of the two project substations. Permissive paths would also be removed. Underground cables may remain in situ. Trees and hedgerows planted as part of our Projectare assumed to remain in situ when the land is returned to the landowners. It is considered all of the solar PV Modules and batteries used in our Project will be recycled. At this stage, it is considered decommissioning will occur over two years.

4.72. During decommissioning our Project will be subject to a Decommissioning Management Plan and a Decommissioning Traffic Management Plan. This will set out the principal decommissioning activities and the measures that will be implemented, so far as is practical, to ensure the works do not adversely impact amenity, traffic or the environment in the surrounding area. It will also set out the monitoring and auditing activities designed to ensure that such mitigation measures are carried out, and that they are effective. An Outline Decommissioning Management Plan will be submitted as part of our DCO Application.

Access

4.73. During construction, operation and decommissioning, access around our Site will be from existing and upgraded strategic points on the public road network, with access achieved via upgraded farm access tracks and new access tracks. **Figure 4-5** shows the location of the indicative access gates.

Figure 4-5: Scheme Access Points / Gates

4.74. A review of the potential for access to our Project using the River Tent has been undertaken and is reported in **Appendix 10.2: Transport Assessment**. As our Project does not feature any suitable river quay facilities to offload materials it is considered that the movement of bulk materials is not feasible. Consideration will be given to the use of the river for the movement of Abnormal Indivisible Loads (AIL) associated with our Project; this will be reported within the ES when further assessment has been undertaken.

4.75. To construct our Project, a variety of vehicles will be required. These will include, but not limited to:

- cars, and Light Goods Vehicles (LGV) and/ Vans;
- articulated Heavy Goods Vehicles (HGV) delivering plant, materials and electrical components;
- rigid HGV delivering bulk materials such as aggregate, ready mix concrete, etc for use on our Site;

- specialist machinery, usually delivered using a low loader style articulated HGV, including loads that may include loads such as directional drilling equipment and excavation plant (for the cable grossing under the River Trent); and
- Abnormal Indivisible Loads (AILs) carrying special oversized loads such as electrical grid transformers.

5. Legislative and Planning Policy Context

Introduction

5.1. As set out within the preceding chapters, the primary legislative requirement applicable to our Project is the Planning Act 2008 (as amended) (the 'Planning Act'). Secondary to this legislation is the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (the 'EIA Regulations'). Alongside this legislation is a framework of national and local planning policy against which decisions can be made.

5.2. This chapter presents a summary of the Planning Act 2008 and key national and local planning policy relevant to energy development and our Project. Where planning policy is specific to a particular environmental technical aspect, further information is also presented in an appendix to each technical chapter. Further details of the EIA Regulations are set out within **Chapter 2: Environmental Impact Assessment** and throughout this PEIR.

5.3. A review of policy relevant to each topic chapter will be included within the ES. The weight to be given to certain policies can inform the assessment of effects and will depend on whether the policy is determinative (as a result of being a policy in an NPS which has effect) or an important and relevant consideration (as is the case for local policies). The weight to be given to draft policy will also vary depending on the stage it has reached. Although adherence to planning policy (and the weight given to certain policies) will have often informed the assessment of effects as detailed within the ES, in particular helping to inform whether an environmental effect is significant or not, absolute compliance of our Project with relevant planning policies will not be undertaken within the ES but will be set out in the Planning Statement which will also accompany the DCO application. It is noted that all legislation, national policy and local policy has been considered and accounted for in the environmental assessment.

Planning Act 2008[4]

5.4. Our Project is classified as a National Significant Infrastructure Project (NSIP), in accordance with the Planning Act 2008, as it comprises:

- The construction or extension of a generating station (Part 3, Section 14(1)(a)); and
- Its capacity will be more than 50MW (Part 3, Section 15(2)).

[4] His Majesty's Office (HMSO) (2008) Planning Act 2008 (as amended)- https://www.legislation.gov.uk/ukpga/2008/29/contents

5.5. Therefore, a Development Consent Order (DCO) application under the Planning Act 2008 is required to be made to the Planning Inspectorate (PINS) as the Examining Authority, for determination by the Secretary of State (SoS for Energy Security and Net Zero (DESNZ)).

5.6. Section 104 of the Planning Act 2008 applies where a relevant NPS has effect[5]. NPS EN-3 (Renewable Energy Infrastructure) applies to solar photovoltaic (PV) greater than 50 MW in England and greater than 350 MW in Wales and therefore Section 104 applies. Under Section 104 the SoS must decide the Project in accordance with the relevant NPS, unless the adverse impacts outweigh the benefits.

5.7. An overview of the NPSs that have been considered from a planning policy perspective as part of undertaking this PEIR are listed below with a summary of their content set out within **Chapters 7 to 18**.

National Policy

5.8. In accordance with Section 104(2) of the Planning Act 2008, the SoS must determine our Project in accordance with the relevant NPS, when deciding whether or not to grant a DCO.

5.9. There are three NPS relevant to our Project:

- Overarching National Policy Statement for Energy (EN-1)[6];
- National Policy Statement for Renewable Energy Infrastructure (EN-3)[7]; and
- National Policy Statement for Electricity Networks Infrastructure (EN- 5)[8].

5.10. Further details of these NPSs are set out in **Chapters 7 to 18**.

[5] Section 104 is where national policy statements have an effect in the decision making (i.e. considering the National Planning Statements when making a decision).

[6] Department for Energy Security & Net Zero (2023) Overarching National Policy Statement for Energy (EN-1).

[7] Department for Energy Security & Net Zero (2023) Policy Statement for Renewable Energy Infrastructure (EN-3).

[8] Department for Energy Security & Net Zero (2023) Policy Statement for Electricity Networks Infrastructure (EN-5).

5.11. At a national level the National Planning Policy Framework (NPPF)[9] sets out the government's planning policies for England and how these are expected to be applied. The NPPF does not contain specific policies for NSIPs as these are determined in accordance with the decision-making framework in the Planning Act 2008 and any relevant NPSs, but it still can be an important and relevant matter for the purposes of the Secretary of State's decision making when determining the DCO application. The NPPF also provides relevant context for individual assessment topics. Further details of the NPPF are set out in **Chapters 7 to 18**.

Local Planning Policy

5.12. The NPSs are the primary consideration for DCO applications. Nevertheless, Local Plans and policies are still considered an important and relevant matter in deciding an application for a DCO, although in the event of any conflict, the relevant NPS(s) prevails.

5.13. The relevant local planning policies of the adopted development plans for each of the 'host' planning authorities have been considered as part of this preliminary assessment, these are listed below with further summary details set out in **Chapters 7 to 18**.

- Newark and Sherwood District Council, Local Development Framework, Amended Allocations and Development Management, Development Plan Document (2023)[10]
- Newark and Sherwood District Council, Amended Core Strategy Development Plan (2019)[11];
- Central Lincolnshire Local Plan (2023)[12];
- Bassetlaw District Council Local Development Framework, Publication Core Strategy and Development Management Policies (2010)[13]; and
- Draft Bassetlaw Local Plan 2020-2038: Main Modifications Version, August 2023[14].

