

# PHOENIX SOLAR PARK



**Environmental Statement**  
**Volume 4 – Non-Technical Summary**  
**December 2023**

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# PHOENIX SOLAR PARK

## Design and Access Statement

**December 2023**

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## List of Abbreviations

°C	degree Celsius
£	Pounds Sterling
AA	Appropriate Assessment
AAI	Areas of Archaeological Interest
AC	Alternating Current
AOD	above ordnance datum
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Plan
BGS	British Geological Survey
BS	British Standard
CCTV	Closed Circuit Television
CDM	Construction Design and Management
CFD	Contract for Differences
CEMP	Construction Environmental Management Plan
CGR	central grid reference
CIEEM	Chartered Institute for Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association's
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CoPA	Control of Pollution Act
COSHH	Control of Substances Hazardous to Health Regulations
CTMP	Construction Transport Management Plan
DAT	Dyfed Archaeological Trust
dB	decibels
DBA	Desk Based Assessment
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges
DNO	Distribution Network Operator
DNS	Development of National Significance
DoE	Department of the Environment
DPD	Development Plan Documents
DRN	Document Reference Number
DTI	Department of Trade and Industry
EA	Environment Agency
EC	European Commission
EIA	Ecological Impact Assessment
EH	English Heritage

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<b>EHO</b>	Environmental Health Officer
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EPA</b>	Environmental Protection Act
<b>ES</b>	Environmental Statement
<b>EU</b>	European Union
<b>EZol</b>	Ecological Zone of Influence
<b>FCA</b>	Flood Consequence Assessment
<b>FiT</b>	Feed in Tariff
<b>GDP</b>	gross domestic product
<b>GLVIA</b>	Guidelines for Landscape and Visual Effect Assessment
<b>GW</b>	gigawatt
<b>GWh</b>	gigawatt-hour
<b>ha</b>	hectare
<b>HER</b>	Historic Environment Record
<b>HGV</b>	heavy good vehicles
<b>IEEM</b>	Institute of Ecology and Environmental Management
<b>JNCC's</b>	Joint Nature Conservation Committee's
<b>JRC</b>	Joint Research Centre
<b>km</b>	kilometre
<b>kV</b>	kilovolts
<b>kW</b>	kilowatt
<b>kWh</b>	kilowatt-hour
<b>l</b>	litres
<b>LBAP</b>	Local Biodiversity Action Plans
<b>LCA</b>	Landscape Character Area
<b>LDP</b>	Local Development Plan
<b>LDU</b>	Landscape Descriptions Units
<b>LEMP</b>	Landscape and Ecological Management Plan
<b>LNR</b>	Local Nature Reserve
<b>LVIA</b>	Landscape and Visual Impact Assessment
<b>m</b>	metre
<b>MAGIC</b>	Multi-Agency Geographic Information for the Countryside
<b>mm</b>	millimetre
<b>MOD</b>	Ministry of Defence
<b>MW</b>	megawatt
<b>MWdc</b>	Megawatts direct current
<b>MWe</b>	megawatt electric
<b>NDF</b>	National Development Framework
<b>NERC</b>	Natural Environment and Rural Communities

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<b>NFFO</b>	Non-fossil Fuel Obligation
<b>NGED</b>	National Grid Electricity Distribution
<b>NNRs</b>	National Nature Reserves
<b>NO<sub>x</sub></b>	oxides of nitrogen
<b>NPS</b>	National Policy Statement
<b>NRW</b>	Natural Resources Wales
<b>NSR</b>	noise sensitive receptors
<b>OEMP</b>	Operational Environmental Management Plan
<b>OS</b>	Ordnance Survey
<b>PIU</b>	Performance and Innovation Unit
<b>PPE</b>	Personal Protective Equipment
<b>PPW</b>	Planning Policy Wales
<b>PINS</b>	Planning Inspectorate
<b>PM<sub>10</sub>'s</b>	particulate matter of less than 10 microns
<b>PPGs</b>	Planning Policy Guidance Notes
<b>PPSs</b>	Planning Policy Statements
<b>PPV</b>	Peak Particle Velocity
<b>PRF</b>	potential roosting feature
<b>PRoW</b>	Public Right of Way
<b>PV</b>	photovoltaic
<b>RO</b>	Renewables Obligation
<b>RPA</b>	root protection area
<b>RSPB</b>	Royal Society for the Protection of Birds
<b>RVAA</b>	Residential Visual Amenity Assessment
<b>SAC</b>	Special Areas of Conservation
<b>SAM</b>	Scheduled Ancient Monument
<b>SIA</b>	Settings Impact Assessment
<b>SNCI</b>	Site of Nature Conservation Interest
<b>SO<sub>2</sub></b>	sulphur dioxide
<b>SPA</b>	Special Protection Area
<b>SPG</b>	Supplementary Planning Guidance
<b>SSSI</b>	Site of Special Scientific Interest
<b>SWMP</b>	Site Waste Management Plan
<b>TAN</b>	Technical Advice Notes
<b>TN</b>	Target notes
<b>UK</b>	United Kingdom
<b>UN</b>	United Nations
<b>UNFCCC</b>	Nations Framework Convention on Climate Change
<b>USA</b>	United States of America
<b>VER</b>	valued ecological receptors

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<b>VDV</b>	Vibration Dose Value
<b>VOC</b>	Volatile Organic Compound
<b>W</b>	Watt
<b>WPD</b>	Western Power Distribution
<b>WSE</b>	Wessex Solar Energy
<b>WTR</b>	Wildlife Trust Reserve
<b>WWBIC</b>	West Wales Biodiversity Information Centre
<b>ZOI</b>	Zone of Influence
<b>ZTV</b>	Zone of Theoretical Visibility

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## 1 Introduction

### 1.1 Introduction

- 1 An Environmental Statement (ES) has been prepared by Wessex Solar Energy in support of a planning application for a Solar Park to be located on land approximately 0.7 kilometres (km) south east of Cosheston, and approximately 2.5 km north east of Pembroke. The location of the proposed Solar Park site is shown in ES Volume 3 Figure 1.1.
- 2 The proposal is classed as ‘major development’ under The Town and Country Planning (Development Management Procedure) (Wales) Order 2012 and the application will be submitted to Pembrokeshire County Council for determination.
- 3 Solar Farm developments are not specifically listed under either Schedule 1 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, referred to as the EIA Regulations. However, the regulations do state that energy development, including “industrial installations for the production of electricity” covering an area exceeding 0.5 ha, are considered to be Schedule 2 developments.
- 4 An EIA Screening Direction was issued by PINS Wales on 7th February 2020 for a larger site at the same location which was subsequently the subject of an application under The Development of National Significance (Wales) Regulation 2016. The direction was that due to the size of the proposals, the proposed Development was considered to be EIA development under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. A Scoping Direction was subsequently issued by PINS Wales, dated 11th March 2020 (Appendix A1.2).
- 5 The Solar Park development now proposed is considerably smaller than that originally proposed, being 13.84 hectares as opposed to 34.25hecatres.
- 6 Pre-Application advice was issued by Pembrokeshire County Council for the smaller development and is included in Appendix A.1.1. A formal request for an EIA Screening Opinion was submitted to Pembrokeshire County Council in December 2023 but has not yet been received. Although the proposed development may no longer be considered to formally represent EIA development under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, a thorough approach has been taken to identifying any potential environmental impacts. As such the Scoping Direction issued for the larger development in 2020 has been used to define the scope of the application and assessments prepared for the now smaller development which is proposed. An Environmental Statement (ES) has therefore been prepared as part of the planning application.
- 7 This document presents a non-technical summary (NTS, DRN BL004) of the information contained within the ES Volumes 1-3 (DRNs BL001, BL002, BL003).

- 8 This Chapter of the NTS outlines the purpose and structure of the ES and provides an overview of the Applicant and the Development.

## **1.2 The Purpose of the ES**

- 9 The ES provides an assessment of the potential environmental impacts of the proposed solar park, how they are proposed to be mitigated and the residual impacts after mitigation.

## **1.3 Wessex Solar Energy**

- 10 Wessex Solar Energy (WSE) is a company involved with the development of Solar Park Projects in the United Kingdom (UK). The company has developed 24 Solar Parks in the UK so far and is looking at a portfolio of sites across England and South Wales for development of similar projects. The proposed site has been identified as being an ideal candidate.
- 11 WSE draws on the expertise of a group of dedicated engineers, environmental scientists and financiers who have many years of experience in the renewable energy and conventional power generation sector.
- 12 The company is committed to developing projects in an environmentally responsible and sustainable manner

## 2 EIA Approach

### 2.1 The Environmental Statement

- 13 The ES is presented in four separate volumes, which are:
- Vol 1: ES Main Report (Document Reference: BL001)
  - Vol 2: Technical Appendices (Document Reference: BL002)
  - Vol 3: Figures (Document Reference: BL003)
  - Vol 4: Non-Technical Summary (Document Reference: BL004)
- 14 ES Volume 1 comprises the following chapters:
- Chapter 1: Introduction
  - Chapter 2: EIA Approach
  - Chapter 3: Need for the Development and Its Benefits
  - Chapter 4: Consultation
  - Chapter 5: Site Selection and Consideration of Alternatives
  - Chapter 6: Development Description
  - Chapter 7: Planning Policy Framework
  - Chapter 8: Landscape and Visual Effects
  - Chapter 9: Ecology and Nature Conservation
  - Chapter 10: Archaeology and Cultural Heritage
  - Chapter 11: Construction Noise
  - Chapter 12: Geology, Hydrology and Hydrogeology
  - Chapter 13: Traffic Infrastructure
  - Chapter 14: Climate Change
  - Chapter 15: Miscellaneous (Waste, Population and Human Health, Major Accidents and Disasters)
  - Chapter 16: Grid Connection Route
  - Chapter 17: References
- 15 ES Volume 2 comprises the following technical assessments and reports:
- Appendix A1.1 PINS Wales Scoping Opinion
  - Appendix A5.1 Agricultural Land Classification Report
  - Appendix A5.2 Agricultural Assessment Report
  - Appendix A5.3 Land Quality Implications Assessment

- Appendix A6.1 Outline Decommissioning and Restoration Plan
  - Appendix A8.1 LVIA Methodology
  - Appendix A8.2 Visual Aids
  - Appendix A8.3 Landscape Sensitivity Assessment
  - Appendix A8.4 Viewpoint Analysis
  - Appendix A8.5 Residential Visual Amenity Assessment
  - Appendix A8.6 Illustrative Views
  - Appendix A9.1 Phase 1 Survey Target Notes
  - Appendix A9.2 Protected Species Legislation
  - Appendix A9.3 Habitat Regulations: No Significant Effects Report
  - Appendix A9.4 Landscape and Ecological Management Plan (LEMP)
  - Appendix A9.5 Arboricultural Survey, Impact Assessment and Method Statement
  - Appendix A10.1 Desk Based Assessment
  - Appendix A10.2 Geophysical Survey
  - Appendix A10.3 Archaeological Trenching and Site Walkover
  - Appendix A10.4 Setting Impact Assessment
  - Appendix A.11.1 Glossary of Terminology
  - Appendix A.11.2 Construction phases and plant
  - Appendix A12.1 Flood Consequence Assessment
  - Appendix A13.1 Draft Construction Traffic Management Plan
  - Appendix A13.2 Access Assessment
  - Appendix A13.3 Road Condition Survey
- 16 This ES is available for public viewing on the Pembrokeshire County Council Planning website.
- 17 Each technical ES Chapter has been written with an introduction, approach and methodology, existing situation and policy and predicted potential impacts, mitigation and residual impacts, and conclusions.
- 18 In addition to the ES a number of other technical documents are provided as part of this application as follows;
- Non-EIA Technical Assessments (Glint and Glare, Air Quality and Operational Noise Statement)(Document Reference: BL005)
  - Planning Statement (Document Reference: BL006)
  - Pre-Application Consultation Report (Document Reference: BL007)

- Design Access Statement (Document Reference: BL008)
- Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) (Document Reference: BL009)

## 2.2 EIA Process and Methodology

19 Each of the technical assessments includes:

- Description of baseline conditions;
- Identification and assessment of likely effects;
- Identification of appropriate mitigation measures; and
- Assessment of any residual environmental effects.

20 The EIA is based on a number of related activities as appropriate, as follows:

- Consultation with statutory and non-statutory consultees;
- Consideration of relevant local, regional and national planning policies, guidelines and legislation relevant to EIA;
- Consideration of technical standards for the development of significance criteria;
- Review of secondary information, previous environmental studies and publicly available information and databases;
- Physical surveys and monitoring;
- Desk-top studies;
- Computer modelling; and
- Expert opinion.

### 2.2.1 Baseline Description

21 Information relating to the existing environmental conditions has been collected through field and desktop research. These are known as the baseline conditions. Data has also been collected from public records and other archive sources and where appropriate

22 Predictions of the future baseline potentially involve large uncertainties and in most cases the future baseline is assumed to remain unchanged throughout the operation of the Development. Where this is not the case, it is explicitly stated.

23 The sensitivity of receptors on and near the Development site is assessed based on the baseline, the changes that may take place during the construction, operation and decommissioning phases of the Development and the effects, if any, that these changes may have on these receptors.

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### 2.2.2 Prediction of Likely Effects

- 24 The prediction of likely effects covers the three phases of the Development: construction (including pre-construction), operation and decommissioning. During each phase different environmental effects are likely to arise.
- 25 Each technical assessment covers:
- Direct and indirect effects;
  - Short, medium and long term effects;
  - Permanent and temporary effects; and
  - Likelihood of an effect occurring (i.e., very likely, likely, or unlikely)
- 26 Following identification of likely environmental effects, changes to baseline conditions have been predicted, allowing an assessment of the environmental impact of these changes.

### 2.2.3 Assessment of Likely Effects

- 27 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 beneficial or adverse).
- 28 The magnitude of change from the baseline is described as high, medium, low, negligible or no change and can be beneficial or adverse. The definition of magnitude varies by technical discipline as described in the technical chapters of the ES.
- 29 Environmental sensitivity (or importance) may be categorised by a multitude of factors, such as threat to rare or endangered species; transformation of natural landscapes or changes to soil quality and land-use.
- 30 The sensitivity or importance of each identified receptor is detailed within each technical chapter.
- 31 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). In order to evaluate the likely environmental effects, the assessment criteria used are identified and justified within each technical chapter.

### 2.2.4 Mitigation

- 32 Each technical chapter proposes mitigation measures. Such measures may include the consideration of alternatives and operational and management measures.
- 33 The mitigation strategy is a hierarchical one which seeks:
- Avoid likely effects;
  - Reduce those which remain; and



- Offset effects which can otherwise not be avoided or reduced.

#### **2.2.4.1 Embedded Mitigation**

- 34 Where possible, mitigation measures have been “embedded into” the overall design strategy rather than “added on” to the proposals. By being flexible with the design, the project design has responded to the findings of consultation and EIA work to avoid and reduce potential effects.

#### **2.2.5 Residual Effects**

- 35 The assessment process concludes with an examination of residual effects after mitigation has been applied, i.e., the overall predicted (likely) effects of the Development.

##### **2.2.5.1 Assessment of Cumulative Effects**

- 36 The spatial extent of potential cumulative impacts is set out in each technical chapter, and generally covers an area within which receptors could potentially be subject to significant cumulative effects.
- 37 Pembrokeshire County Council; as part of the pre-application advice issued in March 2020, identified a number of other development projects which should be considered as part of the cumulative impact assessment. These comprised the following:
- Two existing solar farms are located at West Farm 1.1 km north west and Golden Hill 1.8 km south west of the site;
  - Three 15-20 m high existing vertical axis turbines located at London Road Industrial Estate 3 km west of the site;
  - An existing 14.8 m turbine at Warreston House 1.5 km southwest of the site;
  - An existing 41.4 m turbine at Milton Manor 2.6 km southeast of the site;
  - Proposed 9MW solar farm at West Farm, Cosheston, Pembroke Dock (adjacent to the existing solar farm).
  - Two 47 m turbines which were the subject of a 2013 screening request. (The two turbines screening requests have not progressed to application and are considered unlikely to do so in their given form given the time elapsed. They are therefore not considered further within this ES).
- 38 The search was based only on developments for which a valid planning application had been submitted, some of which had been determined, and developments which had been refused planning permission and were subject to an appeal. They also included DNS Projects which were in the DNS process and development for which an EIA screening/scoping opinion request had been submitted.

#### **2.2.6 Transboundary Effects**

- 39 As a result of the scale and nature of the Development, and its location, the Development is not considered to have the potential for significant environmental effects beyond the ZOI determined by the cumulative impact assessment process.

As a result it is not considered possible for the proposed Development to result in and transboundary impacts.

- 40 Transboundary effects are therefore not assessed further in the ES.

#### **2.2.7 Site Selection and Consideration of Alternatives**

- 41 The EIA Regulations require the consideration of alternatives, defined as:

*'A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant or appellant which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects'.*

- 42 ES Vol 1. includes a detailed Chapter presenting the reasonable alternatives considered by the Applicant in respect of the location of the Development, its scale and design and the implications of a "do nothing" scenario (ES Vol 1. Chapter 5: Site Selection, Development Design and Consideration of Alternatives).

