CLEVE HILL SOLAR PARK

ENVIRONMENTAL STATEMENT
NON-TECHNICAL SUMMARY

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Revision A

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CLEVE HILL
SOLAR PARK

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

1. This document is a Non-Technical Summary (NTS) of the Environmental Statement (ES) that has been prepared on behalf of Cleve Hill Solar Park Ltd (the Applicant) in relation to a Nationally Significant Infrastructure Project (NSIP) application (the Application) to be made to the Secretary of State (SoS) for Department for Business, Energy & Industrial Strategy (BEIS), under Section 37 of the Planning Act 2008.

2. The Application is for a Development Consent Order (DCO) for the construction, operation and maintenance, and decommissioning of Cleve Hill Solar Park, a solar photovoltaic (PV) array electricity generating facility and electrical energy storage facility, with a total capacity exceeding 50 MW, and an export connection to the National Grid (hereafter referred to as 'the Development').

3. The Development will be located approximately 2 km (1 mile) to the northeast of Faversham, and 5 km (3 miles) west of Whitstable on the north Kent coast. The Site Location is shown on Figure 1 of this NTS.

4. The Development site boundary includes all of the land required for the Development, habitat management areas and flood defence. The land that would be subject to the construction, operation and decommissioning of the Development as set out above is referred to as the 'solar park site' in this NTS.

1.2 The Development

5. The Development will comprise an array of solar PV modules, an energy storage facility and associated infrastructure. A description of the physical characteristics of the solar park site and the land-use requirements within the wider Development site boundary during the construction, operational and decommissioning phases is given in section 5: Development Description of this NTS. The Development layout is shown on Figures 2a-d of this NTS.

1.3 The Applicant

6. Cleve Hill Solar Park Ltd is a joint venture formed by two solar industry specialists: Hive Energy Ltd and Wirsol Energy Ltd.

1.3.1 Hive Energy

7. Founded in 2010 by Giles Redpath, Hive Energy has become established as one of the largest and most experienced solar PV developers in the UK, responsible for the installation of in excess of 300 MW of solar PV generating capacity across the country.

8. Hive developed the Southwick Estate Solar Farm in Hampshire, energised in March 2015, and at the time the largest solar park in the UK with an installed capacity of 48 MW. Hive is now commencing the roll out of a pipeline of subsidy-free solar parks in the UK.

9. Building on its UK experience, Hive has opened a number of overseas offices and is currently developing a pipeline of international projects across Europe, South America, Africa and Asia, including an operational site in Turkey and a 58 MW solar park in Cuba about to commence construction.

10. Hive is committed to using the knowledge and expertise gained in the UK to develop large-scale, low-cost solar, across the world.

1.3.2 Wirsol Energy

11. Wirsol Energy is a highly experienced solar park developer, constructor and operator across the UK, Europe and Australia. Globally, Wirsol has developed 1.9 gigawatts (GW) of solar electricity generating capacity.

12. Wirsol's global experience of particular relevance to the Development includes the construction and operation of a 25 MW / 50 MW hour energy storage project in Gannawarra, Australia[1] and a solar PV facility with east-west facing arrays in Delfzijl, Netherlands[2].

13. Wirsol has built and operates 24 solar parks in the UK with a combined capacity of 159 MW. The UK development portfolio includes 470 MW of new generating capacity.

14. Wirsol takes great pride in the quality of its solar parks.

1.4 The Purpose of the ES

15. The ES has been produced to accompany the Application, as required by The EIA Regulations[3].

16. The purpose of the ES is to:

- Provide a description of the Development, including its location, the physical characteristics, scale and design of the Development;
- Provide a description of the reasonable alternatives considered, including the reasons for selecting the chosen option;
- Set out the baseline scenario (the current and future state of the environment;
- Examine the existing environmental character of the Application site and the wider area likely to be affected by the Development;
- Predict and describe the likely significant effects of the Development, including the methods used for the assessment;
- Describe measures which would be taken to avoid, prevent, reduce or offset significant negative environmental impacts (referred to as mitigation); and
- Provide the public, the SoS, the planning authorities and other consultees with information on the Development, which would assist the SoS in the determination of the Application.

17. The general methodology used to define and assess the significance of the environmental effects is described in section 2: EIA Process and Methodology of this NTS.

1.5 The Purpose of the NTS

18. This NTS presents a concise summary of the ES using simple, non-technical language.

[1] Gannawarra Energy Storage System https://wirsol.com.au/portfolio/gannawarra-energy-storage-system/ [accessed 17/10/2018]
[2] SunPort Delfzijl Solar Energy Park https://wirsol.com/en/final-agreement-on-realization-of-the-largest-solar-energy-park-in-the-netherlands/ [accessed 17/10/2018]
[3] HMSO (2017). S.I. 2017/572: The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available at: http://www.legislation.gov.uk/uksi/2017/572/contents/made [accessed on 14/08/2018].

2 EIA PROCESS AND METHODOLOGY

19. Environmental Impact Assessment (EIA) is the process undertaken to identify and evaluate the likely significant effects of a proposed development on the environment and to identify measures to mitigate or manage any significant negative effects. The EIA should be informed by consultation with statutory consultees, other interested bodies and members of the public. The purpose of identifying significant effects is to ensure decision makers are able to make an informed judgement on the environmental impacts of a proposal.

20. The findings of the EIA are presented in the ES.

21. The process of assessing and minimising effects involves continually feeding back environmental information obtained through surveys and consultation into the project design and re-evaluating the likely effects of the Development as a result.

22. All the environmental assessments in the ES follow a similar methodology. The likely effect that the Development may have on each receptor is influenced by a combination of the sensitivity of the receptor and the predicted magnitude of change from the baseline conditions (either positive (beneficial) or negative (adverse)).

23. The environmental sensitivity, value or importance of a receptor may be categorised by a range of factors, such as threat to rare or endangered species; transformation of natural landscapes or changes to soil quality and land-use.

24. The overall significance of a potential likely effect is determined by the interaction of the above two factors (*i.e.*, sensitivity/importance and predicted magnitude of change from the baseline). Each chapter sets a threshold above which effects are considered to be "significant" in terms of the EIA Regulations. Where the magnitude of change is identified as "no change", there is no effect.

25. Where significant effects are identified, mitigation is proposed, where possible, to reduce or prevent the likely significant negative effects occurring.

26. Residual effects are the effect that remains after the mitigation has been taken into account.

27. Cumulative effects have also been assessed, which take into account other developments in the area which could lead to additional effects in combination with the Development.

2.1 EIA Scoping

28. The aim of the scoping process is to identify key expected environmental issues at an early stage, to determine which elements of the Development are likely to result in likely significant effects on the environment and to establish the extent of survey and assessment requirements for the EIA.

29. The issues to be addressed by the EIA were identified in the EIA Scoping Report submitted to the Planning Inspectorate in December 2017. The SoS's Scoping Opinion was received on 22nd January 2018, including the formal responses received by the Planning Inspectorate from consultees on the EIA Scoping Report.

30. Key issues raised in the Scoping Opinion are summarised at the start of each technical chapter of the ES and have been considered during the EIA process.

3 CONSULTATION

31. The main consultation activities undertaken include:

- Publication of a Statement of Community Consultation at the start of the pre-application process – which set out the consultation activities which the Applicant has now undertaken;
- EIA Scoping – as described in section 2.1 of this NTS;
- Public exhibitions – to give an opportunity for members of the public to talk to members of the Development team and influence the EIA process;
- A series of meetings with the nearest neighbours to the Development – to give the nearest neighbours an opportunity to talk to members of the Development team and influence the EIA process;
- Section 42 consultation on Preliminary Environmental Information – formal consultation where more detailed environmental information is consulted on, to enable more detailed responses to be received from a wide range of consultees and stakeholders to inform the EIA process; and
- Other meetings with a wide range of consultees and stakeholders including local planning authorities, statutory consultees and other interested parties.

32. The Applicant carried out public exhibitions in December 2017 following publication of Scoping, and in June 2018.

33. Throughout the consultation process, the Applicant has engaged with the local community in order to inform local people about the project, to explain the Development and its likely effects and to feedback any concerns or issues raised into the EIA process.

3.1 Section 42 Consultation

34. The aim of Section 42 consultation is to provide sufficiently detailed information to allow consultees and stakeholders to provide detailed consultation responses in order to inform the EIA process.

35. The Applicant produced a Preliminary Environmental Information Report (PEIR) in May 2018 to inform Section 42 consultation which was presented in the form of a draft ES. This enabled detailed responses to be received, and to be taken into account in the preparation of this final ES.

36. Key issues raised during Section 42 consultation are summarised at the start of each technical chapter of the ES and have been considered during the EIA process and in the Application design.

4 SITE SELECTION, DEVELOPMENT DESIGN AND CONSIDERATION OF ALTERNATIVES

4.1 Site Selection

37. The solar park site was identified through site search exercise undertaken by the Applicant. A large number of sites have been identified by a team of project developers via direct approaches and a network of land agents across the country. The south of England is of particular interest due to the higher levels of solar irradiation experienced relative to other parts of the UK.

38. A range of technical, environmental and economic factors are considered when investigating and assessing any potential site for ground-mounted solar PV development. Key factors for consideration include:

- Solar irradiation levels;
- Proximity to an available grid connection;
- Proximity to local population;

- Topography;
- Field size / shading;
- Access to the site for construction;
- Archaeological interest;
- Agricultural land classification;
- Landscape designations and visual impact;
- Nature conservation designations;
- Flood risk; and
- The potential for a commercial/land agreement with a landowner.

39. Following consideration of the above factors as set out in the following sections, the solar park site was identified as having very good potential for a large-scale ground mounted solar PV array.

4.2 Development Design

40. The Development design has evolved from: an initial south-facing layout design which filled all the available space within the solar park site; then the scoping layout which began to take into account environmental constraints, was based on an east-west facing layout design and was subject to Scoping consultation in December 2017 and January 2018; then the PEIR candidate Development design was presented during Section 42 consultation in June and July 2018; and finally the layout which accompanies the Application.

41. Environmental and technical constraints considered in the design include:

- Landscape character and visual impact;
- Residential amenity including visual outlook from residential properties and potential noise effects from the operation of the Development;
- Existing land-use;
- Ecologically and archaeologically designated sites, including certain undesignated features; and
- Separation distances from overhead power lines.

42. The key changes from the scoping layout to the PEIR layout included:

- Removing the closest solar PV modules to residential properties from the design;
- Removing single tables and including half tables instead to promote a more coherent layout design and increase the separation distance between tables either side of ditches;
- Introduction of a landscaping scheme to provide screening and biodiversity enhancement;
- Refinement of buffers to overhead power lines which cross the solar park site; and
- Reorientation of the electrical compound to accommodate approximately 350 MWh of battery storage capacity.

43. The key changes from the PEIR layout to the Application layout included:

- Removal of all panels from the sloping parts of Cleve Hill and Graveney Hill (Field Y) in direct response to requests received during consultation;
- An increase in the minimum separation between the solar PV arrays and the bank top of ditches from 5 m on either side (or 8 m for IDB drains) at PEIR to 15 m on either side on the main north-south ditches that cross the solar park site representing the majority of ditches overall;
- A commitment to underground the existing 11 kV overhead line that crosses the south of the solar park site;

- All of Field J, and the eastern 50 m of Fields H and I have been removed from the solar PV array areas. This is to increase the size, and therefore the capacity of the arable reversion habitat management area for overwintering waders (birds) associated with the Swale SPA;
- The land between Warm House and the Development will be planted as a woodland, rather than grass/scrub land;
- An updated landscaping scheme to reflect the above design changes;
- The spine road has been reduced in length as it was unnecessary for the spine road to run the length of Field A;
- Mammal friendly culverts have been proposed for new and upgraded ditch crossings;
- An area within the existing Cleve Hill Substation has been proposed as a habitat management area to offer complementary management for biodiversity in support of other habitat management areas;
- A list of flood defence maintenance activities has been agreed with the Environment Agency and the Marine Management Organisation; and
- A potential alternative access route to the south of the existing substation has been proposed as an option.

4.3 Consideration of Alternatives

44. The reasonable alternatives considered by the Applicant include:

- Consideration of alternative designs, such as;
  - South facing solar PV panels;
  - Alternative means of access to the solar park site;
  - Alternative electrical compound location;
  - Alternative additional access proposals; and/or
  - Incorporation of a community orchard.
- Consideration of alternative sites which could connect to the existing Cleve Hill Substation;
- Consideration of alternative low-carbon, subsidy-free forms of electricity generation; and
- Consideration of specific alternative sites proposed in section 42 consultation responses.

45. The Development design as described in section 5 of this NTS has been finalised following consideration of the above alternatives. None of the alternatives set out above are more viable in environmental, economic or technical terms than the Development proposed on the solar park site by the Application layout shown in Figure 2 of this NTS.

5 DEVELOPMENT DESCRIPTION

5.1 Existing Development Site

46. The Development site is coastal and the area is identified on Ordnance Survey maps as Nagden, Cleve and Graveney Marshes although the majority of the land within the Development site is used for arable farming.

47. The total area of the Development site shown on Figures 1 and 2 is 491.2 ha and can be divided into four distinct existing land use types:

- Arable land (387.6 ha);
- Freshwater grazing marsh (35.1 ha);
- Coastal Flood Defences (including areas of freshwater grazing marsh) (58.5 ha); and

- The existing Cleve Hill Substation which serves the London Array Offshore Wind Farm (10 ha). The solar park site is all situated on arable land.

5.2 Description of the Development

48. Due to the rapid pace of technological development in the solar photovoltaic (PV) and energy storage industry, it is necessary to provide flexibility in the design, to allow for the most up to date technology possible to be utilised by the Development.

49. This uncertainty must be balanced against the need to assess likely parameters of the proposed project. The need for flexibility is identified in a number of National Policy Statements (NPS)[4] which suggest the Rochdale Envelope as an approach to address uncertainties inherent to the Development. Specifically, NPS EN-1 states that where it is not possible for all aspects of the proposal to be settled in precise detail, the Applicant may explain the elements that are not finalised, and the reasons for this, and provide and assess the maximum extent of the proposed development.

50. A realistic worst-case design (the "candidate design") has been produced within Rochdale Envelope parameters against which the impacts of the Development can be assessed for the purposes of EIA. These Rochdale Envelope parameters are set out in ES Chapter 5: Development Description and in the Outline Design Principles document which accompanies the Application (DCO Document Reference 7.1).

