

PHOENIX SOLAR PARK



Environmental Statement

Volume 1

January 2023

Document Reference: BL001

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Revision	Date Issued	Prepared By	Approved By
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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 ₂	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
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment

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

NO_x	oxides of nitrogen
NPS	National Policy Statement
NRW	Natural Resources Wales
NSR	noise sensitive receptors
OEMP	Operational Environmental Management Plan
OS	Ordnance Survey
PIU	Performance and Innovation Unit
PPE	Personal Protective Equipment
PPW	Planning Policy Wales
PINS	Planning Inspectorate
PM₁₀'s	particulate matter of less than 10 microns
PPGs	Planning Policy Guidance Notes
PPSs	Planning Policy Statements
PPV	Peak Particle Velocity
PRF	potential roosting feature
PRoW	Public Right of Way
PV	photovoltaic
RO	Renewables Obligation
RPA	root protection area

1 Introduction

1.1 Introduction

- 1 This Environmental Statement (ES) has been prepared by Wessex Solar Energy (WSE) in support of a planning application for a Solar Park (which will generate up to 9.99 megawatts (MW) alternating current (AC)) 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 Figure 1.1.
- 2 The proposal is classed as 'major development' under The Town and Country Planning (Development Management Procedure) (Wales) Order 2016 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 proposal, 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 A1.1).
- 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 chapter 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

- 8 The content of this ES complies with the requirements set out in SCHEDULE 4 Regulation 17(3).
- 9 Table 1-1 provides a document reference for where the various information required for inclusion within an ES in accordance with EIA Regulations 2017: Schedule 4 can be found.

Table 1-1: Information for inclusion in environmental statements

Regulation 17 Article 4 Requirement	Document Reference
1. Description of the development, including in particular— (a) a description of the location of the development;	Environmental Statement Volume 1; Chapter 6 (Document Reference Number BL001)
(b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works and the land-use requirements during the construction and operational phases;	Environmental Statement Volume 1; Chapter 6 (Document Reference Number BL001)
(c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used;	Environmental Statement Volume 1; Chapter 6 (Document Reference Number BL001)
(d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, oil and subsoil pollution, noise, vibration, light, heat, radiation) and quantities and types of waste produced during the construction and operational phases.	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
2. 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.	Environmental Statement Volume 1; Chapter 5 (Document Reference Number BL001)

Regulation 17 Article 4 Requirement	Document Reference
3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
4. A description of the factors specified in regulation 4(2) likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape.	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
5. A description of the likely significant effects of the development on the environment resulting from, inter alia— (a) the construction and existence of the development, including, where relevant, demolition works;	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
(b) the use of natural resources in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances and the disposal and recovery of waste,	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)

Regulation 17 Article 4 Requirement	Document Reference
(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;	Environmental Statement Volume 1; Chapter 14 (Document Reference Number BL001)
(g) the technologies and the substances used. The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the development. This description should take into account the environmental protection objectives established at European Union or Member State level which are relevant to the project, including in particular those established under Council Directive 92/43/EEC(1) and Directive 2009/147/EC(2).	Environmental Statement Volume 1; Chapter 6 and Chapters 8-15 (Document Reference Number BL001)
6. A description of the forecasting methods or evidence used to identify and assess the effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)
7. A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	Environmental Statement Volume 1; Chapters 8-15 (Document Reference Number BL001)

Regulation 17 Article 4 Requirement	Document Reference
8. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of the Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	Environmental Statement Volume 1; Chapter 15 (Document Reference Number BL001)
9. A non-technical summary of the information provided under paragraphs 1 to 8.	Environmental Statement Volume 4; (Document Reference Number BL004)
10. A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	Environmental Statement Volume 1; Chapter 17 (Document Reference Number BL001)

1.3 The Structure of the ES

- 10 The ES consists of four volumes, the authors and contributors to each chapter and the structure of the document is set out in Table 1-2.
- 11 In line with the EIA Regulations 2017, the ES and all technical assessments have been undertaken by suitably qualified persons who can be considered to be '*competent experts*'. Details of their relevant expertise are set out in Table 1-2.

Table 1-2: Details of competent experts

Document		Author / Contributors	Lead Author's Expertise
Volume 1 – Main Text			
Chapter 1	Introduction	Wessex Solar Energy	Wessex Solar Energy (WSE) was established in 2010 to finance, install and operate a portfolio of solar parks in England
Chapter 2	Environmental Impact Assessment		
Chapter 3	Need for the Development		

Document		Author / Contributors	Lead Author's Expertise
Chapter 4	Consultation		and South Wales. The company draws on the expertise of a group of dedicated engineers, environmental scientists and financiers with many years of experience in the renewable energy and conventional power generation sector. Our in-house team include specialists in ecology, hydrology, geology, and air quality. Our development team comprises chartered environmentalists, members of IEMA, and the IES. Our team hold qualifications in EIA, ecological assessment and chemical engineering. With specific regard to planning and permit applications our team have decades of experience having sought and secured planning consent under the town and country planning act, Sections 36 and 37 of the electricity act and through the development consent order process, for over 10,000 MW of projects in the UK.
Chapter 5	Site Selection and Consideration of Alternatives		
Chapter 6	Development Description		
Chapter 7	Legislative and Planning Policy Context		
Chapter 8	Landscape and Visual Impact Assessment	Stephenson Halliday	Stephenson Halliday has over 24 years of experience working on development proposals for a diverse range of proposals throughout the UK. Key individuals working on this project have over 18 years of

Document		Author / Contributors	Lead Author's Expertise
			experience as chartered landscape architects. The Practice is a Landscape Institute and IEMA registered practice and all work is prepared and reviewed internally by senior highly experienced landscape planners with Public Inquiry experience.
Chapter 9	Ecology and Ornithology	SK Environmental Solutions Ltd	Established in 2011, SK Environmental Solutions Ltd are a growing team of highly competent and responsive ecological consultants, providing a comprehensive range of ecological services including species and habitat surveys, planning support, habitat creation/mitigation schemes and Ecological Clerk of Works. SK Environmental Solutions Ltd, has a wealth of experience in all aspects of the EcIA, from data collection to the assessment of anticipated impacts. Our ecological knowledge, experience and skills are used to produce high quality assessments which follow current best practice guidelines as set out in the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018). All work is undertaken by suitably experienced ecologists and where surveys and

Document		Author / Contributors	Lead Author's Expertise
			mitigation require it, all work is completed by ecologists holding the appropriate wildlife licenses.
Chapter 10	Cultural Heritage and Archaeology	Landgag e Heritage	Landgag e Heritage Limited produced the settings impact assessment and ES chapter in support of the planning application for the proposed development. Landgag e Heritage are a leading heritage and archaeology consultancy and work on behalf of developers from a wide range of industries across the UK. All Landgag e Heritage staff are professionally accredited by ClfA. The assessments have been produced by staff who have extensive experience of supporting solar developments, and have assessed in excess of 50 schemes. Landgag e Heritage have used this experience to ensure that development impacts are accurately represented, and that robust design and mitigation measures are in place with the development to conserve the historic environment.
Chapter 11	Noise	Mubassir Malik; Stantec Ltd.	MEng (Hons), Corporate Member of the Institute of Acoustics (MIOA) Mubassir has 15 years of acoustic consultancy. He has particular expertise in

Document		Author / Contributors	Lead Author's Expertise
			environmental acoustics demonstrated by his work on residential and mixed-use projects, infrastructure projects, industrial facilities, and energy generating facilities.
Chapter 12	Geology, Hydrology and Hydrogeology	Wessex Solar Energy	See Chapter 1-7
Chapter 13	Access and Traffic	Mark Baker MBC Traffic	Chapter 13 has been prepared by Mark Baker of Mark Baker Consulting Limited. Mark Baker has a Bachelor of Science Degree with Honours in Civil Engineering from Newcastle University. He is a Member of the Institution of Civil Engineers, a Chartered Engineer, and a European Engineer. He is a Fellow of the Chartered Institute of Transport, and of the Chartered Institute of Logistics and Transport. His experience covers the range from urban highway design to major transportation studies both in the UK and Overseas.
Chapter 14	Climate Change	Wessex Solar Energy	See Chapter 1-7
Chapter 15	Miscellaneous (Waste, Population and Human Health, Major Accidents and Disasters)		
Chapter 16	Grid Connection		
Chapter 17	Reference List		

Document		Author / Contributors	Lead Author's Expertise
Volume 2 – Technical Appendices			
A1.1	PINS Wales Scoping Direction	N/A	
A5.1	Agricultural Land Classification Report	Reading Agricultural Consultancy	Reading Agricultural Consultants Ltd (RAC) has more than 50 years' experience of providing advice on agricultural, environmental and countryside issues, particularly in assessing the impacts of housing, minerals, infrastructure and other large-scale developments on agricultural land, soil resources and farm holdings. The RAC team includes Practitioner members of IEMA, fellows and members of the British Institute of Agricultural Consultants, members of the Institute of Soil Science and Chartered Environmentalists.
A5.2	Agricultural Assessment Report	Wessex Solar Energy	See Chapter 1-7
A5.3	Land Quality Implications Assessment	Wessex Solar Energy	See Chapter 1-7
A6.1	Outline Decommissioning and Restoration Plan	Wessex Solar Energy	See Chapter 1-7
A8.1 -A8.6	• LVIA Methodology • Visual Aids • Landscape Sensitivity Assessment • Viewpoint Analysis • Residential Visual Amenity Assessment • Illustrative Views	Stephenson Halliday	See Chapter 8

Document		Author / Contributors	Lead Author's Expertise
A9.1 – A9.3	- Phase 1 Survey Target Notes - Protected Species Legislation - No Significant Effects Report	SK Environmental Solutions Ltd	See Chapter 9
A9.4	Landscape and Ecological Management Plan	Wessex Solar Energy SK Environmental Solutions Ltd Stephenson Halliday	See Chapter 1-9
A9.5	Arboricultural Survey, Arboricultural Impact Assessment and Method Statement	Arbtech Ltd.	Prepared by arboricultural surveyors with qualifications including FDS in Forestry, and LANTRA Professional Tree Inspector certification. Surveyors are also members of the Arboricultural Association.
A10.1	An Archaeological Desk Based Assessment	Orion Heritage	See Chapter 10
A10.2	A geophysical survey	Bartlett Clark Consultancy (BCC)	Bartlett Clark Consultancy was established in 1991. BCC were the first in the UK to introduce continuous detailed magnetometer recording to pipeline and other linear evaluations, and in 2002 were the first to introduce the (now standard) 1m Bartington magnetometers (which are based on the design we commissioned from the supplier). They used custom-designed data loggers and in-house software to configure these in light-weight multiple hand-carried arrays. BCC have worked on a wide variety of sites and projects, and have carried out major

Document		Author / Contributors	Lead Author's Expertise
			geophysical investigations for a range of consultancies, National Grid, AECOM, Tarmac, the National Roads Authority in Ireland, and various other County Councils, archaeological units and consultancies.
A10.3	A programme of archaeological trial trenching, including a walkover survey	Red River Archaeology	Red River Archaeology is part of Red River Group, a Registered Organisation with the Chartered Institute for Archaeologists and therefore work to their standards and are audited for compliance. We are also a CHAS accredited contractor and hold a silver level award from the Supply Chain Sustainability School. We undertake numerous evaluations across South Wales and across the UK every year, and have worked on five solar farm projects within South Wales in the last few years. Our staff all hold relevant academic qualifications and industry accreditations.
A10.4	A Settings Impact Assessment	Orion Heritage	See Chapter 10
A11.1 – A11.2	Glossary of Terminology	Mubassir Malik; Stantec Ltd.	See Chapter 11
A11.2	Construction phases and plant	Wessex Solar Energy	See Chapter 1-7
A12.1	Flood Consequence Assessment	Richard Laker; Stantec Ltd.	Stantec has many years of experience in, amongst other areas, the assessment of flood risk, hydrology, flood defence and river engineering. Team

Document		Author / Contributors	Lead Author's Expertise
			members include members of the Chartered Institution of Water and Environmental Management (CIWEM) and Institution of Civil Engineers (ICE). This Assessment was completed by Richard Laker (BSc MSc). Richard is a Senior Engineer with Stantec and has worked in environmental consultancy for over 10 years.
A13.1	Construction Traffic Management Plan	Wessex Solar Energy	See Chapter 1-7
A13.2	Access Assessment	CPA Ltd	Charlotte Peacock Associates Ltd. (CPA) is a multi-disciplinary environmental consultancy operating throughout the UK. The CPA team includes a qualified highways engineer with over a decade of experience of transport assessments for all types of development, incorporating junction analysis and traffic modelling using TRANSYT, ARCADY and/or PICADY to assess capacity and safety factors. CPA have completed swept path analysis for over 20 solar park developments and advised upon required improvement works.
A13.3	Road Condition Survey	Mark Baker MBC Traffic	See Chapter 13
Volume 3 – Figures and LVIA Visualisations			
Figures 1.1 and 1.2, 5.1, 5.2, 6.1 - 6.6	Site Location and Design Drawings	Wessex Solar Energy	See Chapter 1-7
Figures 8.1	Landscape figures and	Stephenson	See Chapter 8

Document		Author / Contributors	Lead Author's Expertise
– 8.8 and Viewpoint Photosheets	photomontages /visualisations	Halliday	
Figure 9.1	Phase 1 Habitat Plan	SK Environmental Solutions Ltd	See Chapter 9
Figure 10.1 -10.3	Archaeological Areas of Interest and Listed Buildings	Orion Heritage	See Chapter 10
Figure 11.1	Noise Sensitive Receptors	Stantec Ltd.	See Chapter 11
Figure 13.1	Construction Traffic Route	Wessex Solar Energy	See Chapter 1-7
Figure 16.1	Grid Connection Route	Wessex Solar Energy	See Chapter 1-7
Volume 4 - Non-Technical Summary		Wessex Solar Energy	See Chapter 1-7

1.4 Wessex Solar Energy

- 12 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.
- 13 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.
- 14 The company is committed to developing projects in an environmentally responsible and sustainable manner.