### 3 Need for the Project and its Benefits

#### 3.1 Overview

- 43 In spring 2019 the Welsh and UK Governments both declared a **Climate Emergency** recognising the significant risks of continuing the emit greenhouse gases to the future wellbeing of our planet. For many years now the development of renewable energy projects in the UK, such as the proposed Solar Park, has principally been driven by initiatives and targets set by successive to combat this climate threat.
- 44 The adoption of renewable energy power generation as a significant part of our country's energy mix has also been driven by the decline of the UK's indigenous energy supplies and increase in energy imports requires a shift from our current dependence on fossil fuels.
- 45 The construction and operation of renewable energy projects, such as the proposed Solar Park, will add to the diversity of the UK electricity generation sector, helping to maintain the reliability of supplies. Solar energy is inexhaustible and is not subject to the instability of the international fuel markets. Solar energy developments eliminate the emissions of the acidic gases and local air quality pollutants associated with the operation of existing fossil fuelled generation plant.

#### 3.2 Climate Change

- 46 Climate change is one of the most serious environmental problems faced by the world today. It is internationally recognised that the global climate is changing as a result of increasing levels of 'greenhouse' gases in the Earth's atmosphere. Over the last two centuries global atmospheric concentrations of carbon dioxide have grown by nearly 30 per cent, methane concentrations have more than doubled, and nitrous oxide concentrations have risen by about 15 per cent (United States Environmental Protection Agency). This growth is a direct effect of mankind's increased burning of fossil fuels, which, during processing and combustion, give rise to greenhouse gas emissions. These greenhouse gases prevent heat escaping into space, raising the global temperatures as their presence increases.
- 47 The last decade was the warmest since records began in 1861. The average global surface temperature has risen by 0.6°C over the 20th century, and could rise by 2.5°C in the next 50 years, and by up to 5.8°C during this century, as a direct result of the greenhouse effect, though the impact on global regions will be varied. In some regions these changes could lead to drought, in others increased flooding. It is already evident that the polar icecaps are receding as global temperatures rise, which may lead to an increase in sea levels. In the 20th Century, records show that the global mean sea level rose by an average of 1-2 millimetres (mm) a year (United Nation (UN) Working Group of the Intergovernmental Panel on Climate Change).
- 48 A report issued by the UK's Office of Science and Technology – Foresight Future Flooding in 2004 estimated that by the end of this century, up to 4 million Britons face the prospect of their homes being inundated directly as a result of climate change. In the UK it is likely that our winters will become warmer and wetter whilst our summers become hotter and drier. Extreme weather events will become more frequent.

- 49 The Royal Society for the Protection of Birds (RSPB) have highlighted that “a staggering number of species could be committed to extinction as a result of climate change – a third or more of land-based plant and animal species by the 2050’s if we take no action to limit global warming. Climate change is now the greatest long-term threat to wildlife worldwide”.
- 50 Worldwide the consequences could be devastating with many millions of people exposed to the risk of disease, hunger and flooding. By the middle of the century, 200 million more people may become permanently displaced due to rising sea levels, heavier floods, and more intense droughts.

### 3.3 Tackling Climate Change

- 51 The problem of climate change was first addressed in the international arena at the United Nations Conference on the Environment and Development, the Earth Summit, in Rio de Janeiro in 1992. One of the major themes of the meeting was promoting sustainable economic development in the face of global climate change. Another was that industrial nations who have contributed the bulk of the greenhouse gas emissions should assume the burden of leadership.
- 52 This was followed by further international action in 1997 when worldwide Governments took a further step and agreed on the Kyoto Protocol, which upon ratification, would establish legally binding targets for the reduction of greenhouse gases emitted by industrialised countries. Under the Protocol all industrial nations were required to reduce collective greenhouse gas emissions by just over 5.2 per cent from 1990 levels by 2008-12.
- 53 More recently, in 2016 the Paris Agreement was signed with the central aim of strengthening the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. As part of the agreement the UK committed to a net zero emission target for greenhouse gases by 2050.
- 54 In the years since the climate change movement has grown with Governments including the UK parliament and the Welsh Assembly agreeing that there is a Climate Emergency in 2019. Pembroke County Council have also declared a climate emergency locally.
- 55 Work by the Climate Change Committee in 2019 in response to a challenge from the UK, Welsh and Scottish Governments recommended a series of dramatic targets. In Wales, it was recommend a 95 per cent reduction in greenhouse gases by 2050 was implemented.

### 3.4 UK Climate Change Programme

- 56 The UK Climate Change Programme, published in November 2000, set out the Government's proposals for meeting the UK's legally-binding target of a 12.5 per cent reduction in greenhouse gas emissions, (Kyoto Protocol) and for moving towards the Government's domestic goal of a 15 per cent reduction in carbon dioxide emissions

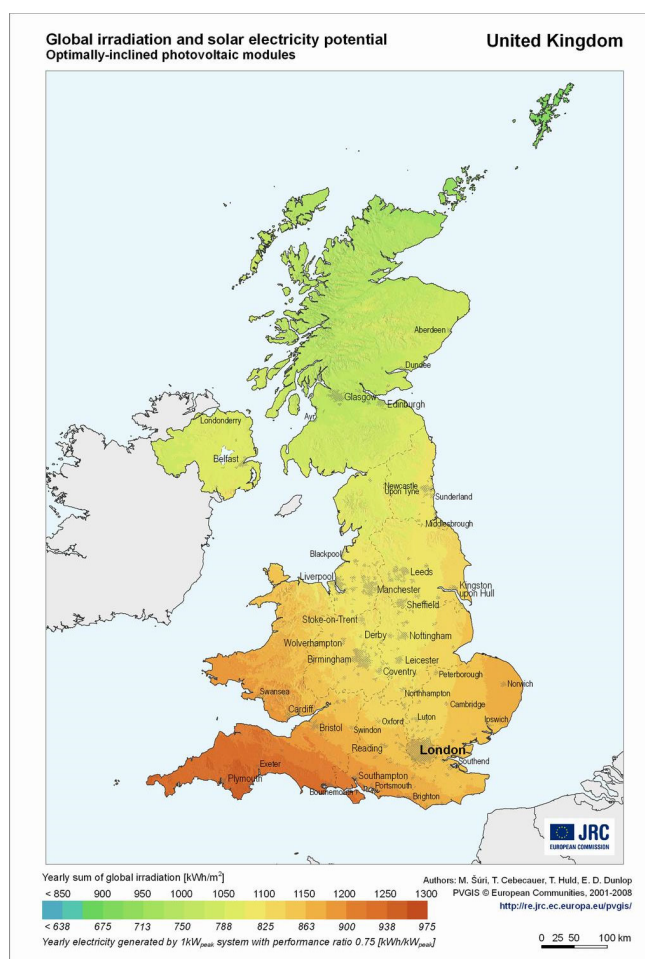
by 2015. The programme also confirmed the requirement to supply over 10 per cent of UK electricity from renewable sources by 2010 in line with the Renewables Directive (a requirement that the UK failed to meet).

- 57 Since this time the UK Government has introduced the Climate Change Bill which aimed to achieve a mandatory reduction of 60 per cent in the carbon emission from the 1990 level by 2050, with an intermediate target of between 26 per cent and 32 per cent by 2020. The bill was passed in to UK Law as **"The Climate Change Act"** on 26 November 2008 and in addition to reductions in 2020 and 2050 targeted an 80 per cent reduction over 1990 as an aspirational target. The U.K. was the first country to ratify a law with such a long-range and significant carbon reduction target.
- 58 As referenced above in 2016 the UK signed the Paris Agreement committing to reducing emission of greenhouse gases to net zero by 2050 albeit the agreement is consensus based and not legally binding. Climate Change Committee which was challenged by the Prime Minister to draw up plans to meet the net zero target observed the following:
  - *"Fully decarbonising electricity supply can be achieved through increasing the share of renewables and firm low-carbon power from around 50% today to around 95% in 2050....Renewable generation could be four times today's levels, requiring a sustained and increased build out between now and 2050."*
  - *Renewables are cheaper than alternative forms of power generation in the UK and can be deployed at scale to meet increased electricity demand in 2050 - we therefore consider deep decarbonisation of electricity to be a Core measure.*
  - *Our 2018 Progress Report to Parliament recommended that, in addition to current commitments, a further 50-60 TWh of low-carbon generation would need to be contracted to come online by 2030, in order to reduce emissions to below 100 gCO<sub>2</sub>/kWh (75% low carbon generation)."*
- 59 It is clear that the uptake of renewable energy in the UK needs to rapidly accelerate if we are to achieve such aims as part of our international commitments.
- 60 Over the years a series of incentive mechanisms and tariff have supported the implementation of renewable energy projects to ensure their lifetime economic viability. However as time has gone on the level of these incentives have fallen significantly such that many schemes are now approaching "grid parity" with electricity acquired on the open market.
- 61 With the deployment of renewable energy being far more economic the key barriers to the meeting of our targets and objectives for its uptake are becoming planning constraints and the availability of connections to the local / national electricity grid. Councils like Pembrokeshire have the ability to help make sure that planning constraints are not a significant inhibitor in realising our national climate change objectives.

### 3.5 Solar Energy in the UK

- 62 Levels of solar irradiation are typically measured in kilowatt hours (kWh). This is a measure of the amount of solar energy experienced at a given location over the course of an hour. Solar irradiation levels are higher the closer the location of interest is to the equator. Therefore, solar irradiation is highest in the southernmost areas of the UK. This is illustrated by the map below, produced by the European Commission's Joint Research Centre (JRC).

Insert 3-1: Map of solar radiation levels in the UK



- 63 The map shows the average number of kWh of solar irradiation per square metre which would be received over the course of an average year by an optimally inclined solar panel (i.e. tilted between 20-35°). It shows that the areas which experience the highest levels of solar irradiation in the UK are in the south of England, South Wales and East Anglia.

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### 3.6 Benefits of the Project

64 In addition to playing a major role in achieving Government targets for renewable energy and thereby tackling climate change, solar energy has a number of additional benefits for the region and the UK, including:

- Economic benefits – in terms of UK construction and maintenance jobs etc.
- Power supply benefits – by increasing diversity and security of electricity supply.
- Environmental benefits – reduced emissions of pollutants in addition to carbon dioxide

65 These issues are discussed further below.

#### 3.6.1 Economic Benefits

66 The development of renewable energy schemes presents an economic opportunity both nationally and at a regional and local level. It is estimated by the government in 2017 that £79.6 billion turnover in the UK economy was generated directly and indirectly by businesses active in the low carbon and renewable energy economy.

67 Solar projects such as that proposed by Wessex Solar Energy can help stimulate business investment in a sector with enormous growth potential.

68 It is considered that the project will have a beneficial impact with regard to socio-economics in the wider area. The proposed development represents a total investment of the order of £6 million in isolation, a proportion of which will be spent in the local area, primarily on civil and electrical contractors. WSE will encourage the contractor who will construct the project to use locally sourced materials and locally based contractors as part of their proposals so as to maximise the benefit to the local economy.

69 The potential for investment in new and emerging renewable energy technologies must also be seen against the potential impacts of not taking action to combat climate change. Climate change could perhaps reduce global GDP by 5 per cent year on year 'now and forever' whilst the costs associated with combating global climate change could be as little as 1 per cent of global GDP (Stern Report 2005). The risks to the UK economy such predictions are correct are plain to see and it is considered that it is through projects such as the proposed Solar Park that this threat can be combated.

#### 3.6.2 Electricity Supply Benefits

70 The use of renewable energy, such as that which would be generated from the proposed Solar Park, will add to the diversity of the UK electricity generation sector helping to maintain the reliability of supplies and represents an inexhaustible supply. Renewable energy also has advantages relating to slowing the depletion of finite fossil fuel reserves. North Sea oil and gas supplies have meant the UK in more recent times has been self-sufficient in energy but this cannot be maintained, leaving the country potentially vulnerable to price fluctuations and interruptions to supply caused by regulatory failures, political instability or conflict in other parts of the world.



- 71 The Solar Park will also help to reduce the transmission losses associated with the transfer of electricity along long lengths of transmission lines from conventional power stations. As the proposed project will be “embedded generation” (i.e. generating electricity directly into the local power distribution network) it reduces the distance the electricity travels and reduces these small losses of power. By contrast, energy from large power stations has to be transmitted on high voltage power lines and travels long distances before point of use. The Solar Park will therefore contribute towards the efficiency of the UK distribution system and further reduce the harmful emissions generated by thermal power plant.
- 72 There are a number of annual average UK household electricity consumptions quoted by various credible sources. The Department of Business Energy Industry and Skills (BEIS) now estimates the average consumption to be below 4,000 kWh with average consumption in 2019 being about 3,731 kWh. The project would generate approximately 12,300 MWh per year based on solar irradiance data for the site. It can be calculated using the 2019 BEIS figure therefore that the proposed Solar Farm will provide approximately 3296 households with renewable energy annually.

### 3.6.3 Environmental Benefits

- 73 In addition to the benefits associated with reduced emissions of greenhouse gases, other external environmental costs of conventional generation are avoided, including poor air quality and the damage to the natural and built environment caused by acid rain, as in addition to the prevention of emissions of carbon dioxide (the main greenhouse gas), the use of solar power prevents the emissions of the acid gases and local air quality pollutants such as sulphur dioxide (SO<sub>2</sub>) oxides of nitrogen (NO<sub>x</sub>), particulate matter of less than 10 microns (PM<sub>10s</sub>) and Volatile Organic Compounds (VOCs). Producing energy from the proposed Solar Park would reduce the quantities of these pollutants being produced in the UK, thus helping the UK government’s environmental and social objectives. In addition, there is no requirement for fuel transportation.
- 74 During operation, the land will be available for use around the PV panels, with sterilised areas of land essentially being the electrical and inverter buildings. Also, when compared to conventional power stations, solar parks are easily and quickly decommissioned and any visual impact is totally reversible.
- 75 With regard to local environmental issues, the project will, of course, have an impact on the existing environmental baseline at the proposed site, which has been assessed as part of this Environmental Report. However, mitigating measures will be employed to help minimise the impact of the project and, in some cases, improve the existing environment.



## 4 Consultation

### 4.1 Consultations

- 1 The proposal is classed as ‘major development’ under The Town and Country Planning (Development Management Procedure) (Wales) Order 2012 and the application will be submitted to Pembrokeshire County Council for determination.
- 2 Solar Farm developments are not specifically listed under either Schedule 1 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, referred to as the EIA Regulations. However, the regulations do state that energy development, including “industrial installations for the production of electricity” covering an area exceeding 0.5 ha, are considered to be Schedule 2 developments.
- 3 An EIA Screening Direction was issued by PINS Wales on 7th February 2020 for a larger site at the same location which was subsequently the subject of an application under The Development of National Significance (Wales) Regulation 2016. The direction was that due to the size of the proposals, the proposed Development was considered to be EIA development under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. A Scoping Direction was subsequently issued by PINS Wales, dated 11th March 2020 (Appendix A1.2).
- 4 The Solar Park development now proposed is considerably smaller than that originally proposed, being 13.84 hectares as opposed to 34.25 hectares.
- 5 Although the proposed development may no longer considered to formally represent EIA development under the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, a thorough approach has been taken to identifying any potential environmental impacts. As such the Scoping Direction issued for the larger development in 2020 has been used to define the scope of the application and assessments prepared for the now smaller development which is proposed. An Environmental Statement (ES) is therefore included as part of the planning application.
- 6 An additional design consultation exercise was also undertaken in July 2020 for the larger development proposals. The following consultees were asked for their comments regarding the design proposals:
  - Pembrokeshire Coast National Park Authority
  - Pembrokeshire County Council
  - Cadw
  - Dyfed Archaeological Trust
- 7 Comments received during the design consultation process and from the Transport Division for the previous larger development were used to inform the design for the

now smaller proposed development and are detailed within the Pre-Application Consultation Report (DRN BL007).

- 8 In accordance with The Town and Country Planning (Development Management Procedure) (Wales) Order 2012 a draft version of the entire application has been made available for viewing and comment by specialist consultees and members of the public for 28 days. Community consultees include Cosheston Community Council and the County Councillor for Cosheston.
- 9 Specialist consultees include:
- The Welsh Ministers (Truck Road Agent and Transport, CADW)
  - Natural Resources Wales
  - Local Highways Authority
  - Coal Authority
  - The Health and Safety Executive
  - The Local Planning Authority
  - Dyfed Archaeological Trust (DAT)
  - Dwr Cymru / Welsh Water
- 10 Details of how the comments received as part of the scoping, pre-application design consultation and direct consultation processes have been considered and addressed within this ES are detailed within the Pre-Application Consultation Report (DRN BL007).
- 76 Additional comments were also received during the determination of the larger 2020 application. Details of how these comments have been considered and addressed within the ES are detailed within the Pre-Application Consultation Report (DRN BL007) and within each technical chapter of the ES as appropriate.

#### **4.1.1 Public and Community Consultation**

- 11 Consultation with the local community and other stakeholders is seen by Wessex Solar Energy as an important part of the development process.
- 12 The nature of the development is such that it will have relatively localised impacts when compared to a project such as a wind farm which can be seen over many miles.
- 13 Based on a zone of theoretical visibility (ZTV) (ES Vol 3: Figure 8.5) and site visits 446 properties were identified which either had potential views of and/or who lived not far from the site.
- 14 An information booklet was prepared. A copy of this booklet is provided within the Pre-Application Consultation Report (PAC: DRN BL007).