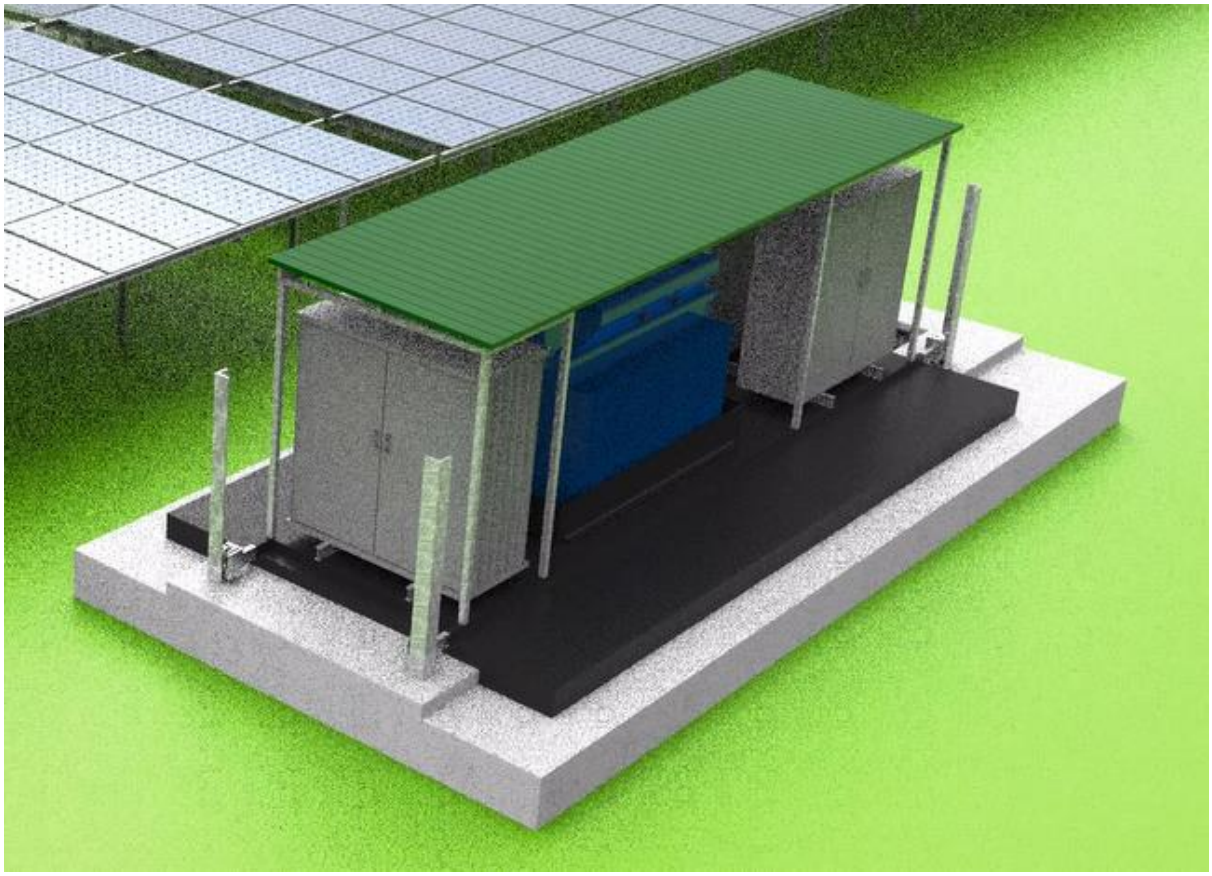
51. The candidate Development design includes the following:

- Solar PV Arrays:
  - Solar PV modules / panels for conversion of solar irradiation into electricity;
  - PV module mounting structures to support solar PV modules facing towards the east and west and mounted at between 1.2 and 3.9 m above ground level (see Plate 1 for an example);
  - String inverters mounted beneath the solar PV modules;
  - Transformers of 3 m in height sited at regular intervals throughout the array (see Plate 2 for an example);
  - Electrical cabling, underground or fixed to mounting structures; and
  - Landscaping.
- Electrical Compound:
  - Flood Protection Bund (of 5.3 m above ordnance datum (sea level));
  - Energy Storage Facility consisting of battery packs or containers (or an extension to the solar park);
  - Development Substation.
- Grid connection to the National Grid at the existing Cleve Hill Substation;
- Site Access, using the existing Cleve Hill Substation tarmac access road, extended to the electrical compound, then a stone spine road running east to west through the middle of the solar park site;
- Habitat Management Areas;
- Flood Defences, where maintenance activities may be undertaken;
- Fencing, security measures and lighting (see Plate 3 for an example); and
- A permissive footpath.

[4] https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/national-policy-statements/

Plate 1 - Indicative Solar PV Array Design[5]

Plate 2 - Indicative Transformer Design



[5] SunPort Delfzijl Solar Energy Park https://wirsol.com/en/final-agreement-on-realization-of-the-largest-solar-energy-park-in-the-netherlands/ [accessed 17/10/2018]

Plate 3 - Indicative Fencing and CCTV

5.3 Construction

52. The construction period is likely to be undertaken in at least two phases:

- Phase one will include the construction of all aspects of the Development except the energy storage facility; and
- Phase two will include the construction of the energy storage facility (phase two in itself could be undertaken in multiple phases in order to deliver smaller amounts of energy storage capacity gradually).

5.3.1 Phase One

53. Phase one of Development construction is currently anticipated to last 24 months. The anticipated start date for construction is spring 2021.

54. To build the solar PV array a small temporary field compound will be established in an adjacent field to serve the field under construction.

55. The types of construction activities that may be required include during phase one (not necessarily in order):

- Site preparation and civil engineering works:
    - Preparation of arable land for construction (*e.g.*, seeding);
    - Establishment of the key habitat management areas;
    - Import of construction materials, plant and equipment to site;
    - Establishment of the perimeter fence;
    - The establishment of the main construction compound;
    - Construction of the spine road;
    - The upgrade or construction of crossing points (culverts) over drainage ditches; and
    - Marking out the location of the Development infrastructure.

- Construction of onsite electrical infrastructure to facilitate the export of generated electricity:
  - Construction of the flood protection bund;
  - Site preparation and civils for the Development substation and energy storage facility;
  - Trenching and installation of electric cabling;
  - Import of components to site; and
  - Installation of the Development substation.
- Solar PV array construction:
  - Import of components to site;
  - Piling of module mount verticals;
  - Erection of module mounting structures;
  - Mounting of modules and inverters;
  - Trenching and installation of electric cabling;
  - Transformer foundation excavation and construction; and
  - Installation of transformers.
- Testing and commissioning;
- Landscaping and habitat creation.

5.3.2 Phase Two

56. Construction phase two of the Development includes the establishment of the energy storage facility and is expected to last a total of up to 6 months.

57. Regardless of whether it is to be delivered separately or concurrently, provision for the energy storage facility will be made during phase one of construction while the energy storage area is be used as a construction compound and therefore most of the site preparation will have already taken place. The types of construction activities that may be required include during phase two (not necessarily in order) are therefore likely to include:

- Energy storage facility construction:
  - Installation of electric cabling;
  - Foundation construction (if not already in situ);
  - Import of components to site; and
  - Installation of energy storage facility.

58. If the energy storage facility is installed concurrently with the rest of the Development during phase one, the work would be undertaken over a longer timescale to reduce traffic impacts.

5.3.3 Construction Controls

59. The construction phase will be subject to controls which will limit and control activities. The outline documentation provided in the ES includes:

- Outline Construction Traffic Management Plan - which will guide the delivery of materials and staff onto the Development site during the construction phase; and
- Outline Construction Environmental Management Plan - which will guide the construction process through environmental controls in order to promote good construction practice and avoid adverse impacts during the construction phase.

60. Core working hours are proposed to be between 07.00 until 19.00, Monday to Friday and 07.00 until 13.00 on a Saturday (unless in exceptional circumstances where need arises to protect plant, personnel or the environment).

5.4 Operation

61. During the operational phase, activity on the Development site will be minimal and would be restricted principally to vegetation and livestock management (the Development site will be grazed by sheep), equipment/infrastructure maintenance and servicing including cleaning and replacement of any components that fail, and monitoring to ensure the continued effective operation of the Development.

62. Operational staff could require to access the Development 24 hours a day, seven days a week.

5.4.1 Sheep Grazing

63. During operation, vegetation within the Development site will be grazed by sheep. This has the benefit of continuing the agricultural use of the Development site whilst still giving scope for biodiversity enhancement through controlled grazing[6]. This land use is consistent with historic and present land use in the area such as grazing which takes place on adjacent land.

64. Temporary stock fencing will be utilised to keep sheep to areas around the solar PV arrays where vegetation control is required and separate them from areas where a more relaxed grazing regime may be desirable at certain times of year, for example around the ditch edge habitats. Stocking densities and breeds used will be chosen to fit the conditions onsite.

5.4.2 Cleaning Panels

65. Cleaning would likely be undertaken by a vehicle travelling down the minimum 2.5 m gaps between the arrays with a cleaning boom attached. Technological advances could result in automated cleaning equipment being used during the lifetime of the Development.

66. Solar PV modules are typically cleaned using distilled or deionized water. Detergents or abrasive products are not used as they have potential to damage the solar PV modules. The run-off from cleaning would therefore be clean water and would be dealt with in the same way as rainwater.

67. The need for cleaning would be appraised during the early stages of operation as it can be the case that cleaning is not worthwhile as the short-term benefit of cleaning the solar PV modules can be outweighed by the costs of cleaning.

5.4.3 Security

68. Security measures such as perimeter sensors, PIR lighting and alarms would be controlled from a central control room offsite. In the event of an emergency, security personnel would be despatched to the Development to respond.

69. Operational staff could require to access the Development 24 hours a day, seven days a week.

5.5 Decommissioning

70. When the operational phase ends, the Development will require decommissioning. All solar PV array infrastructure including solar PV modules, mounting structures, cabling, inverters and transformers would be removed from the Development site and recycled or disposed of in accordance with good practice and market conditions at that time.

[6] BRE (2014) Agricultural Good Practice Guidance for Solar Farms. Ed J Scurlock

71. A Decommissioning and Restoration Plan, to include timescales and transportation methods, will be agreed in advance with the local planning authority and will be subject to environmental controls and legislation extant at the time. Decommissioning is expected to take between 6 and 12 months.

72. The effects of decommissioning are similar to, or often of a lesser magnitude than construction effects.

6 LEGISLATIVE AND PLANNING POLICY CONTEXT

6.1 National Policy Statements

73. National Policy Statements (NPS) describe the national case and establish the need for certain types of infrastructure development, as well as identifying potential key issues that should be considered by the decision maker when considering an application for a DCO. Although there is no NPS which provides specific policy in relation to solar photovoltaic (PV) and energy storage development, in previous applications where no NPS applies, the Secretary of State has applied relevant related NPSs as if the NPS governed the development in question. Further consideration of this is set out in Chapter 6: Legislation and Planning Policy Context of the ES and in the Planning Statement.

74. The overarching NPS for Energy (EN-1)[7] was adopted in July 2011 and sets out the overall national energy policy for delivering major energy infrastructure.

75. Part 1 advises that within the context of the planning system EN-1 is likely to be a material consideration. Whether and to what extent EN-1 is a material consideration, will be judged on a case by case basis

76. Part 2 of the statement sets out the Central Government policy context for major energy infrastructure. It comprises the need to meet legally binding targets to cut greenhouse gas emissions; transition to a low carbon economy; decarbonise the power sector; reform the electricity market; secure energy supplies; replace outdated energy infrastructure; and widen objectives of sustainable development. In particular in this section, paragraph 2.2.16 identifies that approximately a quarter of the UK's generating capacity is due to close by 2018 and that new low-carbon generation is required which is reliable, secure and affordable.

77. Part 3 also outlines that considerations of need should be given considerable weight when determining applications for energy developments.

78. Part 4 sets out a number of assessment principles against which applications are to be decided, including the presumption to grant consent for applications for energy NSIPs, and the need to balance potential benefits against potential adverse impacts.

79. Part 5 sets out guidance for the Inspectorate in relation to the generic impacts of energy developments, stating that impacts and means of mitigation should be considered where the impact is relevant and important to the decision. These impacts concern air quality and emissions; biodiversity; aviation; coastal change; dust and various other pollution control related matters; flood risk; historic environment; landscape and visual; land use; noise and vibration; socio-economics; traffic and transport; waste; and water quality and resources. The impacts of the Development on those factors have been considered throughout the EIA and presented in detail in the ES.

80. The EN-1 reflects the Government's commitment to carbon emission reduction, energy security and affordability. As most of the households and modes of transport are wholly

[7] Department of Energy and Climate Change, July 2011, " National Policy Statement for Energy (EN-1)", Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for- energy-en1.pdf [Accessed 31/01/2018]

dependent on fossil fuels, the EN-1 calls for reducing the dependency on high carbon fossil fuels, and transitioning to low carbon energy mix.

81. The National Policy Statement on Renewable Energy Infrastructure (EN-3)[8] was adopted in July 2011 and provides national planning policy in respect of renewable energy infrastructure.

82. Paragraph 1.1.1 of EN-3 underlines the importance of the generation of electricity from renewable sources by stating:

"Electricity generation from renewable sources of energy is an important element in the Government's transition to a low-carbon economy. There are ambitious renewable energy targets in place and a significant increase in generation from large-scale renewable energy infrastructure is necessary".

83. The National Policy Statement on Electricity Networks Infrastructure (EN-5)[9] was adopted in July 2011. Whilst EN-5 principally covers above ground electricity lines of 132 kV, paragraph 1.8.2 confirms that EN-5 will also be relevant if the electricity network constitutes an associated development for which consent is sought, such as a generating station. EN-5 is therefore relevant to the Development, as a grid connection is proposed.

84. Part 2 of EN-5 sets out a number of assessment and technology specific matters. Paragraph 2.2.2 points out that the location of electricity networks will often be determined by the particular generating station and the existing electricity network. Part 2 sets out particular generic impacts concerning biodiversity and geological conservation, landscape and visual, noise and vibration, and electric and magnetic field effects

6.2 National Planning Policy Framework (2018)

85. Although reference to the NPS should be sufficient in principle for compliance purposes, NPS EN-3 states that applicants and the Secretary of State should still have regard to existing planning policy guidance specifically related to renewable energy projects.

86. The National Planning Policy Framework[10] ("the NPPF") was published on 24th July 2018 and is a material consideration in planning decisions.