2 EIA Approach

2.1 Scope

- 15 A Screening Opinion from Pembrokeshire County Council has not yet been received. However, the Scoping Direction previously issued by PINS Wales for the 2020 Blackberry Lane Solar Park Development has been used to set the scope of the assessments for this application. The following environmental aspects were 'scoped in' and are therefore included within this ES:
- Landscape and Visual Impact Assessment (LVIA);
 - Ecology and Nature Conservation
 - Archaeology and Cultural Heritage
 - Construction Noise Assessment
 - Hydrology, Hydrogeology and Geology
 - Climate
 - Waste
 - Grid Connection Route
 - Cumulative Impacts
- 16 We also propose to include the following assessment within the ES:
- Construction Traffic
- 17 The following aspects were previously 'scoped out' in agreement with the Welsh Planning Inspectorate and other consultees and remain so;
- Operational Noise
 - Operational Traffic
 - Glint and Glare
 - Socio-economics
 - Air Quality

2.2 The Environmental Statement

- 18 The ES is presented in 4 separate volumes, each with a unique Document Reference Number (DRN), which are:
- Vol 1: ES Main Report (DRN: BL001)
 - Vol 2: Technical Appendices (DRN: BL002)
 - Vol 3: Figures (DRN: BL003)
 - Vol 4: Non-Technical Summary (DRN: BL003)

- 19 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
- 20 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 A11.1 Glossary of Terminology
- Appendix A11.2 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

- 21 This ES is also accompanied by a number of stand alone planning documents:
- 22 This ES is available for public viewing on the Pembrokeshire County Council Planning website.
- 23 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.
- 24 In addition to this ES a number of other technical documents, each with a unique Document Reference Number (DRN) are provided as part of this application as follows.;
- Non-EIA Technical Assessments (Glint and Glare, Air Quality and Operational Noise Statement) (DRN: BL005)
 - Planning Statement (DRN: BL006)
 - Pre-Application Consultation Report (DRN: BL007)
 - Design Access Statement (DRN: BL008)
 - Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) (DRN: BL009)

2.3 EIA Process and Methodology

- 25 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.

26 The EIA assessment 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.

2.3.1 Baseline Description

- 27 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.
- 28 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.
- 29 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.

2.3.2 Prediction of Likely Effects

- 30 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.

- 31 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)
- 32 Following identification of likely environmental effects, changes to baseline conditions have been predicted, allowing an assessment of the environmental impact of these changes.

2.3.3 Assessment of Likely Effects

- 33 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).
- 34 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 this ES.
- 35 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.
- 36 The sensitivity or importance of each identified receptor is detailed within each technical chapter.
- 37 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.

2.3.4 Mitigation

- 38 Each technical chapter proposes mitigation measures. Such measures may include the consideration of alternatives and operational and management measures.
- 39 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.

2.3.4.1 Embedded Mitigation

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

2.3.5 Residual Effects

- 41 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.

2.3.5.1 Assessment of Cumulative Effects

- 42 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.
- 43 A number of development projects have been 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).
- 44 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.

2.3.6 Transboundary Effects

- 45 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 Zone of Influence (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.
- 46 Transboundary effects are therefore not assessed further in this ES.

2.3.7 Site Selection and Consideration of Alternatives

- 47 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'.

- 48 The ES 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 Chapter 5: Site Selection, Development Design and Consideration of Alternatives).

3 Need for the Project and its Benefits

3.1 Overview

- 49 In spring 2019 the Welsh and UK Governments both declared a Climate Emergency recognising the significant risks of continuing to 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 governments to combat this climate threat.
- 50 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.
- 51 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 plants.

3.2 Climate Change

- 52 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.
- 53 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 Nations (UN) Working Group of the Intergovernmental Panel on Climate Change).
- 54 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.

- 55 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”.
- 56 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

- 57 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.
- 58 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.
- 59 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.
- 60 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.
- 61 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

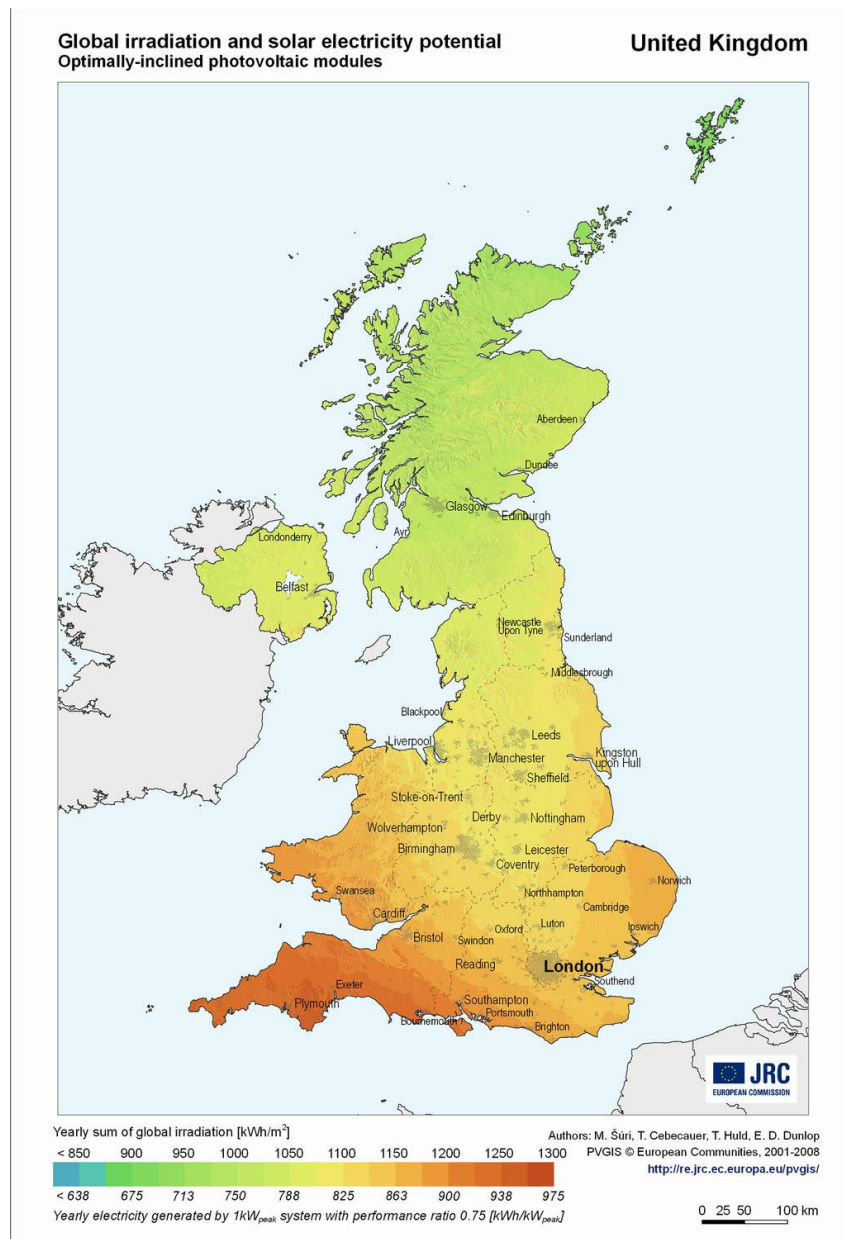
- 62 The UK Climate Change Programme, published in November 2000, set out the Government's proposals for meeting the UK's legally binding target of a 12.5 per cent reduction in greenhouse gas emissions, (Kyoto Protocol) and for moving towards the Government's domestic goal of a 15 per cent reduction 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).
- 63 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 into 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.
- 64 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 gCO₂/kWh (75% low carbon generation)."
- 65 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.
- 66 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.
- 67 With the deployment of renewable energy having become 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

- 68 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).

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



- 69 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.

3.6 Benefits of the Project

70 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

71 These issues are discussed further below.

3.6.1 Economic Benefits

72 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 2021 that £41.2 billion turnover in the UK economy was generated directly and indirectly by businesses active in the low carbon and renewable energy economy. The sector also supported over 200,000 jobs.

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

74 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. Wessex Solar Energy 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.

75 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

76 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 that until relatively

recently the UK 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.

- 77 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. exporting 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.
- 78 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 Cost of Energy

- 79 As discussed in Section 2.4 solar energy as is the case for any emerging technology required subsidy to be financially viable. As the technology has matured all subsidy support has been withdrawn. Any ground mounted solar project being developed in the UK today therefore must be commercially achievable without financial support from Government.
- 80 Solar energy in the UK is now the cheapest form of electricity production, followed closely by offshore wind. Solar energy costs about half that of new build nuclear and has no legacy of long-term waste, it is also significantly cheaper than electricity from gas fired power plant which have been highly susceptible to the inflationary costs associated with gas supply.
- 81 Solar therefore has an important part to play, not only in security of supply, carbon reduction and the reduction of emissions of other pollutants, but also in helping drive down energy bills for UK consumers and reducing fuel poverty.

3.6.4 Environmental Benefits

- 82 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 (SO₂) oxides of nitrogen (NO_x), particulate matter of less than 10 microns (PM_{10s}) 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.

- 83 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.
- 84 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 the EIA. 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

- 85 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.
- 86 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.
- 87 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 A1.1).
- 88 The Solar Park development now proposed is considerably smaller than that originally proposed, being 13.84 hectares as opposed to 34.25 hectares.
- 89 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.
- 90 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
- 91 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).

- 92 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.
- 93 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
- 94 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).
- 95 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

- 96 Consultation with the local community and other stakeholders is seen by Wessex Solar Energy as an important part of the development process.
- 97 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.
- 98 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.
- 99 An information booklet was prepared. A copy of this booklet is provided within the Pre-Application Consultation Report (PAC: DRN BL007).

- 100 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.
- 101 Further to the above consultation with residents WSE contacted Cosheston Community Council to introduce the proposed Development.
- 102 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.

5 Site Selection and Consideration of Alternative Sites

5.1 Introduction

- 103 This Chapter of the Environmental Statement (ES) 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.
- 104 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".
- 105 This Chapter is supported by the following figures provided in the Environmental Statement Volume 3:
- Figure 5.1. Alternative Site Search Area;
 - Figure 5.2. 2017 Predictive ALC Map;
- 106 This Chapter is also supported by the following Technical Appendices provided in Environmental Statement Volume 2:
- Technical Appendix A5.1: Agricultural Land Classification Report;
 - Technical Appendix A5.2: Agricultural Assessment Report;
 - Technical Appendix A5.3: Land Quality Implications Assessment; and
 - Technical Appendix A9.4: Landscape and Ecological Management Plan.
- 107 It also makes reference to the following documents:
- Planning Statement (DRN BL006).
- 108 Relevant planning policy for the Development is set out in Chapter 7: Legislation and Planning Policy Context and also in the Planning Statement (DRN BL006).
- 109 This 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 that have been considered and the selection of the Development as the preferred option.

5.2 The Need for the Development

- 110 Chapter 3 of this ES: Need for the Project and its Benefits and the accompanying Planning Statement (DRN BL006) set out the reasons why a solar PV electricity generating facility is needed in the context of the national need for energy related infrastructure. This Chapter should be read in conjunction with Chapter 3 and the Planning Statement (also summarised in Chapter 7).

5.3 Site Selection

- 111 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.
- 112 Our approach has been found to be acceptable by Local Planning Authorities and the Planning Inspectorate in previous cases.

5.3.1 Definition of a Search Area

- 113 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.
- 114 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.

5.3.2 Stage 1 Site Screening Study

5.3.2.1 Electrical Connection Location

- 115 Any power station development requires a connection to the electricity distribution or transmission networks.
- 116 There are two elements to this key consideration in determining the appropriateness of a site for a development with respect to its grid connection:

- The environmental and social impact of the installation and operation of a length of overhead or underground cable between the generating station and a suitable location to connect to the electricity distribution or transmission networks;
- The economic impact to the viability of the project caused by the cost of such a connection.

- 117 Clearly, based on both of these elements, a site where a connection is possible within or close to the development boundary is preferable than one where a connection is some distance off-site. The longer the connection becomes, the more far reaching the potential environmental and social impacts become and the less likely the project is to be viable.
- 118 Connections to the distribution network at 132kV, or the transmission network at 275kV or 400kV, involve considerable cost, both for the connection itself and the cost of transforming from a low site voltage, up to these very high voltages. Sites with an export capacity between approximately 2 MW and 25 MW can connect into the distribution network at 33kV, subject to the nature of the connection and capacity being available on that part of the network.
- 119 Therefore, in searching for appropriate sites, WSE focuses on sites within 2 km of the 33kV electricity distribution network.

5.3.2.2 Environmental and Planning Designations (Ecology, Landscape and Cultural Heritage)

- 120 Given the importance of sites which are designated for ecology, landscape and cultural heritage, WSE does not consider potential sites which contain or lie entirely within such a designation to be suitable for development of a solar park. WSE also seeks to avoid Green Belt land unless exceptional circumstances can be demonstrated to justify the development of a solar farm.

5.3.2.3 Existing Land Use

- 121 Planning Policy Wales Edition 11 (PPW11) encourages the effective use of land by reusing brownfield land provided that it is not of high environmental quality. The recent PPG encourages “focusing large scale solar farms on previously developed and non-agricultural land, provided it is not of high environmental value”.
- 122 All land uses were included in the Stage 1 study.

5.3.2.4 Agricultural Land Classification

- 123 Planning Policy Wales Edition 11 (PPW11) advises that land with an Agricultural Land Classification of 1, 2 and 3a “should only be developed if there is an overriding, need for the development and either previously developed land or land in lower agricultural grades is unavailable, or available lower grade land has an environmental value recognised by a landscape, wildlife, historic or archaeological designation which outweighs the agricultural considerations.”

- 124 WSE undertook the site search in Pembrokeshire that resulted in the proposed development site being selected in 2013. At that time the only available source of Agricultural Land Classification mapping for the area was the Agricultural Land Classification of England and Wales 1985¹. Therefore, WSE used this to inform its site search process.
- 125 In WSE's Stage 1 study, sites that were classified as Grades 3, 4 or 5, non-agricultural or urban were examined for their suitability.