[9] Available at: https://www.gov.uk/government/publications/national-planning-policy-framework--2

[10] Newark and Sherwood District Council (2023) Local Development Framework, Amended Allocations and Development Management, Development Plan Document

[11] Newark and Sherwood District Council (2019) Amended Core Strategy Development Plan

[12] Central Lincolnshire Local Plan (2023)

[13] Bassetlaw District Council (2010) Local Development Framework, Publication Core Strategy and Development Management Policies

[14] Bassetlaw District Council (2023) Draft Bassetlaw Local Plan 2020-2038: Main Modifications Version, August 2023

6. Methodology for the Preliminary Environmental Information Report

6.1. This PEIR has been produced in accordance with the requirements of Regulation 12(2) of the EIA Regulations, which state:

"In this regulation, "preliminary environmental information" means information referred to in regulation 14(2) which—

(a) has been compiled by the applicant; and

(b) is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)."

In addition to the EIA Regulations, the PEIR has been produced in accordance with PINs Advice Note Seven15 taking note of paragraph 8.4 which states:

"*A good PEI document is one that enables consultees (both specialist and non-specialist) to understand the likely environmental effects of the Proposed Development and helps to inform their consultation responses on the Proposed Development during the pre-application stage*".

Approach to the Preliminary Environmental Information Report

6.2. Within our PEIR, each technical aspect as presented in **Chapters 7 to 18** documents the bespoke elements of the methodology used to undertake a preliminary assessment of potentially significant environmental effects. The assessments do, however, take a broadly similar overarching approach that includes:

- Defining the Study Area: the study area is a geographical area within which it is considered there may be environmental effects as set out in technical guidance. So, if considering changes in air quality, it is the area within which it is considered there could be changes in the quality of air as a result of our Project based on the likely distances as detailed in the guidance from the Institute of Air Quality Management. Study areas are not necessarily consistent between technical aspects, so (for example) the study area for air quality may be different to the study area for noise.

[15] Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/

- Current Environmental Conditions: this is also described as the 'baseline' and sets out how data on the existing environment conditions within our Site and surrounding area have been collected such as through project specific monitoring (for example ecological surveys) and the collection of data from reputable sources (such as the local records centres). The results are reported and where possible visualised. The details of any future surveys we will be undertaking is also set out.
- Future Environmental Conditions: within our preliminary assessment we have considered the likely environmental changes of our Site and surrounding area, without the implementation of our Project. This can also be described as the 'future baseline'. This draws on details contained within policy and technical guidance. For example, data from the Department for Environment, Agriculture and Rural Affairs (Defra) shows air quality is expected to improve overtime with the projected increase in cleaner vehicles (either newer vehicles with cleaner emissions or electric cars with no emissions).
- Environmental Measures: as described in **Chapter 2: Environmental Impact Assessment**, our PEIR describes the environmental measures that have been incorporated into our Project which will help to ensure that any likely significant environmental effects can be avoided or where such is not possible, to ensure that they are minimised. Environmental measures also include the measures which will benefit the local environment, such as the ecological enhancements which will improve local biodiversity. These are listed in the technical chapters as they are specific to the particular technical aspect and not repetitious of more general scheme description as detailed in **Chapter 4: Our Project**.
- Potential Likely Significant Effects Scoped Out: through the EIA Scoping Opinion received from PINs (see **Volume 3: Scoping Consultation**), we have agreed the effects which are scoped out of the environmental assessment as they are not considered likely to be significant. This includes the evidence that justifies this approach. They will not be considered further within the EIA.
- Preliminary Environmental Assessment: this section sets out our approach to the preliminary assessment of each technical topic, to determine the preliminary likely significant environmental effects of our Project. This considers the methodology used to determine the likely effects from the construction, operation and decommissioning phases. The methodology makes reference to published guidance where appropriate. The effects in this PEIR are described as either:

Significance	Definition of Significance
Not Significant	No significant effect to an environmental resource or receptor.

Significant Beneficial	Advantageous or positive effect to an environmental resource or receptor.
Significant Adverse	Detrimental or negative effect to an environmental resource or receptor.

As described in **Chapter 4: Our Project**, we are currently exploring options for our cables to cross the River Trent. The options include either directional drilling under the River Trent or using the existing Fledborough viaduct. We are also looking at options for the location of our compounds which will contain our substation and BESS. The options relate to the potential locations on the western side of the River Trent within our Site. Within the environmental assessments the likely significance of effects from each of the options for cable crossing and the locations of the BESS and substations have been considered within the technical assessments as presented in **Chapters 7 to 18**. The highest level of significance from these options has then been reported and represents the worst case in terms of environmental effects.

- Conclusions: a summary of the preliminary likely significant effects, with further information is presented. It also includes the next steps to be undertaken as part of the EIA.

Appendices

Appendix 1-1: Environmental Consultant Technical Team

Appendix 4-1: Project Description

Appendix 4-2: Environmental Register

Appendix 1-1: Environmental Consultant Technical Team

Table 1-1: EIA Consultant Team

Name	Company	Aspect Covered	Qualifications	Description of Competence
Toby Gibbs	Logika Consultants Ltd	EIA	CEnv, CMIEEM	A Chartered Environmentalist and a specialist in EIA having worked on many infrastructure projects, and with experience in the UK, Europe, Africa and the Middle East. Projects include being engaged to provide environmental support to the development of Heathrow Airport's expansion proposals, a major NSIP development. He was also the Director responsible for the EIA that formed part of the DCO documentation for reopening Manston Airport in Kent and had a leadership role in the EIA for Hinkley Point C new Nuclear Power Station DCO application.
Guido Pellizzaro	Logika Consultants Ltd	EIA	BSc (Hons) MIAQM AMIEnvSc PIEMA	Environmental consultant with more than 15 years' experience overseeing the production of EIA reports and ES' for a range of developments, including solar, throughout the UK. Expert in the management of ES' including liaising with clients, external organisations and project team members. Working as part of the team in providing technical advice on a wide range of environmental issues.

Alan Kirby	Logika Consultants Ltd	Ecology and Biodiversity	BSC(HONS), MSC, PHD	Alan is an ecologist with 19 years of consulting experience. Alan has led the biodiversity inputs on a number of large infrastructure projects including input into the ES's as part of the DCO applications for Rampion 2 Offshore Wind Farm (ongoing), the Heathrow Expansion Project, Navitus Bay Offshore Windfarm (NBOWF) and the North London (Electricity Line) Reinforcement Project. He has also provided input to DCO Examination hearing sessions (e.g. Hinkley Point C NNB, NBOWF and Triton Knoll Electrical System), Public Inquiries and Examinations in Public including the provision of written representations, the negotiation of Statements of Common Ground and the giving of oral evidence as an expert witness.
Craig Thwaites	Logika Consultants Ltd	Hydrology and Hydrogeology	MEng	Craig has worked on a variety of complex solar projects across the UK including Tregonning Solar Farm and Inkersall Road Solar Farm. Within all these projects Craig uses his experience to impact design and inform the design team on the requirements and benefits that are provided by implementing sustainable flood and drainage solutions.
Simon McMillan	ADAS	Land and Soils	BASIS, BSSS	Simon is a senior soils consultant for ADAS (an RSK company). He has expertise in the management and delivery of soils consultancy and agricultural and environmental research. In recent years he has delivered soil surveys and provided reports for hundreds of projects, including large scale solar, rail, housing and cross-country pipeline projects. These typically comprise agricultural land classification (ALC), soil resources plans and soils aftercare management plans. Simon was a lead surveyor Welsh Government project that undertook the largest scale soil survey for over 30 years, covering around 3,000 ha of Wales to