- 15     The booklet was sent to the 446 properties along with a feedback form and a pre-paid return envelope. The booklet and feedback form included options to request a call back by telephone or a reply to any questions by email / in writing to try and ensure that where ever possible we could provide the information that residents might wish to have.
- 16     Further to the above consultation with residents WSE contacted Cosheston Community Council to introduce the proposed Development.
- 77     Wessex Solar Energy's consultations will be ongoing throughout the determination phase of the development and community consultee will be informed once the application has been formally submitted.

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## 5 Site Selection and Consideration of Alternative Sites

### 5.1 Introduction

78 Chapter 5 of the Environmental Statement (ES) Volume 1 provides an overview of the site selection process undertaken to identify the Development site. It also provides a description of the evolution of the Development design so far and the main alternatives considered.

79 This information meets the requirements of the EIA Regulations 2017 which state that an ES should include:

"a description of the reasonable alternatives studied by the applicant or appellant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the development on the environment".

80 The Chapter includes the following sections:

- Site Selection. An overview of the site selection process undertaken for the Development;
- Development Design. A description of the iterative design process undertaken for the Development and how it has responded to consultation comments; and
- Design Considerations and Alternatives. A description of the main alternatives to the Development and the selection of the Development as the preferred option.

### 5.2 Site Selection

81 In identifying potential sites for development of solar energy facilities Wessex Solar Energy (WSE) undertakes a two stage sequential approach. First a desk-based screening exercise is undertaken to establish sites that appear to have some potential for development. Any sites identified by this process are then studied more closely for their merits on various environmental, planning and technical grounds.

82 Our approach has been found to be acceptable by Local Planning Authorities and the Planning Inspectorate in previous cases.

#### 5.2.1 Definition of a Search Area

83 WSE has considered hundreds of sites for development across South Wales and Southern England and has fully developed nearly twenty. There is no formal guidance regarding what constitutes an acceptable search area for an alternative sites study accompanying a planning application. As all Local Authorities will have to play their part in meeting climate change objectives, WSE has focused this study on the Pembrokeshire County Council Local Authority boundary.

84 The area contains large parts of the electricity distribution network, various land uses and large areas that, subject to further study, appeared to have some basic potential for the development of a solar energy facility.

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### 5.2.2 Stage 1 Site Screening Study

85 The stage 1 screening study considered the following elements:

- Electrical Connection Location
- Environmental and Planning Designations (Ecology, Landscape and Cultural Heritage)
- Existing Land Use
- Agricultural Land Classification

### 5.2.3 Findings of Stage 1 Site Screening Study

86 Within the site search area (ES Volume 3; Figure 5.1) shows red 'exclusion zones' where WSE did not focus our attention due to the presence of:

- Sites of Special Scientific Interest
- Special Areas of Conservation
- Special Protection Areas
- RAMSAR sites
- Scheduled Monuments
- National Parks
- National Nature Reserves
- Local Nature Reserves
- Conservation Areas
- Country Parks
- Built Up Areas
- AONBs
- World Heritage Sites
- Historic Registered Landscapes
- National Trails
- Registered Landscapes of Outstanding and of Special Interest
- Flood Zone 3
- Areas >2km from the 33kV electricity distribution network

87 ES Volume 3; Figure 5.1 also shows the Agricultural Land Classification of England and Wales 1985 and associated key.

88 ES Volume 3; Figure 5.1 shows that there were a number of areas that were absent of the environmental designations above, were relatively near to the 33kV electricity

network and were not classified as Grade 1 or 2 agricultural land. WSE focused its attention on identifying and pursuing sites with the search area identified.

#### **5.2.4 Stage 2 Site Suitability Investigations**

89 WSE undertook to look more closely at the areas identified by the Stage 1 study and embarked on site visits as well as further desk-based investigations.

90 The assessment focussed on the following aspects:

- Existing Land Use
- Planning Designations
- Visual Impact
- Access
- Topography
- Shading
- Size
- Public Rights of Way (PRoW)
- Cumulative Impacts

#### **5.2.5 Findings of Stage 2 Site Suitability Investigations**

91 ES Volume 3: Figure 5.1 identifies seven specific sites that WSE considered and from which the associated investigations influenced our continued search effort. These sites are described in more detail in ES Vol 1 Chapter 5.

#### **5.2.6 Subsequent Developments**

92 Following the process above in 2013 the Blackberry Lane site was taken forward for development. Due to a number of delays the site has taken some time to reach the stage that a planning application is ready to be submitted.

93 In the intervening time the planning and economic environment has changed.

94 New Agricultural Land Classification maps are now available. Figure 5.2 shows how this affects the search area. It confirms the Grade 3 status of a number of sites, while upgrading the classification of others, including the proposed development site as well as a number of operational solar farms.

95 To confirm the Classification of the site WSE undertook its own Agricultural Land Classification Survey (Appendix A5.1). This survey covered a wider area than that included within the current site boundary but the results remain valid.

96 A larger site was initially taken forward through the DNS process (Blackberry Lane Solar Park). However, a reduced site area is now proposed (Phoenix Solar Park).

The site now proposed is a mixture of Grades 2, 3a and 3b in the following proportions (including the entire link track area within the redline, much of which will not be built on):

**Table 5-1: ALC**

Grade	Hectares	Proportion
2	5.78	41.1%
3a	1.77	12.6%
3b	6.5	46.3%
<b>Total</b>	<b>14.05</b>	<b>100%</b>

#### 5.2.7 Development of alternative sites

- 17 As is clear from the site investigations described in Section 5.2.5, the electricity network was already somewhat constrained in 2013, with most of WSE's applications or enquiries to WPD (now National Grid Electricity Distribution, NGED) resulting in unviable offers. Since then, a few additional generation projects, have been developed in Pembrokeshire (a number of which are identified on Figures 5.1 and 5.2). This has resulted in the limited capacity available in the network being used and the network currently has no spare capacity. NGED now provides a Network Capacity Map<sup>1</sup> to assist developers in identifying areas with available capacity on their network.
- 18 The map confirms that none of the substations in Pembrokeshire have enough capacity for even 1 MW of additional generation. The red dotted substations are those without sufficient capacity. Substations would be dotted amber or green if there was at least some potential for a generation connection. WSE has confirmed through enquiries to NGED for other sites in South Wales that this constraint applies due to the circuits between Carmarthen and Swansea operating at full capacity.
- 97 Therefore, there are no alternative sites of any Agricultural Land Classification available for development in Pembrokeshire, or indeed west of Swansea.

#### 5.2.8 Alternative land within the development site

- 19 PPW11 states that "if land in grades 1, 2 or 3a does need to be developed, and there is a choice between sites of different grades, development should be directed to land of the lowest grade."

<sup>1</sup> <https://www.westernpower.co.uk/our-network/network-capacity-map/>

- 20 Since 2017, solar farms have no longer been given subsidy support and therefore the pressure to keep costs low and maximise output is stronger than ever before. The grid connection cost for a project at the development site is relatively high, involving a circa 2 km off-site connection at Golden Hill substation. Recent reductions in the cost of solar panels and other items combined with increases in the forecast wholesale price of electricity have enabled the project to remain viable at the reduced capacity of 9.99 MWac as proposed.
- 21 WSE has determined that approximately 34 acres of land are required to enable a 9.99 MWac capacity. Therefore, in order to direct the development towards lower grade land, WSE decided to remove all but one field comprising only BMV land.
- 22 In addition, a Land Quality Implications Assessment (A5.3) was undertaken to determine the potential impact of the proposed solar park upon the best and most versatile agricultural land within the site boundary.

#### 5.2.9 Conclusion

- 98 WSE believes that the site selection study that was undertaken (and detailed above) demonstrates that the development of agricultural land was necessary to facilitate the proposed development. Areas of brownfield/non-agricultural land were considered and found to either be unavailable or unsuitable due to planning designations/existing uses that are not consistent with the development of a solar park.
- 99 Reasonable attempts were made to identify land that was not Best and Most Versatile land.
- 100 The development site was chosen as it was identified through high-level mapping as being in an area with a mixture of Grade 3 and 4 land, as was consistently the case across the entire search area. WSE pursued other developments in Pembrokeshire, one of which is now operational, but was not able to identify any other viable projects on lower grade agricultural land than a mixture of Grade 3 and 4.
- 101 Upon site-specific studies, the land making up the site was identified as being a mixture of Grades 2, 3a and 3b. Part of the site could therefore be considered to be Best and Most Versatile land. At this point, it was identified that the entire electricity distribution network in Pembrokeshire was operating at full capacity, removing any potential to develop alternative sites.
- 102 It has not been possible to develop a viable project exclusively on the Grade 3b land identified within the development site. However, WSE did identify that it was possible to remove all but one 'BMV only' field from the proposed development without rendering the project unviable and has therefore done so. Furthermore, the Land Quality Implications Assessment (A5.3) concludes that there will be no permanent loss of best and most versatile agricultural land and there will be no decrease in the quality of the agricultural land across the site as a result of the proposed development.



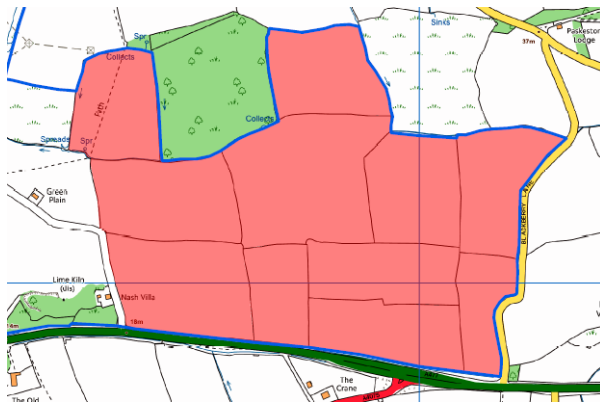
- 103 WSE believes that it has been demonstrated that development of agricultural land is necessary and that land of poorer agricultural quality has been chosen in preference to higher quality land. Furthermore, it considers that there are no reasonably available alternative sites in the search area. It should also be noted, as detailed within the Agricultural Assessment Report (A5.2) and Land Quality Implications Assessment (A5.3), that the development of the proposed solar park will not prevent the conservation of best and most versatile agricultural land within the site boundary and may in fact result in an improvement in land quality due to regenerative farming practices.

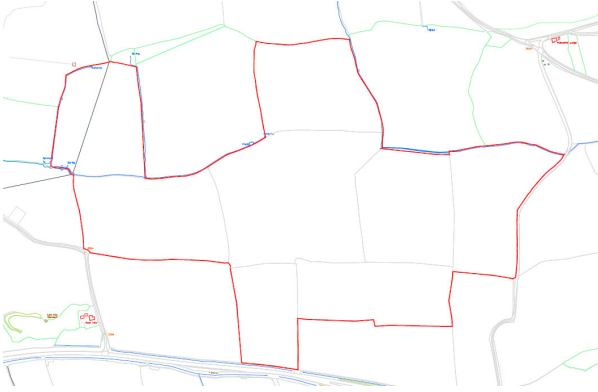
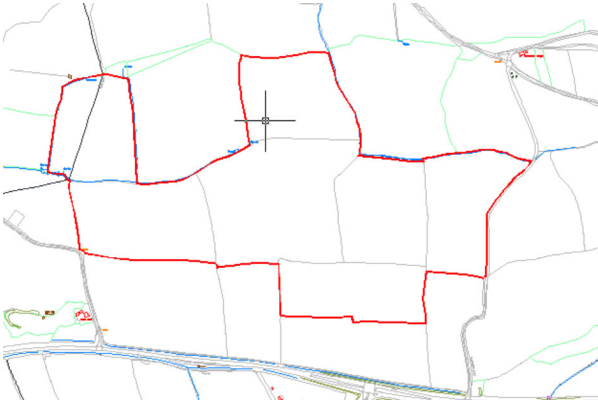
### 5.3 Development Design


- 104 The purpose of solar PV development is to harness the power of the sun to generate electricity. The optimum design is therefore to locate solar PV arrays in areas exposed to the highest levels of solar irradiation.
- 105 The identification of environmental effects is an iterative process, running in tandem with the design process. As environmental effects and sensitivities have been identified, the layout of the Development has undergone a series of modifications to avoid or reduce potential environmental effects through careful design.
- 106 Specific environmental factors are considered in the final design parameters of the Development, such as constraints avoided. Typically this is referred to as “development design mitigation” or “embedded mitigation”, which is set out in the various technical Chapters of the ES.
- 107 The Development layout has evolved throughout the EIA and pre-application consultation processes. This iterative approach has allowed the results of consultation along with results from the environmental studies carried out to inform the EIA to guide the evolution of the Development and allowed the design to be modified in order to avoid or minimise environmental effects where possible.
- 108 This iterative process has led to the Development design presented in ES Volume 1: Chapter 6: Development Description of the ES.
- 109 The initial focus of design was on locating the solar PV arrays outside more sensitive areas. The initial layout was tested against environmental and technical constraints.
- 110 Constraints included:
- Landscape character and visual impact;
  - Cultural Heritage impact,
  - Residential amenity including visual outlook from residential properties and potential noise effects from the operation of the Development; and
  - Ecological and archaeological receptors.
- 111 The Design Principles and the development design described in ES Volume 1: Chapter 6: Development Description has been achieved following a number of key layout iterations, which are summarised in Table 5-1, and ES Volume 3; Figure 1.2

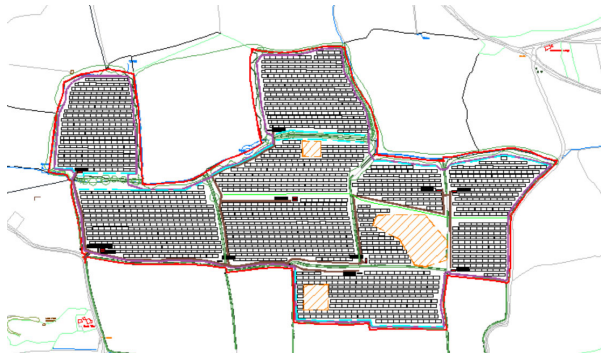
(the Application layout). Although the summaries in Table 5-1 reflect discrete designs, small refinements to, and testing of new locations within these general stages has been undertaken throughout the EIA process as new information and feedback became available.


**Table 5-1: Main Design Iterations**

Iteration	Parameters	Comment
EIA Screening and Pre-application Site Boundary (September 2013)	Site Area: 48.56 ha No. Fields: 11 Inverters: 22 Transformers: 22 Output: 22MW(AC)	<p>The initial boundary was selected in the absence of detailed data from environmental assessments.</p> 
EIA Screening, Scoping and Pre-Application Layout (January 2020)	Site Area: 36.9 ha No. Fields: 8 Inverters: 22 Transformers: 22 Output: 22MW(AC)	<p>Due to improvements in technology a reduction in site area could be applied to the 2013 site boundary.</p> <p>The south western most field was removed to increase the separation between the proposed Development and Nash Villa.</p> <p>A selection of fields in the south eastern part of the site were also removed following the completion of a preliminary landscape and visual impact assessment which identified these fields as being the most visible from surrounding receptors.</p>

Iteration	Parameters	Comment
		
Design Consultation Layout	Site Area: 34.25 ha No. Fields: 7 Inverters: 22 Transformers: 22 Output: 22MW(AC) No. Panels: c.70,000	<p>Following the completion of a range of environmental surveys and assessments:</p> <ul style="list-style-type: none"> <li>• ALC</li> <li>• Tree survey</li> <li>• Ecology survey</li> <li>• Archaeological trenching and evaluation</li> <li>• Cultural heritage Impact Assessment</li> <li>• LVIA</li> </ul> <p>A further reduction to the site area was made and an initial design developed.</p>  <p>An additional field was removed from the site area. This field was identified as being entirely grade 2 agricultural land.</p>

Iteration	Parameters	Comment
		<p>This detailed design included buffers to avoid the root protection areas of all existing trees and hedgerows. It also included a buffer from any existing ditches. The design incorporated development exclusion zones for potential areas of archaeological interest.</p> <p>The design was accompanied by a proposed planting scheme which was designed to minimise any potential impacts identified by the LVIA and Cultural Heritage Settings Impact Assessment, including the listed building to the west of the site and the National Park to the north of the site. All existing trees and hedgerows were retained and an additional hedgerow was proposed.</p> <p>The proposed solar panels were orientated in an east-west direction and a minimal separation distance was allowed between the panel rows in order to maximise potential output while minimising landtake, maintaining buffer zones and retaining/protecting all existing trees and hedgerows.</p> <p>Inverter cabins and the control building were located to minimise potential visual impacts and the length of new track needed.</p> 

Iteration	Parameters	Comment
DNS Draft Application Layout	Site Area: 34.25 hectares No. Fields: 7 Inverters: 22 Transformers: 22 Output: 22MW(AC) No. Panels: c.70,000	A number of responses were received from consultees in response to the design consultation exercise. These comments did not result in any changes to the proposed design
DNS Submission Layout	Site Area: 34.25 hectares No. Fields: 7 Inverters: 12 Transformers: 12 Output: 22MW(AC) No. Panels: c.70,000	<p>Taking into consideration the comments from Pembrokeshire County Council and Natural Resources Wales, the number of inverter cabins has been reduced in order to minimize the potential visual impacts as much as possible. The inverter/transformer cabins now proposed are slightly longer (+1.7m) than those initially included within the site design but the total number has been reduced from 22 to 12.</p> 

Iteration	Parameters	Comment
Pre-Application Layout 2023	Site Area: 13.84ha plus link road (total 14.05ha) No. Fields: 3 Inverters: 5 Transformers: 5 Output: 9.99MW(AC) No. Panels: c.25,500	

## **5.4 Consideration of Alternative Equipment and Technology**

### **5.4.1 Design Considerations and Alternatives**

112 A number of design options were considered including:

- Single Axis tracking vs Fixed Tilt Panels
- Inverter Cabin Locations
- Control Building Location
- Fencing Type and Location

113 Further details are provided in ES Volume 1: Chapter 5.

### **5.4.2 Consideration of Alternative Low-Carbon Forms of Electricity Generation**

114 Alternatives for utilising the connection capacity secured for the Development site were discounted as detailed below.