5.3.3 Findings of Stage 1 Site Screening Study

- 126 Within the site search area 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
- 127 The Figure also shows the Agricultural Land Classification of England and Wales 1985 and associated key.
- 128 The Figure shows that there were a number of areas that were absent of the environmental designations above, were relatively near to the 33kV electricity

¹ <http://publications.naturalengland.org.uk/publication/6172638548328448>

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.

5.3.4 Stage 2 Site Suitability Investigations

- 129 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.

5.3.4.1 Existing Land Use

- 130 While brownfield land is preferred for development there are a number of factors that often result in such land being inappropriate/unavailable for development of a solar park, such as:
- It contains existing buildings that are in use, could reasonably be brought back into use or would be so costly to demolish as to render a solar park development unviable;
 - Even where previous buildings have been demolished the cost of contaminated land remediation would render a solar park development unviable;
 - Due to planning policy requirements for almost all types of development to be directed towards brownfield land, such land is often designated in local development plans for employment uses, which solar parks could not be considered to be, and therefore planning permission is in fact unlikely to be granted;
 - As a result of such designations (or expectations that such designations will be forthcoming) the landowner's expectations regarding sale price or lease rentals render solar parks unviable.
- 131 It is also worthy of note that successive Governments have made it clear that, to assist in meeting the UK's urgent demand, new housing should be built on brownfield land and pledged support to expedite this. Developing a solar park on brownfield land could therefore be at odds with this Government policy.
- 132 However, sites that pass the Stage 1 study criteria above were examined for these constraints during the Stage 2 investigations.

5.3.4.2 Planning Designations

- 133 In addition to employment uses land can be designated in local development plans for a variety of reasons that would not be consistent with the development of a solar park. For example, ecological, landscape or archaeological sites which are not designated at a national or international level but would carry significant weight in the determination of a planning application. Other planning designations might include strategic flood zones.

5.3.4.3 Visual Impact

- 134 The potential visual impact of a proposed development is a very important consideration. Views from sensitive receptors including residential areas, cultural heritage sites, Areas of Outstanding Natural Beauty (AONB) and amenity areas, such as footpaths, must all be assessed. Preference is given to sites where the overall

visibility of the site is limited, or can likely be made so with appropriate visual screening.

5.3.4.4 Access

- 135 Taking into account the size and number of the proposed construction vehicles that will be used it is necessary to find a site which has suitable road access with minimal highway improvements required.

5.3.4.5 Topography

- 136 Output from solar panels is maximised when the panel is angled at between 15 and 35 degrees in a southerly direction and has maximum exposure to direct sunlight. Shading from one row of panels can affect the performance of the row of panels behind it (further north). For this reason, a few metres separation is required between each row of panels. The closer the slope of a site is to the required 15-35 degree angle the less the shading and the less separation which is required. This allows a greater number of panels to be installed in a smaller area. Therefore, a site that is mostly flat or south facing is preferred to a site with a north facing slope, as the area of land required is reduced and the amount of electricity generated per acre of land used is higher.

5.3.4.6 Shading

- 137 Shading of solar panels has the potential to reduce the electrical output from a solar park. Potential shading from boundary trees/hedgerows and buildings is an important consideration, as is longer distance shading caused by topography (e.g. a site in a deep valley would receive less sunlight and therefore generate less electricity than one on top of a hill). Sites which are separated from buildings and which have shorter internal field boundaries are less constrained and are therefore preferred. The issue of shading is closely linked with the size of a site as reduced shading issues means that a reduced site area is needed to produce the same electrical output as a site which is heavily shaded along internal and external boundaries.

5.3.4.7 Size

- 138 The smaller the size of a site relative to the electrical output that can be achieved the better, because this minimises visual impacts and land take. The fewer field boundaries/hedgerows within a site the better, due to the separation distance required from hedgerows and boundaries which could shade the panels and require access for maintenance. Sites with many smaller fields are therefore less appropriate when compared with a site with fewer, but larger fields, as a site with many smaller fields requires a greater overall site area for the same electrical output to be achieved.

5.3.4.8 Public Rights of Way (PRoW)

- 139 While it is possible to limit the impact of a solar park development on users of public rights of way WSE has a preference for sites which are not crossed by numerous public footpaths and bridleways so that potential impacts can be avoided.

5.3.4.9 Cumulative Impacts

- 140 Due to the potential for adverse cumulative impacts with many different types of development including housing, wind farms and other solar projects, land located away from other proposed development projects is preferred.

5.3.5 Findings of Stage 2 Site Suitability Investigations

- 141 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 detailed below.

5.3.5.1 Site 1 - Withyhedge

- 142 This site is in an area that was identified as a mixture of Grade 3 and 4 land and includes a landfill site. WSE established contact with local landowners, one of whom expressed an interest. WSE submitted a grid connection application to Western Power Distribution (WPD), now NGED. However, the offer revealed that there was not sufficient capacity in the nearby 33kV network and a connection would need to be made at Haverfordwest, some 5 km to the south of the site. The offer was therefore not viable and the site was abandoned.
- 143 As a result of this information, WSE also established that it would not be worth pursuing any developments further north of this site, as the same limitations on network capacity would apply. The search area was therefore reduced with this in mind.

5.3.5.2 Site 2 – Chapel Hill

- 144 This site is in an area that was identified as a mixture of Grade 3 and 4 land and included a number of 33kV circuits. WSE established contact with local landowners, one of whom expressed an interest. WSE submitted a grid connection application to WPD and received a viable offer. The offer was accepted and WSE pursued a development, which has now been completed and is operational.

5.3.5.3 Site 3 – Dale Road

- 145 This site is in an area identified as a mixture of Grade 3 and non-agricultural/urban land and includes a number of 33kV circuits. Some of the area is within a National Park. However, WSE identified a parcel of land between two oil refineries that was considered to be uncharacteristic of the wider National Park and potentially suitable for development. WSE established contact with the owner of this land, who expressed an interest. WSE submitted a grid connection application to WPD. However, the offer revealed that there was not sufficient capacity in the nearby 33kV network and a connection would need to be made at 132kV as well as triggering extensive wider network reinforcements. The offer was therefore not viable and the site was abandoned.

5.3.5.4 Site 4 – Martletwy

146 This site is in an area identified as a mixture of Grade 3 and 4 land and is crossed by a 33kV circuit. WSE established contact with local landowners, one of whom expressed an interest. WSE submitted a grid connection application to WPD. However, the offer revealed that there was not sufficient capacity in the nearby 33kV network and a connection would need to be made at Haverfordwest, some 8 km to the northwest of the site, crossing an estuary. The offer was therefore not viable and the site was abandoned.

5.3.5.5 Site 5 – Blackberry Lane, the proposed development site

147 The proposed development site is in an area identified as a mixture of Grade 3 and 4 land and contains a number of 33kV circuits and a 33kV substation. WSE established contact with local landowners, one of whom expressed an interest. WSE submitted a grid connection application to WPD. The offer was accepted and WSE pursued a development.

5.3.5.6 Site 6 – Corseside

148 In addition to our site search exercise WSE was contacted by the landowners of two sites in Pembrokeshire. This site, near Newton, in an area identified as a mixture of Grade 3 and 4 land was within the National Park and, unlike the Dale Road site, was not adjacent to industrial or urban areas. As such, WSE did not consider the site to be suitable and did not pursue it.

5.3.5.7 Site 7 – Clarbeston Road

149 The owner of land near to Clarbeston Road approached WSE with a view to taking forward a development. The site was identified as being in an area with a mixture of Grade 3 and 4 land and not significantly impacted by environmental designations. However, an enquiry to WPD confirmed that the nearest possible point of connection would be at Haverfordwest, some 7 km to the southwest of the site. Therefore, WSE did not consider the site to be suitable and did not pursue it.

5.3.6 Subsequent Developments

150 Following the process above in 2013 the Blackberry Lane (Phoenix Solar Park) 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.

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

152 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.

153 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.

- 154 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

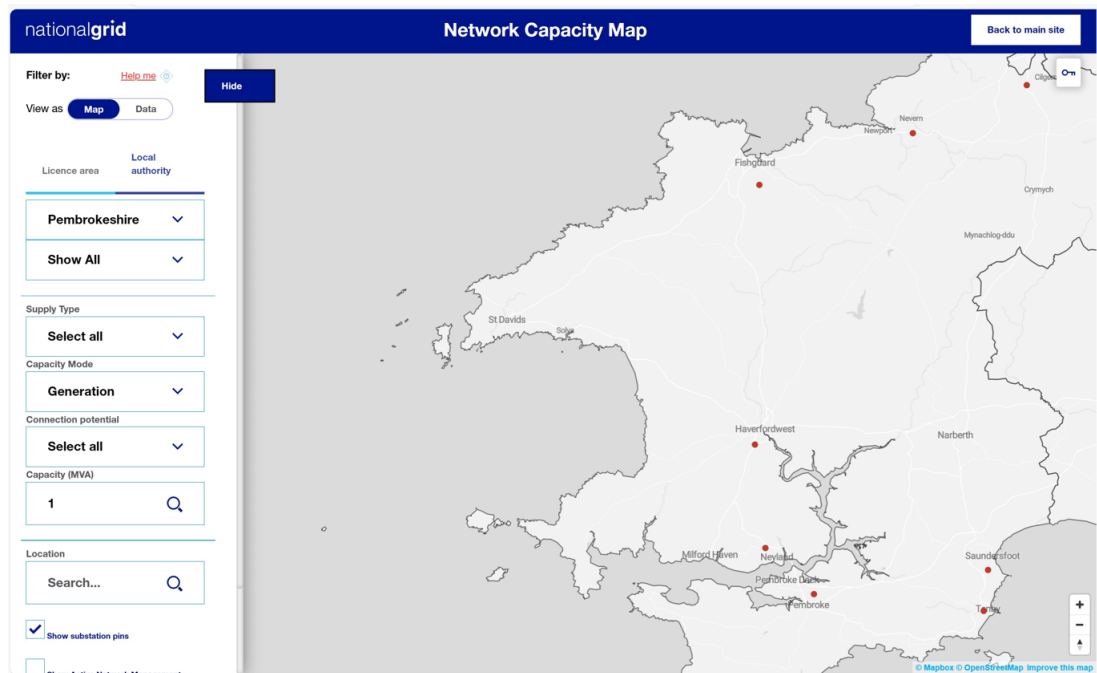
Grade	Hectares	Proportion
2	5.78	41.1%
3a	1.77	12.6%
3b	6.5	46.3%
Total	14.05	100%

5.3.7 Development of alternative sites

- 155 As is clear from the site investigations described in Section 5.3.5, the electricity network was already somewhat constrained in 2013, with most of WSE's applications or enquiries to WPD (now 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 Map² to assist developers in identifying areas with available capacity on their network. A recent extract from this map is provided below for information.

² <https://www.westernpower.co.uk/our-network/network-capacity-map/>

Insert 1: Network Capacity Map Extract



- 156 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.
- 157 Therefore, there are no alternative sites of any Agricultural Land Classification available for development in Pembrokeshire, or indeed west of Swansea.

5.3.8 Alternative land within the development site

- 158 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.”
- 159 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.

- 160 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.
- 161 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.

5.3.9 Conclusion

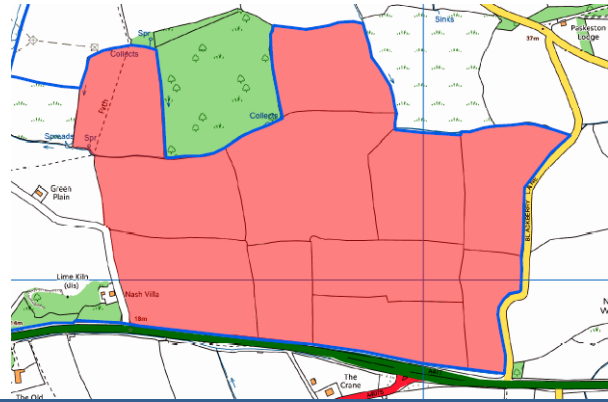
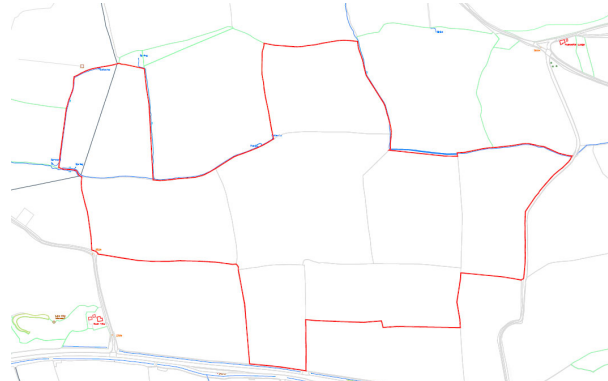
- 162 WSE believes that the site selection study that was undertaken (and detailed above) demonstrates that the development of agricultural land was necessary to facilitate the proposed development. Areas of brownfield/non-agricultural land were considered and found to either be unavailable or unsuitable due to planning designations/existing uses that are not consistent with the development of a solar park.
- 163 Reasonable attempts were made to identify land that was not Best and Most Versatile land.
- 164 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.
- 165 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.
- 166 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.
- 167 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

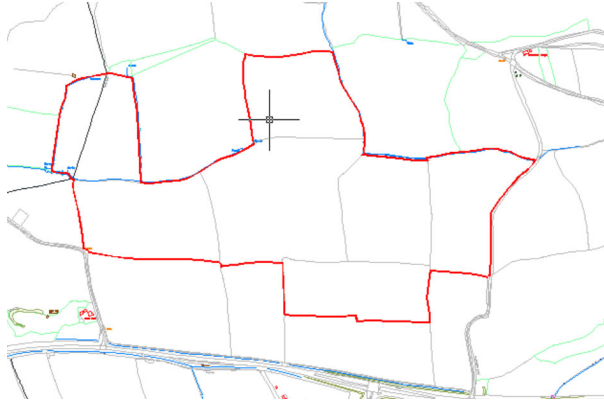
and may in fact result in an improvement in land quality due to regenerative farming practices.