				help develop the Welsh Government's predictive ALC tool.
Claire Cogar	Iceni	Buried Heritage	MCIfA	Claire is the director of archaeology at Iceni. She has extensive experience of development-led archaeology. She has managed works on the Thames Tideway and HS2 Infrastructure schemes and has carved out a niche in undertaking the archaeological and heritage components of large-scale public sector health projects.
Georgia Foy	Iceni	Cultural Heritage	BA (hons)	Georgia specialises in large scale development schemes affecting the historic environment and townscape character, where a careful but pragmatic approach is needed to balance the need for development with the heritage and townscape sensitivities of a place. Her particular expertise is in detailed policy appraisals, design and feasibility advice and inputting into Environmental Impact Assessments
Sam Griffiths	Iceni	Landscape and Visual	CMLI	Sam is an Associate Landscape Architect at Iceni working on complex projects as part of multidisciplinary teams, including preparation of landscape planning and design deliverables for Nationally Significant Infrastructure. Sam was part of the landscape team for the DCO consented Longfield Solar Farm.
Gordon Buchan	Pell Frischmann	Transport and Access	BEng (Hons), MSc, CMILT, FCIHT	Gordon Buchan is a highly experienced Transport Planner, having worked on wide range of projects across the UK, Ireland and Scandinavia. Gordon specialises in private sector development and renewable energy projects. He has supported several EDF projects in the UK and have acted as Expert Witness on a number of Public Inquiries and NSIP hearings. He has given presentations at the ICE Infrastructure Show at the NEC and at the All Energy conference in Aberdeen on two occasions. Gordon was a finalist in the 2018 NCE 100 Alternative Energy Award category.

Chris Whall	Air Quality Consultants Ltd	Air Quality	CEnv, MiEnvSci, MIAQM	Chris is a Chartered Environmentalist with over 20 years' experience in environmental consulting. He has a background in air quality, climate change and emissions quantification, impact assessment and management. Chris has particular expertise in the management and delivery of complex air quality and carbon assessments for major infrastructure projects, most notably in the power and transport sectors including Development Consent Order applications and highly contentious public consultation exercises.
Laurence Caird	Air Quality Consultants Ltd	Climate Change	Csci, MIEA, IAQM	Laurence is a Chartered Scientist with 15 years' experience in the field of environmental consultancy with extensive experience in air quality and climate change assessments. He helped shape the methodology for the assessment of greenhouse gas emissions within EIA to satisfy the requirements of the EIA Regulations 2017. He has produced carbon footprints and greenhouse gas assessments for a number of projects including major infrastructure projects including transportation, as well as EIA residential, commercial and mixed-use developments and industrial facilities

Jon Sims	Noise Consultants Ltd	Noise and Vibration	BEng (hons), BSc (hons), MIO	Jon has over 15 years experience in acoustic consultants, this includes many large infrastructure projects including onshore and offshore wind farms, energy transmission systems, rail, road and large industrial projects. Jon provided consultancy advice on noise to HS2 Ltd for several years, particularly in relation to the construction and operation of Phase 1 of HS2, the DCO application for Triton Knoll Offshore Wind Farm Onshore Electrical system, including giving evidence on noise at the planning hearing and environmental permitting for several power stations.
Jon Wright	Iceni	Health	Full Member RTPI, AIEMA	Jon has significant solar experience in the completion on heath assessments; he held a role within the in-house planning team of Lightsource BP, a global leader in the development and management of solar projects and smart energy solutions. He was responsible for large-scale solar farm planning applications throughout the UK and Republic of Ireland.
David Tyrer	Logika Consultants Ltd	Socio-Economics	Msc BA (Hons)	David is an environmental policy and economics expert with nearly 20 years professional experience. He specialises in socio-economic impact assessment, cost benefit analysis, impact assessment and valuation, in the context of government policy as well as development plans and projects. He has led studies for the then Department for Communities and Local Government on the UK costs and benefits of the EU proposals for a revised EIA Directive and a further analysis of the adopted proposals (now the 2017 EIA Regs). He has long experience of preparing and reviewing socio-economic assessment as part of the EIA and DCO processes (including airports, nuclear power stations, wind farms, urban extensions, and various mixed-use developments in the UK and overseas).

Appendix 4-1: Project Description

Good Design

Good design, as required by NPS EN-1 (section 4.7)[1], has been a fundamental consideration from the outset of our Project, influencing the siting, sustainability, and appearance of our Project, as well as the functionality of each individual element.

Design is an iterative process, and as such our Project masterplan has evolved between non-statutory consultation and statutory consultation and will continue to develop through until submission of the DCO. Design Principles, prepared with reference to the National Infrastructure Commission Guidance on Design Principles for National Infrastructure[2] were adopted by our Project from the outset and continue to guide decision making throughout design development. The Design Principles are categorised under the headings of climate, people, places and value. As well as developing the design in line with the Design Principles, our Project committed to appreciate the wider context in which the Potential Order limits are located, engage meaningfully with local and technical stakeholders, and seek to continually measure and improve the proposed design.

The Project Design Principles are set out in Table 1 with a description of how they have been embedded in our Project layout.

Table 1: Project Design Principles

Category	Design Principle	How this has been embedded in our Project to date.
Climate	Maximise the volume of clean energy that can be provided to the national electricity grid.	The Project has sought to allocate sufficient land to the solar PV area to generate an output of approximately 740MWac.
	Seek to reduce embodied carbon throughout the project lifecycle.	The amount of concrete used across our Project continues to be minimised, for example via the preference for pile driven frames rather than concrete footings.
	Craft a scheme that is resilient to the effects of climate change.	All land subject to the greatest level of flood risk has been excluded from the developable area. The height of infrastructure within areas of potential low flooding has been staggered, allowing for a 300mm freeboard.

[1] Available at: https://assets.publishing.service.gov.uk/media/65a7864e96a5ec0013731a93/overarching-nps-for-energy-en1.pdf

[2] Available at: https://nic.org.uk/app/uploads/NIC-Design-Principles.pdf

	Protect and improve the local environment.	Offsets have been incorporated from environmental features, including the following minimum measurements: > Trees: 10m > Woodlands: 15m > Hedgerows: 10m > Waterbodies: 10m > Drains: 8m > Rivers: 16m > Public Rights of Way: 15m > Badger Sets: 30m Our Project includes improvements to existing hedgerows and the planting of new hedgerows. 100ha. of land has been designed to accommodate ground nesting birds The use of Best and Most Versatile (BMV) land has been minimised as far as practical.
People	Protect features that are important to the local community.	Larger infrastructure, such as the project substations and BESS, have been sited at least 300m from residential properties and 100m from PRoW. Bespoke offsets have been incorporated from isolated properties, including: > Top Farm > Long Row Cottages > Fledborough House > Station Cottages > The Old Police House > The Old Station House > Clifton Hall > 1 Collingham Road

		> Westwood Farm Cottages
Place	Protect and enhance places of value.	The developable area close to Fledborough has been reduced to protect the continuity of the village from east to west.
	Create new places of amenity and ecological value.	A series of beetle banks, bug hotels and herptile hibernaculas is proposed across the site
Value	Enhance local recreational assets.	A permissive path network is proposed, connecting to existing PRoW.
	Create jobs and contribute to the local economy and education provision.	750 peak jobs during construction 15 – 20 full time jobs during operation
	Provide resource for research and development.	An area of the Site has been set aside for research and development, focussing on management techniques and landscape enhancement.