#### ***5.4.2.1 Energy Storage***

115 Unfortunately, due to existing capacity and management constraints on the National Grid network, it is not currently possible to connect new energy storage capacity in South Wales. This situation will not change until 2028 at the earliest, when grid reinforcement work is completed.

116 Given these constraints, energy storage is not currently an option on the Development site.

#### ***5.4.2.2 Wind Farm – Onshore***

117 As a company, Wessex Solar Energy exclusively develops solar energy facilities. However, it's directors do have experience and interest in/of wind farm development. The following constraints to the placement of wind turbines would preclude locating a wind farm within the Development site;

- Separation from residential properties to protect residential amenity from visual and noise effects (typically more than 1 km for a large windfarm);
- Potential ecological impacts upon local bat and bird populations associated with the Pembrokeshire Marine Special Area of Conservation, Milford Haven Waterway SSSI and Bosherton Lakes SAC;
- Indirect effects on settings of heritage assets including Carew Castle;
- Visual impacts on local communities, the Pembrokeshire Coast National Park and users of local public rights of way.

#### ***5.4.2.3 Smaller-scale solar PV development***

- 118 A greater number of smaller solar PV facilities could be developed to meet the same total generating capacity as the proposed Development e.g. 2no. 5MW sites or 3no. 3.5MW sites. However, not only would this distribute any potential impacts unnecessarily across multiple sites and locations, but as detailed above, would not be feasible within Pembrokeshire due to the size and location of available grid capacity and the significant development constraints which exist.



## 6 Development Description

### 6.1 The Site

- 119 Chapter 6 of ES Volume 1 provides details of the proposed Development Site and Design.
- 120 The Solar Park will be located approximately 0.7 kilometres (km) south east of Cosheston, and approximately 2.5 km north east of Pembroke. There are a small number of scattered houses in the vicinity of the proposed Solar Park site. The closest of these is Nash Villa (located approximately 130 m south west of the proposed site boundary at the nearest point).
- 121 The location of the proposed Solar Park site is shown in Figure 1.1, and the site boundary (and indicative site layout) is shown in Figure 1.2. The proposed Solar Park site is centred at Ordnance Survey (OS) Grid Reference 201580, 203280. The proposed site comprises 3 fields (arable), covering a total area of approximately 34.84 hectares (ha). Further details regarding the agricultural activity across the site are provided within the Agricultural Assessment Report (Appendix A5.2).
- 122 The proposed Solar Park site falls within the jurisdiction of Pembrokeshire County Council (the Council), and the relevant Community Council is Cosheston.
- 123 There are no public footpaths or bridleways which cross the site. There is an unofficial path which crosses the north western field, as shown on the OS mapping, but this is not included on the definitive footpath map<sup>2</sup> and is therefore not treated as a formal public right of way. Furthermore, there is an official route located approximately 80m to the west (at the furthest point) formed by footpath SP8/11 and SP30/2. There are a small number of public rights of way in the vicinity of the site. The nearest, is a footpath which follows the western boundary of the north west field, located off-site on the other side of the field boundary (SP8/11). This footpath will not be affected by the proposed construction works. Further details of nearby public rights of way are provided in Chapter 8: Landscape and Visual.
- 124 The site is flat for the most part, with a north-south slope which is more exaggerated in the northern part of the site. The site altitude varies from approximately 35 m Above Ordnance Datum (AOD) to approximately 20 m AOD.
- 125 The nearest landscape designation (or at least designation with landscape implications) is the Pembrokeshire Coast National Park, located approximately 120 m to the north of the proposed site. Further information on potential landscape and visual impacts is provided in Chapter 8 (Landscape and Visual).
- 126 The proposed Solar Park site is not located within any internationally, European or nationally designated ecological sites. The closest are the Pembrokeshire Marine / Sir Benfro Forol Special Area of Conservation (SAC) (approximately 1 km to the west

<sup>2</sup> Footpath numbers taken from the Pembrokeshire Definitive Footpath Map: <sup>2</sup>  
<https://www.pembrokeshire.gov.uk/definitive-map/view-the-consolidated-definitive-map>; accessed 20/08/2020

at its nearest point) and the Milford Haven Waterway Site of Special Scientific Interest (SSSI) (approximately 870 m to the east and 1km o the west. Further information on ecology and ornithology is provided in Chapter 9 (Ecology and Ornithology).

- 127 There are no World Heritage Sites within 5 km of the proposed site. There is a Registered Park / Garden located approximately 510 m to the north east of the proposed site. There are no Scheduled Ancient Monuments within the proposed Solar Park site boundary. The closest Scheduled Ancient Monument is located approximately 1.5 km to the south. Further information on cultural heritage / archaeology is provided in Chapter 10 (Cultural Heritage / Archaeology).
- 128 Site access would be along the A447, turning onto the access road to Lower Nash Farm and entering the site via an existing access point in the south west corner of the south western most field. These roads are used frequently by large farm vehicles and HGVs.

## 6.2 The Project

- 129 The key elements of the proposed Solar Park are summarised in Table 6-1.

**Table 6-1: Key Elements of Proposed Solar Park Project**

Element of Proposed Scheme	Details
Approximate Number of PV Panels (PV Cells)	25,500
Panel Size	2210mm x 1200mm
Panel Angle	Up to 22 degrees
Number of Inverters	Up to 5
Number of Transformers	Up to 5
Inverter / Transformer Cabin Dimensions (m)	10.4 m (length) by 2.6 m (width), and 3.18 m (height).
Control Building Dimensions (m)	7 m (length) by 3 m (width), and 4 m (height).
Perimeter Fence (m)	2.5 m (height)

Element of Proposed Scheme	Details
Electrical Connection	<p>The PV Cells will require interconnection within the proposed Solar Park site to Inverters that will convert the low voltage DC to low voltage AC. In turn, the Inverters will connect to Transformers that will convert the low voltage AC to higher voltage AC (33 kV) for export to the regional electricity grid.</p> <p>Electricity will be exported to the regional electricity grid via an underground cable to the existing Golden Hill 33 / 132 kV Substation located approximately 2.3 km to the south west. This is operated by National Grid Electricity Distribution (NGED), the local distribution network operator. Details of the off-site connection works are provided in Chapter 16.</p>
Onsite Access Track	<p>The onsite access track would be constructed from compacted stone or aggregate. The total length of the onsite access track will be approximately 865m.</p>
Temporary Site Compound / Laydown Area	<p>The Temporary Site Compound / Laydown Area would be approximately 1600 m<sup>2</sup>, and would include an area of hard standing / gravel which will house a temporary office and welfare facility (including a port-a-loo). This Compound / Area will also be used for the parking of staff vehicles and the storage of construction equipment / vehicles / materials. An additional HGV turning area will also be incorporated into the designated compound area as shown in Figure 6.6.</p>

- 130 Inverters will convert the low voltage DC electricity generated by the panels to low voltage AC electricity. Transformers will then increase the voltage of this electricity. The inverters and transformers will be housed in dedicated buildings on site, the location of which is shown on ES Volume 3 Figure 1.2 along with an indicative site layout. Elevations of these proposed buildings are shown on ES Volume 3 Figure 6.2a.

- 131 A network of cables will connect the transformers to a set of switchgear, housed in a control building on site. No fluid filled cables will be installed on site. Elevations of the proposed control building are shown on ES Volume 3 Figure 6.2b. From the control building Electricity will be exported to the regional electricity grid via an underground cable to the existing Golden Hill 33 / 132 kV Substation located approximately 2.3 km to the south west. The off-site grid connection works will be completed by National Grid Electricity Distribution (NGED) as the distribution network operator) under their statutory development powers. The off-site grid connection works do not therefore form part of this application for the solar park and associated infrastructure. However, the potential environmental impacts of the off-site grid connection works are assessed in ES Volume 1 Chapter 16 as they are an integral part of the proposed Development.
- 132 To construct and service the Solar Park a new on site track linking the site access points to the fields and electrical buildings will be required as shown in Figure 1.2. The total length of new access track will be approximately 865 m and constructed from compacted stone or aggregate as detailed in ES Volume 3 Figure 6.3. Construction roads will be about 3 m nominal width and will be placed to avoid known ground hazards and environmental constraints at the site, in addition to steep gradients.
- 133 The Solar Park would be equipped with a computer control system that would continuously monitor variables such as electrical voltage and current from a central off-site host computer or from a remote personal computer. In the event of any fault at the park the system would be able to alert operations staff. The control system would always run to ensure that the Solar Park operates efficiently and safely.
- 134 A 2.5 m tall perimeter fence will be installed, with an access gate at the point of access, to ensure there is no unauthorised access to the proposed Solar Park site. The security fence will take the form of deer fencing with stock proof fencing up to one metre above ground level. Security cameras may also be used which will face into the site and monitor any activity within the site boundary. Fence and camera details are shown in ES Volume 3 Figure 6.4 and Figure 6.5.
- 135 Figure 1.2 illustrates the proposed general site layout of the key elements as envisaged, subject to any minor micro-siting. These include: the PV panels, the inverter and transformer buildings, the control building and the proposed access track.

### 6.3 Site Access

- 136 The exact location of the PV panel and Inverter / Transformer manufacturers will not be known until the receipt of planning permission and award of the construction contracts. However, from the motorway network, access to the proposed Solar Park site would be achieved from the M4. Deliveries are anticipated to approach the site along the M4, A48, A40, A447, turning onto the access track to Lower Nash Farm, all of which are frequently used by large vehicles.
- 137 Access onto the proposed Solar Park site would be through an existing site access point located in the south west corner of the proposed site.

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## 6.4 Construction of the Project

- 138 Following receipt of the planning permission and award of construction contracts, it is anticipated that it could take as little as 4 months to construct the Solar Park.
- 139 Construction working hours will be restricted to the following, with no working on Saturdays, Sundays or Bank Holidays:
- Monday to Friday 08:00 to 18:00
- 140 Any deviations from these times will be agreed in advance with the Local Authority.
- 141 The principal activities during the construction of the Solar Park include:
- Constructing the limited site access road and site compound / laydown area (plus any other enabling works);
  - Installation of perimeter fencing;
  - Excavating and constructing the electrical buildings foundations / skid mounts;
  - Constructing and installing of the inverter and transformer / electrical buildings, and installation of PV panel support structures;
  - Transporting and assembling the panel mounting systems;
  - Mounting the PV panels on the mounting systems;
  - Installing the electrical collection system (cables etc);
  - Commissioning and energising the Solar Park; and
  - Site re-instatement and any enhancement measures.
- 142 After construction has been completed, the laydown areas would be restored as closely as possible to their original condition.
- 143 A construction workforce of up to 50 personnel is expected. However, it is not expected that all workers would be on site at any one time. The peak workforce would be on site during the busiest construction period, when multiple disciplines of contractors complete work simultaneously. Local contractors will be encouraged to tender for the civil and electrical works. Electricians, riggers, crane operators and heavy equipment operators will also be required.

## 6.5 Construction Control Mechanisms

### 6.5.1 Traffic Management

- 144 An Draft Construction Traffic Management Plan (CTMP) has been developed as part of the EIA which will guide the delivery of materials and staff onto the Development site during the construction phase. The Draft CTMP is provided as ES Vol 2. Appendix A13.1.

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### 6.5.2 Construction Environmental Management Plan

- 145 An Draft Code of Construction Practice including a construction Environmental Management Plan (CEMP) (DRN BL009) has been developed as part of the EIA which will guide the construction process through environmental controls in order to promote good construction practice and avoid adverse impacts during the construction phase.

### 6.5.3 Temporary Construction Compound

- 146 The temporary construction compound of approximately 1600 m<sup>2</sup> will be established just within the site entrance during the construction phase. This compound will likely include:
- Temporary portable buildings to be used for site offices, the monitoring of incoming vehicles and welfare facilities;
  - Self contained welfare facilities;
  - Containerised storage areas for tools, small plant and parts;
  - Parking for construction vehicles and workers' vehicles;
  - A receiving area for incoming vehicles;
  - A materials storage area; and
  - A bunded area for any refuelling and storage of fuels and greases.
- 147 The construction compound will become part of the solar park site towards the end of the construction phase and therefore the initial establishment of the compound will be designed to facilitate the later installation of the panels.

## 6.6 Operations and Maintenance

- 148 The Solar Park is expected to have an operational life of approximately 40 years.
- 149 The operation of the Solar Park will be undertaken in accordance with an Operational Environmental Management Plan (OEMP).
- 150 The Solar Park will be unmanned. Its performance would be automatically monitored from a centralised control room, which would be off site. In the event of an emergency, security personnel would be despatched to the Development to respond.
- 151 The site would be visited typically twice a month for routine visual inspections. As far as is practical, short term routine maintenance procedures would be undertaken during winter periods to minimise the impact on electricity generation. Any major maintenance / servicing would be similarly timed.
- 152 In the event of a fault, the modular design of solar panels allows them to be rapidly replaced.
- 153 The electrical equipment (the inverters, transformers and switchgear) will require annual visual inspections. This does not affect availability of the project. On a

3 yearly basis, testing and calibration of the equipment would require a short break in operation.

- 154 A sign would be located at the access point to site and would provide information about the installation and contact telephone numbers.
- 155 During operation, vegetation within the Development site will be grazed by sheep or mown. Sheep grazing has the benefit of continuing the agricultural use of the Development site whilst still giving scope for biodiversity enhancement through controlled grazing.
- 156 Further details on how grazing will be used to manage vegetation are set out in ES Vol 2 Appendix A9.4; Landscape and Ecological Management Plan.

## **6.7 Decommissioning**

- 157 Compared to other power generation technologies, solar parks can be easily and economically decommissioned and removed from site at the end of their economic life with the site returned to its original condition. There would be little or no trace that the Solar Park had existed following decommissioning.
- 158 There are several aspects of the decommissioning phase which may have environmental effects. The main activities will comprise:
- Removal of PV panels, inverter and associated equipment;
  - Reuse / recycling / disposal of the above; and
  - Removal of cable and ancillary structures.
- 159 Decommissioning must take account of the environmental legislation and the technology available at the time. Notice will be given to the Local Authority in advance of the commencement of the decommissioning work. Any necessary licences or permits would be acquired.
- 160 An Outline Decommissioning and Restoration Plan has been prepared (A6.1). Wessex Solar Energy would develop a more detailed decommissioning plan at the appropriate time taking into account any changes in the technology available, environmental and economic considerations and legislation during the 40 year operational period. The necessary works as detailed within the plan would be undertaken in accordance with a Working Practices Procedure. The details of the Working Practices Procedure would be agreed not less than 12 months prior to decommissioning. This would be the subject of a planning condition.
- 161 It is probable that most of the equipment will be at the end of its useful operating life and will be obsolete and unsuitable for further use. It will therefore need to be dismantled for recycling. Decisions on reuse of plant items, recycling of materials or the disposal to waste will be made at the time of decommissioning in the light of the technology then available, environmental and economic considerations and legislation. Unsalvageable material will be disposed of at a licensed landfill. A small crane would be required to dismantle the equipment.

- 162 The foundations would be removed and the soil surface would be restored to its original condition. Disturbed areas would be re-vegetated as appropriate. Access tracks will also be removed.



## 7 Planning Policy Context

### 7.1 Introduction

163 ES Volume 1; Chapter 7 and the separate Planning Statement (DRN BL006) provide detailed consideration of the planning policy context relevant to the development of the proposed Solar Park including:

- The Planning Framework;
- The National Plan 2040;
- Welsh Renewable Energy Policy;
- Welsh Spatial Plan;
- Planning Policy Wales 11 (2021) ,
- Welsh Government Technical Advice Notes, specifically TAN5, TAN6, TAN8 and TAN18; and
- Pembrokeshire County Council Local Development Plan.

### 7.2 Conclusion

164 The proposed Solar Park is compliant with the higher-level requirements of the relevant national planning policy. Taken together, the objectives and policies within this national planning policy is considered to support and indeed encourage the development of renewable energy projects, such as the proposed Solar Park, where such projects do not have an unacceptable impact on their surrounding environment.

165 Furthermore, the proposed Solar Park is compliant with the requirements of the relevant policies of the Pembrokeshire County Council LDP. These policies relate to (generally) to spatial development and (specifically) to the impact of development on the surrounding environment. The assessment documented in the Environmental Statement and supporting documentation concludes that the proposed Solar Park will have no significant environmental impacts.

166 Therefore, due to the need for the development of renewable energy projects and its clear compatibility with both national and local planning policy, it is considered that the proposed Solar Park is an acceptable proposal.