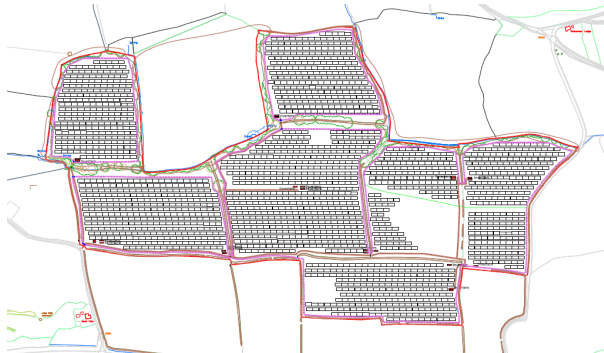
5.4 Development Design

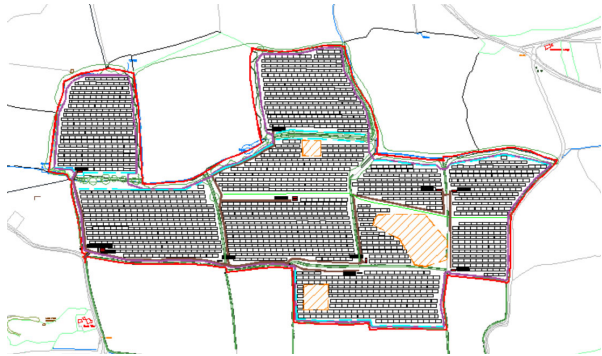
- 168 The purpose of solar PV development is to harness the power of the sun to generate electricity. The optimum design is therefore to locate solar PV arrays in areas exposed to the highest levels of solar irradiation.
- 169 The identification of environmental effects is an iterative process, running 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.
- 170 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.
- 171 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.
- 172 This iterative process has led to the Development design presented in Chapter 6: Development Description of this ES.
- 173 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.
- 174 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.
- 175 The Design Principles and the development design described in Chapter 6: Development Description has been achieved following a number of key layout iterations, which are summarised in Table 5.2, and shown in Plates 5.1 and 5.2 below, and Figure 1.2 (the Application layout). Although the summaries in Table 5.2 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 5-2: 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)	The initial boundary was selected in the absence of detailed data from environmental assessments. 
EIA Screening, Scoping and Pre-Application Layout (January 2020)	Site Area: 36.9 ha No. Fields: 8 Inverters: 22 Transformers: 22 Output: 22MW(AC)	Due to improvements in technology a reduction in site area could be applied to the 2013 site boundary. The south western most field was removed to increase the separation between the proposed Development and Nash Villa. 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. 

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	Following the completion of a range of environmental surveys and assessments: • ALC • Tree survey • Ecology survey • Archaeological trenching and evaluation • Cultural heritage Impact Assessment • LVIA A further reduction to the site area was made and an initial design developed.  An additional field was removed from the site area. This field was identified as being entirely grade 2 agricultural land. 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. 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

Iteration	Parameters	Comment
		and an additional hedgerow was proposed. 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. Inverter cabins and the control building were located to minimise potential visual impacts and the length of new track needed. 
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

Iteration	Parameters	Comment
DNS Submission Layout	Site Area: 34.25 hectares No. Fields: 7 Inverters: 12 Transformers: 12 Output: 22MW(AC) No. Panels: c.70,000	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. 
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	

5.5 Consideration of Alternative Equipment and Technology

5.5.1 Do Nothing Scenario

- 176 In the absence of proposals for the Development, it is assumed that the site would continue to be managed as it is currently, as arable farmland. The future baseline would include this, along with the effects of climate change, as set out in Chapter 14: Climate Change. All effects that the Development would have, both adverse and beneficial, including those assessed in this ES as well as effects in terms of meeting planning and energy policy and effects on the electricity market, would not occur.

5.5.2 Design Considerations and Alternatives

5.5.2.1 *Single Axis tracking vs Fixed Tilt*

- 177 Two types of solar panel racking systems were considered early in the design stage of the Development. These were fixed-tilt and single-axis tracker. Fixed-tilt system positions the modules at a “fixed” tilt and orientation, while solar tracker systems automatically adjust the positions of the PV array so that the PV modules consistently “track” the sun throughout the day.
- 178 Tracker systems are subject to additional technical viability issues compared to fixed tilt, including wind loads and site topography.
- 179 Tracker systems are now capable of withstanding wind speeds up to 135MPH at 3-second gusts but, although the tracker can withstand these high wind speeds, the modules would be stowed in a flat position when gusts exceed 60MPH, resulting in production losses.
- 180 Site topography also limits tracker viability because trackers need to be installed in relatively flat locations. Each tracker segment is typically 250-275ft (72-80 PV modules) in length and cannot be installed at grades exceeding 5-6%. Additionally, ground undulations within the tracker segment need to be levelled to a certain tolerance resulting in additional ground works across a site. This means that sites with sloping or non level terrain would require extensive grading resulting in additional construction costs and potential environmental impacts.
- 181 In addition to the above, tracker systems also require a greater land take at approximately 5.5 acres per MWdc installed compared with approximately 3 acres per MWdc installed for a fixed tilt system.
- 182 Taking all of the above factors into account for the Development site, the fixed tilt system was selected.

5.5.2.2 *Inverter Cabin Locations*

- 183 During the design stages of the Development, various inverter locations were considered.

- 184 The selected locations of the inverter cabins mean that the need for new access track is minimised across the site while taking other environmental constraints into account. This reduces habitat loss and construction material usage.
- 185 The cabins are located close to existing and proposed vegetative screening and avoid high ground where possible, reducing potential visual impacts.
- 186 In order to minimise potential ecological impacts and protect existing trees and hedgerows, the cabins are not located within 5m of the centreline of any existing hedgerow and are not within the root protection area of any existing hedgerow or tree.

5.5.2.3 Control Building Location

- 187 The selected location for the control building links the Development with the point of connection into the local distribution network along the shortest route possible while minimising potential environmental impacts. This reduces the need for excessive underground cabling and disruption and avoids habitat loss.
- 188 The location also minimises the need for hardstanding tracks required to reach the control building during operation, minimising habitat loss and construction material usage.
- 189 The building is located close to existing vegetative screening in order to minimise any visual impacts but avoids the root protection areas of existing trees and hedgerows, again minimising any potential ecological impacts.

5.5.2.4 Fencing

- 190 Many different fencing options are available which would provide security and stock proofing. The selected fencing design is similar to deer fencing with stock proof mesh for the first meter from ground level. This provides security for the site while providing safe fencing for sheep to graze without becoming trapped. It also avoids the need for more industrial style metal rail security fencing which can be more intrusive and result in additional adverse visual impacts.
- 191 The route of the fencing around the site is such that it avoids the root protection areas of all existing trees and hedgerows except where it passes through existing gateways. This minimises potential ecological impacts and allows the retention of existing trees and hedgerows which provide screening benefits across the site.
- 192 Sufficient distance has been allowed between the fencing and the existing hedgerows and trees such that maintenance of the buffer strips is possible using standard machinery. This means that effective habitat creation and management can be implemented across the site as detailed within the Landscape and Ecological Management Plan (Appendix A9.4).

5.5.3 Consideration of Alternative Low-Carbon Forms of Electricity Generation

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

5.5.3.1 Energy Storage

194 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.

195 In May 2016 National Grid, in their role as System Operator, confirmed that studies and technical data have revealed that;

“the Transmission Network in South Wales had reached capacity under peak conditions, resulting in new connections being limited in the short term as a result. These limits apply to connecting further generation technologies relied upon to generate at peak demand periods such as market driven storage, as in the short term there will not be capacity available for storage providers to sell energy back to the network on peak. However, renewable types of generation such as solar and wind can continue to connect, utilising existing capacity.”

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

5.5.3.2 Wind Farm – Onshore

197 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.

5.5.3.3 Smaller-scale solar PV development

198 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 Introduction

- 199 This Chapter of the ES describes the Development. It provides a description of the existing Development site and the physical characteristics of the Development for the purpose of identifying and assessing the likely significant environmental effects resulting from the Development. It also describes the proposed programme of site preparation, construction and decommissioning works for the Development and the key activities that would be undertaken during the works to inform the prediction of likely significant environmental effects set out in the technical Chapters.
- 200 This Chapter is supported by the following figures provided in the Environmental Statement Volume 3:
- Figure 1.1: Site Location Plan
 - Figure 1.2: Site Layout Plan
 - Figure 6.1 Indicative Mounted Panel Dimensions
 - Figure 6.2a Inverter Cabin
 - Figure 6.2b Control Building
 - Figure 6.3 Access Track Cross Section
 - Figure 6.4 Security Fence (Deer Fence)
 - Figure 6.5 Security Camera Details
- 201 This Chapter is also supported by the following Technical Appendices provided in Environmental Statement Volume 2:
- Technical Appendix A5.2: Agricultural Assessment Report;
 - Technical Appendix A6.1: Outline Decommissioning and Restoration Plan;
 - Technical Appendix A9.4: Landscape and Ecological Management Plan; and
 - Technical Appendix A13.1: Draft CTMP
- 202 It also makes reference to the following documents:
- Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) DRN BL009.

6.2 The Site

- 203 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).
- 204 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).
- 205 The proposed Solar Park site falls within the jurisdiction of Pembrokeshire County Council (the Council), and the relevant Community Council is Cosheston.
- 206 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 map³ 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.
- 207 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.
- 208 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).
- 209 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 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).
- 210 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

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

approximately 1.5 km to the south. Further information on cultural heritage / archaeology is provided in Chapter 10 (Cultural Heritage / Archaeology).

- 211 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.

6.3 The Project

- 212 Due to the rapid pace of technological development in the solar photovoltaic (PV) industry, it is necessary to provide flexibility in the Development Description Chapter of this ES, to allow for the most up to date technology possible to be utilised by the Development at the time of construction. In some cases, the Development could utilise technology which does not currently exist such as more powerful panels.
- 213 The design principles are broad, allowing for flexibility in the Development design. Therefore, a set of realistic worst-case design parameters have been developed, which in all cases fall within the bounds of the design principles but are more specific to allow for robust assessment of likely significant effects to be undertaken within this ES.
- 214 An example of this is the angle of slope of the solar PV modules. The maximum height of the solar PV modules is the limiting design principle, but for the purposes of assessment, a parameter for the angle of slope is also required, e.g. to inform the three-dimensional model used to produce the photomontage visualisations and glint and glare assessment. The height of the solar PV modules is partly governed by the angle of slope. This means that although the angle of slope is not fixed, future adjustments to it are limited by the maximum height design principle and would only result in a reduction in overall height and a subsequent reduction in potential impacts to those identified and assessed.
- 215 The relationship between panel size and output can affect the design of a proposed development. For example, slightly larger panels may have a greater output but can also be restrictive in terms of the area required for their installation, reducing the overall output of a site. Conversely, greater output would result in the need for fewer panels, but if these particular panels were no longer manufactured at the time of construction then more, smaller panels would be required, which would increase land take for a reduced output and result in potentially more significant environmental impacts. Taking the above into consideration a combined scenario is presented as the design for the Development.
- 216 The chosen design assumes a worst case of more, lower output panels. These result in the maximum land take across the site. However, installing fewer, greater output panels is a viable option on the site in order to maximise electrical output and would likely be the chosen design for economic reasons. For this reason, the maximum output is also assumed as part of the design so as not to restrict future export from

the site. This combination presents a realistic case while allowing for the assessment of a worst-case scenario for potentially adverse environmental impacts.

- 217 It is also likely that fewer inverter cabins may be required, as technology improves and equipment sizes reduce. A worst-case assumption of one inverter for every 2MW has been assumed as this would require the maximum land take and result in the greatest number of structures. However, other options may be available in the future which would require even fewer inverters to be installed.
- 218 Following this approach will ensure that the findings of this ES will apply to the final design of the Development as-built and any adverse effects will be no worse than predicted.
- 219 For clarity, 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	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. 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.
Onsite Access Track	The onsite access track would be constructed from compacted stone or aggregate. The total length of the onsite access track will be approximately 865m.
Temporary Site Compound / Laydown Area	The Temporary Site Compound / Laydown Area would be approximately 1600 m², 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.

6.3.1 Project Description

- 220 PV technology is uncomplicated. The proposed Solar Park will comprise approximately 25,500 panels. There will also be up to 5 inverters and transformers that will be housed in dedicated cabins.
- 221 The PV panels to be used at the site will be of the order of 2210 mm (l) x 1200mm (w). The panels will be positioned at an angle of approximately 22° and will have a height of no more than 3.5 m from the ground to the top of the panel. It should be

noted however that the final selection of the exact type and size of PV panels and the number of inverters will be subject to confirmation through a competitive tendering process.

- 222 Figures showing the front, side and plan profiles of the selected PV panel designs are provided in Figures 6.1.
- 223 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 Figure 1.2 along with an indicative site layout. Elevations of these proposed buildings are shown on Figure 6.2a.
- 224 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 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 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 Chapter 16 of this ES as they are an integral part of the proposed Development.
- 225 To construct and service the Solar Park a new 6.3. Construction roads will be about 3 m nominal width and will be placed to avoid known 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 865m and constructed from compacted stone or aggregate as detailed in Figure ground hazards and environmental constraints at the site, in addition to steep gradients.
- 226 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.
- 227 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 Figure 6.4 and Figure 6.5.

6.4 Project Layout

- 228 Throughout the development of the proposed Development design, Wessex Solar Energy has sought to minimise the impact of the Solar Park, especially the impacts associated with landscape and visual amenity, ecology and cultural heritage.
- 229 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.

6.5 Site Access

- 230 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.
- 231 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.