Components of the Project

This section lists the key components and activities associated with our Project during construction, operation and maintenance, and decommissioning.

Construction

Construction is anticipated to start in 2027 and be completed in 2029. It is estimated that a maximum of approximately 750 workers will be working on Site at any one time. This represents the peak of construction activity. It is assumed that construction would be undertaken across the entire Site, simultaneously. This is considered to be the worst case scenario for environmental impacts and is therefore the scenario assessed in the PEIR.

Construction will be undertaken in line with the following management plans

- Outline Construction Environmental Management Plan;
- Outline Construction Traffic Management Plan;
- Outline Soils Management Plan; and
- Outline Employment Skills and Supply Chain Management Plan.

The management plans listed above will accompany the ES at upon submission of the DCO application. An overview of the management plans is provided in the relevant chapter.

Construction working hours will be 7.00 - 19.00 hours Monday to Saturday with allowance for occasional overnight working where operations cannot be paused, for example completion of the HDD.

Mobile lighting towers, fitted with directional hoods/cowls, will be used for all activities during hours of darkness (within permitted working hours) or within sheltered areas where natural light is not sufficient.

All public rights of way will remain open during construction, but temporary minor diversions may be required and managed in line with the Outline Construction Traffic Management Plan.

At this stage it has been estimated that during the peak of the construction phases our Project will generate 60 car/ light duty vehicles per day on the east and on the west of the River Trent (a total of 120 vehicles) and 272 heavy goods vehicles per day on the east and on the west of the River Trent (a total of 544 vehicles) This represents the peak number of construction traffic journeys based on the preliminary information.

A review of the potential for access to our Project using the River Tent has been undertaken and is reported in **Appendix 10.2: Transport Assessment**. As our Project does not feature any suitable river quay facilities to offload materials it is considered that the movement of bulk materials is not feasible. Consideration will be given to the use of the river for the movement of large infrastructure (such as the transformers) knows as Abnormal Indivisible Loads (AIL) associated with our Project; this will be reported within the ES and submitted in the DCO Application when further assessment has been undertaken.

We have retained flexibility to allow for two methods of connecting the eastern and western sides of our Project across the River Trent. The first option is to install electrical cables beneath the river using horizontal directional drilling (HDD). The second option is to attach electrical cables to the Fledborough viaduct. The location of both options is shown on the Construction Parameter Plan (see **Figure 4-4**). Whilst only one option will be required, implementation of both options has been considered and assessed in this PEIR. It is noted that for the HDD option, during construction the preliminary assessments have considered the use of an HDD rig to allow for direction drilling.

Table 2 identifies the key activities and the associated indicative durations that will be undertaken throughout the construction period.

Table 2: Construction Activity and Durations

Construction Activity	**Indicative Duration**
Site Establishment including: > Construction of site access points > Setting out	3 months
General Deliveries: > Import and export of materials from site.	Ongoing throughout 25 months

Establishment and decommissioning of site compounds including: > Installation of surfacing for material storage and parking > Installation of welfare buildings and site offices > Establishment of secondary compounds which will be used to store materials and welfare to limit movement of internal traffic.	4 months
Site Tracks: > To comprise crushed aggregate	6 months
Installation of geotextiles	14 months
Preparation of substation platform	6 months
Cabling Works	6 months
Pouring of substation concrete	2 months
Substation HV Deliveries	3 months
Internal HV Works & Buildings	3 months
Solar Array Works > Piling of mounting structures to 1.5 – 3m below ground. > Mounting of 1,445,130 modules to be completed using lifting machinery but fixed using hand held power tools.	16 months
Installation of cabling & cabling sand	16 months
Battery Platform	6 months
Battery Foundations	4 months
Battery Cabling	4 months
Site Restoration & Fencing	Ongoing throughout 25 months
Commissioning	5 months
Final Connection	1 month

Staff Movements	Ongoing throughout the anticipated 25 month programme

Table 3 below shows the indicative construction plant required for our Project.

Table 3: Anticipated Construction Plant

Plant	Description	Indicative Dimensions	Number of Items During Construction Period
Excavator	Used for site preparation, grading, and trenching for cable laying.	Crawler Excavators → 22.5 tons (9.53x 3.17x 2.96, Lx Wx H) Smaller Excavators → 1.7 tons (dig depth: 2.57m, dump height 2.63m)	40-50 units
Mobile Cranes	Lifting heavy equipment and panels into place.	Varies widely depending on the capacity, but could range from 20 to 500+ tons. Height when fully extended could range from 20 to 100+ meters.	10 units
Compact track loaders	Moving smaller loads and materials across rough terrain.	Length around 3 to 4 meters, width around 1.5 to 2 meters, height around 2 meters.	10 units
Compact track loaders	Moving smaller loads and materials across rough terrain.	Length around 3 to 4 meters, width around 1.5 to 2 meters, height around 2 meters.	10 units
Telehandlers (Telescopic Handlers)	Used for lifting and transporting materials and equipment around the site	Height reach could vary from 6 to 20 meters, with a lifting capacity of 2 to 4 tons.	40 units

Bulldozers	Used for grading and levelling the site.	Length around 5 to 8 meters, width around 3 to 4 meters, height around 3 meters.	10 units
Aerial Work Platforms (AWPs) or Cherry Pickers	Used for accessing elevated areas during installation	Height reach could vary from 10 to 30 meters.	30 units
Flatbed trucks	Transporting solar panels, mounting structures, and other large materials.	Length could vary from 6 to 18 meters, width around 2.5 to 3 meters.	Flatbed trucks
Dump trucks	Hauling earth, gravel, and other construction materials	Varies widely, but typical dimensions could be around 8 meters in length, 3 meters in width, and 3 meters in height.	10 units
Water trucks	Used for dust suppression and site watering during construction	Could be similar to flatbed trucks or smaller.	10 units
Generators	To provide temporary power during installation	Relatively small in size	25 units
Concrete Mixers and Pump Trucks	Used for pouring concrete foundations for mounting structures and equipment pads.	Up to 8m	10 units
Pile driver	Driving piles into the ground	Can be around 3m in height and can provide around 50HP of power.	15-20 Units
Trencher	Cable trenching	As an indication only: > Weight: 1,800kg	20 units

		> Length: 3.7m > Width: 1.9m > Height: 1.8m	
Compactors	Compacting soil and gravel for roads and foundations.	As an indication only: > Weight: 12.6 tons > Length: 5.87 > Width: 2.27 > Height: 2.9m	15 units

Operation

The following management plans will accompany the DCO application:

> Outline Operational Environmental Management Plan;

> Outline Landscape and Ecological Management Plan; and

> Outline Battery Safety Management Plan.

Our Project will be operational for 60 years. It is assumed that the Solar PV modules will be replaced once during the operational phase.

An overview of the approach taken to each management plan, recording the proposed mitigation, is provided in the relevant chapter.