87. Whilst the NPPF does not contain any specific policies for NSIP development, paragraph 5 of the NPPF states that:

"These are determined in accordance with the decision making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework). National policy statements form part of the overall framework of national planning policy, and may be a material consideration in preparing plans and making decisions on planning applications."

[8] Department of Energy and Climate Change, July 2011, " National Policy Statement for Renewable Energy Infrastructure (EN-3)", Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47856/1940-nps- renewable-energy-en3.pdf [Accessed 31/01/2018]

[9] Department of Energy and Climate Change, July 2011, " National Policy Statement for Electricity Networks Infrastructure (EN-5)", Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/47858/1942- national-policy-statement-electricity-networks.pdf [Accessed 31/01/2018]

[10] Department of Communities and Local Government, July 2018, "National Planning Policy Framework" Available online at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/740441/National_Planning_Policy_Framework_web_accessible_version.pdf [Accessed 07/11/2018]

88. Whilst there is no specific policy for solar energy development contained in the NPPF, paragraph 148 proposes that the planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change.

> *"The planning system should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings, and support renewable and low carbon energy and associate infrastructure"*

89. The NPPF sets out that the purpose of the planning system is to contribute to the achievement of sustainable development, identifying that sustainable development consists of economic, social and environmental roles.

6.3 Energy Policy

90. The UK is subject to the following legally binding targets in respect of reduction of carbon emissions and use of renewable energy:

- Climate Change Act 2008[11] (as amended) sets a legally binding target to reduce UK carbon emissions by 80% by 2050 and at least 34% by 2020, against a 1990 baseline; and
- Renewable Energy Directive 2009/28/EC[12] sets targets for Member States in respect of the use of energy from renewable resources. The UK's obligation is 15% of energy consumption from renewable energy resources by 2020.

91. The European Council 2030 Climate and Energy Framework[13] has set a further target of at least a 40% reduction in greenhouse gas emissions by 2030. The target is binding and all Member States are required to participate in this effort to further combat climate change.

92. In January 2018 the EU revised the 2030 energy mix target from 27% renewable to 35%. There are not yet explicit member-specific targets, but it is clear that all countries will be required to provide significant amounts of renewable energy. The UK's obligation will only increase, and the replacement of large traditional power stations with major renewable energy projects is required for this to be achieved.

93. This application is being submitted before the UK has concluded its exit negotiations with the EU. There will therefore be no impact on the policies directing this Development, as all relevant EU laws are expected to be copied across into UK law as part of the EU Withdrawal Act.

94. The UK Solar PV Strategy Part One: Roadmap to a Brighter Future (2013)[14] and Part Two: Roadmap to a Brighter Future (2014)[15] set out the role of solar development to increase the use of renewable energy. These is a recognition in these documents that agricultural

[11] Climate Change Act 2008 as amended by the Climate Change Act 2008 (2020 Target, Credit Limit and Definitions) Order 2009
[12] Directive 2009/28/EC (Renewable Energy)
[13] European Council, 24 October 2014, Conclusions on 2030 Climate and Energy Policy Framework, Available online at http://data.consilium.europa.eu/doc/document/ST-169-2014-INIT/en/pdf [Accessed 31/10/2018].
[14] Department of Energy and Climate Change, October 2013, "UK Solar PV Strategy Part 1: Roadmap to a Brighter Future", Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/249277/UK_Solar_PV_Strategy_Part_1_Roadmap_to_a_Brighter_Future_08.10.pdf [Accessed 31/10/2018]
[15] Department of Energy and Climate Change, April 2014, "UK Solar PV Strategy Part 2: Delivering a Brighter Future", Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/302049/uk_solar_pv_strategy_part_2. pdf [Accessed 31/10/2018]

land will be used for solar development and that biodiversity benefits can arise, if developments are well planned.

95. The Annual Energy Statement (2014)[16] provides the most recent update from Central Government on progress against energy policy, recognises the significant level of investment and employment which has resulted from renewable energy development, and that investment and employment is likely to reach into the supply chain in all parts of the UK.

6.4 The Development Plan

96. Under the Planning Act 2008 the Development Plan is classed as a relevant material planning consideration. The NPSs are instead the primary consideration for NSIP applications. Nevertheless, the Development Plan is still a matter which can be considered important for the consideration of DCO applications and has been considered for the Development.

97. The relevant Development Plan comprises of:

- 'Bearing Fruits 2031: The Swale Borough Local Plan' ("the Swale Local Plan");
- The Kent Minerals and Waste Local Plan (2013 – 2030); and
- The Canterbury District Local Plan 2017 ("the Canterbury Local Plan")

98. All the relevant local and national policy has been considered in detail in Chapter 6 of the ES and assessed in the Planning Statement.

7 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

99. A Landscape and Visual Impact Assessment (LVIA) has been undertaken for the candidate layout design and is contained in Chapter 7: Landscape and Visual Impact Assessment. The LVIA includes the following:

- Consultation;
- Baseline surveys and site visits;
- Desk-top analysis and computer modelling;
- Viewpoint photography during winter and summer;
- Production of photomontage visualisations to inform the assessment;
- Assessment surveys and site visits;
- Residential visual amenity survey and assessment; and
- Written analysis of the landscape and visual impact of the Development.

7.1 Designations

100. The solar park site does not fall within any international or national landscape designation. The nearest site with a landscape designation is Kent Downs Area of Outstanding Natural Beauty (AONB), which is located approximately 4 km to the south.

101. The solar park site lies within an 'Area of High Landscape Value - Kent Level'[17], as referred to within Policy DM24 of The Swale Borough Council Local Plan.

[16] Department of Energy and Climate Change, October 2014, "Annual Energy Statement 2014" Available online at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/371388/43586_Cm_8945_print_ready.pdf [Accessed 31/10/2018]

[17] Bearing Fruits 2031: The Swale Borough Local Plan, Full Council Item, 26th July 2017 and Technical Paper No.6

7.2 Landscape Character

7.2.1 Regional Landscape Character

102. Landscape character is described at regional level in the Landscape Assessment of Kent (October 2004)[18]. The solar park site is located in the Eastern Swale Marshes Character Area[19] which is described as having the following characteristic features:

- *"Remote, wild and exposed;*
- *Broad skies. Pervasive influence of sea and sky. Creeks, ditches, sea walls. Grazing marsh, wild birds and grazing animals;*
- *Creekside townscape and waterside buildings; and*
- *Poorly managed fences. Intrusion of power lines."*

103. Part of the solar park site also lies within the Eastern Fruit Belt Character Area[20] (south and southeast of the CLS Area) which is described as having the following characteristic features:

- *"Rural character, sense of remoteness and privacy.*
- *Enclosed and diverse.*
- *Strong woodland blocks.*
- *Orchards and hops, shelterbelts. Large pockets of open farmland. Undulating landform."*

7.2.2 Local Landscape Character

104. The site is a large flat low lying coastal area with, to the south and east, land rising steadily to higher ground, which runs southwest to northeast towards Whitstable. The site consists of agricultural land formed from reclaimed salt marsh. The topography is low-lying, ranging between 1-2 m above sea level, and is generally flat. Notable exceptions to this are Graveney Hill in the southeast, which rises to a height of 17 m, and the sea flood defence wall runs around the north and west sides of the site at a height of approximately 6 m. The land is subject to intensive agricultural use which exacerbates its flat uniform and open appearance. The site is traversed by a network of linear watercourses running predominantly north to south in orientation. These man-made features have a natural appearance associated with similar features in the wider landscape and the remnants of marshland drainage creating an interesting pattern of field division.

105. The landscape is visually contained in part by distance of view and low elevation across the length of the site but also due to the presence of the large flood defence which restricts views from outside and creates a sense of enclosure, removing a visual relationship with The Swale immediately beyond.

106. The site is predominantly located in the Graveney Marshes Landscape Character Area 5 of the Swale Landscape Character and Biodiversity Appraisal (SLCBA) Supplementary Planning Document[21] the key characteristics of which include:

- *"Large open area of alluvial marshland;*

[18] KCC (2004). The Landscape Assessment of Kent. Available at: https://www.kent.gov.uk/about-the-council/strategies-and- policies/environment-waste-and-planning-policies/countryside-policies-and-reports/kents-landscape-assessment [accessed 01/12/2017]
[19] SBC (2011) Swale Landscape Character and Biodiversity Appraisal SPD. Available at: http://www.swale.gov.uk/assets/Planning-General/Planning-Policy/Landscape-Character-Appraisal-Final-Sept-2011/Marshland-Landscape-Types-reduced-size.pdf [accessed 01/12/2017]
[20] Ibid.
[21] SBC (2011) Swale Landscape Character and Biodiversity Appraisal SPD. Available at: http://www.swale.gov.uk/assets/Planning-General/Planning-Policy/Landscape-Character-Appraisal-Final-Sept-2011/Marshland-Landscape-Types-reduced-size.pdf [accessed 01/12/2017]

- *Large scale arable fields divided by long straight drainage ditches;*
- *Typical features ditches, sea wall, estuarine saltmarsh, sand and mudflats; and*
- *Atmospheric and tranquil landscape with large open and often dramatic skies."*

107. The SLCBA describes landscape condition within the seawall as being in poorer condition than that on the outside of the sea wall which is in a good condition. The reason for its poor condition "*lies in the intensive agricultural land use that has produced a featureless monoculture extending over a large area*". In addition, the high voltage transmission line on large lattice pylons that cross from east to west introduces large scale vertical structures into a landscape with a predominantly horizontal emphasis.

108. The site lies within the Kent Level Area of High Landscape Value (Policy DM24) in the Swale Borough Council Local Plan. It is designated for its significance to Kent.

7.3 Landscaping

109. The solar park site is set within an open landscape with limited vegetation within the solar park site itself and to the north, east and western boundaries. On the southern boundary of the solar park site there is more vegetation which includes hedgerows, individual trees and tree lined blocks. Within the solar park site there are tall reeds within the drainage ditches which divide the fields and define their boundaries. Beyond the solar park site there are small blocks of woodland and a network of hedgerows. The solar park site will therefore benefit from hedgerow and hedgerow tree planting to assist in screening the Development whilst also trying to maintain the open views across the solar park site towards The Swale to the north. The proposed planting will bring additional amenity and biodiversity value to the local area.

110. The substation and battery storage compound will be enclosed in a bund, for protection from potential flood risk. On the northern, eastern and western edges of the bund there will be native species buffer planting. On the southern edge of the bund there will be native species shelterbelt planting which is taller in size to assist with the screening of the taller substation equipment in this part of the compound. The proposed buffer and shelterbelt planting consists of trees and shrubs which will create informal and natural landscape features.

111. The landscape and biodiversity enhancement measures set out in the Landscape and Biodiversity Management Plan, which forms Technical Appendix A5.2 of the ES, are designed to complement and enhance existing landscape character at the solar park site and in the surrounding area. The landscape enhancement measures also aim to improve integration of the Development in to the landscape and to minimise visual effects.

112. Land beneath and around the panels will be used for grazing following the introduction of grazing marsh meadows. All existing (non-arable) vegetation would remain and the panels would be sited within the existing field pattern which are divided by the drainage ditches.

7.4 Assessment of Landscape and Visual Effects

113. The assessment includes consideration of the following groups of receptors:

- Landscape designations;
- Landscape character;
- Residential areas;
- Roads, recreational routes and public rights of way; and
- Assessment viewpoints selected through consultation to reflect visual amenity effects on a range of receptors from within 5 km of the site.

114. The assessment concludes that the Development would have the most influence on the landscape and visual amenity within a short distance of 1 km from the solar park site.

Long distance views of the Development may be restricted, due to intervening built form, polytunnels, tall vertical infrastructure and the horizontal nature of the Development. The low-lying character of the Development restricts the overall visibility of the Development and its potential for wider landscape and visual effects. The Development is contained by the sea wall which runs to the north and west. The enhancement measures proposed in the Outline Landscape and Biodiversity Management Plan (LBMP) will enhance existing landscape structure along the site boundaries to soften the appearance of the Development edges, allowing integration with existing landscape context beyond the solar park site.

Landscape Effects

115. The landscape character of the solar park site itself would be directly affected because of changes to the physical components of the landscape within the site. The landscape elements of the solar park site that would be directly affected during construction are scenic value, recreational value, perceptual aspects, landscape quality, rarity and whether the landscape is representative of landscape character. These effects are mainly confined to areas where substantial construction is taking place (electrical compound area, spine road and solar PV module areas). These effects would be Major to Major/Moderate effects. The effects during the operational phase of the solar park site would remain the same as construction. During the decommissioning phase there would be Moderate effects within the site, which are significant. All effects are reversible, and the site would return to its current state (or better, if some enhancement measures are left) following decommissioning.

116. There would be Major/Moderate effects on the Kent Level AHLV within the site itself during construction and operation. Outside of the solar park site there would be Moderate/Minor effects on the AHLV, and these effects are not significant.

117. The Development will not give rise to any significant effects on any other landscape designations.

118. The significant effects of the Development on landscape receptors arise primarily from the fact that it will change the appearance of the land at the solar park site from agricultural and grazing land to that of solar panels and an electrical compound. Currently, lattice pylons, and an existing 400 kV substation, give a modified character to the land within the solar park site. The Development will be seen in the context of these large features within the landscape. Because views of the Development from outside the site will be limited, effects on the landscape character of other areas would be not significant.

Visual Effects

119. The visual effects during construction will be limited to visibility of construction activities. Such effects would be of short duration and temporary in nature. Users of the Saxon Shore Way to the north and west of the site and the Public Right of Way (PRoW) ZR485 which runs through the site would have the greatest visual effect from the construction of the solar park site, because of the unobstructed views of construction activity and proximity. Approximately 5 km of the Saxon Shore Way long distance footpath would experience Major visual effects and the whole 1.5 km of PRoW ZR485 would have Major/Moderate visual effects, which are significant. Approximately 600 m of PRoW ZR488 which runs through the southeast of the site would experience Moderate visual effects during construction, and these effects are significant. National Cycle Network Route 1 (NCN 1), runs along Seasalter Road for approximately 1.5 km before turning west onto Sandbanks Road. There would be Major/Moderate visual effects only for approximately 800 m of NCN 1, north of the existing Cleve Hill Substation access road on Faversham Road/Seasalter Road, and these effects are significant.

120. Effects during the operation of the solar park site on visual amenity would be greatest closest to the solar park site, particularly on users of the Saxon Shore Way and other public rights of way (PRoWs) within the solar park site and immediately in the vicinity.