6.6 Construction of the Project

- 232 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.
- 233 Wessex Solar Energy may retain the services of specialist advisors with regards to ecology and archaeology for the construction period, if this is considered appropriate at the time.
- 234 The contract for supply, construction and commissioning of the Solar Park will be awarded through a competitive tendering process to one or more contractors who may in turn appoint specialist subcontractors. The main contractors and subcontractors will be responsible for all the detailed design, civil construction, manufacture, supply, delivery to site, off-loading, erection, installation and commissioning of the PV panels, inverters and associated structures. The selection of the construction contractor will include an assessment of the contractor's record in dealing with environmental issues and require provision of evidence that it has incorporated environmental requirements into its methods statements.
- 235 The main contractors will be responsible for organising the site construction and installation works to the required safety standards and the programme.
- 236 Wessex Solar Energy will require, among other things, that the site contractor nominates an Environmental Site Manager and Site Waste Manager for the duration of the construction and commissioning phase.

- 237 The contractor would also be responsible for training its personnel in spill prevention and control and, if an incident occurs, would be responsible for containment and clean-up. Spills would be addressed in accordance with the Working Practice Procedures.
- 238 An individual will be nominated who will be responsible for the site management and all aspects of the work. An information board will be displayed in a publicly accessible location at all times and will give the name and telephone number of the developer's site representative. Warning signs would be erected to inform and protect members of the general public of the construction works being undertaken.
- 239 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
- 240 Any deviations from these times will be agreed in advance with the Local Authority.
- 241 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.
- 242 In order to minimise disturbance, the limited site access tracks will be constructed first. This is estimated to take between one to two weeks and would involve the creation of a small area of hard standing / gravel next to which the inverters / transformer would be located. The onsite roads leading to this area would likely comprise a Geogrid, interlocking plastic honeycomb structure that would allow grass to grow on the track whilst still proving a hard surface that would allow access by on site construction traffic.
- 243 A temporary wheel washing facility will be installed on site to prevent transfer of soil onto nearby public roads, if found to be necessary.
- 244 A temporary site compound would then be constructed for the parking of construction vehicles and equipment, staff vehicles, and the storage of materials including PV

- panels and other components. A temporary office and welfare facility, including a portaloo would also be installed.
- 245 Trenching, installation of underground services and provision of temporary construction facilities and services can then take place.
- 246 Once the access tracks and site compound are in place, foundation / skid mount construction would commence. The excavation and construction of the foundations/skid mounts is expected to take approximately 2 weeks.
- 247 The delivery of the PV panels would then commence as would the installation of the panel supports and security fence. Supports would be driven into the ground to a depth of approximately 1.5 m.
- 248 After construction has been completed, the laydown areas would be restored as closely as possible to their original condition.
- 249 The construction contractor will provide his own skips which will be clearly labelled and designated for a specific type of waste. Any recyclable waste will be taken off site for reprocessing where possible. All skips will be kept covered to reduce dust being blown around the site. It is not anticipated that soils will need to be removed from the site following the creation of any foundations for the electrical buildings but will instead be used for any site re-instatement works following the completion of construction.
- 250 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.

6.7 Construction Control Mechanisms

6.7.1 Traffic Management

- 251 A 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 Technical Appendix A13.1.
- 252 Details of the traffic movements expected and staff numbers are given in Chapter 13: Access and Traffic. These include maximum expected numbers of vehicle movements per day, which have been used as the candidate scenario for assessment purposes.
- 253 HGV delivery hours are restricted to avoid peak times at sensitive receptors on the delivery route.

6.7.2 Construction Environmental Management Plan

- 254 A 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.
- 255 The CEMP brings together control measures that are commonly included in documents such as working hours, Site Waste Management Plans, Pollution Prevention Plans and Codes of Construction Practice and includes a tabulated executive summary for easy reference during the construction phase.
- 256 Core working hours are proposed to be between 08.00 until 18.00, Monday to Friday.
- 257 The CEMP will be embedded in the Development design and the assessment of effects will assume that the measures contained within the CEMP are implemented in full.

6.7.3 Temporary Construction Compound

- 258 The temporary construction compound of approximately 1600 m² 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.
- 259 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.

6.8 Operations and Maintenance

- 260 The Solar Park is expected to have an operational life of approximately 40 years.
- 261 The operation of the Solar Park will be undertaken in accordance with an Operational Environmental Management Plan (OEMP).

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- 262 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.
- 263 The availability of the PV panels to operate will be close to 100 per cent of daylight hours. Forced outages can occur due to the malfunction of mechanical or electrical components or computer controls, although this would be very infrequent.
- 264 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.
- 265 In the event of a fault, the modular design of solar panels allows them to be rapidly replaced.
- 266 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.
- 267 A sign would be located at the access point to site and would provide information about the installation and contact telephone numbers.
- 268 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.
- 269 Further details on how grazing will be used to manage vegetation are set out in ES Technical Appendix A9.4; Landscape and Ecological Management Plan.

6.9 Decommissioning

- 270 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.
- 271 There are several aspects of the decommissioning phase which may have environmental effects. The main activities will comprise:
- Removal of PV panels, inverter/transformer cabins and foundations, and associated equipment;
 - Reuse / recycling / disposal of the above; and
 - Removal of cable and ancillary structures.
- 272 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.
- 273 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.
- 274 The first step of decommissioning would be to make the site safe for work in accordance with the normal safety procedures, such as the issue of permits to work. The Solar Park would be de-energised in conjunction with the DNO. Once the site is completely disconnected, it will be handed over to a competent contractor (or contractors) to complete the dismantling and demolition work. The lead contractor would produce safety and environmental management plans for the work.
- 275 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.
- 276 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.
- 277 Disposal of all waste materials will only be via appropriate and authorised routes.
- 278 Decommissioning would be timed to minimise its environmental impact, for example by avoiding the bird breeding season.
- 279 The effects of decommissioning are similar to, or often of a lesser magnitude than, construction effects and are considered as such in the relevant Chapters of this ES.

7 Planning Policy Context

7.1 Introduction

280 This Section provides the planning policy context relevant to the development of the proposed Solar Park. This Section covers:

- The Planning Framework;
- National Planning Policy; and,
- Local Planning Policy.

7.2 The Planning Framework

281 The Planning and Compulsory Purchase Act 2004 requires that all planning decisions are 'plan led'. The Act also provides the statutory basis for the 'plan led' system and is particularly important in that it establishes a statutory purpose for planning, namely the achievement of sustainable development. Section 38(6) of the Act states that

"...if regard is to be had to the development plan for the purpose of any determination to be made under the Planning Acts the determination must be made in accordance with the plan unless material considerations indicate otherwise".

282 In essence, any consideration which relates to the use and development of land is capable of being 'material'

283 The Act also outlines in detail in Part 6 the requirements of the Welsh Government in terms of putting Planning Policy in place in terms of the "National Development Framework for Wales". Parts of the framework relevant to the proposed development are discussed further later in this document as appropriate:

7.2.1 National Planning Policy & Guidance

284 There are a number of documents that are relevant to the project in terms of national planning policy and guidance. These are addressed below.

7.2.1.1 Welsh Renewable Energy Policy

285 The Welsh Government's Policy Statement "A Low Carbon Revolution: Wales Energy Policy Statement" (March 2010) sets out the aims of the Government's renewable energy policy as well as advice to Local Planning Authorities on its implementation.

286 The Policy Statement sets ambitious targets for the deployment of renewable energy in Wales. While it is mostly focussed on the development of wind energy projects this is primarily because other forms of renewable energy were not perceived to be widely available or cost effective at the time. Due to technology improvements and

cost reductions the deployment of solar energy projects in the UK is now cost effective and is indeed widespread and rapidly expanding.

7.2.1.2 *Wales Spatial Plan*

- 287 As a statutory requirement of the Planning and Compulsory Purchase Act 2004 the Welsh Government was required to produce a Spatial Plan for Wales to set out the strategic framework to guide future development and policy in Wales. The Wales Spatial Plan: People, Places Futures was adopted by the National Assembly for Wales in November 2004, covering a 20-year period, and was updated in July 2008.
- 288 The Plan aims to align infrastructure investment with spatial development in the 'Pembrokeshire - The Haven' region, i.e. the region within which the proposed solar farm is located. There is little of the documentation that is especially relevant to the proposed development albeit that it does aim to facilitate "diversification of the energy sector."

7.2.1.3 *Future Wales: The National Plan 2040 (draft)*

- 289 The National Plan is currently in draft and sets out where the Welsh Government think the country should try to grow and the types of development needed over the next twenty years to help Wales be a sustainable and prosperous society. It is understood that the Minister intend to ensure FW2040 will be in place by February 2021
- 290 The plan states that “
- “The challenges of climate change demand urgent action on carbon emissions and the planning system must help Wales lead the way in promoting and delivering a competitive, sustainable decarbonised society. Decarbonisation and renewable energy commitments and targets will be treated as opportunities to build a more resilient and equitable low-carbon economy, develop clean and efficient transport infrastructure, improve public health and generate skilled jobs in new sectors.”*
- 291 Naturally as a national level document the content is relevant mostly in broad terms. Of particular relevance to the proposed Phoenix Solar Park are the following policies which are replicated in full in Appendix A:
- Policy 8 – Strategic framework for biodiversity enhancement and ecosystem resilience”;
 - Policy 11 – Wind and Solar Energy Outside of Priority Areas for Solar and Wind
- 292 It is considered that the project is supported by these policies which require that projects do not give rise to unacceptable environmental impacts, something which is demonstrated by the various studies that are reported within the Environmental Statement.

293

7.2.1.4 *Planning Policy Wales 10 (2018)*

- 294 The Planning Policy Wales (PPW10) document (2018) contains land use planning policies for Wales and sets out the framework for Local Authorities to prepare their development plans and is a material consideration in the determination of planning applications.
- 295 The document makes significant references to the need to move to a low carbon, renewable energy based economy in Wales and strongly recognises the issues associated with our changing climate.
- 296 It also sets a renewable energy target for Wales to generate 70 per cent of its electricity consumption from renewable energy by 2030, something that will require rapid deployment of projects such as the proposed Solar Park if it is to be achieved.
- 297 The document identifies the benefits of renewable and low carbon energy, as part of the overall commitment to tackle climate change and increase energy security recognising it to be of “paramount importance”. It goes on to say that:

“The planning system should:

- integrate development with the provision of additional electricity grid network infrastructure;*
- optimise energy storage;*
- facilitate the integration of sustainable building design principles in new development;*
- optimise the location of new developments to allow for efficient use of resources;*
- maximise renewable and low carbon energy generation;*
- maximise the use of local energy sources, such as district heating networks;*
- minimise the carbon impact of other energy generation; and*
- move away from the extraction of energy minerals, the burning of which is carbon intensive.”*

298 With specific regard to renewable energy the document starts that:

“Planning authorities should facilitate all forms of renewable and low carbon energy development. In doing so, planning authorities should seek to ensure their area’s full potential for renewable and low carbon energy generation is maximised and renewable energy targets are achieved.....

....Planning authorities must develop an evidence base to inform the development of renewable and low carbon energy policies. Planning authorities should:

- take into account the contribution their area can make towards the reduction of carbon emission and increasing renewable and low carbon energy production;*
- recognise that approaches for the deployment of renewable and low carbon energy technologies will vary;*

- *identify the accessible and deliverable renewable energy resource potential for their area, including heat, and consider the likely utilisation of this resource over the plan period;*
- *assess the social, economic, environmental and cultural impacts and opportunities arising from renewable and low carbon energy development;*
- *take into account the cumulative impact of renewable and low carbon energy development and their associated infrastructure, for example grid connections;*
- *identify criteria for determining applications for sites based on their installed capacity;*
- *engage with the renewable energy development industry and consider the deliverability of schemes;*
- *take into account issues associated with grid connection (see Grid Infrastructure section) and the transportation network; and*
- *consider local and strategic priorities for renewable energy.”*

299 It is clear PPW in principle strongly supports to fight to combat climate change through the uptake of renewable energy generation such as the proposed Solar Park.

7.2.1.5 *Welsh Government – Technical Advice Notes*

300 The Welsh Government has produced Technical Advice Notes (TANs) which should be read alongside the PPW document, both of which should be taken into account by Local Authorities when they are preparing development plans and determining planning applications.

301 TANs of relevance to the proposed Solar Park include:

- TAN 5 – Nature Conservation and Planning: The TAN describes how Local Authorities should have regard to the need to safeguard ecological characteristics (e.g. protected species). The proposed Solar Park is not predicted to have adverse impacts on habitats or protected species (Chapter 9 of this Environmental Statement contains a detailed assessment).
- TAN 6 – Agriculture and Rural Development: This TAN outlines who Local Authorities should consider the quality of agricultural land as well as other agricultural aspects. The studies for the proposed Solar Park includes an assessment of land quality. The reasons for the use of the site are discussed within the Agricultural Assessment Report (ES Volume 2 A5.2).
- TAN 8 – Renewable Energy: This TAN provides a number of recommendations for Local Authorities to consider when determining applications for renewable energy developments. Specifically relating the solar PV developments the TAN states that “Other than in circumstances where visual impact is critically damaging to a listed building, ancient monument or a conservation area vista, proposals for appropriately designed solar thermal and PV systems should be supported” Chapter 10 of this Environmental Statement contains a detailed assessment of potential impacts on cultural heritage assets and concludes that there will be no unacceptable adverse impacts on such assets.
- TAN 18 – Transport: TAN 18 provides guidance on the integration of transport and land use planning; integration between different types of transport;

integration of transport policy with policies for the environment, education, social justice, health, economic development and wealth creation. Chapter 13 of this Environmental Statement provides an assessment of the potential impacts of the development on the transport network.

7.2.1.6 *Other guidance and relevant material*

Planning Implications of Renewable and Low Carbon Energy February 2011

302 In addition to Tan 8, the Welsh Government Practice Guidance: Planning Implications of Renewable and Low Carbon Energy February 2011 is worthy of note. It summarises the potential impacts of solar parks and possible options for mitigation and enhancement measures as part of any projects based in Wales. Specifically, it highlights the need to address the following issues as appropriate.

- Landscape and visual;
- Glint and glare;
- Ecology;
- Historic environment;
- Agriculture;
- Hydrology and flood risk; and
- Cumulative impacts.