Our Project will comprise the following key elements during operation:

> • Solar array, occupying approximately 965ha. which will comprise:

– Solar panels that convert sunlight into electrical current (as direct current (DC)). Individual modules are typically up to 2.4m in height by 1.3m in width and consist of a series of PV cells beneath a layer of toughened glass with anti-reflective coating. Other PV technologies are developing rapidly and may be available at the time of construction, therefore, to allow flexibility for future module technology to be larger, the maximum height parameter considered within this PEI Report is 3.8m. This maximum height is limited to areas of flood risk. The maximum solar panel height across the rest of the site is 3.5m. The areas of 3.8m and 3.5m high solar panels are shown on the Parameter Plan (see **Figure 4-3**). The module frame is typically built from anodised aluminium. Each module would likely have a DC generating capacity of between 400 and 850 watts (W), or more depending on advances in technology at the time of construction. The modules are fixed to a mounting structure in groups known as ‘strings’. The number of PV Panels that will make up each PV Table (group of PV Panels within a string) is not yet known. We are seeking flexibility in this arrangement to accommodate future technology developments.

- Mounting frames for the solar panels will likely be the frames which are usually supported by galvanised steel poles. We have assumed that the poles will be driven to a depth of 3m. This is the most common solution on existing UK solar farms. The modules across the Project would be mounted on structures with a minimum clearance above ground level of 0.7m, increasing to 1.5m and 1.8m in areas where there is elevated risk of flooding. These dimensions are maximum parameters and have been assessed in this PEIR. The area covered by each parameter is shown on the Parameter Plan (see **Figure 4-3**).The final elevations of the frames, within the parameters assessed, will be influenced by various design factors such as local topography, drainage design and configuration. The separation distance (interrow distance) between each row of frames would be a minimum 3m for a south facing fixed configuration, dependent upon angle and length of slope, to allow for appropriate maintenance and to minimise inter-row shading.
- Power Conversion Stations (PCS) typically comprise the inverter, transformer, and switchgear (although the inverters can alternatively be located at the panels rather than in this centralised configuration, as described further below). These components may be located next to one another individually or enclosed together in a single container. A single container would occupy the greatest area and therefore has been assessed in this PEIR. The containers are typically externally finished in keeping with the prevailing surrounding environment, often utilising a green painted finish. The containers would be mounted on adjustable legs on an area of hardstanding. This PEIR assumes that the containers will measure 13m (l) x 3m (w) and 6m (h). There is potential for the containers to be lower; however 6m has been assessed to allow for the containers to be elevated in areas of flood risk. There would be up to 170 Power Conversion Stations located within the Solar PV Array area. A Power Conversion Station will comprise two inverters, a transformer, and switchgear which can be grouped together or distributed throughout the Site. It is anticipated that PCSs would be installed on compacted gravel and concrete bases.

> BESS, occupying up to 20ha split over two sites; will allow the storage of energy generated by the solar panels at times of low demand and release to grid at times when demand is high or when solar irradiance is lower, known as load shifting. The BESS will also have the ability to import power from the grid directly to allow the BESS system to help support the grid through grid balancing mechanisms. The BESS will be located in up to two BESS sites next to the substation locations. The BESS sites will consist of a series of battery units with dimensions of around 9.5m x 1.8m x 2.6m (LxWxH) with BESS inverters with dimensions of around 12.5m x 2.5m x 3.5m. There will be a ratio of 8 battery units to every BESS inverter. The BESS compound will also have water tanks for fire suppression, a control building with footprint 15m x 20m, a storage building with footprint 15m x 10m and drainage ponds in the region of 2500m^3 at each BESS location. Given the flexibility currently required with regard to the layout of the BESS, this PEIR has assumed that all areas shown on the Parameter Plan (**see Figure 4-3**) as potential locations for the substations and BESS, totalling 86ha., would 13.5m high such that potential impacts arising from the tallest element has been assessed. It is assumed that areas not required for substations or BESS in the final Project layout will be occupied by solar PV panels.

- Substations: There will be two substations, one on either side of the River Trent. However, the location of the substation on each side of the river is not yet fixed. The potential areas within which the substation could be located are shown on the Parameter Plan (**see Figure 4-3**). These areas are the same as shown as potential areas of the BESS and total 86ha. This PEIR assumes that the substation would occupy the entire extent of the potential 86ha, measuring up to 13.5m in height. In reality, the maximum area of the substation on the eastern side will be 170m x 140m x 13.5m (l x w x h) , occupying a footprint of 23,800m2. The maximum area of the west substation will be 250m x 190m x 13.5m (l x w x h) with a footprint of 47,500m2. Our assessment in this PEIR includes for lightning rods of up to 25m tall within each of the substations. The substations will consist of 33kV switchgear and 2 33/400kV transformers and other power quality equipment such a reactive compensation equipment. The exact design of the substations will be determined later in our Project.
- Grid connection route: This connection route will connect the east and west substations prior to combining into a single cable route to the National Grid substation which is assumed to be located near the existing High Marnham 275kV substation south of the red line boundary on the west side of the Trent.
- Electrical cables, fencing and CCTV: A fence will enclose the operational area of our Project. The fence is likely to be a 'deer fence' (wooden with wire mesh) and 2.2m in height. Pole mounted internal facing closed circuit television (CCTV) systems installed at a height of up to 4.5m are also likely to be deployed around the perimeter of the operational areas, typically these CCTV cameras will be infrared triggered and would not record unless triggered.
- To comply with British Standard (BS) EN 62271-1:2017, if outdoor transformers are used, they will be surrounded by a secure wire mesh fence or metal palisade fence. These will only be located in inverter stations. This fence is likely to be 1.8 to 2.5m in height, and so a height of 2.5m has been assumed for the purpose of this PEIR. In addition, the Onsite Substation would be surrounded by a secure metal palisade fence and would also be up to 3m in height
- Low voltage cabling between PV modules and the inverters (typically via 1.5/1.8kV cables) will typically be located above ground level (along a row of racks), fixed to the mounting structure, and then underground (between racks and in the central inverter's and or transformer input). Medium voltage cables (around 33kV) are required between the transformers, switch gear and the onsite primary substations. The dimensions of trenching will vary subject to the underground cabling which will be based on the number of cables they contain. The trench will typically be up to 1m wide per cable with a maximum depth of 1.2m and will be dependent on the method of installation, ground conditions and number of cables laid in parallel. Subject to engagement with utility providers there may be a requirement for horizontal directional drilling (HDD) within our Project to cross beneath existing buried utilities.
- Landscape enhancement areas will be included across our Project, totalling an area of approximately 250ha, including a network of permissive paths, new species rich grassland, wildflower meadows, tree and hedgerow planting and habitat creation areas.
- Part of the solar PV area will be identified for research and development to monitor and trial landscape enhancements and management techniques.

Decommissioning

Decommissioning is anticipated to last two years and will take place 60 years after our Project becomes operational. A Decommissioning Environmental Management Plan will be prepared prior to decommissioning.

Table 4 presents the plant likely to be used throughout decommissioning.