121. PRoW ZR485 which runs through the solar park site would experience the most change due to the proximity of the panels and giving the feeling of enclosure created by the height of the panels. The sense of openness would be lost given the sense of enclosure created by the panels, around PRoW ZR485. There would be Major/Moderate visual effects which are significant.

122. From the Saxon Shore Way, panels would be visible due to the elevated position along the sea wall which visually contains the solar park site. Views over the solar panels will be unobstructed, and the sense of openness and remoteness will remain. Due to the low lying horizontal nature of the Development and the low lying landform, the Development does not restrict the wider distant views towards the Kent Downs Area of Outstanding Natural Beauty (AONB), Whitstable, Faversham, The Swale and beyond to the Isle of Sheppey. The lower level grazing marsh planting will begin to visually integrate with the Development, but the panels would be visible. From more eastern locations along the Saxon Shore Way, the taller substation equipment would be visible above the vegetated bund, but would be seen in context with the existing substation and two large agricultural buildings. Overall, for the section of this path that passes the site, there would be Major to Major/Moderate visual effects which are significant.

123. Users of PRoW ZR488 will experience some degree of change due to the proximity of the Development to the PRoW and when seen from the elevated position in the landform on Graveney Hill. Hedgerow and trees will provide further screening and define the solar park site whilst creating open views. There would be Moderate visual effects which are significant.

124. PRoW ZR490 located to the south east of the solar park site would have Moderate effects at year 1 and 5 which is significant. At year 10 there would be no significant effects due to maturing planting.

125. Cyclists on the section of National Cycle Network Route 1 (NCN 1) along Faversham/Seasalter Road would have distant views across to the solar park site. The section of NCN 1 along Sandbanks Road would have no views for the majority of the section. There is potential for distant views as it approaches Nagden Cottages but this would reduce over time due to the planting maturing, which would screen the Development. There would be significant effects at years 1 and 5 of operation, but at year 10 the effects would not be significant. For road users on Faversham/Seasalter Road, Sandbanks Road and Broom Street there would be no significant effects.

126. Recreational users of Victory Wood would have Moderate significant effects at year 1. At years 5 and 10 this would reduce and there would be no significant effects.

127. Residential properties nearest to the solar park site would have visibility during the construction phase. Warm House and 3 properties at Nagden would experience the greatest visual effects due to the open nature of the view. There would be Major visual effects on these properties. An assessment of residential visual amenity concludes that the effects would not lead to any properties becoming unattractive places in which to live. A further 11 properties or groups of properties are assessed as likely to receive significant visual effects during the construction and the first few years of the operational phase of the Development. Following around 10 years of operation, planted vegetation will have grown to screen views of the solar infrastructure to some extent, and soften views particularly of the edges of the solar park, helping it integrate into the surrounding landscapes. After 10 years of operation, 10 properties are assessed as receiving significant visual effects, and during decommissioning this number would reduce to 8. All effects are reversible, and the views would return to their current state (or better, if

some enhancement measures are left, such as undergrounding the 11 kV wooden pole line through the site) following decommissioning.

128. During the decommissioning stage of there will be significant effects on the Saxon Shore Way and PRoW ZR485 as there would be views associated with the removal of the solar park, and potentially removal of vegetation and the bund material. The NCN 1 cycle route would have significant visual effects along the Faversham/Seasalter Road as there would be views towards bund and increase in traffic during the removal of equipment from the solar park.

7.5 Cumulative Effects

129. Cumulative visual effects are restricted to receptors to the west of the solar park site, with views that could also include other proposed development on the Oare peninsula (at Oare gravel works). This assumes that the other proposed development is built. Recreational users of the Saxon Shore Way would receive significant cumulative visual effects during construction and year 1 of operation, though this would reduce at years 5 and 10 when there would be no significant effects. There are significant cumulative visual effects on properties at Shipwright Arms, but by year 10 of operation there would be no significant effects. There are no significant cumulative effects predicted upon other footpaths, roads and residential properties.

8 ECOLOGY

130. The ecological characteristics of the solar park site have been determined through desk study, consultation, habitat surveys, and species surveys.

131. As well as considering existing usage of the solar park site itself, the ecology assessment specifically focuses on the effects arising from the construction, operation and decommissioning of the Development on The Swale, which is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA) and Ramsar site. The Swale Estuary is also a Marine Conservation Zone (MCZ) and parts of it are a National Nature Reserve (NNR). The solar park site is also immediately adjacent to the South Bank of the Swale Local Nature Reserve (LNR).

132. A series of desk studies, ecological surveys and assessments have been completed within the Site and in areas just beyond to identify designated sites, habitats and species that are considered important ecological features.

133. Important ecological features that have been identified following detailed assessment, include:

- The Swale SSSI/SPA/Ramsar Wetland;
- Other designated sites;
- Priority habitats;
- Invertebrates;
- Great crested newt;
- Bats (all species);
- Water vole;
- Reptiles; and
- Other species.

134. Within the Development area, most important ecological features have been found within the ditch network, adjacent grassland habitats, and standing water, which represent the most biodiverse areas on the Site. Outside of the Development area, adjacent or nearby designated sites, such as the Swale SSSI/SPA/Ramsar and habitats such as ponds, and ditches are key areas for important ecological features.

135. The Development has been designed to minimise potential effects on these important ecological features (designated sites, habitats and species), by avoiding changing them, and by avoiding adverse effects on the species that support them. The construction of solar PV panels within the Development site will be within existing habitats of negligible ecological value, such as arable fields. The footprint of the electrical compound will mostly be within arable fields, whilst existing tracks and track access crossing points will be utilised where possible and trenching of electrical cabling will mostly take place away from the ditch network. Where there is the potential that important ecological features could be affected during construction, operation or de-commissioning of the solar park, an approved Construction Environment Management Plan (CEMP) will be followed that will provide the necessary mitigation measures required to minimise impacts to important ecological features. Of key importance, an Ecological Clerk of Works will be appointed to ensure that environmental mitigation is carried out effectively.

136. Additional measures to minimise potential effects on important ecological features are included as mitigation and enhancement measures within an Outline Landscape and Biodiversity Management Plan (LBMP; Technical Appendix A5.2 to the ES).

137. The mitigation includes the provision of new native species hedgerow planting, grazing marsh and grassland habitats containing wildflowers, shelterbelts to include tree planting, and native scrub buffer planting.

138. Within the Outline LBMP, further mitigation is referenced where significant ecological effects are not envisaged, but individual legally protected species such as reptiles, great crested newts and water voles may potentially be affected by the Development and a licence to enable construction works to take place is required from Natural England, or a mitigation strategy is required, to avoid committing a criminal offence.

139. No significant adverse ecological effects have been identified with the mitigation in place and following the application of further mitigation measures to control construction activities close to valued habitats. In most cases, following the application of the measures detailed within the Outline LBMP, a minor beneficial effect on important ecological features has been predicted, along with a predicted net gain in the biodiversity value of the site. For invertebrates, a significant beneficial effect is assessed.

140. A net gain in ecologically important habitats and biodiversity generally has been predicted and there are no adverse significant effects on important ecological features from the Development. Mostly as a result of this, the Development will not contribute to significant adverse cumulative effects when considered in combination with other nearby developments.

9 ORNITHOLOGY

141. The avian interests of the Development site have been characterised through desk study, consultation, and baseline bird surveys undertaken across three bird breeding seasons and four non-breeding seasons between January 2013 and April 2018. The baseline bird surveys included breeding bird surveys, wintering bird surveys and flight activity surveys designed to quantify the use of the site by birds at different times of year.

9.1 Baseline Description

142. The Development site is adjacent to and includes parts of The Swale, designated as a Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar Wetland Site due to its important bird populations. No development is proposed within the designated site; however, the Development site provides important foraging resources for a number of species associated with the designated site and is therefore functionally linked. As a result, it was recognised that there would be a need to carry out a Habitats Regulations Assessment, in addition to the EIA.

143. Breeding bird surveys recorded up to 40 confirmed breeding species within the survey area that included the Development site and surrounding habitats, making it as of local significance according to standard biodiversity criteria. These included species of conservation concern including marsh harrier, lapwing, bearded tit, skylark, Cetti's warbler, dunnock, house sparrow, yellow wagtail, meadow pipit, linnet and reed bunting. A pair of peregrines also frequented the local area throughout the year.

144. Flight activity surveys and other observations confirmed that marsh harriers and kestrels frequently hunt within and around the Development site throughout the year, favouring the coastal grazing marsh habitat and strips of grassland vegetation bordering the network of ditches within the site. Foraging barn owls were also observed occasionally and short-eared owls were seen on two occasions during the spring and summer 2016.

145. Field surveys during the passage and winter seasons demonstrated that three species associated with the Swale, brent goose, lapwing and golden plover, were frequently recorded in the arable fields within the Development site and in the adjacent pasture fields, often in important numbers in the context of The Swale SPA/SSSI/Ramsar Site. Other waterbird species associated with The Swale were occasionally recorded within the Development site, but did not occur regularly in important numbers.

146. The arable fields and margins and perimeter habitats around the site also provide foraging resources and resting places for a diverse range of species during the non-breeding season. These included occasional large numbers of skylark, starling, gulls and stock dove taking advantage of suitable foraging conditions following cultivation of the soil in early autumn. Small wintering populations of reed bunting, yellowhammer and corn bunting were also recorded in the peripheral scrub and reedbed habitats surrounding the blocks of arable fields.

9.2 Consultation

147. Pre-application consultations have included discussions with a Habitat Management Steering Group, including representatives from Natural England, Kent Wildlife Trust and the Royal Society for the Protection of Birds, established in February 2018 to guide plans for mitigation and enhancement of habitats for birds.

9.3 Assessment Approach

148. The potential effects were assessed in relation to the construction, operation and decommissioning phases of the Development. These were identified as:

- *Disturbance* to birds from construction/decommissioning activities or maintenance activity and the presence of the solar panels and other associated aspects of the Development during the operational phase;
- *Displacement* of breeding or wintering birds from the area occupied by the Development as a result of habitat loss or change or fragmentation, including land functionally linked to The Swale SPA/SSSI/Ramsar Site;
- *Indirect effects* on birds through impacts on habitats as a result of changes in water quality or deposition of dust;
- *Collision* of birds with the solar panels; and
- *Disturbance* to birds from changes in public access to the area around the Development during operation.

149. The baseline information was used to determine the Important Ecological Features at the Development site, which are those bird species present in important populations and potentially affected by the Development. The assessment focuses on species or populations afforded higher levels of legislative protection and/or those considered to be most at threat due to declines or fragility in their populations (typically, those listed on Annex 1 of the Birds Directive, Schedule 1 of the Wildlife and Countryside Act, Section 41

of the Natural Environmental and Rural Communities Act and the Red-list of Birds of Conservation Concern.

150. The Important Ecological Features identified were:

- The Swale SPA/SSSI/Ramsar Site (including component nature reserves), comprising the qualifying interest features identified as 22 component wintering waterbird species and the breeding bird assemblage (including marsh harrier);
- Breeding farmland bird community;
- Wintering farmland bird community;
- Barn owl; and
- Peregrine.

9.4 Mitigation Built into the Design of the Development

151. The Development includes a number of embedded design and construction mitigation measures to avoid or reduce the potential effects on birds. These include:

- Outline Landscape and Biodiversity Management Plan, which sets out the habitat management prescriptions for areas of the Development site which provide mitigation for loss of breeding and foraging resources; and
- Outline Construction and Environmental Management Plan, which sets out measures to be adhered to during the construction of the Development to avoid adverse environmental effects. This includes a Construction Noise Management Plan and Breeding Bird Protection Plan.

9.5 Assessment of Effects

152. The greatest risk of disturbance was identified for the construction and decommissioning phases, with no likely adverse disturbance effects during operation. During the non-breeding season, noise and visual disturbance would affect birds in a small proportion of the intertidal mudflats of The Swale, as well as having localised effects on birds using the land within the Development site. In the breeding season, disturbance would affect breeding birds in the Development site and adjacent grazing marsh/reedbed habitats of the South Swale reserve. Measures have been included in the construction scheduling to avoid disturbance to breeding birds in the coastal grazing marsh/reedbed during the breeding season. Assuming implementation of noise mitigation measures, including zoning and sensitive timing of construction activities, as well as acoustic screening around the pile-driving machinery, (set out in the Construction Noise Management Plan), adverse effects will be largely avoided, resulting in no more than low magnitude effects that are not significant.

153. There will be various changes to the habitats currently present at the Development site. These include the installation of the solar arrays on what is currently arable land, the introduction of grassland on land under the panels, between panel tables and between solar PV arrays (amounting to approximately 27 hectares between arrays), introduction of new planting of scrub, hedgerows and trees around the periphery of the site, improvement of some ditch habitats, 56 hectares of arable conversion to grassland/grazing marsh to the east of the solar PV arrays to mitigate loss of foraging resources for geese and waders, 32 hectares of conversion of arable land to lowland meadow in the south of the site and improved grazing marsh management in the existing grazing marsh at the east end of the site to further the aims of the SSSI.

154. The largest extent of habitat loss to Development will be in the arable land. All other areas of change are opportunities for the enhancement of habitats for the benefit of birds and other wildlife. The displacement of brent geese, lapwing and golden plover from this area would have a significant effect without the implementation of the 56 hectare Arable Reversion Habitat Management Area (AR HMA), which involves the conversion of cropped

land to permanent grassland. The AR HMA will provide foraging resources for these wintering species, such that the site will continue to provide resources to support them consistently throughout the winter.

155. The establishment of large areas of conversion of arable cropped land to grassland meadow, including a 32 hectare area in the south of the site and 27 hectares in wide areas between the solar PV arrays will increase the extent of suitable foraging habitat for marsh harriers, barn owl and short-eared owl. Combined with long-term improvements to water quality, because of substantial reduction in application of fertiliser, herbicides and pesticides, it will also improve conditions for some farmland breeding birds, particularly those associated with the ditches, field margins and boundary habitats. Other farmland birds that prefer open habitats provided by arable fields, such as skylark are likely to decrease due to the reduction in extent of open habitat. Overall the change in habitats provided by the Development are not significant for the breeding farmland bird community.

156. Similarly, in the winter, some farmland species will benefit from the changes from intensive arable farming practices to the presence of the solar arrays with grassland, whilst other species that occur in large flocks to take advantage of food resources after harvesting of crops and cultivation soil will be negatively affected.