Well Being of Future Generations (Wales) Act 2015

303 During the course of the scoping of the EIA it was also highlighted that consideration may need to be given to the Well Being of Future Generations (Wales) Act 2015.

304 The Act places a duty on public bodies to place the principles of sustainability and sustainable development at the heart of its decision-making processes. It also makes it clear that the global effort to combat climate change is of critical importance in decision making. Its objectives can be summarised as follows:

“A Prosperous Wales

- *Promoting resource-efficient and climate change resilient settlement patterns which minimise land take and urban sprawl, especially through the reuse of suitable previously developed land and buildings, wherever possible avoiding development on greenfield sites;*
- *Play an appropriate role to facilitate sustainable building standards;*
- *Play an appropriate role in securing the provision of infrastructure to form the physical basis for sustainable communities;*
- *Support initiative and innovation and avoid places unnecessary burdens on enterprises so as to enhance the economic success of both urban and rural areas, helping businesses to maximise their competitiveness; A Resilient Wales*

- *Contributing to the protection and improvement of the environment, so as to improve the quality of life, and protect local and global ecosystems;*

A Healthier Wales

- *Contribute to the protection and, where possible, the improvement of people's health and wellbeing as a core component of achieving the well-being goals and responding to climate change; A More Equal Wales*
- *Promoting access to, inter alia, employment, shopping, education and community facilities and open and green space, maximising opportunities for community development and social welfare;*
- *Promote quality, lasting, environmentally-sound and flexible employment opportunities;*
- *Respect and encourage diversity in the local economy;*

A Wales of Cohesive Communities

- *The location of development so as to minimise the demand for travel, especially by private car;*
- *Fostering improvement to transport facilities and services which maintain or improve accessibility to services and facilities, secure employment, economic and environmental objectives, and improve safety and amenity.*
- *Fostering social inclusion by ensuring that full advantage is taken of the opportunities to secure a more accessible environment for everyone that the development of land and buildings provides. This includes helping to ensure that the development is accessible by means other than the private car;*

A Wales of Vibrant Culture and Thriving Welsh Language

- *Helping to ensure the conservation of the historic environment and cultural heritage;*
- *Positively contribute to the well-being of the Welsh language; A Globally Responsive Wales*
- *Support the need to tackle the causes of climate change by moving towards a low carbon economy."*

305 The importance of the policy was highlighted by the Welsh government in for form of a letter from the Minister for Natural Resources Letter to Planning Lead Members, Chief Planning Officers and Planning Inspectorate Wales dated 15th March 2016

306 In the letter the Minister states:

"When taking decisions on local planning policies and individual development management decisions consideration should be given to the overall context of helping to tackle climate change and delivering the sustainable development duty placed on all public bodies by the Well-being of Future Generations (Wales) Act. This needs to happen for all renewable energy and low carbon technologies and at all

scales from nationally significant projects to community and individual building scale schemes.

Our planning policies in Planning Policy Wales (PPW) are clear that the planning system should support the transition to a low carbon society and that local planning authorities should facilitate the development of all forms of renewable and low carbon energy. In addition, PPW states that the economic benefits associated with a proposed development are understood and these are given appropriate consideration in the decision-making process.

I appreciate that visual and amenity impact on surrounding communities and properties is an important issue (and policies are in place to protect against unacceptably adverse impacts) and that discussions of this nature can become quite emotive during the planning process.

However planning decisions need to be taken in the wider public interest and in a rational way, informed by evidence, where these issues are balanced against other factors. At the larger scale, the new Developments of National Significance (DNS) system, introduced on 1 March will consider these issues on a strategic level for energy projects, taking into account policies in development plans and Planning Policy Wales.”

7.3 Local Planning Policy

7.3.1 Pembrokeshire Local Development Plan

- 307 The proposed Solar Park site falls within the jurisdiction of the Pembrokeshire County Council. Therefore, at the local level relevant planning documentation is that contained in the Pembrokeshire County Council Local Development Plan (LDP) which was adopted in February 2013. It should be noted that the council is in the process of its review of the plan which commenced in 2017.
- 308 A revised LDP is due to be adopted sometime in late 2021 depending on the impacts of Covid-19 to the inspection process. For the purposes of this report, it is assumed that it is the existing LDP policies that carry the most weight.
- 309 From a review of the proposals maps contained within the LDP the only policy which is directly applicable to the site itself is Hard Rock Resource Policy GN22. However, there are a series of other policies that re considered to be relevant more generally to the project site. The list of policies considered to be relevant include:
- SP 1 Sustainable Development
 - SP 11 Waste
 - SP 16 The Countryside
 - GN.1 General Development Policy
 - GN.2 Sustainable Design
 - GN.3 Infrastructure and New Development

- GN.4 Resource Efficiency and Renewable and Low-carbon Energy Proposals
 - GN.10 Farm Diversification
 - GN.22 Prior Extraction of the Mineral Resource
 - GN.37 Protection and Enhancement of Biodiversity
 - GN.38 Protection and Enhancement of the Historic Environment
- 310 The various policies outlined above are replicated in the Planning Statement (DRN BL006) along with a commentary on where the policy is relevant to the project and where additional information is provided in the various documents that accompany the planning application.
- 311 In addition to the core LDP there are relevant local council guidance notes and baseline documents as follows:
- Pembrokeshire County Council Landscape Character Assessment (Consultation Draft), July 2019
 - Renewable Energy Supplementary Planning Guidance (SPG) (Oct 2016).

Renewable Energy Supplementary Planning Guidance (SPG) 2016

- 312 The Renewable Energy Supplementary Planning Guidance notes the following as being relevant to solar park planning applications. The EIA has addressed considerations where relevant to the project and its site.

“Application Considerations: Pre Application considerations:

- *Equipment detail & design (expected output, equipment typology, colour, finish, etc);*
- *Scale - Landscape context & character (LANDMAP, Landscape Management Plan);*
- *Landscape sensitivity (PCNPA, Landscapes of Historic Importance, statutory designations, etc);*
- *Quality & Grading of Agricultural Land;*
- *Visual Impact Assessment, sightlines, photomontages (consider the impact on the skyline, important vistas, landscape openness / vegetation / tree cover);*
- *Glint/Glare & consideration of night time lighting for security purposes;*
- *Sensitivity of receptors – Local resident / tourists / business;*
- *Social & economic impact (business impact/ diversification/ local community benefits);*
- *Natural environment, ecology & ornithology (Ecological Management Plan);*
- *Hydrology (Drainage, Flood Consequences Assessment, etc) Telecommunications & HSE constraints, including aviation / radar / rail, MOD constraints, etc;*
- *Electronic communication interference;*
- *Pollution considerations;*
- *Access information, including a Construction Method Statement & Management Plan & a Transport Management Plan where appropriate;*

- Screening / EIA;
- AA / HRA;
- Cumulative Impact considerations, including the relationship to other solar & consented renewable schemes, and to other large structures within the landscape context, taking care to avoid cluttering or visual discord. Cumulative impact can also include the impact on the natural and historic environment, etc”.

7.4 Key Planning Considerations

313 As noted above, there are several policies at a local level which have been identified as being relevant to the proposals and are therefore important to address in the determination of the planning application for the proposed Solar Park. Whilst these policies have individually been discussed within the Planning Statement (DRN BL006), this section considers them together within the context of other broader issues. National policies by their nature are broader and are discussed as required in the text below.

7.4.1 Climate Change

- 314 Both the UK and Welsh Governments have declared climate emergencies in response to the threat of global climate change as have Pembrokeshire County Council in May 2019. In their meeting where Pembrokeshire’s climate emergency was declared county councillors also stated a desire for the council to become a net zero carbon local authority as early as 2030.
- 315 The declaration of climate emergencies is of course just the latest policy position in a long pattern of governments and council putting in place the measures to combat climate change and the greenhouse gases that drive that change.
- 316 The imperative to switch to a low carbon economy and tackle climate change has been reinforced time and again including, as discussed in Section 2, by the Minister for Natural Resources who emphasised the need to reflect the “Well-being of Future Generations (Wales) Act” in decision making on renewable energy projects.
- 317 The Phoenix Solar Park would make a significant contribution to the fight against the emission of greenhouse gases through the provision of clean, renewable energy providing on **average 7,825** homes with electricity.
- 318 It is considered that there is a clear policy commitment at all levels of government to combatting the emission of greenhouse gases that lead to climate change. This is a significant material consideration that favours the Phoenix Solar Park being awarded planning consent.

7.4.2 Uptake of Renewable Energy

- 319 There are international and national targets for both the development of renewable energy projects and the reduction of greenhouse gas emissions. If these targets are to be achieved, a quick, sustained, and substantial acceleration is needed in the

development of renewable energy projects, with solar energy making an important contribution.

- 320 These targets exist not only to combat climate change but also to help ensure that the UK becomes less dependent of energy sources overseas and that the generation of electricity becomes more localised adding to its sustainability.
- 321 These targets are backed up by a wealth of national and local policy that support the active update on renewable energy. At a local level the Local Development Plan includes a policy in the form of GN4 that strongly supports development which enable the supply of renewable energy through environmentally acceptable solutions.
- 322 It is considered that the proposed Solar Park has the potential to help the Council and the Country meet renewable energy targets whilst avoiding the installation of relatively more intrusive renewable energy projects, such as onshore wind farms.

7.4.3 Contribution towards Sustainable Development

- 323 Renewable energy projects, such as the proposed Solar Park, provide local supplies from green, carbon-neutral sources. These projects are very much a demonstration of sustainable development in action. The development of renewable energy projects is essential in contributing to national targets for renewable energy generation.
- 324 In addition, through displacing electricity currently generated by fossil-fuel fired power plants, the proposed Solar Park will avoid the emission of pollutants (including CO₂, SO₂ and NO_x) associated with such power plants.
- 325 Solar Parks also represent embedded electricity generation, feeding renewable energy into the grid, invariably at closer to the point of use, therefore often removing the need for extensive additional transmission lines and reducing the transmission losses associated with transporting electricity over longer distances.
- 326 The undoubted benefits of electricity generated by renewable energy projects embedded in the local grid network, such as the proposed Solar Park, is a further highly significant material consideration.

7.4.4 Appropriateness of the Project and the Proposed Site

- 327 In terms of the appropriateness of the proposed site, the application for Planning Permission follows a process including site selection and initial desktop technical feasibility studies. These are documented in Chapter 5: Site Selection and Consideration of Alternatives.
- 328 This process identified the proposed Solar Park site as being technically suitable for the development of a 22 MW Solar Park. It is considered that there are a number of advantages of the proposed site that make it suitable for the development of a Solar Park. Amongst others, these advantages include:
- Its location in an area of the UK that has a high level of solar radiation and good levels of direct sunlight;

- The availability of land of a sufficient area to accommodate a 22 MW Solar Park; and,
- Its proximity to the regional electricity grid such that significant off-site works (with the associated environmental and commercial costs) are not required.

7.4.5 Limited Period of Operation

- 329 Compared to other power generation technologies, Solar Parks can be easily and economically decommissioned and removed at the end of their economic life (typically expected to be about 40 years). Following decommissioning and removal, the site can then be restored close to its original condition such that there would be little (and in some cases no) trace that a Solar Park had existed.
- 330 The limited period of operation, and ease of decommissioning, is therefore considered to be an additional favourable material consideration.

7.4.6 Environmental impacts

- 331 Environmental policies and commentary are included across all parts of UK Government, Welsh Government and Local County Council documentation. The Pembrokeshire County Council Local Development Plan contains, as might be expected, the most locally relevant content.
- 332 For ease of reading the various environmental and technical issues are addressed below under the relevant subheadings. The Planning Statement (DRN BL006) provides a policy by policy review.

7.4.6.1 Landscape and visual, including Glint and Glare

- 333 Due to the nature of solar parks the principal impact tends to be visibility, and this must be seen in the context of the wider economic, environmental and social benefits. A Full Landscape and Visual Impact Assessment (LVIA) has been undertaken for the proposed development (Chapter 8).
- 334 The report concluded that the proposed solar park would not lead to unacceptable impacts that would be in any way significant in environmental assessment terms. It noted that there would be a temporary loss of farmland that would become pasture once the physical construction works had been completed. Field boundaries are proposed to be strengthened through additional planting and managed to grow to a height of 4 m to help mitigate views into the site.
- 335 Visual impacts as is the case for most solar parks were highlighted as being more pronounced the closer viewers were to the site with the assessment including a detailed analysis of impacts from a variety of local receptors. However, no impacts were considered to be significant in EIA terms.
- 336 Impacts on Landscape Character were not predicted to be significant whilst impacts to the National Park would be slight at worst in the long term. The report also highlighted that the long term yet temporary nature of the proposals, meant that potential operational effects would be reversible. The residual effects on the landscape fabric would therefore be beneficial as the improvements to hedgerows to be retained would be permanent.

- 337 With specific regard to Glint and glare from the proposed site a detailed computer analysis was undertaken for the site. It found that the existing screening by vegetation, buildings and topography will eliminate glint effects at the majority of the receptor points analysed. In addition, potential residual glint effects on residential properties, roads, public rights of way, cultural heritage receptors and selected viewpoints are not considered to be significant and therefore no additional mitigation measures are recommended or required.
- 338 In terms of policy GN1 supports development where it does not result in a significant detrimental impact on amenity. With regard to visual impacts and amenity more generally the EIA has not found that there would be any significant impacts and therefore the project is considered to be supported by the policy.

7.4.6.2 Ecology and Ornithology

- 339 Full details of the Ecological and Ornithological assessments undertaken for the project site are included in Chapter 9 of this Environmental Statement.
- 340 No significant effects are anticipated for designated sites, habitats, or species as a result of the proposed solar park. Similarly, there are not predicted to be any unacceptable impacts with regard to onsite ecology or ornithology receptors.
- 341 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.
- 342 In terms of policy the LDP policy GN1 details the need to protect the natural environment including protected habitats and species whilst Policy GN37 requires wherever possible biodiversity enhancement. Policy GN37 also seeks to protect 'protected species' or their habitats and the integrity of other habitats, sites or features of importance to wildlife and individual species.
- 343 It is considered that the assessments undertaken have demonstrated that the project will not impact in any significant way on off-site or on-site ecology and will not impact on protected species. Therefore, the project is considered to be fully compliant with the relevant policy.