Table 4: Anticipated Decommissioning Plant

Plant	Description	Indicative Dimensions	Number of Items During Construction Period
Excavator	Used for site restoration, grading, removal of piles	Crawler Excavators → 22.5 tons (9.53x 3.17x 2.96, Lx Wx H) Smaller Excavators → 1.7 tons (dig depth: 2.57m, dump height 2.63m)	40-50 units
Mobile Cranes	Lifting heavy equipment and panels removing panels from site	Varies widely depending on the capacity, but could range from 20 to 500+ tons. Height when fully extended could range from 20 to 100+ meters.	5 units
Compact track loaders	Moving smaller loads and materials across rough terrain.	Length around 3 to 4 meters, width around 1.5 to 2 meters, height around 2 meters.	10 units
Compact track loaders	Moving smaller loads and materials across rough terrain.	Length around 3 to 4 meters, width around 1.5 to 2 meters, height around 2 meters.	10 units
Telehandlers (Telescopic Handlers)	Used for lifting and transporting materials and equipment around the site	Height reach could vary from 6 to 20 meters, with a lifting capacity of 2 to 4 tons.	40 units

Bulldozers	Used for grading and levelling the site.	Length around 5 to 8 meters, width around 3 to 4 meters, height around 3 meters.	10 units
Aerial Work Platforms (AWPs) or Cherry Pickers	Used for accessing elevated areas during installation	Height reach could vary from 10 to 30 meters.	30 units
Flatbed trucks	Transporting solar panels, mounting structures, and other large materials.	Length could vary from 6 to 18 meters, width around 2.5 to 3 meters.	15-20
Dump trucks	Hauling earth, gravel, and other construction materials	Varies widely, but typical dimensions could be around 8 meters in length, 3 meters in width, and 3 meters in height.	10 units
Water trucks	Used for dust suppression and site watering during construction	Could be similar to flatbed trucks or smaller.	10 units
Generators	To provide temporary power during installation	Relatively small in size	25 units

Decommissioning will include the removal of all above ground infrastructure with the exception of the two project substations. Permissive paths would also be removed. Underground cables may remain in situ. Trees and hedgerows planted as part of our Project are assumed to remain in situ when the land is handed back to landowners.

100% of the solar PV panels and batteries used in our Project will be recycled.

Design Parameters

The use of design parameters has been adopted to present a likely worst-case assessment of potential environmental effects of our Project. Wherever an element of flexibility is maintained, the likely worst-case scenario is assumed and impacts reported accordingly. As such, the PEIR has been undertaken adopting the principles of the ‘Rochdale Envelope’, as described in the Planning Inspectorate Advice Note 9. This involves assessing the maximum (and where relevant, minimum) parameters for our Project.

Table 5 sets out the construction and operational parameters that have been assessed within this PEIR.

Table 5: Project Parameters

Component	Parameter Type	Proposed Parameter
Solar PV fields	Location	Solar PVs will occupy land shown for solar panels on the parameter plan (see **Figure 4-3**)
Solar PV Modules and Mounting Structure	Design	The maximum width of the solar arrays will be 9.5m
Solar PV Modules and Mounting Structure	Design	Minimum pile depth will be 1.5m deep. Maximum pile depth will be 3m.
Solar PV Modules and Mounting Structure	Scale	The maximum height of the highest part of the solar array module will be 3.8m above ground level (AGL)
Solar PV Modules and Mounting Structure	Scale	The minimum height of the lowest part of the PV module will be 0.7m AGL
Solar PV Modules and Mounting Structure	Scale	The solar arrays will be south facing
Solar PV Modules and Mounting Structure	Design	The solar modules will face south at 10 - 25 degree pitch
Solar PV Modules and Mounting Structure	Design	Minimum spacing between rows of 3m
Solar PV Modules and Mounting Structure	Design	The solar PV module will be dark blue, grey, or black in colour
Solar PV Modules and Mounting Structure	Design	All DC cables within the solar arrays will be secured to the PV mounting structure or buried underground up to 1m deep.
Solar PV Modules and Mounting Structure	Design	33kV distribution cables to be buried in trenches alongside access tracks or between arrays up to 1.2m deep.

Power conversion station (PCS)	Scale	Power conversion station to be mounted on skid with dimensions 13m x 3m
Power conversion station (PCS)	Scale	PCS within the arrays will not exceed height 6m AGL
Power conversion station (PCS)	Number	There will be up to 170 PCS across the Site.
Access tracks	Design	Internal access tracks will be between 4 and 10m wide with passing places where required.
Access tracks	Design	Internal access tracks will comprise unbound gravel or similar
Substations	Location	Two substation locations will be implemented, one on the west side of the River Trent and one on the east side. The location of the substations is shown on the parameter plan (Appendix 4.2)
Substation	Size	Substation located on the west of the River Trent - dimensions as 250m x 190m (area as 47,500m^2) x height of 13.5m. Lightning rods up to 25m in height may be required. This will be located adjacent or near to the west BESS compound. Substation located on the east of the River Trent - dimensions as 170m x 140m (area as 23,800m^2) x height of 13.5m. Lightning rods up to 25m in height may be required. This will be located adjacent or near to the east BESS compound.
Welfare and storage building(s) for operation and maintenance of PV and BESS	Size	Up to 2No. buildings each measuring up to 40x15x8m

River Crossing	Option 1	Electrical cables will be installed beneath the River Trent using horizontal directional drilling (HDD). The location of the HDD is shown on the Construction Parameter Plan (see **Figure 4-4**).
River Crossing	Option 2	The cable(s) will be attached externally to Fledborough Viaduct crossing the River Trent.
BESS	Number and location	There will be up to two BESS sites, one on the east and one on the west of the River Trent. The locations are shown on the Parameter Plan (see **Figure 4.3**).
BESS	Location	Each BESS compound will be located adjacent to an on-site Substation Location
BESS	Scale	The west BESS will occupy up to 11.2 hectares and measure up to 3.5m tall. This will be located adjacent or near to the west substation compound. The east BESS will occupy up to 8.5 hectares and measure up to 3.5m tall. This will be located adjacent or near to the east substation compound. Buildings within the BESS compound will be up to 8m tall.
Construction	Design	Access points are shown on the Construction Parameter Plan
Construction	Design	There will be two principal construction compounds. One of the west and one of the east

Construction	Design	There will be up to 10 satellite constriction compounds. Five on the east and five on the west.
Lighting	Design	No external lighting will be permanently operated.
Lighting	Design	Operational lighting will be directional, orientated internally, away from the surrounding environment, and will be fitted with features to minimise light spillage.
CCTV	Scale	The camera height will be up to 4.5m tall.
Fencing	Design	The fence around the solar PV area will comprise a deer fence (wooden posts and metal wire mesh) and will be up to 2m in height. The fence posts will measure up to 2.2m above ground level.
Fencing	Design	The fence around the substations, BESS and PCS will be palisade fencing, up to 3m in height.

Appendix 4-2: Environmental Register

Indicative Measures to be included During Construction

Tables 1 to 9 below sets out the indicative measures that will be used during the construction phase of our Project to ensure that construction activities, so far as is practical, do not adversely impact amenity or the environment in the surrounding area. These measures are only in outline at this stage, a final list of environmental measures will be included within the Construction Environmental Management Plan, which will be implemented (as agreed with the host authorities) prior to commencement of the construction works.

For the purposes of the PEIR, the measures set out in Tables 1 to 9 set out our assumption on how environmental impacts during construction will be controlled to ensure likely significant effects do not occur. Measures specific to the management of soils, in particular how Best Most Versatile soils will be protected are detailed in **Appendix 9-3** of the PEIR. These measures are considered to be embedded within the environmental measures included within our Project.