157. During construction and decommissioning of the Development the risk of adverse effects on birds due to negative impacts on water quality (e.g. through a pollution event or sediment loading) or dust emissions will be controlled through established good-practice construction/decommissioning measures, such that there is a negligible risk to birds and the habitats they rely on. In the long-term during operation of the Development, there will be a substantive reduction in the application of herbicides, pesticides and fertiliser below the current baseline use for arable farming practice at the site. The ecological and hydrological assessments predict a net positive effect on local habitats as a result, which in turn are likely to have a positive outcome for breeding and wintering birds.

158. There is a theoretical risk of collision of birds with the solar panels, if they mistake the solar panel surfaces for water and try to land on them. Natural England has published a review of the impacts of solar farms on birds which concluded that there is no scientific evidence of collision risk associated with solar PV arrays; the risk of collision with solar panels is likely to be very low but not impossible. Similarly, there is no evidence that the installation of new fencing around the Development will result in a significant collision risk to birds.

159. Recreational activities can result in disturbance to breeding and wintering birds. One new permissive footpath is proposed during the operational phase to provide additional public access to the Development site over and above the existing public rights of way, which creates a new circular route from The Sportsman to the east of the site. There is not expected to be any notable change in the recreational use of the footpaths around the site and therefore the indirect effect of changes to recreational access is not significant.

160. This assessment has considered the likely significance of effects of the Development on birds, both alone and cumulatively with other proposed developments. Following embedded mitigation measures in the design of the project and applied mitigation measures implemented through a Breeding Bird Protection Plan and other measures set out in the Construction Environmental Management Plan, the Development has been assessed as having the potential to result in adverse and positive effects of low magnitude. No effects are considered to be significant in terms of the EIA Regulations.

161. In terms of the Habitats Regulations, screening concluded that there is a 'likely significant effect' on The Swale SPA/Ramsar site. As such, it will be necessary for the Secretary of State, as the competent authority, to undertake an Appropriate Assessment of the implications of the plan or project for that site in view of that site's conservation

objectives. A Report to Inform an Appropriate Assessment (RIAA) accompanies the application to provide the information required by the secretary of state to carry out its duties in this respect. The RIAA concluded that there would be no adverse effects on the integrity of The Swale in view of its conservation objectives.

10 HYDROLOGY, HYDROGEOLOGY, FLOOD RISK AND GROUND CONDITIONS

162. The hydrological characteristics of the solar park site have been determined through desk study, site visits, consultation, computer modelling and intrusive geotechnical survey.

163. The assessment includes consideration of:

- Watercourses, drainage ditches and coastal waters;
- Near-surface water;
- Groundwater;
- Soils; and
- Private water supplies.

164. The assessment has proposed a series of construction mitigation measures in an outline Construction Environmental Management Plan. All construction effects are predicted to be negligible with the incorporation of these measures. Decommissioning effects are predicted to be similar to construction effects. The effects assessed includes:

- Potential chemical pollution effects on the hydrological environment;
- Potential erosion and sedimentation effects on the hydrological environment;
- Potential impediments to stream flow;
- Potential effects on private water supplies;
- Potential changes in soil and interflow patterns;
- Potential for the compaction of soils; and
- Potential for an increase in runoff and flood risk.

165. During operation land under the PV arrays would be allowed to naturally vegetate following seeding with a wildflower or grass mix prior to the construction phase and be grazed by livestock. Surface water run-off rates will be managed as vegetation becomes established under and around the PV arrays. It is also likely to lead to a reduction in the potential for sediment and agricultural pesticides (phosphates and nitrates) to transfer into the wider hydrological catchment compared to the baseline scenario, where agricultural fields remain tilled for substantial parts of the year. All operational effects are predicted to be negligible.

166. The Development is located in Flood Zone 3a but in an area that benefits from flood defences, in the form of a raised embankment with a concrete wall which offers protection up to the 1 in 1,000 year tidal event.

167. A Flood Risk Assessment has been carried out for the Development which concludes that with the implementation of design measures, such as a bund around the electrically sensitive infrastructure and the raising of the bottom edge of the PV arrays, the Development will be safe for its operation lifetime (allowing for sea level rise as a result of climate change), even in the event of a catastrophic breach in the flood defences to the north.

11 CULTURAL HERITAGE AND ARCHAEOLOGY

168. The Cultural Heritage Chapter considers the potential for significant effects, both direct and indirect, to occur to the significance of heritage assets (including archaeological remains) within the Development boundary and in the areas surrounding it as defined in the Study Area.

169. The Chapter is supported by Appendices including a Desk-Based Assessment (which informs the baseline condition of the Development site), as well as visualisations and a

report on geoarchaeological investigations undertaken to provide a baseline deposit model for the Development. A Study Area which included the Development Site (the Core Study Area) and an area out to 1 km from the boundary (the Principal Study Area) was defined to consider the potential for known and unknown archaeological remains to survive within the Development, as well as to identify the key nearest built heritage assets to be included in the assessment. A Wider Study Area was also defined to allow consideration of designated heritage assets at longer distances from the Proposed Development, where these might be subject to a potentially significant effect as a result of development within their setting. The extent of the Study Areas was agreed in consultation.

170. The Proposed Development is situated on farmland (primarily arable) which was previously marshland within the Thames estuary, this being progressively drained from the medieval period onwards, and reaching its current form (broadly) by the 19th century and continuing to evolve into the 20th Century (as evidenced by WWII related defensive structures) and the 21st Century (as evidence by the infrastructure associated with the London Array Onshore Connector). Settlement was historically confined to the higher and drier ground to the south and south-east of the Development site, but occupation and exploitation of the wider area, including the marsh environment, goes back to the prehistoric period (as evidenced by finds made during investigations on Cleve Hill for the London Array Onshore Connector). The current settlement pattern around the Proposed Development boundary reflects a medieval origin with farms and holdings along the edge of the former marshland (such as at Sparrow Court) and occupying higher and drier ground such as Graveney Court upon the Graveney Hill, and settlement on Cleve Hill to the south-east.

171. Due to the nature of the development, it is assessed that there is a limited chance that remains and deposits of earlier prehistoric periods would be encountered, although this may be more likely on the higher drier ground where the construction compound and sub-station are proposed. No traces of later structures (such as Decoy House) or uses of the site (such as for the decoy systems dating from the last war) are expected to be impacted by the development. The site of the crashed Junkers 88 bomber and the skirmish between its crew and a patrol of soldiers from the London Irish Rifles (the "Battle of Graveney Marsh") is believed to have been cleared during the war but does lie within the Development Boundary.

172. Construction of the Development could cause damage or destruction of unknown (buried or otherwise unrecorded) archaeological remains, through activities such as excavation and earthmoving etc., and depending on the nature of the remains the effect could be significant. However, it is considered that any effects upon such remains (if present) can be mitigated by the implementation of an appropriate programme of archaeological work to be detailed in a Written Scheme of Investigation and approved by Kent County Council. This would lead to the preservation by record of any such remains with the residual effect being assessed as minor and not significant for purposes of the Regulations.

173. Although the Proposed Development is extensive, the majority of it is of relatively low height and confined to the lower-lying former marshland and as a result its visual influence is limited in the wider landscape. Nevertheless, a number of heritage assets are assessed as having the contribution made by their settings changed to such an extent they lose significance as a result of the Proposed Development within their settings.

174. A significant effect is anticipated upon a non-designated WWII Pillbox on the southern boundary of the Proposed Development, as panels will be close to it and cover all of the ground that the pillbox covered with its north facing field of fire. The structure itself will be preserved in situ, and a full record made of both the building and its current setting.

175. Effects of minor significance (i.e., not significant for purposes of the EIA regulations) were found on the significance of the Grade I listed Graveney Church, and the Grade II listed Graveney Court and Sparrow Court as a result of a reduction made in the contribution of their settings to their significance. Similarly, an effect of minor significance is found upon the Graveney Conservation Area, albeit this is confined to the very northern part of Area. These indirect effects are fully reversible upon decommissioning of the Proposed Development.

12 NOISE AND VIBRATION

176. The noise and vibration impacts of the Development have been assessed through a combination of consultation, background noise survey and computer modelling.

177. The assessment has included consideration of:

- Noise and vibration from construction activities on human and ecological receptors;
- Noise and vibration from construction traffic on human and ecological receptors; and
- Operational noise on human and ecological receptors.

178. Noise and vibration levels during construction have been predicted at the nearest human receptor locations. The predictions for piling active activities are above the threshold criteria when undertaken at the closest point at which they take place at each receptor. Given that most fields will be entirely constructed within 4 weeks, construction activities will not exceed the threshold criteria for more than one month, and as such the effect of construction noise on human receptors is not significant. All other construction activities are predicted to be below the threshold criteria.

179. With regards to noise and vibration effects on ecological receptors, the most sensitive receptor locations during the bird breeding season (1 March to 31 August) and bird wintering period (1 September to 28 February) were considered separately, as follows:

- Breeding – South Bank of the Swale LNR and Swale SPA boundary (within the sea wall); and
- Wintering – Seaward of Mean High Water Springs (MHWS).

180. Appropriate noise thresholds for each have been set following analysis carried out in Chapter 9: Ornithology. Following appropriate mitigation, noise levels at the MHWS are below the assessment criteria for all construction activities. Depending on the availability of sufficiently quiet plant and equipment, in order to avoid significant effects at the SPA boundary, it is possible that certain construction activities will need to be restricted in the areas closest to the Swale SPA during breeding season in order to avoid exceeding the noise thresholds.

181. Vibration effects during construction activities are below the assessment criteria for both human and ecological receptors and no significant effects are assessed.

182. Noise and vibration during peak periods of construction traffic is assessed as, at most, minor effect and no significant effects are assessed.

183. In order to inform the assessment of operational noise, background noise monitoring was carried out at three properties following consultation with Swale Borough Council:

- 3 Nagden Cottage;
- Warm House; and
- 1 Crown Cottages.

184. The noise emissions of plant associated with the Development, including the solar PV array, energy storage and electrical substation have been predicted at the nearest human and ecological receptors. Predicted operational noise levels at the nearest receptors

exceed the operational noise limits, based on the current layout and equipment manufacturer data. Example mitigation measures have therefore been presented to ensure that noise during the operational phase do not result in significant impacts at both human and ecological receptors.

185. The assessment of operational noise will be updated and provided to Swale Borough Council in the form of an updated operational noise assessment report, as manufacturers data and additional design information becomes available. That report will set out how the threshold noise levels or criteria for each phase of the Development will be met, once a specific design and a specification for the equipment to be used has been has been fixed. This control mechanism will ensure that noise and vibration levels at sensitive receptor locations during all phases of the Development are not significant.

13 SOCIOECONOMICS, TOURISM, RECREATION AND LAND USE

186. An assessment of socio-economic, tourism, recreation and land-use effects has been undertaken informed by consultation, desk-based research and site survey. The assessment has included consideration of:

- Current socio-economic conditions in Swale Borough Council area, Canterbury City Council area, and the wider Kent area;
- Tourism in the area;
- Onsite and nearby recreational resources; and
- Land use within the solar park site.

13.1 Socio-economics

187. Positive socioeconomic effects of the construction and decommissioning phases of the Development include skills and unemployment effects in terms of local construction employment opportunities, and economic effects in terms of temporary construction employment and economic turnover. These effects would not be significant.

13.2 Tourism

188. The effect of the Development on tourism during the construction and operational phases is a negligible adverse effect, which would be short term during the construction phase. This effect would not be significant.

13.3 Recreation

189. Effects on recreational receptors have been assessed on footpaths within c. 200 m of the site, which include the Saxon Shore Way long distance footpath, which is also part of the proposed England Coast Path, National Cycle Network route 1 and bird and wildlife watchers.

190. During construction, significant adverse recreational amenity effects were assessed on the Saxon Shore Way and path ZR485, which goes through the middle of the site, because of visibility and possible audibility of construction activity. Other construction phase effects were assessed as not significant.

191. Mitigation of construction phase effects includes keeping all paths open during the construction phase, and the provision of information to the public about where construction is taking place within the site. This will be updated on a month to month basis. The notices will also highlight other paths in the area that recreational users might consider as alternatives. Whilst this mitigation is aimed at reducing effects on would-be users of the Saxon Shore Way and ZR485, it does not change the effect on people that actually do use it while construction occurs, and the residual effects are assessed the same as in the absence of mitigation.

192. During the operational phase, significant effects during were assessed on path ZR485, although they were assessed as neutral rather than adverse, reflecting that some of the changes to the path would be positive in nature (e.g., a better walking surface) and others would be subjectively negative in nature (e.g., the loss of long-range views).

193. Operational-phase recreational amenity effects on the Saxon Shore Way were assessed as not significant, although it is acknowledged that the visual effects would be significant. Several factors as well as the view are important to recreational amenity, and all other factors would remain unaffected, or potentially enhanced.

194. All other operational phase effects were assessed as not significant.

195. A permissive footpath is proposed as part of the Development, from mid-way along the Saxon Shore Way as it passes the site, south and then southeast, to link up with path ZR488 between Broom Street and Graveney Hill. This would enable circular walks from the Sportsman public house, Broom Street or Graveney. This enhancement does not change the effect on existing paths, and the residual effects are assessed the same as in the absence of the enhancement.

13.4 Land Use

196. The effect of the Development on land use will be negligible; whilst there will be a change of land use from arable to solar park and sheep grazing the sensitivity of the land is low, being predominantly Grade 3b which is not classified as being the best and most versatile land. In addition, habitat creation and enhancement is also proposed as part of the Development. Following mitigation, no significant adverse socio-economic, tourism, recreation or land use effects are predicted as a result of the Development.

14 ACCESS AND TRAFFIC

197. Likely significant effects relating to access and traffic as a result of the construction, operation and decommissioning of the Development were assessed. Potential effects and mitigation measures have been described that would be implemented to reduce or avoid effects.

198. The assessment is supported by the following documents in Technical Appendix A14.1:

- Outline Construction Traffic Management Plan (CTMP);
- Outline Public Rights of Way (PROW) Management Plan;
- Outline Travel Planning Statement; and
- Outline Traffic Incident Management Plan (IMP).

199. The CTMP and supporting documents set out the proposed mitigation measures and discuss methods of monitoring and management as the scheme is constructed.

200. The construction access route is from the A299 via Head Hill Road and Seasalter Road to the existing Cleve Hill Substation site entrance. All vehicles during construction, operation and decommissioning will access the solar park site via this existing entry point.