7.4.6.3 Cultural Heritage / Historic Environment

- 344 In terms of cultural heritage / archaeological designations, ES Volume 2 A10.1 – A10.4 presents the results of an Archaeological Desk Based Assessment, a Geophysical Survey, a programme of Trial Trenching and a Settings Impact Assessment (SIA). This is summarised in as an Archaeological Impact Assessment in this ES (Chapter 10).
- 345 The assessment work concluded that with proposed mitigation the proposed Solar Park will have no significant impacts on any cultural heritage / archaeological features including listed buildings and their settings. Onsite archaeology would benefit to a minor extent by the cessation of ploughing onsite whilst there would be a

short term minor adverse impact to the Church of St Mary that would be briefly impacted on by construction noise.

- 346 The LDP addresses cultural heritage / archaeological interests under Policy GN38 asking that projects demonstrate protection or enhancement for the character and integrity of such assets.
- 347 The assessment has demonstrated there is potential for in situ protection for onsite assets and that off-site receptors will not be impacted on in a significant way satisfying the policy requirements.
- 348 The project is considered to be fully compliant with the relevant policies.

7.4.6.4 Noise

- 349 Solar parks are inherently quite due to their nature, with no moving parts etc. Construction work can create noise however construction works are only undertaken within hours defined by any planning consent and for a relatively short duration.
- 350 The Noise assessments undertaken for the project and reported in Chapter 11 of this Environmental Statement demonstrate that there will be no significant impacts due to noise on any sensitive receptors in the construction or operational phases.
- 351 The project therefore is considered to satisfy the requirements for noise protection afforded in the LDP by policy GN1.

7.4.6.5 Land, Geology, Hydrology, Hydrogeology and flood risk

- 352 An assessment was undertaken as part of the EIA regarding impacts to hydrology, hydrogeology, flood risk and ground conditions. The development was found to have minor to negligible significance reducing to negligible with the implementation of best practice mitigation measures.
- 353 With specific regard to planning policy the only policy designation which covers the site as noted earlier in this document is GN22. The policy covers extensive areas of the countryside in the county. It is concerned with the extraction of mineral recourse and states.

“Where new development is permitted in an area of mineral resource, prior extraction of any economic reserves of the mineral must be achieved, wherever appropriate in terms of economic feasibility and environmental and other planning considerations, prior to the commencement of the development”.

- 354 The site is not proposed for any mineral extraction and the installation of panels is temporary and reversible in the longer term. The project is therefore not considered to be contrary to the policy.
- 355 Regarding flood risk the project was found with suitable mitigation not to give rise to increased risk of flooding on or off site.
- 356 In terms of the use of the proposed site the reasons for this are set out in detail in the Chapter 5 of this ES which included a thorough analysis of alternatives.

357 The project is considered to be fully compliant with the relevant policies.

7.4.6.6 Cumulative Environmental impacts

358 Wherever relevant the EIA has examined the potential for cumulative environmental impacts. In no cases were there found to be significant impacts that would result from the development or go against the various policies of the LDP.

7.4.6.7 Residential Amenity

359 There are many factors that influence residential amenity which is protected by policy GN1 of the LDP. These are discussed where relevant above and more fully in the Environmental Statement.

360 Various studies undertaken as part of the EIA have found no significant potential to impact on local amenity. This includes visual impacts, as well as noise / vibration, and air quality impacts.

361 The project is considered to be fully compliant with the relevant policies.

7.4.6.8 Traffic and Infrastructure

362 As part of the development process, WSE has sought to ensure that there is appropriate and safe vehicular access to the proposed Solar Park site. Further information is provided in Chapter 13 Traffic and Infrastructure of this Environmental Statement.

363 No detrimental impact to the local highway network is envisaged. The site is close to a main road from which relatively easy access is achieved. The construction phase will be relatively short and will not unduly impact on other road users. In the operational phase visits to and from site will be minimal.

7.4.6.9 Local opinion

364 Local opinion can be viewed as a material factor in considering planning applications. As documented in the PAC Report (DRN BL007) our consultation with local residents showed majority support from those who responded to the consultation.

7.5 Summary and Conclusion

365 The proposed Solar Park is compliant with the higher-level requirements of the relevant national planning policy (including the National Policy Statements and the National Planning Policy Framework). 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.

366 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.

- 367 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 Introduction

8.1.1 Background

- 368 Stephenson Halliday was originally commissioned in November 2019 to prepare a Landscape and Visual Impact Assessment (LVIA) Chapter as part of the Environmental Statement (ES) for a proposed development at Blackberry Lane, Pembrokeshire on behalf of Wessex Solar Energy.
- 369 This assessment provides an update to the LVIA for the larger 2020 development and takes account of the reduced solar panel areas as detailed in Section 5. This LVIA defines the key landscape and visual related aspects of the proposed development; describes the nature of the anticipated changes and assesses the effects arising during construction and operation.

8.1.2 Structure and Terminology

- 370 Supporting appendices have been prepared that supplement the sections regarding methodology, planning policy and baseline. The appendices are important to the assessment and should be read alongside this chapter. Relevant appendices are located within ES Volume 2 (DRN BL002):
- 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
- 371 Key terms used within the assessment are described in Section 8.5 and Appendix A8.1 which set out the methodology.
- 372 This assessment should also be read in conjunction with the following Figures, located within ES Volume 3 (DRN BL003):
- Figure 8.1: Site Context
 - Figure 8.2: Landscape Context: Aerial Photograph
 - Figure 8.3: Topography
 - Figure 8.4: Landscape Character
 - Figure 8.5: Zone of Theoretical Visibility with Local Landscape Designations
 - Figure 8.6: Landscape Mitigation
 - Figure 8.7: Cumulative Developments

- Figure 8.8: Cumulative ZTV Study
- Viewpoint Photo-sheets 1-10

373 To inform the assessment and building on field work undertaken for the 2020 LVIA, a site visit was made to various locations within the study area including, but not restricted to, representative viewpoints by Stephenson Halliday's assessment team during November 2023. The original baseline photography has been retained as there has been no substantive change in the baseline since the original application.

8.2 Consultation

374 Extensive consultation regarding the scope of the original LVIA was undertaken in relation to the previous application via a formal screening and scoping request to PINS in early 2020. Responses were received from Pembrokeshire County Council, Natural Resources Wales (NRW) and the Pembrokeshire Coast National Park Authority in relation to Landscape and Visual matters. Further consultation in relation to the previous application was subsequently undertaken with the same statutory consultees. The Pre-Application Consultation Report (DRN:BL007) outlines the issues raised through consultation and details how these issues were addressed. There has been no further consultation regarding the revised application.

8.3 Study Area

375 It is accepted practice within landscape and visual assessment work that the extent of the study area for a development proposal is broadly defined by the visual envelope of the proposed development (as illustrated by Figure 8.5 Zone of Theoretical Visibility). In this case a study area of 3km has been used (as shown by Figures 8.1-8.5). This study area is adequate to identify all non-negligible effects on landscape and views given that the scale and nature of the proposals and the context of the study area (refer to Section 8.6.2 ZTV Study).

8.4 Planning Policy

8.4.1 National Policy and Guidance

376 Current planning policy in Wales is set out within Planning Policy for Wales, Edition 11, February 2021 (PPW 11) with updates to Chapter 6 published on 18th October 2023; the updates are not considered relevant to the LVIA, albeit they provide guidance relevant to the mitigation scheme. PPW 11 is supported by a number of guidance documents and technical studies of which the following are relevant to this assessment:

- Planning Implications of Renewable and Low Carbon Energy (Feb 2011); and
- Future Wales: The National Plan.

377 TAN8 was revoked in February 2021 on the publication of Future Wales: The National Plan 2040. The SSAs identified in TAN 8 have been replaced by the Pre-

Assessed Areas for Wind Energy identified in Future Wales. Technical studies to identify candidate areas for large scale wind (>10MW) and solar farms (10-50MW) were issued during 2019 as part of the 'Assessment of onshore wind and solar energy potential in Wales', as follows:

- Stage 1 - Development of Priority Areas for Wind and Solar Energy (March 2019);
- Stage 2 - Refinement of Priority Areas for Wind and Solar Energy (July 2019); and
- Executive Summary Stages 1 and 2 (July 2019).

8.4.1.1 Planning Policy for Wales (PPW 11)

378 Para 5.6.13 of PPW 11 identifies solar farms as one example of farm diversification that *"should be supported where there is no detrimental impact on the environment and local amenity"*, and para 5.7.7 sets out the aim of maximising renewable energy generation.

379 At 5.9.14 to 5.9.15, PPW 11 requires local planning authorities to identify the most suitable locations for renewables, with *"a presumption in favour of development in identified areas, including an acceptance of landscape change"*, with applications outside such areas determined on their merits. Paragraphs 5.9.20 and 5.8.21 set out that mitigation of impacts (through location, scale and design) on local communities, the natural environment and cumulative impacts form some of the considerations. In relation to nationally designated landscapes, para 6.3.9 indicates that *"Proposals in National Parks and AONBs must be carefully assessed to ensure that their effects on those features which the designation is intended to protect are acceptable."*

8.4.1.2 Planning Implications of Renewable and Low Carbon Energy

380 This document predates PPW 11 and advises in respect of ground mounted solar arrays and landscape and visual impacts that:

"Construction of the solar PV array can result in impacts on, or the loss of landscape features such trees and hedges or contours through site levelling and the potential need to remove trees etc. to reduce shading. Key landscape and visual impacts which should be borne in mind during the siting decision include:

- *Solar PV arrays may be particularly visible in long views when located on a hillside or adjacent to high ground.*
- *The presence of PV panels and associated infrastructure may mask underlying semi-natural habitats or archaeology.*
- *Solar PV developments may mask field patterns, particularly where the maximum height of supporting racks is higher than hedgerows or other field boundaries or where racks are arranged right up to the boundary.*

Designated landscapes such as National Parks and AONBS are likely to be particularly sensitive in respect of one or more of these types of visual effect. Extreme care therefore needs to be taken to ensure the siting of solar arrays does not affect the special qualities of designated landscapes.”

“Potential mitigation may include using existing landscape features or new planting to screen the development although this will need to avoid the shading of the panels. Screen planting (including allowing hedges to grow out) around solar PV development can, however, change the sense of enclosure of a landscape and would need to be undertaken through careful design. Existing landscape features should be retained where possible.”

8.4.1.3 Assessment of onshore wind and solar energy potential in Wales

- 381 This set of documents “did not seek to identify development sites, rather, it utilised known constraints in order to identify broad areas considered to be of greatest opportunity”. Potential landscape and visual impacts were amongst the various constraints considered.
- 382 The site does not lie within one of the priority areas proposed by the Stage 2 analysis and Executive Summary as being ‘of greatest opportunity’. The area around the site was not included within the Stage 2 refinement analysis, having been filtered out during Stage 1. In stage 1, which takes account of a number of constraints the site is identified within the ‘Solar Preferred Scenario’ as lying within ‘Areas of varying opportunity’ within which the Executive Summary suggests that “development may be acceptable, on the basis of key policy criteria”.

8.4.2 Local Planning Policy

- 383 Current local planning policy is described in the following adopted and emerging policy documents:
- The Pembrokeshire Local Development Plan (LDP) February 2013.
- 384 It is noted that the Authority is now working on a Replacement Local Development Plan for Pembrokeshire (LDP 2). There is currently no date for the adoption of LDP 2 and the emerging plan is not considered further within this assessment.
- 385 Part of the study area is covered by the Pembrokeshire Coast National Park Local Development Plan (Adopted 2010), but the site does not lie within that area and policies within that plan are not considered further. Baseline documents that inform the consideration of effects on the National Park are identified below.

8.4.2.1 The Pembrokeshire Local Development Plan February 2013

- 386 Relevant policies include:
- **GN.1 General Development Policy** aims to ensure ‘the nature, location, siting and scale of the proposed development is compatible with the capacity and character of the site and the area within which it is located’, ‘It would not result in

a significant detrimental impact on local amenity in terms of visual impact...’ and ‘would not adversely affect landscape character, quality or diversity, including the special qualities of the Pembrokeshire Coast National Park and neighbouring authorities’.

- **GN.2 Sustainable Design** requires that development be well-design including (inter alia) that it “pays due regard to local distinctiveness”, and “is appropriate to the local character and landscape/townscape context in terms of layout, scale, form, siting, massing, height, density, mix, detailing, use of materials, landscaping and access arrangements / layout”.
- **Policy GN.4** indicates that renewable energy development will be supported where “environmentally acceptable” and makes no specific provisions regarding landscape, but the supporting text indicates that “...landscape impact, alone and in-combination, will be a material consideration.”
- **Policy SP 16 (The Countryside)** states “The essential requirements of people who live and work in the countryside will be met whilst protecting the landscape and natural and built environment of Pembrokeshire and adjoining areas”.

387 Effects on landscape character, views and the National Park are considered within Sections 8.6 (baseline) and 8.8 (effects) of this Chapter. Design and mitigation are discussed within Section 8.7.

8.4.3 Local Guidance

388 In addition to the policy documents identified above, there are relevant local guidance and baseline documents as follows:

- Pembrokeshire County Council Landscape Character Assessment (Final for Consultation), May 2022.
- Pembrokeshire Coast National Park Authority, SPG Landscape Character Assessment 22 June 2011.
- Pembrokeshire Coast National Park Management Plan 2020-2024.
- Renewable Energy SPG (Oct 2016).