Table 1: Biodiversity

Environmental Issue	Environmental Protection Measure

Ecological receptors including protected/ notable species.	• Appointment of a licenced Ecological Clerk of Works (ECoW) for the duration of the construction works. They will oversee the management of the construction works in terms of managing and protecting (where required) biodiversity. They will ensure compliance with environmental legislation and planning conditions as they relate to nature conservation on site. Duties will include carrying out surveys to identify ecological constraints to site operations, and to help guard against ecological risks from design and construction activity, for example to flora, fauna and water courses. The will ensure compliance with relevant management plans, including the Outline Landscape and Ecology Management Plan (oLEMP).
	• All construction works of our Project will be undertaken with the relevant management plans, this includes:
	  ○ oLEMP that sets out measures to mitigate the potential impacts of construction on biodiversity and landscape features.
	  ○ A Species Protection Plan (SPP).
	  ○ An Invasive Species Management Plan (ISMP).

	These plans will include specific measures such as: ○ Protection and enhancement measures include avoiding areas of high-quality habitat, protection and maintenance of retained vegetation, implementation of a timetable for maintenance and management to protect, manage and enhance habitats. ○ Undertaking vegetation clearance in advance of construction at the appropriate time of year, outside of the bird breeding season and the reptile/ amphibian hibernation period. Should it not be possible to avoid this season, vegetation will be inspected/surveyed by the ECoW immediately before clearance (within 24 hours). ○ Maintaining short vegetation post clearance to displace present amphibians away from the Site. ○ Maintaining disturbed cleared ground in the run-up to construction to minimise the risks of nesting birds attempting to nest. ○ Protecting hedgerows, tree lines, ditches and trees including the tree RPA during construction with suitable buffers and fencing. ○ Application for species licences from Natural England for translocation of animals away from construction areas sufficiently in advance of the works. ○ Implementation of measures to avoid trapping, injuring, or killing wildlife within construction areas. ○ Employing reasonable measures to avoid impacts on bats including maintenance of trees with potential bat roost trees with potential roost features (PRF), which will be protected during development, in line with British Standard BS 5837: Trees in relation to design, demolition and construction by establishing a Construction Exclusion Zone (CEZ) around their Root Protection Areas (RPA). ○ No works will be undertaken within 30m of a badger sett. Where there are badger setts, employing reasonable measures to avoid impacts on badgers including conducting pre-construction surveys, covering exposed trenches and implementing fencing early in the construction phase. ○ All works in proximity to waterbodies/watercourses should follow standard protection measures to ensure their complete protection against pollution, silting and erosion. ○ Undertaking of pre-construction surveys to provide am update on the presence and location of invasive species.

	○ Creating an Invasive non-native plant species (INNPS) method statement. ○ Controlling lighting to minimise visual intrusion and potential adverse effects on sensitive ecology such as bats, as far as reasonably possible. ○ Restricting lighting to working hours (unless in the case of emergency or occasional overnight quiet working), and directing light away from retained habitats, including hoods or cowls to direct light forwards into the construction areas where possible. ○ Avoidance of construction traffic through designated sites. ○ Securing the perimeter of the Site with appropriate fencing, including mammal gates where required to secure Site boundary, including gaps for mammals. ○ Aeration of compacted soils from heavy machinery prior to landscape planting. • Implementing measures to minimise/ prevent dust creation, pollution incidents and noise and vibration impacts on ecology. Please refer to Table 2: Hydrology and Hydrogeology, Table 5 Air Quality and Table 7 Noise and Vibration for the measured employed to minimise effects on air quality, water quality and noise and vibration effects.

Table 2: Hydrology and Hydrogeology

Environmental Issues	Environmental Protection Measures
Surface and Groundwater	• Compliance with Guidance for Pollution Prevention (GPP) 2 (Above ground oil storage tanks), 4 (Treatment and disposal of wastewater). 5 (works and maintenance in or near water), 8 (Safe storage and disposal or used oils), 21 (Pollution incident response planning). • Adherence to Construction Industry Research and Information Association (CIRIA) report C532: Control of water pollution from constriction sites and CIRIA report C649: Control of water pollution from linear sites. • Adherence to BS 6032: Code of Practice for Earthworks. • Implementing a temporary sustainable drainage system to prevent runoff contaminated with fine particles / construction waste / debris / wash water from entering surface drains. This will include protection of land drains and waterbodies using drain covers, earth bunds, geotextile silt fences, straw bales or proprietary treatment. • Undertaking of earthworks in dry months of the year where possible.

	• Storage of topsoil 20m or more from watercourses on flat land where possible. Where this is not practical the material should be covered with geotextile mats, seeded to promote vegetation growth or runoff prevented from draining to a watercourse without prior treatment. • Providing appropriately sized runoff storage areas for the settlement of excessive fine particulates in runoff to be treated on site or discharged under a water discharge activity permit from the Environment Agency to controlled waters. • Washing and cleaning of designated runoff areas within the site, and vehicle wheels at entry and exit points to the Site. • Maintenance of a secure, clean and tidy site, clearly labelled waste receptacles, and the maintenance of site fencing to prevent the entrance of debris into watercourses. • Storing fuel in accordance with the Control of Substances Hazardous Regulations 2002 and the Control of Pollution (Oil Storage) (England) Regulations 2001. Fuel should be stored in leak proof containers and in a secure bunded area. • Regular inspection of plant, machinery and vehicles off Site. • All vehicles carrying hazardous loads must regulations set out in the Health and Safety Executive's (HSE) Carriage of Dangerous Goods. • Drivers of vehicles carrying hazardous loads must be properly trained and carry a transport document with a description of the load. • Washing, refuelling, oiling and greasing vehicles take place in designated areas protected from underground strata and watercourses. • Keeping spill kits at high-risk locations. • Undertaking water quality monitoring of potentially impacted watercourses. • Management of site welfare facilities, appropriate waste disposal by an appropriate contractor to a suitably licenced facility. • Developing strategy to detail monitoring of cable route construction if required.
Flood risk	• Application and implementation of a Flood Risk Activity Permits (FRAP) to document the measures to be implemented when working in the flood zone. The FRAP will be submitted to the Environment Agency for approval and to obtain the licence to undertake works during the construction phase. • Restricting storage of machinery or spoil/materials within the identified flood extent, to ensure no impact on contractors, or deviation in flow routes due to the proposed works.

	• Maintaining connectivity between the floodplain and the adjacent watercourses. • Designing drainage systems to ensure surface runoff is adequately attenuated and treated and there is no significant increases in flood risk downstream during storms (up to and including the 1% annual probability design flood – with allowance of 40% for climate change). • Monitoring of weather forecasted, and planning works according. • Appointment of an Emergency Response Plan. This would include appointment of a contractor with 24hr availability and ability to mobilise staff in the event of a flood, details of evacuation procedures and safe exits. Plan for the removal of plant, machinery, and hazardous material and the implementation of de-watering methods (in line with the requirements of the Environment Agency under the 1991 Water Resources Act and the 2016 Environmental Permitting Regulations) if water is encountered below ground construction.