201. The anticipated level of vehicular movements associated with each construction activity is based on information provided by specialist solar farm and civil contractors. The total construction programme will span approximately 24 months. A scenario exists whereby the construction of the energy storage facility is delayed and undertaken outside the 24 month period. If this scenario is brought forward, the installation of the batteries would take up to six months and is not anticipated to exceed the peak number of HGVs outlined in this section of the NTS.

202. It is anticipated, during the peak of construction, up to 80 two way HGV movements (40 vehicles) will be required per day. This peak is expected to last for four weeks starting in week 27 of construction. However, the peak in total vehicle volumes is expected to occur

when civils, solar array construction and energy storage facility are being undertaken at the same time. At this stage, 222 two way movements (111 vehicles) are expected, comprising 162 two way LGV movements (81 vehicles) and 60 two way HGV movements (30 vehicles) per day.

203. Traffic flows on the strategic and local road network along the construction route have been obtained from the Department for Transport (DfT) database and traffic surveys respectively. The peak number of construction vehicles including HGVs, has been added to the baseline and used, alongside professional judgement, to determine the magnitude of effect on receptors identified along the construction route.

14.1 Method of Assessment

204. The assessment has been undertaken using a combination of desk-based and site based techniques. Traffic data has been collected at a number of locations along the proposed traffic route.

205. The likely effects on local receptors from severance, driver delay, fear and intimidation, pedestrian delay, severance, pedestrian and cycle amenity and highway safety have been identified.

206. Sensitive receptors identified along the construction route and included in the assessment are:

- Bus service 660 along Seasalter Road and Head Hill Road;
- Properties along the construction traffic route close to the carriageway edge;
- Properties along the construction traffic route set back from the carriageway edge;
- Businesses along the construction traffic route;
- Graveney Primary School;
- All Saints Church, Graveney;
- Country View Park;
- Public Rights of Way through site; and
- National Cycle Route 1.

207. The construction phase of the project is expected to result in the greatest traffic generation, therefore the traffic flow assessment will consider this phase as a worst-case assessment.

208. The IEA Guidelines[22] suggests that, to help with assessment, two broad rules can be used as part of a screening process. These rules state that a road should be considered within the assessment if the total increase in traffic flows or HGV flows exceeds 30%. In sensitive areas, roads should be considered where traffic has increased by 10% or more.

209. As such, those links or junctions that are not predicted to have an increase in total traffic of 30% or HGVs of 30% have not been assessed further, unless in areas with sensitive receptors.

14.2 Significance of Effects

210. Prior to mitigation, construction traffic effects were assessed as having the following significance of effects:

- Delay – Slight;
- Public Transport Delay – Slight;
- Road Safety – Neutral;
- Fear / Intimidation – Slight to Large;
- Severance - Slight to Large;

[22] Institute of Environmental Assessment (1993). Guidelines for Environmental Assessment of Road Traffic.

- Pedestrian delay –Slight; and
- Pedestrian / cyclist amenity – Moderate.

14.3 Mitigation

211. Extensive mitigation is proposed along Head Hill Road and Seasalter Road which is detailed in the Outline CTMP. Vehicles travelling to and from the Development will be required to use specific construction traffic routes and will be carefully programmed in order to manage the number of HGVs travelling on the local road network at a time. Furthermore, a number of timing restrictions are proposed to avoid HGV movements at Graveney Primary School during school start/finish times. This will also be effective in limiting vehicle movements on the local highway network during traditional peak periods. This will reduce the potential effects of construction traffic on delays, severance, and fear and intimidation.

212. Temporary signage will be positioned along the construction traffic routes to the Development and temporary speed limits for construction vehicles will also be introduced through sensitive areas.

213. It is the intention to keep all PRoW routes in proximity to the site open during construction of the Development. Two metre high fencing will be placed between the PRoW and Development equipment and infrastructure, and CCTV will not directly cover any PRoW.

214. Through extensive mitigation in the surrounding area, particularly along construction route and PRoWs, it is likely that the level of effect will be reduced. The residual magnitude of effect on pedestrian and cycle amenity and pedestrian is likely to be reduced to negligible, whilst the magnitude of effect on delay, fear and intimidation and severance is expected to be reduced to minor. Following this mitigation, the significance of residential effect is expected to be reduced to slight and below for all receptors.

14.4 Residual Significance of Effects

215. Following implementation of mitigation set out in the CTMP, residual construction traffic effects were assessed as having the following significance of effects:

- Delay – Slight;
- Public transport delay – Slight;
- Road Safety – Neutral;
- Fear / Intimidation – Slight;
- Severance – Slight;
- Pedestrian delay – Slight; and
- Pedestrian / cyclist amenity – Moderate.

216. The moderate adverse effect predicted is in relation to cycle amenity along Seasalter Road. This relates to the pleasantness of a journey. While the number of vehicles (including HGVs) is expected increase along Seasalter Road it is acknowledged that the pleasantness of a journey can be very subjective.

217. Taking this into account and given that the majority of HGV movements are expected during the hours of 09.30 to 15.30 Monday to Friday, the wider mitigation proposed and that the effects will be temporary, this adverse effect is not considered significant in EIA terms.

14.5 Operational Phase

218. Once operational, approximately three members of maintenance staff are expected to attend the site per day, resulting in six additional vehicle trips per day. Staff are anticipated to work at the site between 08:00 and 17:00 and will likely be driving a 4x4 vehicle.

219. This is envisaged to have a negligible residual effect on traffic flows, delay, road safety, intimidation and fear, severance, pedestrian delay, pedestrian amenity and public transport delay, leading to negligible significance effects on all receptors.

14.6 Decommissioning Phase

220. Effects associated with the decommissioning of the Development are difficult to predict at this stage, given the potential changes in receptors over the long time period until decommissioning may occur, however they are likely to be less adverse than those during the construction phases as less plant and material will be required and will therefore be of the same, or lesser significance than construction effects. An Outline Decommissioning and Restoration plan has been produced to accompany the ES. It is expected that a Decommissioning Traffic Management Plan would be produced and agreed with the Local Highways Authority prior to decommissioning commencing.

15 CLIMATE CHANGE

15.1 Influences of Climate Change on the Development

221. A climate change impact assessment has been undertaken in respect of the Development. This considers:

- The vulnerability of the Development to climate change;
- The influence of the Development on climate change; and
- A summary of effects on environmental receptors sensitive to climate change.

222. The vulnerability of the Development to climate change considers effects on the Development as a receptor. In contrast the other two assessments consider effects on environmental receptors as a result of the Development.

223. Solar PV cells are designed to capture the sun's energy. Solar PV cells are therefore built to withstand extreme climatic conditions, and are purposefully located in open locations. However, solar energy developments could potentially be sensitive to significant changes in climatic variables, including atmospheric circulation and land cover changes as well as changes in sea level rise and storm surges, given the coastal location of the Development. The Development could also be sensitive to the frequency of extreme events (e.g., storms) which could damage solar panels or alter their efficiency.

224. Modelling of flooding of the solar park site under various disaster scenarios has been carried out, in consultation with the Environment Agency. These have taken account of climate change in line with consultee requests. As a result, the panel height has been increased to avoid a breach of the sea wall, combined with worst-case storm scenarios, leading to the solar panels being reached by flood water. The inverters will be "string" type, mounted above the ground underneath the panels, and will similarly be above flood water. The transformer stations will be of a flood-resilient design. In addition, the substation/battery storage area has been designed to be within a bund of height c. 4.6 m, to prevent flood water damaging sensitive equipment. These design features ensure that the Development is not vulnerable to increases in sea level, storm surges or catastrophic failures in flood defences.

225. Following the design measures set out above, the susceptibility of the Development to climatic changes in wind speed, sea level and storm surges is very low, and sensitivity overall is negligible.

226. Cloud cover will most likely decrease in a future climate change baseline relative to the current baseline. This would improve the performance of the solar farm, providing increased energy from solar irradiation. This constitutes a minor beneficial effect.

227. No significant effect is predicted as a result of increased wind speeds, sea level rise, storm surges and cloud amount during the operational phase of the Development, nor from other climatic changes.

15.2 Influences of the Development on Climate Change

228. The influences of the Development on climate change are estimated through the emission or reduction in emissions of carbon dioxide (CO_2).

229. When operational, the Development will generate electricity from a renewable source and export this to the national grid. The Development is assessed as having an installed capacity of 330 MWp. Based on a simulation utilising the candidate design, east-west orientation proposed and other site specific parameters, the Development is anticipated to generate approximately 303,000 MWh of renewable electricity per year.

230. The CO_2 emissions of the manufacture and construction of the Development, including the battery component, would be cancelled out within an estimated 7.4 years, and all savings beyond that would be a net benefit of the Development to reducing climate change, relative to the baseline. Over 40 years, for example, the saving is estimated as 2.2 million tonnes of CO_2.

231. In addition, the type of electricity storage services which could be offered by the battery storage element of the Development will help to facilitate greater use of renewable electricity. This could potentially allow electricity generated during times of low demand to be used during times of peak demand, and also to improve National Grid's ability to respond to quickly and economically to fluctuations in electricity supply and demand.

232. These factors are considered to be a material, but non-fundamental, change to the UK's emissions of climate-changing gases and is therefore a moderate, positive environmental effect that is significant.

15.3 Effects of Future Climate Change Scenario on Environmental Receptors Sensitive to Climate Change

233. The potential for environmental receptors to be impacted by the Development differently under an altered-climate scenario is considered throughout the ES where appropriate. In particular, the following scenarios are considered:

- Landscape and Visual Impact – rising sea levels;
- Ecology – increasing temperatures;
- Ornithology – rising sea levels and increasing temperatures; and
- Hydrology and flood risk – rise in sea levels and increased surface water flooding.

234. Given the relatively limited magnitude of change in climate parameters predicted over the operational period of the Development, the baseline for environmental receptors is anticipated to change either imperceptibly, or with high uncertainty, during this period, and the effect of the Development on that altered baseline is negligible.

235. No additional significant effects will occur as a result of climate change during the operational phase of the Development.

15.4 Cumulative Effects

236. In 2017, renewable electricity represented 29.3% of total electricity generation[23]. Solar PV electricity generation represented approximately a third of total renewable electricity

[23] Department for Business, Energy & Industrial (2018) Digest of United Kingdom Energy Statistics (DUKES) (2018) [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/695804/Renewables.pdf [Accessed: 25/10/2018]

capacity installed in the UK[24]. 10.2% of total energy consumption came from renewable sources[19].

237. The cumulative effect of the Development with other UK renewables generation is considered to be a fundamental change in the climate effects of UK energy supply, which is a major, positive, environmental effect that is significant under the EIA Regulations and will contribute to the UK's legally binding emission reduction targets.

16 AIR QUALITY

238. An air quality assessment has been undertaken to evaluate the effects of the Development upon local air quality. The assessment considers potential emissions of fugitive dust during construction activities and the effects of vehicle exhaust emissions associated with the construction phase of the Development.

16.1 Construction Dust

239. Construction dust emissions may have an effect on the short-term particulate matter (typically less than or equal to 10 micro-metres in diameter) (PM_{10}) objective in close proximity of dust raising activities. However, existing baseline PM_{10} concentrations are well below the annual mean PM_{10} objective, which is unlikely to be exceeded during the temporary construction period.

16.2 Vehicle Exhaust Emissions

240. There are not predicted to be any exceedances of the annual mean nitrogen dioxide (NO_2) and PM_{10} air quality objectives at any identified receptor as a result of construction traffic vehicle emissions. The additional construction traffic generated by the Development is predicted to lead to a maximum addition of 0.21 µg/m3 to the annual mean NO_2 concentration for the worst-case receptor. This equates to a 'negligible' magnitude of change. It is also predicted that the increase in construction traffic will have an 'imperceptible' magnitude of change, in terms of annual mean PM_{10} concentrations at the same worst-case receptor.

241. Engine exhaust emissions from off-road vehicles known as non-road mobile machinery (NRMM) have the potential to affect local air quality. The main pollutants of concern from these emissions are those relating to fuel combustion such as NO_2, PM_{10}, carbon monoxide (CO), and sulphur dioxide (SO_2).

242. Air quality in close proximity to the access track, spine road and electrical compound and its bund is likely to be affected by emissions from NRMM operating during construction of the Development. However, the effect will be local and short term, lasting for the duration of activities within that locality, and only when plant and machinery are being operated. In the absence of mitigation, emissions from NRMM used during construction are predicted to have a slight adverse and not significant effect on local air quality impacts in terms of NO_2, PM_{10}, CO and SO_2.

[24] Department for Business, Energy & Industrial (2018) Digest of United Kingdom Energy Statistics (DUKES) (2018) [Online] Table 6.7. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736153/Ch6.pdf [accessed on 27/10/2018]

16.3 Mitigation

16.3.1 Construction Dust

243. Measures such as, but not limited to, the following will be considered for the final construction environmental management plan (CEMP), and are included in the Outline CEMP which will provide the framework for this:

- Excavation and earthworks areas will be stripped as required in order to minimise exposed areas;
- During excavation works, drop heights from buckets will be minimised to control the fall of materials reducing dust escape;
- Completed earthworks and other exposed areas will be covered with topsoil and re-vegetated as soon as it is practical in order to stabilise surfaces.
- During stockpiling of loose materials, stockpiles shall exist for the shortest possible time;
- Material stockpiles will be low mounds without steep sides or sharp changes in shape;
- Material stockpiles will be located away from the site boundary, sensitive receptors, watercourses and surface drains;
- Material stockpiles will be sited to account for the predominant wind direction and the location of sensitive receptors;
- Water bowsers will be available on site and utilised for dust suppression during roadworks/ vehicle movements when and where required;
- Daily visual inspections will be undertaken to assess need for use of water bowsers, with increased frequency when activities with high potential to generate dust are carried out during prolonged dry or windy conditions;
- Shielding of dust-generating activities;
- Use of enclosed chutes, conveyors and covered skips;
- Covering vehicles carrying dry spoil and other wastes to prevent escape of materials;
- Provision of wheel washing and wet suppression during loading of wagons/vehicles; and
- Daily visual inspections will be undertaken to assess the condition of the junction of the site track with Seasalter Road and its approaches.

244. Technical Appendix A5.4: Outline Construction Environmental Management Plan (CEMP), and Technical Appendix A5.5: Outline Decommissioning and Restoration Plan (DRP) accompany Chapter 5: Development Description and set out measures included in the Development design during construction and decommissioning phases to address dust generation.

245. Recommended mitigation measures in relation to NRMM include the use of ultra-low sulphur diesel modern machinery and maintaining equipment in good working order.