## 8 Landscape and Visual

### 8.1 Landscape and Visual Impact Assessment

- 167 The proposed development site comprises existing agricultural fields within the well wooded, gently undulating pastoral landscape to the north east of Pembroke. The pastoral fields that comprise the site are enclosed by established hedgerows and woodland blocks to the north.
- 168 The proposed addition of PV solar panels into these fields would result in the short term temporary loss of the current landscape fabric during the construction period with land under the PV panels returned to grassland pasture during the operations. The current medium to small scale field pattern would be retained, with an additional hedgerow and trees planted, and existing hedgerows strengthened with supplementary planting as necessary. Hedgerows would be managed at an increased height of 4m to aid visual containment of the site. The modern form of development would accord with large electricity pylons, modern farm buildings and other solar parks within the surrounding landscape.
- 169 Effects on character of the host landscape (LCA 25 Hundleton and Lamphey) would be Moderate/Slight in magnitude and Moderate/Minor (not significant) from Localised parts to the north east. From the wider LCA 25 effects would be Slight in magnitude of change and the potential level of effects would be Minor and Adverse (not significant). The effects on the landscape character of the Pembrokeshire Coast National Park to the north (LCA 28 Daugleddau) would be Slight in magnitude and would be of a Moderate/Minor level and Adverse in nature (not significant). Beyond these areas effects on the wider landscape character would be limited and would tend towards Negligible.
- 170 Visual effects would be greatest for the closest receptors to the west including those to the south east of Cosheston, and minor road, and PRow users to the north and north east of the site within the National Park. The panels would form new man made features within views for these receptors, in part filtered by intervening tree vegetation, resulting in a Slight/Negligible and Moderate/Slight magnitude of change and Moderate/Minor and Moderate levels of effect (not significant). Intervening tree vegetation and built form would restrict visibility from Mayeston and Cosheston and effects would be Slight/Negligible in magnitude and Minor level of effects (not significant). The closest A roads including the A4075 and A477 to the south of the site would have a Slight to Negligible magnitude of change and Minor to Negligible levels of effect respectively.
- 171 Given the Long term yet temporary nature of the proposals, potential operational effects would be reversible. Residual effects on the landscape fabric would be beneficial as the improvements to hedgerows to be retained would be permanent.

172 Table 8-1: Summary of Effects

173 Only effects of greater than Negligible magnitude and/or Minimal significance are included in the summary table. No significant effects have been identified and although some effects of Moderate significance have been identified, the detailed analysis has determined these to be not significant.

Receptor	Description	Sensitivity	Magnitude	Significance	Beneficial /Neutral /Adverse
<b>Landscape Character</b>					
<b>LCA 25 - Hundleton and Lamphey</b>	Effects on close range areas to the north east of the site.	Medium / Low	Moderate/ Slight	Moderate-Minor	Adverse
	Effects on wider LCA		Slight	Minor	Adverse
<b>LCA 28 – Daugleddau</b>	Effects on character area to the north of the site within the National Park	High/Medium	Slight	Moderate-Minor	Adverse
<b>Visual Receptor Groups</b>					
<b>Minor road and footpaths within the National Park (0-0.6km N and NE)</b>	Effects arising from views of the development from the minor road and footpaths within the National Park to the north and north east of the site.	High	Slight/ Negligible reducing to Negligible	Moderate/Minor reducing to Minor	Adverse

Receptor	Description	Sensitivity	Magnitude	Significance	Beneficial /Neutral /Adverse
<b>Rights of Way to south east of Cosheston (0km, W)</b>	Effects arising from views of the development from the footpath along the minor road to Lower Nash Farm and St Mary's Church, residents at Greenplains, and footpaths within fields adjacent to the site.	High/Medium	Moderate/ Slight	Moderate	Adverse
<b>Mayeston and Cosheston (0-1km, NW)</b>	Effects arising from views of the development from footpaths and residents near Little Mayeston, and residents at Mayeston Farm and Cosheston.	High/Medium	Slight/ Negligible	Minor	Adverse
<b>Upper Nash to Deer Park Lane (0-1.2km, S)</b>	Effects arising from views of the development from receptors within c.0.6km south of the development site and those out to c1.2km south	High/Medium	Moderate/ Slight	Moderate	Adverse
<b>Key Routes</b>					
<b>A4075 (0.1km, south)</b>	Views of development when travelling north east over a short c.0.5km, north easternmost section of this route.	Medium/Low	Slight	Minor	Adverse
<b>Specific Viewpoints</b>					

Receptor	Description	Sensitivity	Magnitude	Significance	Beneficial /Neutral /Adverse
None affected					
<b>Landscape Designations</b>					
<b>Pembrokeshire Coast National Park (0.1km, N)</b>	See above in respect of effects on character and views.	High/Medium	Slight reducing to Negligible	Minor reducing to Minor/Negligible	Adverse

## 9 Ecology and Ornithology

### 9.1 Introduction

- 174 Chapter 9 of ES Volume 1 covers the assessment of likely significant effects on ecology and nature conservation arising as a result of the proposed Solar Park development.
- 175 The chapter describes the assessment methodology, which includes a summary of the baseline conditions for the proposed solar park site and immediate surroundings, the value of the ecological resources, the mitigation measures and biodiversity enhancements built into the proposal and the likely significant effects associated with the proposed solar park development, after these measures have been applied.
- 176 The proposed solar park comprises three agricultural fields, totalling c.13.84ha. The field boundaries are defined by hedgerows, tree lines and woodland. The northern section of the site is bounded in part by a broadly square shaped pedunculate oak *Quercus robur* dominated woodland.
- 177 The surrounding landscape is primarily rural in character, dominated by large tracts of arable land and small farmsteads.

### 9.2 Assessment Methodology

- 23 Ecological receptors, including designated sites and protected/notable habitats and species, which could be affected by the proposed solar park development have been identified through a desk-based assessment of available records, published sources and ecological survey work undertaken in 2019 and 2023 by SK Environmental Solutions Ltd. From this information, the potential 'Ecological Zone of Influence' (EZol) relating to the proposed solar park development has been established.
- 24 The assessment has been undertaken in accordance with the Chartered Institute for Ecology and Environmental Management (CIEEM) guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018).
- 178 An original Extended Phase 1 Habitat Survey was completed by SK Environmental Solutions Limited in June 2019 for a larger site boundary. An updated survey was undertaken for the current site boundary and immediately adjacent habitats in November 2023 to confirm there had been no habitat changes since the 2019 survey.
- 179 The field survey broadly followed the 'Extended Phase 1 Habitat Survey' methodology as set out in 'Guidelines for Baseline Ecological Assessment' Institute of Environmental Assessment, 1995, which is a development of the method

described in the 'Handbook for Extended Phase 1 Habitat Survey – a technique for environmental audit' Joint Nature Conservation Committee, 1990 .

- 180 The field survey broadly followed the 'Extended Phase 1 Habitat Survey' methodology as set out in 'Guidelines for Baseline Ecological Assessment' Institute of Environmental Assessment, 1995, which is a development of the method described in the 'Handbook for Extended Phase 1 Habitat Survey – a technique for environmental audit' Joint Nature Conservation Committee, 1990.
- 181 The Extended Phase 1 Habitat Survey provides information on the habitats within the proposed solar park and identifies actual or potential presence of legally protected or otherwise notable species in or immediately adjacent to the proposed solar park. The main habitats were mapped and are shown at an appropriate scale on Figure 9.1 – Extended Phase 1 Habitat Plan.
- 182 Target Notes were taken to provide a more detailed description of a particular habitat in terms of species composition or as a means of highlighting a particular feature of ecological interest; these are provided in Appendix A9.1.
- 183 Plant names follow 'New Flora of the British Isles' (Stace, 2019). The common and scientific names of all botanical species identified are provided when first mentioned in the text, but only the common name is stated thereafter.
- 184 In addition to establishing the baseline ecological interest within the proposed solar park, the survey also identified areas where further surveys may be required during the appropriate season for legally protected or notable species. No further surveys were recommended for the proposed solar park; however, a precautionary approach has been taken wherever suitable habitat exists within or adjacent to the proposed solar park.

## 9.3 Existing (baseline) Environment

### 9.3.1 Designated Sites

- 185 A number of statutory designated sites are located within 10km of the site:
  - 2no. Special Protection Areas
  - 5no. Special Areas of Conservation
  - 18no. Site Special Scientific Interest
  - 1no. National Nature Reserve
  - 2.no. Local Nature Reserve
- 186 Two wildlife trust reserves are also located within 3km of the proposed development site, alongside 21 Ancient Woodlands scattered within 3km buffer. These woodlands are disconnected, with the nearest to the site being approximately 180m to the north, 200m to the east, 650m to the west and 450m to the south.

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### 9.3.2 Habitats

- 187 The Extended Phase 1 Habitat Plan (Figure 9.1) shows the habitat types recorded within the survey area. Target notes (TN) are used to identify features of particular interest within the survey area (see ES Vol 2. Appendix A9.1).
- 188 The main habitats recorded during the survey area are:
- Improved grassland;
  - Rush pasture;
  - Semi-natural broadleaved woodland;
  - Tall ruderal vegetation;
  - Trees;
  - Hedgerows; and
  - Drains and spring.
- 189 The dominant habitat within the proposed solar park site is improved grassland used for sheep grazing. Discrete areas of tall ruderal vegetation can be found generally located on and around the site peripheries. The south eastern corner of the eastern most field comprises an area of agriculturally improved rush pasture, where the ground is wetter. The site abuts a square of semi-natural broadleaved woodland to the north, with hedgerows and occasional to frequent individual mature trees located along the field boundaries.
- 190 WWBIC identified five records of common cord-grass *Spartina anglica*; the closest record is located approximately 2.2km north of the CGR.
- 191 WWBIC returned forty-eight records of thirty-one species of flora, (excluding common cord-grass which has been identified above as an invasive non-native species), within 3km of the CGR. Two species are listed on Schedule 8 of the Wildlife and Countryside Act (1981), neither of these are listed in Section 7 of the Environment (Wales) Act 2016, these are bluebell *Hyacinthoides non-scripta* which had eight records, the closest being located 0.7km south of the CGR and lungwort *Lobelia pulmonaria*, which was located approximately 1.3km north of the CGR.
- 192 Records of the following protected species were identified within 3km of the site;
- Invertebrates:
  - Amphibians
  - Reptiles
  - Birds



- Bats
  - Otter
  - Watervole
  - Badger
  - Roe Deer
  - Polecat
  - European Hedgehog
- 193 ES Volume 1 Chapter 9 provides a reasoned justification for allocating a value to each of the above.
- 194 Valued ecological receptors (VERs) are those features/sites that are considered to be valued at a local level or higher. Only VERs are considered further within the assessment.

#### **9.4 Mitigation, Compensation and Enhancement Measures Adopted as Part of the Proposed Solar Park Design**

- 25 The potential ecological constraints have been taken into consideration at an early stage and as such the 'mitigation hierarchy' of avoidance, mitigation, compensation and habitat enhancement has been built into the proposed solar park design at the outset. Details of the inbuilt mitigation is provided in the Landscape and Ecological Management Plan (see Appendix A9.4).
- 26 The proposed solar park design has been carefully considered so as to avoid potential ecological constraints. The habitats of greatest value on site are considered to be the hedgerows, trees, drains/spring and adjacent semi-natural broadleaved woodland habitat.
- 27 All hedgerows, trees and drains within the site will be retained within the development along with buffer zones. The minimum buffer zone distance will be 5m from the centre line of all hedgerows (apart from where the perimeter fencing passes through existing gateways which are narrower than 5m). The centre line of the hedgerows has been used when prescribing the buffer zones for hedgerows as these represent a 'fixed' start point. The hedgerows are currently managed as part of the sites arable use and as such the width of the hedgerows varies throughout the year in line with the current cutting regime. This could introduce some ambiguity when translating the buffer zone from paper onto the ground. No works will be undertaken within the Root Protection Areas (RPAs) of any trees or hedgerows located within and adjacent to the site as detailed within Appendix A9.5 Arboricultural Survey, Impact Assessment and Method Statement.

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- 28 The site layout has been designed to utilise the existing access gate off the existing unnamed road leading from the A477 to Lower Nash Farm road avoiding any associated habitat loss and/or disturbance.
- 29 As well as retaining all hedgerows and trees, the site will be enhanced through the landscape strategy with the planting of c.65m of new native, species rich hedgerow, the planting up of gaps within the retained hedgerows, and c.0.3ha of new native woodland planting. The proposed hedgerow and woodland planting are detailed in Figure 8.6.
- 30 The hedgerow planting will result in a net gain for biodiversity as a result of the proposed solar park through increased structural integrity and species diversity within the retained hedgerows. The new and enhanced hedgerows and the new native woodland will improve habitat connectivity across the site and wider landscape, strengthening the commuting and foraging routes for a variety of species, such as bats, birds and reptiles, and increasing ecosystem resilience.
- 31 The new and retained hedgerows will be managed for wildlife (where constraints such as maintaining road visibility, overhead power lines etc. allow). Management will include cutting back the retained hedgerows on rotation so that no more than a third of the hedgerows are cut in a given year. Arisings will be collected and assembled into small refuges at the base of hedgerows in order to provide additional cover for reptiles and amphibians. Ideally, this will also take into account only cutting one side of the hedgerows at a given time. Hedgerows will not be cut more regularly than once in every three years as this promotes flowering and fruiting. The hedgerows will be maintained at an increased height of 4m. Hedgerow management will be undertaken outside of the breeding bird season (March to August inclusively) and undertaken in January/February to maximise the availability of flowers and fruits for wildlife. Hedgerow standard trees will be maintained and not cut to hedge height. Dead and fallen wood will remain in situ where health and safety permits.
- 32 As well as collecting the hedgerow arisings into piles it is also proposed that six permanent hibernacula features be incorporated into the Landscape Plan. These will comprise log/stone piles and benefit common amphibians, reptiles and small mammals.
- 33 Currently the arable and improved grassland fields are fertilised and subject to pesticide use as part of the current management. It is proposed that once the fields come into use as part of the proposed solar farm, fertiliser and pesticide use will cease, and land will be cultivated using regenerative agriculture techniques and sown with a grass and wildflower/herb mix. It is suggested that ESG2 (a fine leaved grass mix, allowing space for wildflowers to establish and thrive year after year) be broadcast sown in combination with ESF1 (predominantly a nectar rich mix). The grasslands will be managed to promote fine grasses and wildflowers (management

will likely be through sheep grazing). This will result in an increase in species richness within the grassland fields which will be of benefit to a number of species such as invertebrates, birds and small mammals.

- 34 The buffer zones between the development and the retained hedgerows, treeline and woodland edges will be sown with a species rich wildflower seed mix (such as ESF2, which has a high proportion of meadow wildflowers and tends to persist for the long term) and managed to promote biodiversity, including vegetation monitoring surveys to assess species richness. Once the species rich meadow grassland has become established, mowing will be undertaken on a rotational basis and approximately one third of the habitat will be left uncut each year in order to provide refuge habitat for invertebrates and increase the availability of seeds for over wintering birds.
- 35 Overall, the development will result in the creation/enhancement of approximately 14ha of species rich grassland.
- 36 In order to safeguard badgers and small mammals such as hedgehogs/hares/polecats during the construction phase the following best practice measures will be followed:
- Any man-made excavations, trenches or pits relating to the development will either be securely fenced off or covered up overnight to avoid entrapment or, if left open, an egress point (e.g. mammal ladders or a roughened plank) will be placed within the excavation to form a ramp to allow mammals to escape;
  - Any temporarily exposed open pipe system will be capped in such a way as to prevent badgers/small mammals gaining access as may happen when contractors are off site; and
  - Any excavations will be inspected each morning to ensure no mammals have become trapped overnight. Contractors will be made aware that trapped animals such badgers may dig a temporary sett into the side of a trench. If a badger is found within any excavations, an ecologist must be contacted immediately for further advice.
- 37 Fencing is to be erected to prevent damage to the solar panels. However, the fencing will include 'badger gaps' every 50m to ensure that badgers (and other small mammals such as hedgehog/hare/polecat) have continued access across the whole of the proposed solar park for foraging and commuting.
- 38 A badger survey will be undertaken immediately prior to the works commencing to assess how the site is being used by badgers at that time and determine if any setts have been constructed within the site and surrounding area that could be impacted by the proposed solar park development (up to 30m from any proposed works). Should a sett be identified a method statement will be prepared and a disturbance licence applied for as appropriate.

- 39 A Construction Environmental Management Plan (CEMP) will be produced prior to construction activities commencing on the proposed solar park to ensure that best practice methods are adhered to in order to limit the generation of litter, dust, noise, traffic pollution relating to vehicles coming onto and off the site and vibration. This will be controlled and monitored through the CEMP. Measures will be implemented to avoid/minimise potential for problems such as fuel and other chemical spills. There will be no storage of potentially contaminating materials on the site. Silt prevention methods will be included within the CEMP and will include monitoring by the site manager for the presence of any silt run-off across the site and silt fencing will be installed as appropriate to prevent silt from entering existing watercourses and ditches. In addition, the following measures should be included in the CEMP:
- ensure that work compounds and access tracks etc. are not located in, or adjacent to, areas that maintain habitat value such as hedgerows;
  - establish site fencing to prevent access to areas outside working areas, particularly in areas adjacent to features of interest/value;
  - provide briefings and instruction to contractors regarding the biodiversity issues present on the site; and
  - follow pollution prevention guidelines provided by the Environment Agency to prevent pollution from dust or chemical spills.