Table 3: Cultural Heritage

Environmental Issue	Environmental Protection Measures
Cultural Heritage Resources	• Ensuring main site access are set away from heritage assets to manage potential impact of increased traffic and delivery of components. • Adopting mitigation measures to mitigate the temporary impacts of increased visual and noise intrusion on heritage assets are described in Table 4 and Table 7.
Archaeological deposits	• Undertaking all archaeological work in line with a Detailed Archaeological Mitigation Strategy (DAMS), which will be submitted to the host authorities prior to the commencement of works. • Where there are archaeological remains are identified to be of significance and works may result in damage to the asset, a site-specific Written Scheme of Investigation (WSI) will be submitted. • Implementing suitable buffer zones (minimum 5m) around the sensitive archaeological areas prior to construction. • If remains of sufficient archaeological significance are identified, provision will be made to apply mitigation by design through the use of above ground foundations to remove an intrusive groundwork which would otherwise be required. Where mitigation by design is not possible, or not warranted due to the significance of the identified or likely remains, mitigation through preservation by record will be applied via a watching brief.

	• Developing strategy to detail monitoring of cable route construction if required.

Table 4: Landscape and Visual

Potential Impact	Environmental Protection Measures
Loss of landscape features	• Implementing an oLEMP that sets out measures to mitigate the potential impacts of construction on biodiversity and landscape features, including an implementation timetable for maintenance and management. • Undertaking a pre-construction tree survey to establish the extent to which any vegetation removal may be needed and identify required protection zones. • Securing the perimeter and protecting and maintaining retained vegetation during construction. • Implementing replacement tree and hedgerow planting.
Visibility of construction activities	• Maintaining a clean and tidy Site and the use of appropriate hoarding to manage visual presence of construction activity. • Managing existing vegetation to aid the screening of views of the construction Site. • Lighting used in construction will be used only during working hours (unless in the case of emergency or occasional overnight quiet working), and fitted with directional cowls orientated into the Site, away from residential areas and roads.

Table 5: Air Quality

Environmental Issue	Environmental Protection Measures
Dust	• Implementing a Dust Management Plan (DMP). The DMP will include monitoring of dust deposition, dust flux, suspended dust and/or visual inspections. The DMP will also include measure such as: ○ A method for stakeholder communications and a recording for dust/air quality complaints / exceptional incidents.

	○ Undertaking daily on-Site and off-Site inspections where receptors are nearby, especially when activities with a high potential to produce dust are being carried and during prolonged dry or windy conditions. ○ Wetting of dust generating activities and locating of dust generating activities far from receptors, ensuring adequate water supply. ○ Removing dust producing materials as soon as possible or cover, seed, fence or water to prevent wind whipping. ○ Ensuring aggregates do not dry out and cement and other fine particles are delivered in sealed bags / enclosed tankers and stored in silos with appropriate emission control systems. ○ Avoid scabbing (roughening of concrete surfaces) where possible. ○ Sheeting vehicles carrying dust and impose a 15mph speed limit on surfaced and 10mph speed limited on un-surfaced roads. ○ Where appropriate re-vegetate earthworks and exposed areas to stabilise surfaces as soon as possible. If not possible to re-vegetate, use Hessian, mulches or track fires. Only remove the cover in small areas during work and not at once. ○ Implementing Trackout measures such as the use of water-assisted dust sweepers on the access and local roads, avoiding dry-sweeping of large areas, covering and wheel washing vehicles entering and leaving the Site, inspecting hall routes or installing hard surfaced hall routes and ensuring adequate hard surfaces are available between wheel washing and the exit.
Nitrogen dioxide (NO_2) and particulate matter (PM_{10}) Emissions	• Switching off vehicles when stationary. • Avoiding diesel/ petrol powered generators and use mains electricity or battery powered equipment where practicable. • Ensuring proper maintenance of machinery. • Imposing a 15mph speed limit on surfaced and 10mph speed limited on un-surfaced roads. • Implementation of a Construction Traffic Management Plan to manage the sustainable delivery of goods and materials. • Avoiding bonfires and burning of waste.

Table 6: Carbon and Climate Change

Potential Impact	Environmental Protection Measures
Greenhouse Gas (GHG) emissions	• Adopting the Considerate Constructors Scheme (CCS) to assist in reducing GHGs, from the Proposed Development by employing good industry practice measures. • Encouraging the use of lower carbon modes of transport and implementing a Construction Traffic Management Plan, which includes details a construction travel plan to reduce the volume of trips taken by construction staff and employees. • Requiring reporting of fuel consumption and carbon footprint following construction. • Switching vehicles and plant off when not in use and ensuring regular maintenance to optimise efficiency. • Ensuring vehicles conform to current EU Emissions standards.
Natural resource use	• Recycling of construction waste and local disposal of waste where possible. • Maximising the use of alternative materials with lower embodied carbon, such as locally sourced products and materials with a higher recycled content where feasible.
Climate Change	• Monitoring of weather forecasts the news for Environmental Agency warnings and plan works accordingly, protecting workers and resources from any extreme weather conditions. • Adhere to health and safety plans that account for potential climate change impacts. • Using equipment's cooling systems where necessary/adapting working practices and equipment used based on current weather conditions. • Storing construction materials outside of Flood Zone 3 where possible. • Designing drainage systems to ensure no significant increases in flood risk downstream during storms (up to and including the 1% annual probability design flood – with allowance for climate change). • More details on flood risk mitigation measures are found in Table 2.

Table 7: Noise and Vibration

Potential Impact	Environmental Protection Measures
Construction noise and vibration	• Apply Best Practicable Means (BMP) where reasonably practicable to minimise noise and vibration at sensitive receptors. • Contractors should be familiar with BS 5228 guidance, which gives recommendations for basic methods of noise control relating to construction works. • Control of noise and vibration at the source, encouragement of quieter methods and consideration of local Site equipment. • Using and properly maintaining modern plant and equipment. • Restriction of construction to working hours. • Minimising drop heights of materials, engine revving, loading and unloading of materials and dismantling or moving of equipment of materials where possible. • Encouraging sequential engine starting up and switching off equipment where possible. • Offsite prefabrication where practicable. • Screening around possible producing plant and activities. • Identification of potential construction traffic routes that, where possible, avoid the main areas of existing residential development. Implementation of a Framework Construction Traffic Management Plan (CTMP). • Provision of information to Local councils and residents to advise of noisy works and monitoring of noise complaints.

Table 8: Human Health

Potential Impact	Environmental Protection Measures
Human Health Risks	• Measures to mitigate human health risks are covered in the following tables: Table 2 for Hydrology and Hydrogeology, Table 5 for Air Quality, Table 6 for Carbon and Climate Change, Table 7 for Noise and Vibration and Table 9 for Socio-Economic impacts.

Table 9: Socio- Economics

Potential Impact	Environmental Protection Measures
Local residents, businesses and community facilities	• Implementation of an Outline Skills, Supply Chain and Employment Plan (OSSCEP). • Explore employment and supply chain opportunities throughout the construction period. • Prepare Construction Management Plan and Construction Transport Management Plan to temporarily re-route existing Public Rights of Way. Provision of clearly signed alternative routes to minimise disruption. • Measures to mitigate the effects of visual impacts, air quality and noise are outlined in Table 4 of Landscape and Visual, Table 5 for Air Quality and Table 7 for Noise and Vibration respectively.

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