246. Successful implementation of the above mitigation measures would ensure that emissions from NRMM used during construction are not significant as predicted. Implementation of the measures recommended for the mitigation of impacts from NRMM, will reduce the effect on air quality at sensitive receptors to negligible and not significant.

17 MISCELLANEOUS ISSUES

17.1 Glint and Glare

247. A glint and glare assessment has been undertaken to assess the likely effect of solar reflection on receptors within the Development's surrounding environment. This assessment considered road users, residential receptors and footpath users for the Saxon Shore Way and local footpaths (which cross the site) ZR485 and ZR488.

248. Effects on users of Seasalter Road would last for up to approximately 20 minutes per day but in practice they would be fleeting for a moving receptor. Seasalter Road runs approximately north-south to the east of the solar park site and any reflections would occur from the west, which is not the direction a driver would be facing. The reflecting area is likely to be partially or fully obscured by undulating terrain and vegetation. The intensity of any reflection would be comparable to the intensity of a reflection from still water and there is also a relatively large separation between the panels and a vehicular receptor.

249. Reflections at residential receptors would generally coincide with direct sunlight, such that an observer looking towards a reflecting panel would also be looking towards the sun. Direct sunlight is significantly more intense than a solar reflection from a panel. Effects would last for up to 40 minutes per day under worst-case conditions (full visibility of all reflecting panels on a sunny day). However, the reflecting area is likely to be partially or fully obscured due to the separation distance and existing features of the environment (trees and other buildings).

250. Effects for observers on footpaths would last for up to approximately 40 minutes per day for a static observer (this would be a worst case of 20 minutes in the morning and 20 minutes in the afternoon/evening), although in practice effects are likely to be for a few minutes only for a moving observer. Reflections would be most likely at the start and end of the day when the sun is low in the sky, and would be seen in the same direction as the sun. Effects would be comparable in terms of intensity to reflections from water, which is a natural phenomenon along most of the Saxon Shore Way as it passes the site, because of the Swale and Faversham Creek. There is no safety hazard associated with glare from solar panels towards observers on a footpath.

251. Significant impacts on observers using surrounding public rights of way are therefore not predicted.

252. Overall, the impact on road and footpath users is considered low and at worst case residential receptors is considered moderate, and all effects are considered not significant. No mitigation requirement has been identified.

17.2 Human Health

253. A Human Health Impact Assessment (HHIA) has been undertaken to consider key determinants to protect human health. HHIAs are designed to determine whether a proposal might improve health inequalities or negatively affect people's health and wellbeing in its widest sense.

254. As a result of the experience of the project team, the EIA Scoping Opinion and subsequent consultation with the public and other organisations, this section draws together and considers the findings from the following assessments:

- Air Quality;
- Traffic and Transport;
- Noise;
- Residential amenity (from the LVIA);
- Security; and

- Health and safety at work.

255. Overall no significant effects on human health are predicted.

17.3 Electric, magnetic and electromagnetic fields (EMFs)

256. Power frequency EMFs arise from generation, transmission, distribution and use of electricity and occur around power lines and electric cables and around domestic, office or industrial equipment that uses electricity. Electric fields are the result of voltages applied to electrical conductors and equipment. Fences, shrubs and buildings can block electric fields. Magnetic fields are produced by the flow of electric current; however most materials do not readily block magnetic fields. The intensity of both electric fields and magnetic fields diminishes with increasing distance from the source.

257. The scope of the assessment of EMFs is limited to consideration of any cables associated with the Development which exceed 132 kV. The only part of the Development to exceed this voltage is the underground export cable between the Development Substation and the existing Cleve Hill Substation which will likely be a 400 kV cable.

258. The exact cable route is not known but the nearest residential receptor is located more than 100 m from the likely route of the underground cable. Due to the magnitude of effect upon the receptors, in accordance with ICNIRP exposure limit values, EMFs will have negligible effect on local residents.

17.4 Telecommunications, Television Reception and Utilities

259. To identify any existing infrastructure constraints, both consultation and a desk-based study has been undertaken. Consultation with relevant telecommunication and utilities providers is a routine part of solar development and consultees include water, gas and electricity utilities providers and telecommunications providers as appropriate.

260. The potential exists for utilities to be affected during the construction of the Development through damage caused as a result of excavation and engineering operations. In the absence of precautionary measures to avoid damage to utilities, this could lead to a short-term adverse effect. However this risk has been mitigated by mapping infrastructure that crosses the Development and avoiding it through the design of the Development.

17.5 Waste

261. Given the nature of the Development and the construction process no significant quantities of waste are anticipated. The majority of construction equipment will be delivered to the solar park site for assembly and installation (mounting structures) and connection (solar panels). There will be no waste activities undertaken on the solar park site and so the principal area of concern regards the transportation of waste from the solar park site during construction.

262. The number of vehicles associated with the removal of waste material associated with decommissioning and construction are considered within the Access and Traffic assessment. During the operational phase of the Development waste arising are expected to be negligible, and so effects are not assessed.

17.6 Major Accidents or Disasters

17.6.1 Vulnerability of the Development

263. It is considered that the Development is only potentially vulnerable to one type of major accident or disaster; inundation from the sea. This has been assessed in Chapter 10: Hydrology, Hydrogeology, Flood Risk and Ground Conditions of the PEIR and the associated Flood Risk Assessment in Technical Appendix A10.1.

264. The Development has incorporated flood resilience and resistance measures into the design to ensure that the Development would be safe and able to return to operation in the event of a flood defence breach or overtopping event, including accounting for sea level rise as a result of climate change.

17.6.2 Potential for the Development to Cause Major Accidents or Disasters

265. The Development is not considered likely to cause a significant accident or disaster risk during either the construction or operational phases.

266. When operational the majority of the Development comprises solar PV modules which are inert. Electrical infrastructure will be located across the Development, in the form of inverters and cabling, all of which will be subject to routine maintenance such that it is not considered to pose a significant risk to creating an accident or disaster.

267. There will be a concentration of electrical infrastructure at the bunded substation compound which will include the substation and transformers all of which will be subject to routine maintenance such that it is not considered to pose a significant risk of creating an accident or disaster.

268. There is a potential fire risk associated with lithium ion batteries although the cooling systems which are installed on the cabinets are designed to regulate temperatures to within safe conditions to minimise the risk of fire.

269. The manufacturer's guidance will be followed in respect of fire protection and secondary fire detection and suppression systems could be installed where considered necessary, subject to the final battery storage system procured.

18 INTERACTION AND ACCUMULATION

270. Two types of effect arising from more than one source have been assessed in the ES:

- Cumulative effects, these being the additional effect caused by the Development when added to the effects of other proposed developments; and
- Interaction, or interrelationship, effects, these being the additional, combined effect of different types of effect of the Development on a single receptor.

271. Cumulative effects are assessed in the other technical chapters in the ES.

272. Interrelationship effects have been considered by the ES chapters that relate to a specific type of receptor, namely:

- 8: Ecology;
- 9: Ornithology;
- 11: Cultural Heritage and Archaeology; and
- 13: Socio-economics, Tourism, Recreation and Land-Use.

273. The types of receptors not considered by these chapters are humans, either as road users, residents or school pupils/employees.

274. A matrix approach was used to identify the potential effects on each of these types of receptor, and to identify (based on analyses in other ES chapters) specific properties, roads and schools that had been assessed as receiving a non-negligible magnitude of effect from at least two other chapters. These would be the receptors that had potential to receive interrelationship effects. Each of these receptors was then considered in turn, and the interrelationship effects assessed based on professional judgement.

275. Significant interrelationship effects, caused by the combined effect of multiple smaller effects, and over and above each individual smaller effect (to avoid double-counting), were assessed for the construction phase of the Development at four properties: three at Nagden, and Warm House. These are all on the southwest side of the solar park site

and in close proximity to the site. The greatest effect on residents of these properties would be visual effect, as referred to in Chapter 7: Landscape and Visual. In addition to visual effects, residents would use roads that Development construction traffic would use, may use All Saints Church and Graveney primary school, may use local footpaths that would be affected, and may hear audible noise during construction, albeit for short duration only. The combined effect of these changes, over and above any single change, is assessed as significant, during the construction phase. It should be noted that many of these effects are assessed on a worst-case basis (e.g., traffic effects) and hence several worst-cases are being compounded and applied to the whole construction phase, which is overly conservative, and in reality effects would be less than this.

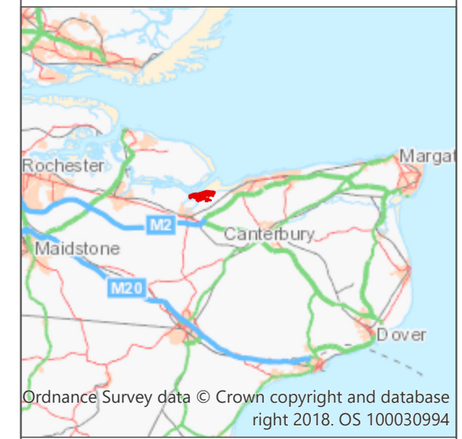
276. At all other properties and receptors, during the construction, operational and decommissioning phases, including cumulative effects, no significant interrelationship effects were assessed.

FIGURES

CLEVE HILL SOLAR PARK

ARCUS

Development Site Boundary



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1:75,000 Scale @ A3

0 1.5 3 km

NORTH

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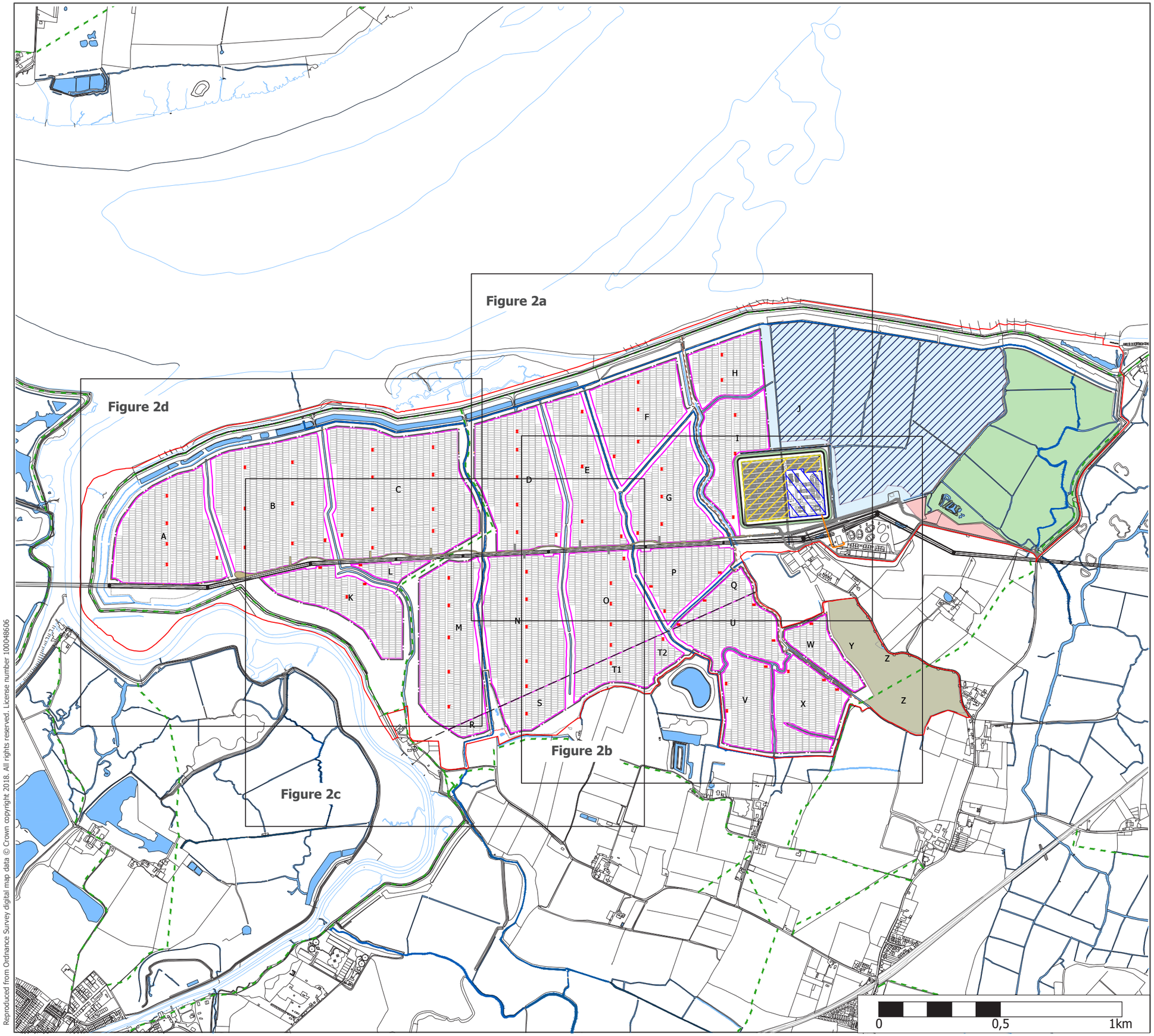
Checked By: MB	Date: 13/11/2018

Site Location
Figure 1

Cleve Hill Solar Park
Non-Technical Summary

N:\Projects\Environment\Environment EIA\2238 Cleve Hill.aprx\2238-REP-321 Fig1 Site Location NTS



CLEVE HILL SOLAR PARK

ARCUS

- Development Site Boundary
- Existing 11kV Wood Pole Line
- Existing 11kV Wood Pole Line to be removed
- Development Parcels-Represent Maximum Area proposed for siting of Solar Panels
- Solar PV Array
- Transformers
- Fencing
- Site Access
- Spine Road
- Electrical Compound
- Energy Storage Facility
- Development Substation
- Indicative 400KV Underground Cable Route
- Flood Protection Bund
- Public Right of Way
- Proposed Permissive Route
- Arable Reversion HMA
- Functional AR HMA (50.1 ha)
- Cleve Hill Substation HMA
- Freshwater Grazing Marsh HMA
- Lowland Grassland Meadow HMA