## 9.5 Potential Effects

- 40 This section identifies the likely effects of the proposed development on VERs during construction, operation and decommissioning and characterises the potential ecological impacts that are likely to arise, taking into consideration the following parameters: beneficial/adverse effect, magnitude, extent, duration, reversibility and timing/frequency.
- 41 The impacts are assessed on the basis of the details of construction, operation and eventual decommissioning of the proposed solar park development. For the purpose of this assessment the effects of decommissioning the development are considered to be as per those of construction and of no greater significance.
- 42 The potential impacts of the proposed development proposals to the valuable ecological features are identified as follows:
- Direct loss of habitat and associated impacts on species that utilise them;
  - Direct mortality of protected/notable species during site clearance and construction of access routes and inverter cabins;
  - Direct and indirect disturbance from construction activities including noise from construction equipment and vehicles, dust and lighting;
  - Habitat fragmentation caused by perimeter fencing; and

- Pollution caused by use of hazardous materials and release of waste materials.

## **9.6 Impact Assessment**

- 195 There are no significant effects anticipated on any VERs as a result of the proposed solar park development.

## **9.7 Summary of Avoidance, Mitigation, Compensation and Enhancement Measures**

### **9.7.1 Avoidance/Mitigation**

- 43 Mitigation measures are those that avoid/reduce potential impacts. For the proposed solar park site, the following embedded mitigation measures are included:
- Retain and safeguard all hedgerows, drains, trees and woodlands and no works to be undertaken within the RPA of any trees or hedgerows;
  - Ensure there is no habitat fragmentation by installing 'badger gaps' at the base of the perimeter deer fencing. These gaps can be used by badgers and other species to maintain full access across the site post development;
  - Safeguard badgers and small mammals such as hedgehogs/hares/polecats during the construction phase by ensuring excavations are fenced/covered overnight (or an egress point such as a ramp is provided). Excavations will be inspected each morning to ensure no animals have become trapped;
  - Prepare a Construction Environmental Management Plan (CEMP) to ensure that best practice methods are adhered to in order to limit the generation of litter, dust, noise, vibration, silt and pollution prevention. The CEMP will also include details of briefings and instruction to contractors regarding the biodiversity present on the site as appropriate;
  - Install panels outside of the breeding bird season or ensure grassland sward is maintained as a short height making it unsuitable for ground nesting birds;
  - Monitoring for grounded, young Manx Shearwater; and
  - Pre-construction badger survey of all habitats within 30m of any proposed works

### **9.7.2 Compensation**

- 196 Compensation measures are those that have been incorporated to off-set potential impacts. For the proposed solar park site, the following compensation measures are included:
- The small-scale loss of low quality improved grassland, arable habitat and tall ruderal habitat to accommodate the installation of the access track will be compensated for through the cessation in fertiliser and pesticide use across the site and the sowing of a fine grass and wildflower seed mix within the central

section of the site (below the panels) and the sowing of a species rich wildflower seed mix within the buffer zones. Overall, there will be c.14ha of high quality species rich grassland created as a result of the proposed development.

### 9.7.3 Enhancement

- 44 Enhancement measures are those that have been incorporated into the scheme to ensure the final development delivers a net gain for biodiversity in accordance with local and national planning policy. For the proposed solar park site, the following enhancement measures are embedded within the scheme:
- An additional c.65m of species rich hedgerow will be planted and existing gaps within the retained hedgerows will be planted up with a species rich, native mix. This will strengthen the connectivity and continuity of the hedgerow network and increase their value as commuting and foraging routes;
  - Arisings resulting from hedgerow management will be collected and assembled into small refuges at the base of hedgerows and six permanent log/stone pile hibernacula will be created. This will provide additional cover for reptiles, amphibians and small mammals;
  - An additional 0.3ha of new native woodland will be planted;
  - In order to further enhance the site for breeding birds and bats, five bird boxes, one barn owl box and five Schwegler 2F bat boxes will be erected on boundary trees of a suitable size; and
  - A Landscape and Ecological Management Plan (LEMP) has been produced (see Appendix A9.4) and sets out how the retained, enhanced and newly created habitats will be managed for wildlife and biodiversity over the lifetime of the development.

## 9.8 Statement of Significance

- 197 No significant effects are anticipated for designated sites, habitats or species as a result of the proposed solar park. The habitat creation/enhancement measures and changes to habitat management, as a result of the proposed development, are likely to see a net gain in biodiversity; this is consistent with local and national planning policies relating to nature conservation.

## 10 Cultural Heritage

- 198 Chapter 10 of ES Volume 1 assesses the likely significant effects of the Proposed Development in terms of Archaeology and Cultural Heritage, and has been informed by a comprehensive assessment of the cultural heritage baseline conditions provided by:
- An Archaeological Desk Based Assessment (DBA)(ES Vol 2. Appendix 10.1),
  - A geophysical survey (ES Vol 2 Appendix 10.2),
  - A programme of archaeological trial trenching, including a walkover survey (ES Vol 2 Appendix 10.3), as well as
  - A Settings Impact Assessment (SIA), to assess the potential for effects to surrounding historic assets through changes to their setting (ES Vol 2; Appendix 10.4).
- 199 The archaeological potential of the Application Site was first considered in the DBA, which was informed by the results of the geophysical survey provided in ES Vol 2 Appendix 10.2. These investigations revealed evidence that the Application Site contained buried archaeological remains of interest, and which warranted additional investigation. Following discussions with the Dyfed Archaeological Trust archaeologist it was agreed that this should take the form of a programme of archaeological trial trenching, which would test the results of the geophysical survey and confirm the nature, extent, and significance of the archaeological remains present. The trial trenching was undertaken in May and June of 2020, and was successful in testing the results of the geophysical survey, and in providing a full understanding of which areas of the Application Site contain buried archaeological remains of interest. The above investigations have resulted in the identification of three areas of archaeological interest (AAIs) within the Application Site (shown in ES Volume 3 Figure 10.1). These comprised:
- AAI 1 - Potential barrow cemetery of regional importance
  - AAI 2 - Neolithic / Bronze Age Enclosure of regional importance
  - AAI 3 - Small Enclosure of local importance
- 200 These AAI's are not within the proposed development boundary (see ES Volume 3 Figure 10.2).
- 201 The setting of historic assets in the surrounding area was considered by the SIA, and was used as a basis for consultation with Cadw and the LPA. The SIA was informed by the ZTV for the proposed development, as well as a site visit to assess the setting of the historic assets in the surrounding area, and the relationship of the Application Site to these. The SIA found that the proposed development would not affect the significance of the majority of the historic assets in the surrounding area, due to the presence of intervening topography and other landscape features, as well as due to the screening initially proposed within the proposed development. The SIA concluded

that the only designated historic asset which may be subject to an adverse effect would be the Grade II listed Church of St Mary, located approximately 225m to the west of the Application Site, as the proposed development may be glimpsed from within parts of the churchyard, particularly in winter views. In response, additional planting proposals were developed within the proposed development, to protect views from the churchyard and protect the setting of the church.

- 202 This chapter has then assessed the potential effects of the proposed development on the identified archaeological and built heritage receptors both within the Application Site and in the surrounding area. It has found that the proposed development would preserve the areas of archaeological interest (AAIs) identified by archaeological investigations as they outside of the development boundary.
- 203 The potential for effects to the Church of St Mary as a result of changes to its setting has also been assessed, and it has been found that during the construction and decommissioning phases there would be a short term, temporary and reversible minor adverse effect, due to the noise and activity which would result, which could lead to momentary distraction from the experience of the church which is provided by the churchyard. Given the brief duration of these effects, the significance of these effects is **minor adverse**.
- 204 Due to the embedded mitigation within the proposed development, which has been designed to mitigate any effects the proposed development may have on the church, the operation effects of the proposed development would be slight adverse in the first 2 to 5 years of operation, while the planting scheme matures, reducing to negligible after 5 years once the planting has fully matured. The significance of this effect would be **minor adverse**, reducing to **negligible** within 5 years, and then for the remainder of the operational phase.
- 205 As such, the proposed development would not result in any significant adverse environmental effects as referred to in the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.



## 11 Noise

### 11.1 Introduction

- 206 Chapter 11 of ES Volume 1 has been produced by Stantec and addresses the likely significant environmental noise and vibration effects of the construction phase of the Development on the surrounding area.
- 207 The Section describes the methods used to establish the baseline environmental sound conditions existing at the Site and surrounding areas, the potential direct and indirect effects of the Development arising from noise and vibration, the mitigation measures required to prevent, reduce or offset the effects, and the residual impacts.

### 11.2 Baseline Conditions

- 208 Based on a desktop review the main source of noise likely to influence the environmental sound climate at existing receptors is vehicular movements on the A477.
- 209 In order to establish the baseline acoustic conditions across the site, a review of DEFRA's strategic noise mapping has been undertaken. The strategic noise maps are required to be produced every five years. They must be produced for agglomerations with a population of more than 100,000 people; for major roads with more than 3,000,000 vehicle passages per year, and for major railways with more than 30,000 train movements per year.
- 210 The strategic noise maps indicate that noise levels are likely to be around 55dB  $L_{Aeq,16hrs}$  at 150 m from the edge of the A477 carriageway.
- 211 The identified receptors are located at between 50 m and 800 m from the A477. Calculations indicate that baseline sound levels at the identified receptors are likely to vary between 47 dB (A) and 60 dB (A) depending on their proximity to the road. This is a conservative estimate and assumes that the baseline sound environment is dominated by noise from vehicular movements on the A477. At some receptors the baseline sound levels may be higher due to more local traffic on nearby roads. However, based on this conservative estimate daytime noise levels are less than 65 dB (A) which is the lowest threshold category from BS 5228 and therefore represents the most conservative criteria that can be set for assessment of construction noise. This represents a worst-case baseline.
- 212 A summary of the predicted ambient levels at the nearby receptors and the threshold levels set for each receptor are provided below in Table 11-1.

**Table 11-1: Ambient Noise levels and Construction Threshold Levels**

Receptor	Ambient Noise Levels(dB, L <sub>Aeq,T</sub> )	Construction Threshold Level (determined as per BS 5228:1 Section E3.2 and Table E.1)
Mayeston Barn Holiday	47	65
Lower Nash Farm		
Pakeston Lodge		
Green Plain		
Nash Villa	60	
The Crane		

- 213 The assessment method does not require the baseline vibration climate to be established however it is considered that it is likely to be low as there are no major sources of vibration in the area.

### 11.3 Impact Assessment

#### 11.3.1 Construction Noise

- 214 The construction of the proposed development is likely to include activities such as site levelling/clearance, ground excavation, rolling, piling and welding.
- 215 An assessment of construction noise has been undertaken, based on typical plant noise level data provided by the developer. A table of activities assumed in each phase are outlined in ES Vol 2. Appendix A11.2
- 216 The above assessment of construction noise considers a worst case scenario, where each activity occurs at a point on the Site boundary closest to the receptor, for the full duration of the assessment period and without any mitigation measures in place, such as screening or operational restrictions. In practice, the main construction activities will tend to take place towards the central area of the Site, away from the Site boundary.
- 217 Based on a worst-case scenario, the magnitude of impacts in noise terms are likely to be negligible or a minor short-term adverse impact. This is considered to be a minor level of significance in EIA terms which is not significant.

#### 11.3.2 Construction Vibration

- 218 Construction of this type of development is not normally a significant source of vibration. Vibration is normally only associated with piling activity.
- 219 The closest existing vibration sensitive receptors are likely to be a minimum of 120 m from construction works on the site boundary. BS 5228:2014 Part 2 provides some

indicative levels of vibration associated with rotary bored piling, which indicates levels with a dolly casing of 1.1 mm/s peak particle velocity (PPV) at distance of 10 m, dropping to 0.55 mm/s peak particle velocity (PPV) at distance of 20 m. With auger piling the levels are 0.03 mm/s PPV at 30 m

- 220 Therefore, given the distances to nearby properties are over 120 m away, the magnitude of impacts in vibration terms, is likely to be negligible. This is also considered to be a negligible level of significance in EIA terms which is not significant.

### 11.3.3 Cumulative

- 221 Cumulative schemes identified in the area include West Farm Solar Farm and Golden Hill Solar Farm. These solar farms are already built and so no cumulative construction effects can occur.
- 222 Should additional works take place at these sites or should the West Farm 'extension' be constructed, significant cumulative effects are unlikely to occur as each of the schemes are more than 1 km from the development site boundary. Furthermore, with each development anticipated to include a CEMP, the cumulative impact is minor and not significant in EIA terms.

## 11.4 Mitigation

### 11.4.1 Construction Noise

- 223 Construction noise impacts are not anticipated to be significant with potential impacts below moderate. However, as detailed within the Draft CEMP (DRN BL009), the following noise mitigation measures based on best practice measures will be implemented:
- Appropriate operational hours.
  - Working methods to ensure quiet working, including the selection of suitably quiet plant and appropriate working hours for excessive noise generating activities.
  - Restriction of number of plant items in use at any one time.
  - Locating noisy plant and equipment at a suitable distance away from residential dwellings.
  - Frequent maintenance of plant and equipment.
  - Where practical, carry out loading and unloading activities at a suitable distance away from residential dwellings.
  - Closing of compressor, generator and engine compartment doors when in use or idling.
  - Careful lowering of materials/equipment and the minimisation of drop heights; and

- Undertaking piling work with a method that minimises the transmission of noise (and vibration) to residential dwellings.
- 224 When considering the mitigation measures outlined above, the magnitude of noise and vibration impact is likely to reduce to negligible. This is considered to be negligible in EIA terms and therefore not significant.

## 12 Geology, Hydrology and Hydrogeology

### 12.1 Introduction

- 225 Chapter 12 of ES Volume 1 details the baseline geological, hydrological and hydrogeological conditions at the site and outlines the potential environmental impacts of the proposed development on these resources. It also details the status of the site in terms of ground and surface water contamination and the risks posed to human health. Where potentially significant impacts have been identified, mitigation measures have been proposed to reduce these impacts to an acceptable level.
- 226 The assessment methodology outlined in the Chapter is based on a source-pathway-receptor methodology, where the sensitivity of the receptors and the magnitude of potential change upon those receptors is identified within the study areas.
- 227 The sensitivity of the receiving environment is defined as its ability to absorb an effect without perceptible change and can be classified as high, moderate or low. These classifications are dependent on factors such as the quality of the subsurface water within the receptor, their purpose (e.g., whether used for drinking, fisheries, etc.) and existing influences, such as land-use.
- 228 The magnitude is determined by the timing, scale, size and duration of the potential effect resulting from the Development. The magnitude of potential effects can be classified as major, moderate, minor or negligible, as outlined in ES Volume 1 Table 12.3.
- 229 The predicted significance of the effect is determined through a standard method of assessment and based on professional judgement, considering both the sensitivity of receptor and the magnitude of the potential effect .

### 12.2 Baseline Conditions

- 230 The site is largely south/ south west facing. At its highest point in the north western field the site is approximately 35m AOD and at its lowest point in the south western field is approximately 20m AOD.
- 231 There are also two shallow valley features located in the central part of the site. The first trends from west to east and slopes down towards Blackberry Lane to approximately 20 m AOD. The second trends from east to west and slopes down towards Lower Nash Farm. Each of these features is associated with existing field boundaries and/or minor ditches.
- 232 From a review of the 1:50 000 scale bedrock geology map from the British Geological Survey (BGS) online digital viewer, the bedrock beneath the site, from north to south, comprises the Cosheston Group (Sandstone), the Avon Group (Limestone and Mudstone) and the Black Rock Subgroup And Gully Oolite Formation (Limestone).

- 233 The online BGS 1:50 000 scale superficial geology map indicates that there are no deposits across the site.
- 234 The UK Soil Observatory (UKSO) online 'Soilscapes for England and Wales' viewer indicates that the northern part of the site comprises 'slowly permeable seasonally wet acid loamy and clayey soils'. The southernmost field is located on 'freely drainage slightly acid but base-rich soils'.
- 235 The Agricultural Land Classification Survey (ES Volume 1:Appendix A5.1) has identified the site as comprising Grade 2, 3a and 3b agricultural land as set out in the table below:

**Table 12-5: ALC Make-up of Development Site including the Link Road Footprint**

Grade	Hectares	Proportion
2	5.78	41.1%
3a	1.77	12.6%
3b	6.5	46.3%
<b>Total</b>	<b>14.05</b>	<b>100%</b>

- 236 It is understood that the proposed Solar Park site has not previously been the subject of any mining activity.
- 237 The site is located within groundwater source protection zone 1 (inner zone). This zone is designed to protect against the effects of human activities which might affect the groundwater source, particularly against microbial pollution. It is defined by a 50 day travel time from any pollution below the water table to the groundwater source.
- 238 The site lies within the catchment of the Cleddau and Pembrokeshire Coastal Rivers. Ford Pill discharges into the River Carew and is located approximately 850 m northeast of the site. Cosheston Pill discharges into the River Cleddau (a designated 'main river') and is located approximately 900 to the west of the site.
- 239 A drain is located 150 m south of the site, along the northern boundary of the A477. This is assumed to flow downslope to the west.
- 240 There are two minor ditches or drainage features which are located on site. The first flows south along the northeast boundary and then east towards Blackberry Lane, the second flows west along the southern boundary of a small wooden area and then west towards Lower Nash Farm. A Spring also flows southwards along the western boundary of the wooden area before flowing into the second drainage feature and continuing west.

- 241 The Natural Resources Wales Development Advice Map shows that the entire site falls within Flood Zone A and is therefore considered to be at little or no risk of fluvial or tidal/coastal flooding.
- 242 Despite the above, due to the size of the development site a Flood Consequence Assessment has been completed. The Flood Consequence Assessment (FCA; ES Vol 2. Appendix A12.1) is provided alongside this ES. It details the proposed sustainable urban drainage system across the site which takes the form of swales with sufficient capacity to contain the relatively small additional volume of surface water run-off as a result of the proposed solar park.
- 243 The Envirocheck report identifies a small area in the north east of the site and the north west of the site as being at high risk of groundwater flooding below surface level and at surface level. However, as detailed within the FCA, trial pits were excavated on site by CC Ground Investigations Ltd in June 2020, of which three were also used to carry out soakaway testing in accordance with BRE 365 (2016). These trial pits were excavated down to a depth of 2m below ground level and no groundwater was encountered. For this reason the risk of groundwater flooding on site is anticipated to be negligible.
- 244 There is one water abstraction point within 1km of the proposed site boundary. This is a surface water abstraction point located approximately 500m to the south west of the proposed site boundary and the abstracted water is impounded, presumably for irrigation or agricultural use although this is not specified.
- 245 There is one active discharge consents within 1km of the site boundary. This is a for a domestic property in relation to a sewerage discharge to land.

### 12.3 Impact Assessment

- 246 The effect of the Development on hydrological receptors has been considered for the construction, operation and decommissioning phases of the Development. Effects occurring during construction and decommissioning are considered to be short term effects, with those occurring as a result of the operational phase of the Development being considered to be long term effects.
- 247 No significant effects are predicted as a result of the proposed development.

### 12.4 Mitigation and Residual Effects

- 248 The construction of the proposed Solar Park has the potential to create several minor impacts. The following mitigation measures will limit these potential impacts to negligible significance or eradicate them completely.

#### 12.4.1 Construction

##### 12.4.1.1 Chemical Pollution

- 249 Storage of fuel would be limited and secure. Any temporary diesel storage tanks will be double skinned or contained within an impermeable bund, capable of holding 110 percent of the tank's contents.
- 250 The storage of fuel, equipment and construction materials will be designed so as to minimise the risk of soil contamination or water pollution for example through the use of bunds, drip trays and oil interceptors in accordance with NRW guidelines. Storage locations are defined within the Site Waste Management Plan contained within the Draft CEMP (DRN BL009).
- 251 Construction machinery will be checked regularly. Any maintenance required will occur over hardstanding or on a suitable impermeable ground cover. Refuelling will be limited to a designated area, on an impermeable surface, away from any existing ditches/drains. Spill kits, absorbent pads and absorbent sands will be available on site at all times. Any spills will be cleaned up as soon as possible with any contaminated sands bagged up and disposed of correctly. Parking of staff vehicles will only be permitted in designated areas.
- 252 Any impacts will be minimised by restricting vehicle movements to specified routes and controlling the construction areas. In addition, a temporary site compound will be created for the parking of construction vehicles and equipment, staff vehicles, and the storage of materials.

##### 12.4.1.2 Erosion and Sedimentation

- 253 In order to further limit disturbance, the site access tracks will be constructed first to allow movement of vehicles around the site on areas of soft-standing. Any vegetation, topsoil and subsoil will be removed to expose a suitable sub-grade. Any soils, sub-soils or aggregate suitable for reuse will be stockpiled on impermeable liners.
- 254 Speed restrictions will be imposed on site to minimise disturbance of bare surfaces and the amount of disturbed surfaces left exposed for significant time periods will be minimised. Stockpiles of loose, fine materials will be damped down or covered over if necessary, again to reduce erosion and the production of dust.
- 255 Any impacts will be minimised by restricting vehicle movements to specified routes and controlling the construction areas. In addition, a temporary site compound will be created for the parking of construction vehicles and equipment, staff vehicles, and the storage of materials.



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#### **12.4.1.3 Water Use and Disposal and Hydrology**

- 256 No water discharge is proposed as part of the construction process. However, should this need arise for unforeseen reasons the construction contractor will provide a silt trap and/or oil interceptor at a location agreed with the NRW to allow solids or immiscible liquids to settle/separate prior to discharge. The contractor will inspect, empty and maintain silt traps/interceptors. A registered waste carrier will remove from site all sludges or residues collected during cleaning operations, to a suitably licensed waste disposal facility.
- 257 A temporary wheel washing facility will be installed, if required, to prevent transfer of soil onto nearby public roads and discharging into highway drains.
- 258 Any surface water, perched waters or groundwater from dewatering operations will not be discharged to surface water or drains, without the appropriate consents from the relevant authority. The disposal of this effluent will be the responsibility of the contractor. If necessary this water will be taken off-site for disposal at a suitable facility.
- 259 Any pumping for the purposes of dewatering will be undertaken at such a rate using an appropriately sized pump in order to avoid disturbance or erosion of the land and nearby ditches. The location of dewatering pipework would be carefully positioned. The contractor will regularly inspect all dewatering pumps, pipe work and connections.
- 260 Cable trenches will be refilled and compacted to the same condition as the surrounding substrate in order to prevent creation of new sub-surface flow pathways and decrease the likelihood of ponded water in the excavations. Trenches will be back-filled promptly in order to minimise water ingress. If necessary temporary silt traps will be provided. Confirmed mitigation measures such as working to best practice guidance, de-watering of excavations, re-instatement of excavations with similarly graded materials to what has been excavated and lining of excavations with sand and geotextile membranes where necessary will also ensure that any impacts are limited.

#### **12.4.2 Operation**

- 261 Any foundations will be designed appropriately to the underlying ground conditions to make sure the panels have maximum stability.
- 262 The onsite switchgear would be equipped with sensors to automatically detect loss in fluid pressure and/or increases in temperature enabling the equipment to shut down automatically in the event of a fluid leak. Any oil leaks from switchgear would be contained inside the electrical building and would be cleaned up as soon as possible.
- 263 Disposal of all waste materials, whether hazardous or not, will only be via appropriate and authorised routes as detailed within the SWMP (DRN).

#### 12.4.3 Decommissioning

- 264 A decommissioning plan will be prepared and submitted to the local planning authority for approval 12 months prior to the commencement of decommissioning works. This will specify a number of mitigation measures representing best practice at that particular time.
- 265 At this stage it is anticipated that the decommissioning area will be delineated and measures taken to avoid vehicle use outside the working boundary. In order to further limit disturbance, the site access tracks will be taken out last unless they are to be retained for future use.
- 266 Dust suppression measures will be put in place to minimise dust levels on the site and in the surrounding environment.
- 267 Any additional soil materials that are to be imported to the site will be required to have certification of their chemical concentrations to ensure that contaminative materials are not being introduced to the area.
- 268 Speed restrictions will be imposed on site to minimise disturbance of bare surfaces and the amount of disturbed surfaces left exposed for significant time periods will be minimised

#### 12.5 Statement of Significance

- 269 This chapter has assessed the significance of effects of the Development on hydrology, hydrogeology, flood risk and ground conditions. The Development has been assessed as having the potential to result in effects of minor to negligible significance reducing to negligible with the implementation of best practice measures which will be detailed within a Construction Environmental Management Plan.
- 270 Given that only effects of moderate significance or greater are considered significant in terms of the EIA Regulations, the potential effects on hydrology, hydrogeology, flood risk and ground conditions are considered to be not significant.

## 13 Traffic and Infrastructure

### 13.1 Introduction

- 271 Chapter 13 of ES Volume 1 presents information regarding the potential traffic and infrastructure impacts associated with the proposed Solar Park.
- 272 The potential impacts resulting from the development of the proposed Solar Park would either be related to:
- Access provisions for the construction / operation / decommissioning of the proposed Solar Park;
  - Traffic generated as a result of construction / operation / decommissioning of the proposed Solar Park; or,
  - The location of the proposed Solar Park and the route of existing roads / public footpaths;
- 273 The chapter provides:
- A brief summary of the Development proposals including the proposed method of transporting plant and equipment to and from the site, and the anticipated vehicles which will be utilised
  - Scoping and consultation responses
  - A summary of the policy context which underpins the assessment
  - Explanation of the assessment methodology and existing baseline conditions
  - Any unknowns or uncertainties relating to access and traffic at the time of preparation of the ES
  - Potential effects of the construction, operational and decommissioning phases
  - Details of mitigation measures prepared to address any adverse effects
- 274 The exact location of the PV panel and Inverter / Transformer manufacturers will not be known until the receipt of planning permission and award of the construction contracts. However, from the motorway network, access to the proposed Solar Park site would be achieved from the M4. .
- 275 The proposed route in detail from junction 48 of the M4 to the proposed site access is as follows:
- North east on the A48 to Camarthen
  - South west on the A40 to St Clears
  - South west on the A477 to Lower Nash
  - North east on the unnamed lane leading to Lower Nash

- The proposed site access is located off the eastern side of the unnamed lane approximately 200m north of the A477 / Lower Nash priority junction.
  - A desk top assessment of the proposed route between junction 48 of the M4 and the A477 / Lower Nash junction confirms that the 16.6m long low loaders can negotiate this route which is all a part of the primary road network. Swept Path assessments (AutoTRACK) confirm that low loaders can also negotiate the unnamed lane without overrunning any adjacent verges / hedges though may require a banksman to allow access due to the single track section of the lane providing access. The swept paths are illustrated on figure BL01 of Technical Appendix A13.2, for the right turn into the lane from the A477, and the left turn out of the lane. The levels of visibility splays from the site access onto the unnamed lane in both directions are commensurate with anticipated speeds. There is a passing place suitable for commercial vehicle use at the bottom end of the lane on first entrance from the A477 where vehicles can wait if other vehicles are on the lane. Three banksmen will be located along the site entrance, the entrance to Nash Villa and A477/ Lower Nash junction during the construction phase of the development.
  - Access onto the proposed Solar Park site would be through an existing site access point located in the south west corner of the proposed site. The suitability of this access point is shown in Appendix A13.2; Access Assessment . In addition a condition survey has been completed along the unnamed road leading from the A477 (ES Vol 2, Appendix A13.3). Although the survey identified a number of defects along the road, none were significant enough to require any works prior to the use of the road by construction vehicles associated with the proposed development. It is proposed that a further update condition survey of this lane will be prior to the start of construction and upon completion of the construction phase to monitor the condition and the need for repair if necessary. The scope of this survey will be pre-agreed with the Council's Highways Officer and carried out jointly with the appropriate officer.
- 276 The onsite access track would not be extensive and would link the site access point to the various fields and buildings that make up the proposed Solar Park. The total length of the onsite access track is approximately 865m. Full details are included within Chapter 6 of ES Volume 1.
- 277 In addition, sufficient space will be provided on site for vehicles to turn so that it will not be necessary for any vehicle to reverse out onto the adjacent lane that serves Lower Nash.

### 13.1.1 Traffic Generated as a Result of Operation of the Solar Park

- 278 During construction, traffic can be broadly split into three main categories. These categories are:
- Construction workforce movements;
  - Delivery of construction plant / equipment; and,
  - Delivery of the Solar Park plant / equipment / materials.

### 13.1.2 Construction Workforce Movements

- 279 During construction, a workforce of up to 50 personnel is expected. However, it is not expected that all personnel would be onsite at the same time. Indeed, the workforce would peak with the most labour intensive construction activity, when multiple disciplines are required simultaneously. Based on the use of mini-buses and car sharing (to reduce the number of vehicular movements), the peak would represent a maximum of approximately 30 vehicles (i.e. 60 traffic) movements per day.
- 280 A summary of the deliveries of construction plant / equipment and the deliveries of Solar Park plant / equipment / materials is provided in Table 13-1.
- 281 Further to this summary, an indicative programme of deliveries is provided in Table 13-2. This indicative programme of deliveries assumes a worst case scenario comprising a 4 month construction programme. It is currently anticipated that deliveries would be spread throughout the working day.

**Table 13-1: Summary of Deliveries**

<i>Item being Delivered</i>	<i>Vehicle Used</i>	<i>Quantity</i>
<b>Construction Plant / Equipment (Delivery and Removal)</b>	Low Loader	16
<b>Aggregate for the Access Roads</b>	HGVs	136
<b>Concrete for Foundation Pouring</b>	Concrete Mixer Truck	37
<b>PV Panels</b>	HGV (with low loader)	20
<b>Support Structures / Mounting System</b>	HGV (with low loader)	13
<b>Small Crane (Delivery and Removal)</b>	Low Loader	2
<b>Inverters and Transformer</b>	HGV (with low loader)	10
<b>Cabling</b>	Trucks	8
<b>Backfilling Sand</b>	HGV	30
<b>Switchgear and Housing</b>	HGV (with low loader)	5
<b>Miscellaneous Items</b>	Trucks	35
<b>Total</b>		<b>312</b>

**Table 13-2: Indicative Programme of Deliveries**

Delivery	Month				Total
	1	2	3	4	
Construction Plant / Equipment (Delivery and Removal)	8			8	16
Aggregate	136				136
Concrete	37				37
PV Panels		20			20
Support Structures / Mounting System		13			13
Small Crane (Delivery and Removal)			1	1	2
Inverters and Transformer			10		10
Cabling			8		8
Backfilling Sand			30		30
Switchgear and Housing			5		5
Miscellaneous Items	25	10			35
<b>Total</b>	<b>206</b>	<b>43</b>	<b>54</b>	<b>9</b>	<b>312</b>

### 13.1.3 Traffic Generated as a Result of Operation of the Solar Park

282 During the operational phase of the Solar Park, traffic would generally be associated with site visits by maintenance and operations personnel. These visits are likely to be limited and infrequent. At present it is estimated that 2 visits a month could be expected for servicing and routine inspection. This would involve very few vehicular movements. Impacts on traffic levels during operation are therefore expected to be negligible.

283 Parking for site associated traffic during the operational phase would be on site at the site entrance.

284 It is proposed that the existing access point in the south west corner of the site would be improved for construction and operational traffic.

#### **13.1.4 Traffic Generated as a Result of Decommissioning of the Solar Park**

285 During decommissioning, traffic can be broadly split into three main categories of:

- Decommissioning workforce movements;
- Delivery of decommissioning plant / equipment; and,
- Removal of Solar Park plant / equipment.

286 The traffic generated during decommissioning would be less than that generated during construction due to the fact that a proportion of the foundations would remain in situ (i.e. the foundations would be removed to approximately 1 m below ground level, and then buried using topsoil). Impacts during decommissioning are therefore considered to as for (or lower than) construction.

#### **13.1.5 The Location of the Solar Park and the Route of Existing Roads / Public Footpaths**

287 There are a small number of public rights of way in the vicinity of the site. The nearest, is a footpath which follows the western boundary of the north west field (SP8/11), located off-site on the other side of the field boundary. This footpath will not be affected by the proposed construction works.

288 There is also a byway which follows the unnamed lane linking the A477 to Lower Nash Church, passing the site entrance (SP30/3). Some minimal disruption to this route may occur as a result of the proposed development due to the movement of large vehicles along the route.

289

## **13.2 Potential Impacts**

#### **13.2.1 Access Provisions for the Construction / Operation / Decommissioning of the Solar Park**

290 In terms of the likely access provisions, the road network in the vicinity of the proposed Solar Park site would be used (receptor importance / sensitivity would be Very High). The road network in the vicinity of the proposed Solar Park site is frequently by large farm vehicles and HGVs (the magnitude of change would be Negligible). Accordingly, the potential impacts due to access provisions would be minor/negligible, and therefore not significant.

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#### **13.2.1.1 Construction Workforce Movements**

- 291 In terms of construction workforce movements, the worst case would be that all vehicles would arrive during the morning peak hour and leave during the evening peak hour. However, based on the likely construction work hours (Monday to Friday 08:00 to 18:00), it is unlikely that the vehicle movements associated with construction of the proposed Solar Park would overlap with the peak hours. There would be no night time working, unless agreed in advance with the Local Planning Authority.
- 292 Construction vehicles will park at the Temporary Site Compound / Laydown Area (i.e. on a dedicated area of the proposed site). Therefore, construction vehicles will not block any roads in the vicinity of the proposed site.
- 293 The magnitude of change would be negligible. Therefore, the potential impacts due to the construction workforce would be negligible, and not significant.

#### **13.2.1.2 Delivery of Construction Plant / Equipment and Delivery of Solar Park Plant / Equipment / Materials**

- 294 The construction traffic will be required to use the route, or routes, agreed with the Highways Authority as / if required. These could be enforced by formal instructions in the construction contract and through the use of road signs locally.
- 295 Timings of construction traffic movements would be restricted to between 8 am and 6 pm. However peak hours, such as those for school journeys (typically between 8 am to 9 am and 3 pm to 4 pm), would be avoided if the Highways Authority consider this to be necessary once the final routes are agreed.
- 296 Table 13.3 indicates that peak traffic is likely to occur during the first month of construction, with a worst case figure of approximately 206 deliveries spread over the first month (i.e. spread over 4 weeks). This is equivalent to an average of approximately 2 vehicles (i.e. 4 traffic) movements per working hour.
- 297 The maximum increase in traffic of 10 deliveries per day which is considered to be a modest or de minimis level of impact compared to the existing local flows on the A477 to the east of the site as detailed in table 13.1. Any inconvenience caused to local road users will therefore be negligible and temporary in nature during the limited period of condition and decommissioning only.
- 298 The magnitude of change would be negligible. Therefore, the potential impacts due to the deliveries of construction plant / equipment and the Solar Park plant / equipment / materials would be minor/negligible, and not significant.