1:15,000 @A3

NORTH

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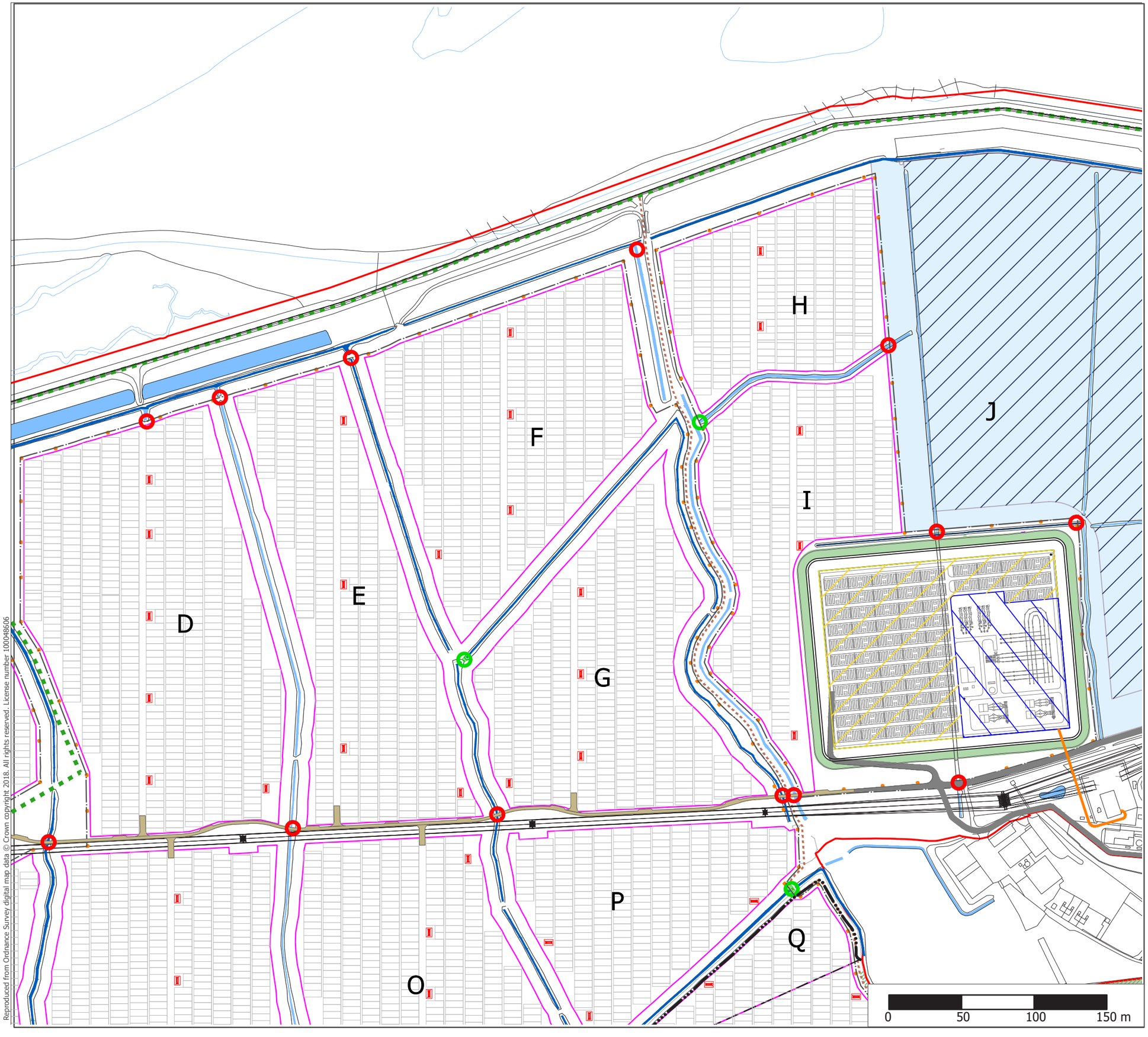
Candidate Design
Development Site Layout
Figure 2

Cleve Hill Solar Park
Non-Technical Summary



CLEVE HILL SOLAR PARK

ARCUS

- Development Site Boundary
- Existing 11kV Wood Pole Line to be removed
- Proposed 11kV Underground Cable
- Development Parcels-Represent Maximum Area proposed for siting of Solar Panels
- Solar PV Array
- Transformers
- Fencing
- Proposed CCTV Camera Location
- Site Access
- Spine Road
- Electrical Compound
- Energy Storage Facility
- Development Substation
- Indicative 400KV Underground Cable Route
- Flood Protection Bund
- Public Right of Way
- Proposed Permissive Route
- Arable Reversion HMA
- Functional AR HMA (50.1 ha)
- Cleve Hill Substation HMA
- Freshwater Grazing Marsh HMA
- Lowland Grassland Meadow HMA
- Proposed Culverts
- Improved Culverts

1:5,000 @A3

NORTH

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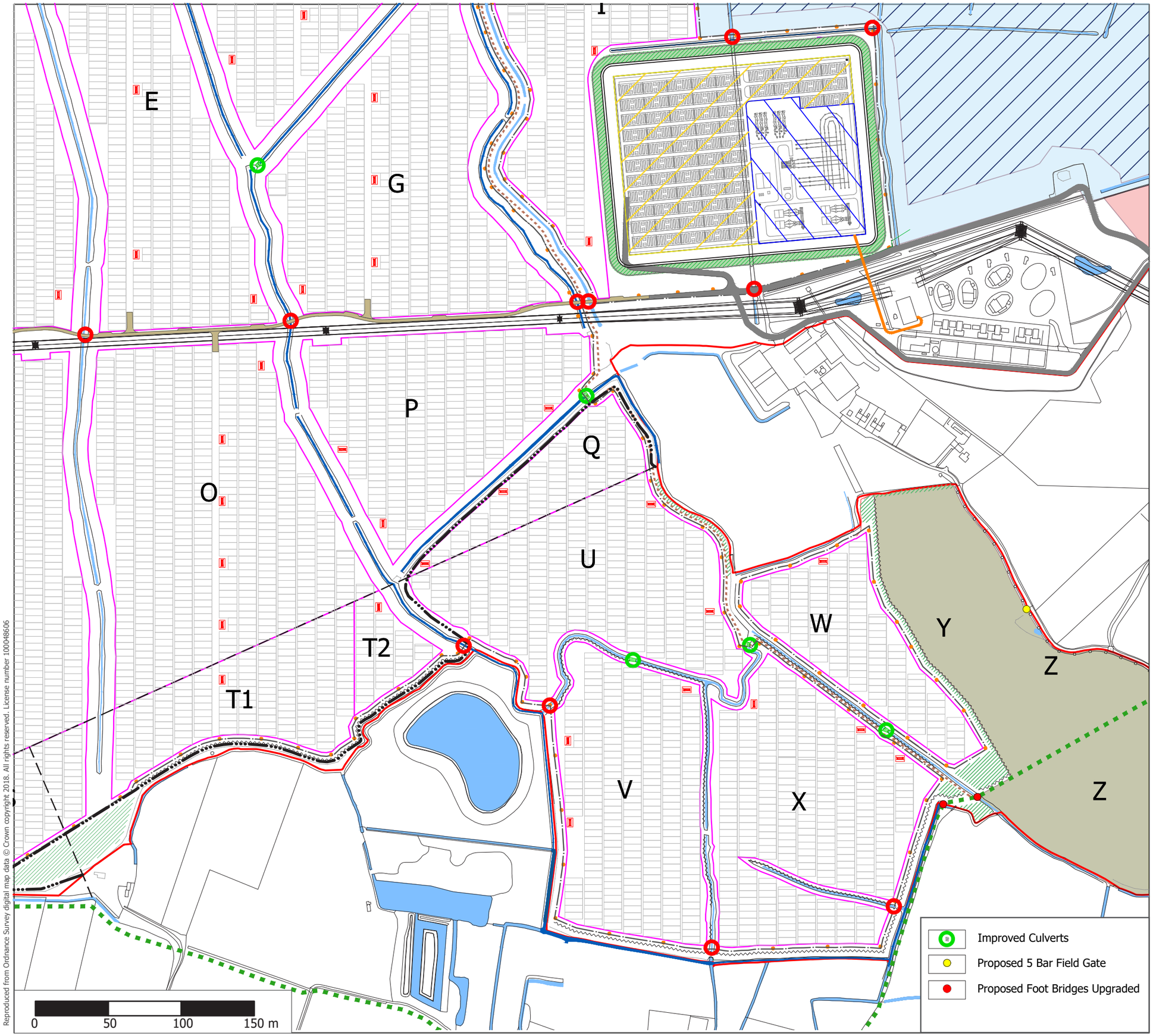
Candidate Design
Development Site Layout
Figure 2a

Cleve Hill Solar Park
Non-Technical Summary



CLEVE HILL SOLAR PARK

ARCUS

- Development Site Boundary
- Existing 11kV Wood Pole Line to be removed
- Proposed 11kV Underground Cable
- Development Parcels-Represent Maximum Area proposed for siting of Solar Panels
- Solar PV Array
- Transformers
- Fencing
- Proposed CCTV Camera Location
- Site Access
- Spine Road
- Electrical Compound
- Energy Storage Facility
- Development Substation
- Indicative 400KV Underground Cable Route
- Flood Protection Bund
- Public Right of Way
- Proposed Permissive Route
- Proposed Native Hedging
- Proposed Landscape Screening
- Arable Reversion HMA
- Functional AR HMA (50.1 ha)
- Cleve Hill Substation HMA
- Freshwater Grazing Marsh HMA
- Lowland Grassland Meadow HMA
- Proposed Culverts
- Improved Culverts
- Proposed 5 Bar Field Gate
- Proposed Foot Bridges Upgraded

1:5,000 @A3

NORTH

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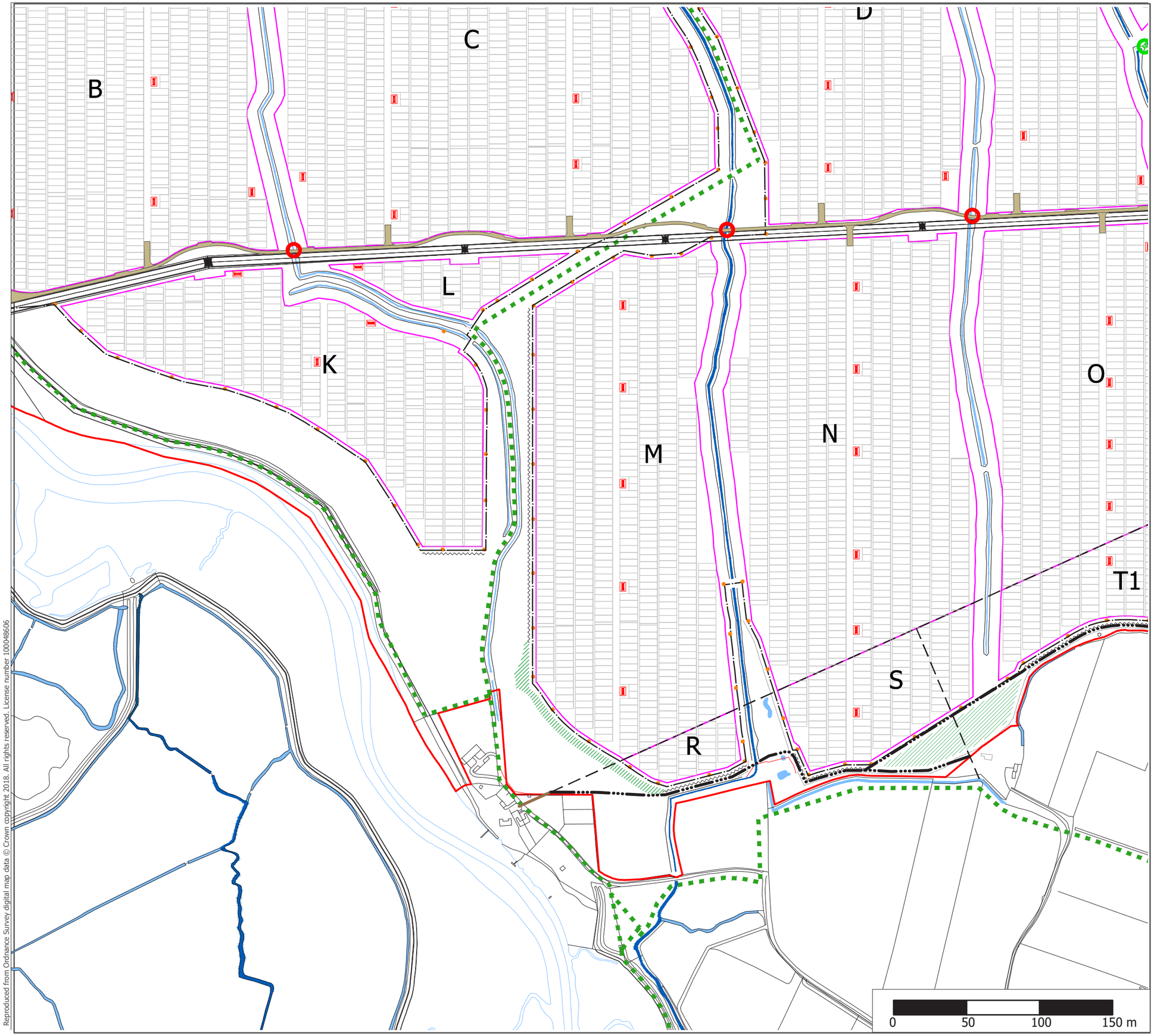
Candidate Design
Development Site Layout
Figure 2b

Cleve Hill Solar Park
Non-Technical Summary



CLEVE HILL SOLAR PARK

ARCUS

- Development Site Boundary
- Existing 11kV Wood Pole Line
- Existing 11kV Wood Pole Line to be removed
- Proposed 11kV Underground Cable
- Development Parcels-Represent Maximum Area proposed for siting of Solar Panels
- Solar PV Array
- Transformers
- Fencing
- Proposed CCTV Camera Location
- Proposed Landscape Screening
- Public Right of Way
- Proposed Culverts
- Proposed Native Hedging

1:5,000 @A3

NORTH

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Canditate Design Development Site Layout
Figure 2c

Cleve Hill Solar Park
Non-Technical Summary

CLEVE HILL
SOLAR PARK

ARCUS

- Development Site Boundary
- Development Parcels-Represent Maximum Area proposed for siting of Solar Panels
- Solar PV Array
- Transformers
- Fencing
- Proposed CCTV Camera Location
- Site Access
- Spine Road
- Public Right of Way
- Proposed Culverts
- Proposed Landscape Screening
- Proposed Native Hedging

A

B

C

K

L

M

0 50 100 150 m

1:5,000 @A3

NORTH

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Candidate Design Development Site Layout
Figure 2d

Cleve Hill Solar Park
Non-Technical Summary

CLEVE HILL
SOLAR PARK

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@clevehillsolar