#### **13.2.2 Traffic Generated as a Result of Operation of the Solar Park**

- 299 During operation, visits to the proposed Solar Park site are likely to be limited and infrequent (approximately twice every month), and will therefore require very few



traffic movements. Vehicles will park onsite, and will not block or park along any roads in the vicinity of the proposed site including Blackberry Lane, or the A477.

- 300 Accordingly, the magnitude of change would be negligible. Therefore, the potential impacts due to operation would be minor/negligible, and not significant.

### **13.2.3 Traffic Generated as a Result of Decommissioning of the Solar Park**

- 301 Impacts during decommissioning are considered to be as for (or lower than) construction.

### **13.2.4 The Location of the Proposed Solar Park and the Route of Existing Roads / Public Footpaths**

- 302 There are a small number of public rights of way in the vicinity of the site. The nearest, is a footpath which follows the western boundary of the north west field, located off-site on the other side of the field boundary (SP8/11)<sup>3</sup>. This footpath will not be affected by the proposed construction works.
- 303 There is also a byway which follows the unnamed lane linking the A477 to Lower Nash Church, passing the site entrance (SP30/3). Some minimal disruption to this route may occur as a result of the proposed development due to the movement of large vehicles along the route. It is proposed that the byway will remain open for use by the public with banksmen controlling vehicle movements to ensure the continued safety of the other users.
- 304 In addition, should pedestrians wish to avoid the construction traffic, an alternative route exists for the PROW located 250m to the west (SP30/4). Access to this alternative route from the footpath link to the south (SP30/6) is the same as that for the byway, with a requirement to walk approximately 150m west instead of east when leaving the southern footpath end point. This alternative route allows continued access to the listed Lower Nash Church and the surrounding PROW routes in the area.

## **13.3 Mitigation Measures and Monitoring Programmes**

- 305 During construction, Wessex Solar Energy will require its Construction Contractor(s) to minimise the impact of construction activities through successful implementation of an agreed and approved Construction Environmental Management Plan (CEMP), which will include a Construction Traffic Management Plan (CTMP).
- 45 Accordingly, in terms of further minimising potential traffic and infrastructure impacts, measures are included in the CTMP covering the enforcement of:

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<sup>3</sup> Footpath numbers taken from the Pembrokeshire Definitive Footpath Map: <sup>3</sup>  
<https://www.pembrokeshire.gov.uk/definitive-map/view-the-consolidated-definitive-map>; accessed 20/08/2020

- A pre-commencement survey of the A477/Lower Nash priority junction and a subsequent scheme for any upgrading or widening works deemed necessary;
- The retention and maintenance of the shared use path;
- Three banksmen to be located along the site entrance, the entrance to Nash Villa and A477/ Lower Nash junction during the construction phase of the development;
- A commitment to a pre and post construction condition survey along Nash Lane;
- Details of a traffic management scheme to include positive traffic control and a temporary speed reduction order on the A477 during the construction phase of the development;
- The provision and agreement of a construction schedule and details of the off-site management of vehicle movements including layover areas;
- The adherence to good construction traffic management principles;
- The use of an agreed and approved route (or routes) to the proposed Solar Park site;
- Specified construction traffic movement hours;
- Maximum parking provisions for the construction workforce;
- Maintaining the cleanliness of the existing roads (i.e. providing wheel washing facilities); and
- Construction traffic monitoring.

306 A draft CTMP is provided as ES Vol 2. Appendix A13.1.

307 In addition to the above deliveries will be marshalled to the site as appropriate to ensure that there are no conflicts on the lane accessing the site. There is a passing place suitable for commercial vehicles use at the bottom end of the lane on first entrance from the A477 where vehicles can safely wait off the A477 if other vehicles are on the lane travelling towards the A477. In addition, there is a westbound layby along the A477 to the west of the A4075 junction (approximately half way between the A4075, and the access lane) that can also accommodate any waiting commercial vehicles, which would then be marshalled to the site.

## 14 Climate Change

### 14.1 Introduction

308 Chapter 14 of ES Volume 1 evaluates the potential impact of the Development on climate and the vulnerability of the project to climate change as required by the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.

#### 14.1.1 Vulnerability of the Development to Climate Change

- 309 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. The Development could also be sensitive to the frequency of extreme events (e.g., storms) which could damage solar panels or alter their efficiency.
- 310 The results of geological tests and surveys will be used to ensure that the mounting system design considers the potential climatic changes, including an increased wind speed, to ensure that the Development is not vulnerable to climate change.
- 311 The value of the receptor (the Development) is high, however, following the design measures set out above, the susceptibility of the Development to climatic changes in temperature and wind speed, is very low, and sensitivity overall is negligible.
- 312 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.
- 313 Given the limited magnitude of the effect and the negligible sensitivity of the Development as an environmental receptor, there is no significant effect in terms of the EIA Regulations predicted as a result of changes in temperature, wind speed or cloud cover during the operational phase of the Development, nor from other climatic changes.

#### 14.1.2 Impacts of the Development on Climate Change

- 46 The impact of the Development on climate (change) is estimated through the emission or reduction in emissions of carbon dioxide (CO<sub>2</sub>). As the operational phase of the Development is unlimited, calculations are provided for lifetimes of 40 years, the lifetime on which reference emissions data is based, and a more relevant approximate project timeframe of 40 years.
- 47 When operational, the Development will generate electricity from a renewable source and export this to the local electricity distribution network. The Development is proposed to have an installed capacity of approximately 12.3 MWp DC. Based on a

simulation, the Development is anticipated to generate approximately 12,300 MWh of renewable electricity per year.

- 48 Constructing the Development will involve sourcing materials, manufacturing components, transporting them to site and installing them.
- 49 The Development, when operational, will not emit substantial gases to the atmosphere with only limited emissions of carbon dioxide associated with service vehicles, maintenance equipment and occasional replacement parts. The operational phase will therefore not have any material adverse impacts upon climate.
- 50 Decommissioning the Development will involve removing components and reinstating the land, and transporting the components away from site.
- 51 Each of these requires energy, and the production of much of that energy will involve the emission of CO<sub>2</sub> to the atmosphere. The IPCC (2014)<sup>4</sup> estimated full life-cycle emissions of CO<sub>2</sub> for a range of electricity generation types. For utility scale solar photovoltaic cells, it estimated an emission of 48 gCO<sub>2</sub>eq/kWh (based on the median value from a range between 18 and 180 kgCO<sub>2</sub>eq/MWh) based on a 25 year operational lifetime and an in-plane solar irradiation figure of 1700 kWh/m<sup>2</sup>/year. For comparison, this figure is 820 gCO<sub>2</sub>eq/kWh for coal and 490 gCO<sub>2</sub>eq/kWh for gas, which are the generation technologies most likely to be displaced by the proposed Development.
- 52 Adjusting for the proposed 40 year operational life of the Development and a site specific in-plane irradiation figure of 1226 kWh/m<sup>2</sup>/year, the lifecycle emissions of CO<sub>2</sub> caused by the Development can be estimated to be 42 gCO<sub>2</sub>eq/kWh<sup>5</sup>.
- 53 The Development is forecast to generate approximately 492,000,000 kWh of electricity over its lifetime. Therefore, the total production of CO<sub>2</sub> associated with the Development can be estimated to be approximately 20,664 teCO<sub>2</sub>.
- 54 The generation of electricity from the Development will displace the generation of electricity from other sources. At present, additional renewable generation displaces generation from more conventional sources, such as coal and gas, which increasingly play the role of balancing the electricity network, responding to the changes in output from renewable generators. With time, these technologies may be

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1 <sup>4</sup> IPCC (2014): Annex III: Technology-specific cost and performance parameters. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Table A.III.2. Available at: [https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc\\_wg3\\_ar5\\_annex-iii.pdf](https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_annex-iii.pdf) [accessed on 25/10/2018]

<sup>5</sup> 48 gCO<sub>2</sub>eq/kWh \* (1700 kWh/m<sup>2</sup>/year / 1226 kWh/m<sup>2</sup>/year) \* (25 years / 40 years) = 42 gCO<sub>2</sub>eq/kWh

phased out by the introduction of energy storage (e.g. batteries), in order to achieve a zero-carbon network.

- 55 For the year from June 2019 to June 2020 the 'carbon intensity' of the British electricity network was calculated to be 194 gCO<sub>2</sub>/kWh<sup>6</sup>. However, this figure includes all sources of generation, including those lower carbon sources that would not be displaced by the proposed Development. Also, it does not include the lifecycle CO<sub>2</sub> emissions associated with the generators.
- 56 If it were to be assumed that the Development was displacing gas-fired generation, which the IPCC estimates to have direct emissions of 370 gCO<sub>2</sub>/kWh and total lifecycle emissions of 490 gCO<sub>2</sub>/kWh, then it could be considered to be avoiding the emissions of 241,080 tonnes CO<sub>2</sub> when adjusting for its own lifecycle emissions.
- 57 Therefore, the CO<sub>2</sub> emissions avoided by the proposed Development would be a net benefit and a positive impact upon predicted climate change
- 314 This is considered to be a beneficial change to the UK's emissions of climate-changing gases and is therefore a moderate, positive environmental effect that is significant under the EIA Regulations.

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<sup>6</sup> <https://electricityinfo.org/carbon-intensity-archive/#data>

## 15 Miscellaneous

315 Chapter 15 of the Environmental Statement (ES) describes and assesses the potential effects of the Development in terms of:

- Waste (section 15.1);
- Human Health (section 15.2); and
- Major Accidents and Disasters (section 15.3).

### 15.1 Waste

#### 15.1.1 Construction

- 316 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 site for assembly and installation (mounting structures) and connection (solar panels).
- 317 A Draft Site Waste Management Plan (SWMP) is included in the CEMP (BL009). The SWMP focuses on the reduction, re-use and recycling of all waste spoil on site. Soils will be segregated according to type status and re-used where possible to fill excavations thus also limiting impacts on the groundwater and surface water drainage regimes at the site. As part of the SWMP any additional soil materials that are to be imported to the site will be required to have certification of their chemical concentrations to ensure that contaminative materials are not being introduced to the area.
- 318 The SWMP also provides guidance on good working practices in order to minimise impacts on the soil and geology resulting from the construction of the development. This will be further developed by the Contractor and agreed with the NRW and local planning authority prior to any works on site. All construction staff would be required to read the procedure and abide by its requirements.
- 319 Wessex Solar Energy will require that the selected Construction Contractor(s) nominates an Environmental Site Manager and Site Waste Manager for the duration of the construction and commissioning phases. They will be responsible for implementing the agreed SWMP.

#### 15.1.2 Operation

- 320 During the operational phase of the Development the site would be unmanned.
- 321 The Inverters and Transformers will be designed to meet stringent electricity industry standards. The oil filled Transformer will have a specifically designed containment system (i.e. a bund) to ensure that any accidental fluid leak does not result in a

discharge to the environment. The Transformer will also be equipped with an oil level indicator to detect potential leaks / spills. If the oil level inside the Transformer dropped due to a leak / spill, an alarm would be activated on the remote control panel and a maintenance engineer would be despatched to investigate and remedy the situation. Any waste fluids would be taken off site for disposal by a licensed collection service for recycling or disposal at a suitable registered facility.

- 322 Any waste generated by maintenance activities will be removed from site and disposed of appropriately.

### 15.1.3 Decommissioning

- 323 The number of vehicles associated with the removal of waste material associated with decommissioning and construction is considered within Chapter 13: Access and Traffic of ES Volume 1.
- 324 At the time of decommissioning, it is likely that most of the equipment will be at the end of its useful operating life and will be obsolete and unsuitable for further use. It will therefore need to be dismantled for recycling.
- 325 Decisions on reuse of plant items, recycling of materials or the disposal to waste will be made at the time of decommissioning in the light of the technology then available, environmental and economic considerations and legislation. Unsalvageable material will be disposed of at a licensed landfill.
- 326 Disposal of all waste materials will only be via appropriate and authorised routes.
- 327 All waste transported offsite will be delivered to the appropriately licenced receivers of such materials. Given that operators receiving any waste materials resulting from the Development will be subject to their own consenting procedures, there is no requirement for further consideration of waste to be undertaken, beyond the volume of any traffic generated during the construction phase resulting from its transportation.

## 15.2 Population and Human Health

### 15.2.1 Introduction

- 328 A Human Health Impact Assessment (HHIA) has been undertaken to consider key determinants to protect human health. HHIA's are designed to determine whether a proposal might improve health inequalities or negatively affect people's health and wellbeing.
- 329 This Chapter considers the findings from the following assessments:
- Air Quality and Climate;
  - Traffic and Transport;

- Noise;
  - Residential amenity (from the LVIA);
  - Security; and
  - Health and safety at work.
- 330 The people who might be affected are different depending on the nature and magnitude of the potential effect; where effects are predicted, the affected population is described.
- 331 Properly designed and maintained solar parks comprise safe technology. This is evidenced by the technology being widely deployed in residential settings in very close proximity to human receptors. The site design and inbuilt buffers from sensitive receptors will minimise any risk to human health resulting from the operation of the Development. Risks associated with electrical infrastructure such as from lightning strikes are removed or reduced through inbuilt control systems and can be scoped out at this stage.

#### 15.2.2 Conclusion

- 332 The outcome of the HHIA indicates that the Development is unlikely to negatively affect people's health and wellbeing in its widest sense. There are no effects that:
- Cause potentially severe or irreversible negative effects;
  - Affect a large number of people; or
  - Specifically may affect people who already suffer poor health or are socially excluded.
- 333 As a result, no adverse significant effects are predicted for any phase of the Development.
- 334 Potential positive effects on health include effects the Development will have on climate, by way of reducing emissions of carbon dioxide as detailed in the air quality assessment (DRN BL005).

#### 15.3 Major Accidents or Disasters

- 335 The development is not considered to be vulnerable to any type of major accident or disaster.
- 336 The Development is not likely to lead to any major accidents or disasters.
- 337 No potential has been identified for the Development to lead to increased risk of a major accident or disaster in combination with cumulative developments.



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## 16 Grid Connection

- 338 As detailed within Chapter 6, electricity will be exported to the regional electricity grid via an underground cable leading from the on-site control building to the existing Golden Hill 33 / 132 kV Substation located approximately 2.3 km to the south west. The off-site grid connection works will be completed by National Grid Electricity Generation (NGED) (as the distribution network operator) under their statutory development powers. The off-site grid connection works do not therefore form part of this application for the solar park and associated infrastructure. However, in accordance with the EIA Regulations 2017, the potential environmental impacts of the off-site grid connection works are assessed within ES Volume 1.
- 339 The study area is defined by the grid connection route. The grid connection route proposed by NGED is shown in ES Volume 2: Figure 16.1.
- 340 The proposed route follows existing roads from the site all the way to the substation. The route can be split into four sections:
- Section 1 – the private road from the on-site substation to the A477.
  - Section 2 – The A477 leading to Myletts Hill ( a C class Road)
  - Section 3 – Myletts Hill leading to the turn off on to the private road leading to the substation
  - Section 4 – the private road leading from Myletts Hill to the substation.
- 341 No significant impacts have been identified as a result of the installation of the grid connection cable along the route proposed by NGED. Furthermore, it is expected that best practice measures will be implemented by NGED to minimise any potential impacts.
- 342 Some disruption to existing traffic flow will occur as a result of the proposed works. It is likely that the two private roads (road sections 1 and 4) may need to be closed for a short period, but access for residents will be maintained should this be necessary. Should the public rights of way which follow these roads need to be closed or diverted then NGED will apply for all necessary permissions in this regard. Any road or PROW closures would be for a short period of time while the works along these sections were completed. An alternative route does exist for the PROW which follows road section 1, 250m to the west. Access to this alternative route from the footpath link to the south, is the same as that for the road section route, with a requirement to walk approximately 150m west instead of east when leaving the southern footpath. This alternative route allows continued access to the listed Church and surrounding PROW routes in the area. There is not an alternative route available for the PROW which follows road section 4. However, this section of the cable route is only 150m and should it need to be closed it would be for only a short duration.
- 343 It is expected that a single lane road closure may be required along road sections 2 and 3 during the works. This would likely be controlled by two way traffic lights. It is

unknown whether this closure would stretch for the full length of these sections or would be split into shorter sections. Taking the class of the roads into account it is expected that there would be sectioned closures along Myletts Hill with a single section closure along the A477. It is possible that lane narrowing rather than a full lane closure may be possible along the A477.

- 344 It is anticipated that any works along each road section (1-4) will take place consecutively rather than currently minimising disruption. NGED will ensure that all necessary permissions and licences are obtained for these works and closures before commencing any works. This will ensure that any other works proposed in the area are taken into account and disruption is minimised on the local road network.
- 345 Once the underground cable is operational there will be no impacts upon any receptors. The cable will not need to be routinely maintained throughout the operational lifetime of the proposed Solar Park and so any works would comprise unplanned, emergency works. It is not possible to determine the extent of any such works but their occurrence is considered very unlikely due to the nature of the cable and the connection.