8.5 Assessment Methodology

389 The detail of the methodology is described in Appendix A8.1. A summary of the primary judgements is provided below.

8.5.1 Sensitivity

390 Sensitivity is judged taking into account the component judgments about the value and susceptibility of the receptor as illustrated by the table below. Where sensitivity is judged to lie between levels, an intermediate assessment will be adopted. A slightly greater weight is given to susceptibility in judging sensitivity of visual receptors as indicated below:

Table 8-1: Sensitivity of Landscape Receptors

Value	Susceptibility		
	High	Medium	Low
National	High	High/Medium	Medium
Regional	High/Medium	Medium	Medium/Low
Community	Medium	Medium/Low	Low

Table 8-2: Sensitivity of Visual Receptors

Value	Susceptibility		
	High	Medium	Low
National	High	High/Medium	Medium
Regional	High/Medium	High/Medium	Medium/Low
Community	High/Medium	Medium	Low

8.5.2 Magnitude

391 Scale of effect is the primary factor in determining magnitude; which may be higher if the effect is particularly widespread and/or long lasting, or lower if it is constrained in geographic extent and/or timescale. The tables below illustrate how this judgement is considered as a two-step process.

Insert 2: Considering Magnitude of Effects

Scale / extent	Large	Medium	Small	Negligible
Wide	Substantial			
Intermediate		Moderate		
Localised			Slight	
Limited				Negligible

Stage 1 Result / Duration	Substantial	Moderate	Slight	Negligible
Permanent	Substantial			
Long-term		Moderate		
Medium-term			Slight	
Short-term				Negligible

392 Where magnitude is judged to lie between levels, an intermediate assessment will be adopted.

8.5.3 Significance of Effects

393 The significance of any identified landscape or visual effect is assessed as major, moderate, minor or negligible. These categories are based on the consideration of sensitivity with the predicted magnitude of change. The table below is not used as a prescriptive tool and illustrates the typical outcomes, allowing for the exercise of professional judgement. In some instances, a particular parameter may be considered as having a determining effect on the analysis.

Table 8-3: Significance of Effects

Receptor Sensitivity	Magnitude of Change			
	Substantial	Moderate	Slight	Negligible
High	Major	Major / Moderate	Moderate	Minor
Medium	Major / Moderate	Moderate	Moderate / Minor	Minor / Negligible
Low	Moderate	Moderate / Minor	Minor	Negligible

394 Where the effect has been classified as Major or Major/Moderate this is considered to be equivalent to likely significant effects referred to in the EIA Regulations. The conclusion that some effects are 'significant' should not be taken to imply that they should warrant refusal in any decision making process.

8.5.4 Beneficial/Adverse

395 Landscape and visual effects can be beneficial or adverse and in some instances may be considered neutral. Neutral effects are those which overall are neither adverse nor beneficial but may incorporate a combination of both.

396 Taking a precautionary stance, changes to rural landscapes involving construction of man-made objects of a large scale are generally considered to be adverse.

8.5.5 Cumulative

397 Cumulative assessment relates to the assessment of the effects of more than one development. The approach to cumulative assessment is set out within Appendix A8.1.

398 Two existing solar farms are located at West Farm 1.1km north west and Golden Hill 1.8km south west of the site. These sites are considered as part of the baseline within the assessment and discussed further in the cumulative assessment at Section 8.10.

399 Consultees also requested the consideration of a number of small to medium wind turbines, including:

- Three 15-20m high existing vertical axis turbines located at London Road Industrial Estate 3km west of the site;
- An existing 14.8m turbine at Warreston House 1.5km southwest of the site;
- An existing 41.4m turbine at Milton Manor 2.6km southeast of the site;
- Two 47m turbines which were the subject of a 2013 screening request.

- 400 The existing turbine sites are considered as part of the baseline within the assessment and discussed further in the cumulative assessment at Section 8.10. The two turbines which were the subject of a screening request have not progressed to application and are unlikely to do so given the time elapsed and are not considered further.
- 401 No further consented developments (or other expected changes) which would require consideration as part of the future baseline have been identified.
- 402 No developments currently in planning which would require a cumulative assessment have been identified.

8.5.6 Residential Amenity

- 403 As set out within LI Technical Guidance Note 02/19 'Residential Visual Amenity Assessment (RVAA)':

"Changes in views and visual amenity are considered in the planning process. In respect of private views and visual amenity, it is widely known that, no one has 'a right to a view.' ...

It is not uncommon for significant adverse effects on views and visual amenity to be experienced by people at their place of residence as a result of introducing a new development into the landscape. In itself this does not necessarily cause particular planning concern. However, there are situations where the effect on the outlook / visual amenity of a residential property is so great that it is not generally considered to be in the public interest to permit such conditions to occur where they did not exist before."

- 404 The methodology for and assessment of effects on residential amenity for the most affected properties within 1km is included as Appendix A8.5.

8.5.7 Distances

- 405 Where distances are given in the assessment, these are approximate distances between the nearest part of the site and the nearest part of the receptor in question, unless explicitly stated otherwise.

8.5.8 Visual Aids

- 406 Photographs of the existing views from agreed viewpoints are shown in Figures 8.5 and Photosheet Viewpoints 1-10. The method of visualisation selected has been informed by Landscape Institute Technical Note 06/19 Visual Representation of Development Proposals, with annotated photograph sheets being selected as being the most appropriate approach for the majority of views considered, with photomontages provided for viewpoints 4 and 7, to illustrate the appearance of the solar panels in near views from the Pembrokeshire Coast National Park.

8.6 Baseline Conditions

- 407 An overview of the baseline study results is provided in this section with the full baseline description of the individual landscape and visual receptors being provided alongside the assessment in Section 8.8 for ease of reference.
- 408 This section provides a review of the key local baseline studies and guidance documents and identifies those landscape and visual receptors which merit detailed consideration in the assessment of effects, and those which are not taken forward for further assessment as effects *“have been judged unlikely to occur or so insignificant that it is not essential to consider them further”* (GLVIA3, para. 3.19).
- 409 Both this baseline section and the effects section describe landscape character and visual receptors before considering designated areas as it is common for designations to encompass both character and visual considerations within their special qualities or purposes of designation.

8.6.1 Local Guidance and Baseline Studies

- 410 The guidance documents listed at Section 8.4 provide advice relevant to this assessment. The landscape character assessments are used to inform the assessment of effects on landscape character and are considered further below and in Section 8.8.
- 411 The two management plans identify the Special Qualities of the National Park (with no change between the adopted plan and the consultation draft). The assessment of effects on the National Park included at Section 8.8 considers the potential effects on both the purposes and special qualities of the designated area.
- 412 The Renewable Energy SPG predates the Pembrokeshire Landscape Character Assessment and refers instead to LANDMAP; but for the purposes of this assessment, it is assumed that the (LANDMAP based) local character assessment is to be used in preference.
- 413 The SPG identifies the need to carry out landscape and visual assessments for renewable energy development, including the consideration of effects on the National Park and cumulative impacts; and the need to discuss the scope of such studies with the Council. It also notes the importance of relating the design to landscape patterns such as topography and historic field boundaries. These matters are considered within Sections 8.7 and 8.8.

8.6.2 ZTV Study

- 414 A Zone of Theoretical Visibility (ZTV) study was generated based on the proposed design. The ZTV is illustrated on Figure 8.5 and indicates areas of potential visibility. The analysis was carried out using a topographic model and including buildings and trees (with heights derived from LiDAR surface mapping data) as visual barriers. It also includes the proposed tree planting and existing hedges that would be grown to

4m high around and within the site, in order to provide a more realistic indication of potential visibility.

- 415 The ZTV study was used to aid the identification of those receptors that are likely to be most affected by the proposed development and those that do not require detailed consideration.
- 416 The ZTV for the proposed development shows that the main area of visibility is concentrated within 0.5km north and 1.2km south of the proposed development site on rising ground – at the southern edge of the National Park to the north and beyond the A477 to the south. From the Pembrokeshire Coast National Park to the north, visibility of the site is limited by landform and tree cover to a localised area along the southern boundary. Visibility extends across agricultural land to the east and west of the site, becoming increasingly patchy out to 3km. Beyond this distance there would be little to no visibility from within the settlement of Pembroke to the west. Beyond this distance to the east visibility becomes more intermittent.
- 417 From the wider study area to the west near Mylett's Hill, to the east near Carew and north east near Carew Newton, visibility is more patchy with intervening tree cover within the landscape further reducing visibility.
- 418 In places, site visit work indicated that hedgerows and tree cover not included within the ZTV modelling provides notable additional screening and visibility is likely to be slightly less than indicated by the ZTV study.
- 419 Effects on landscape or visual receptors outside the areas of visibility shown on the ZTV study would be Negligible and are not assessed in detail.

8.6.3 Landscape Character

- 420 Local landscape character areas in the study area are shown on Figure 8.4. Landscape character for the study area is described in Pembrokeshire County Council Landscape Character Assessment (Final for Consultation), May 2022 and Pembrokeshire Coast National Park Authority (SPG) Landscape Character Assessment June 2011.

8.6.3.1 Pembrokeshire County Council Landscape Character Assessment Final Report for Consultation, May 2022

- 421 Pembrokeshire County Council has published this Supplementary Planning Guidance, following an initial assessment of LANDMAP layers and amendments made by members of the steering group. Each LCA was refined during desk top study and subsequent field study. This is the most recent local level landscape character assessments covering the site and central parts of the proposed study area outside of the National Park.

8.6.3.2 Pembrokeshire Coast National Park Authority, SPG Landscape Character Assessment 22 June 2011.

- 422 This is most recent local level landscape character assessment covering the northern and south eastern parts of the proposed study area that fall within the Pembrokeshire Coast National Park.
- 423 As set out in the Pembrokeshire County Council Landscape Character Assessment, Final Report for May 2022, the site falls within Landscape Character Area (LCA) 25: Hundleton and Lamphey. This landscape is described as a rural LCA which, *“comprises of a series of low east west rolling pastoral and arable ridges and hills interspersed with valleys... To the north it is more enclosed with trees and features strip fields close to Cosheston and the largely extant Lamphey Bishops Palace and associated historic park and garden.”*
- 424 Effects on the following Pembrokeshire County character areas are considered within Section 8.8, with baseline description provided alongside the assessment of effects for ease of reference:
- LCA25: Hundleton and Lamphey (includes site)
 - LCA29: Cosheston Peninsula (1.2km, NW)
- 425 Effects on the following Pembrokeshire Coast National Park character areas are also considered within Section 8.8, with baseline description provided alongside the assessment of effects for ease of reference:
- Pembrokeshire Coast National Park LCA 28 – Daugleddau (c.150m north)
- 426 Aside from these nearby character areas the terrain and vegetation within the surrounding landscape limits visibility, as illustrated by the ZTV, such that the effects would diminish rapidly with distance. Effects in other character areas would tend to be negligible and are not considered further.

8.6.4 Visual Receptors

- 427 Visual receptors are *“the different groups of people who may experience views of the development”* (GLVIA, 3rd edition, para 6.3). In order to identify those groups who may be significantly affected the ZTV study, baseline desk study and site visits have been used.
- 428 The different types of groups assessed within this assessment encompass local residents; people using key routes such as roads; cycle ways, people within accessible or recreational landscapes; people using Public Rights of Way; or people visiting key viewpoints. In dealing with areas of settlement, Public Rights of Way and local roads, receptors are grouped into areas where effects might be expected to be broadly similar, or areas which share particular factors in common.
- 429 Representative viewpoints have been selected to aid the assessment of effects on visual receptors.

8.6.4.1 Baseline Visual Environment

430 As shown on Figure 8.1, the site is located within the gently undulating pastoral landscape to the north east of Pembroke. The pastoral fields that comprise the site are enclosed by established hedgerows with established woodland blocks located to the north and west, as illustrated by Figure 8.2. The site lies to the north of the A477 road corridor which transects the study area east to west. The A4075, minor roads and local Public Rights of Way connect dispersed and farmsteads within the surrounding landscape. The settlements of Cosheston and Carew are located 0.5km north west and 2.6km east respectively.

8.6.4.2 Visual Receptor Groups

431 The following visual receptor groups are located within the study area and are likely to have visibility of the proposed development, as shown on the ZTV study on Figure 8.5 and are considered further in Section 8.8:

- Rights of way to south east of Cosheston (0-0.6km, W);
- Mayeston and Cosheston – (0-0.6km, NW);
- Minor roads and footpaths within the National Park (0-0.6km N and NE);
- Upper Nash to Deer Park Lane – (0.1-1.2km, S).

432 There are also several receptor groups which are excluded from the detailed assessment, on the basis that visual effects are likely to be Negligible, for the reasons indicated below:

- **Blackberry Lane and eastern footpaths** (up to 1km E) – due to the sunken nature of this lane, mature roadside hedgerow vegetation and hedgerow and tree cover within the wider landscape, views of the proposals would be screened from these receptors. Whilst a glimpsed view of the upper parts of the adjacent, easternmost panels may be visible from a field gate along Blackberry Lane, this would be Negligible in scale and very Limited in extent. Effects are likely to be Negligible.
- **Parkeston Hall** (c.0.4km NE) – dwellings c.0.6km north east of the site at and adjacent to Parkeston Hall and nearby footpaths within the national park are surrounded by mature tree cover restricting visibility.
- **Point Lane and footpath west of Cosheston** (1.2km, W) – Hedgerows, tree cover (not included in the ZTV study) and intervening built form at Cosheston restrict views south east towards the development site.
- **Carew, Milton and Sageston** (1.7km, E) – Due to the intervening landform and tree cover within the landscape views of the development site are restricted from the settlement, castle and low-lying roads (including a short section of the A4075) and footpaths, as illustrated by Viewpoint 10.
- **Mylett's Hill** (2km, SW) – Hedgerows and trees along the roadside contain views such that only occasional glimpses towards the site are available. Given distance, the impacts would be negligible.

- **Carew Newton** (2.8km, NE) – Hedgerows and trees around this small nucleated settlement would mostly screen views towards the site. Some views may be gained from field gates and from footpaths and local roads to the south of the village (see Viewpoint 9). Given distance and the intervening tree cover within the landscape, the solar farm would form a very small, distant element and effects would be negligible.

8.6.4.3 Key Routes

433 As shown on Figure 8.1, the following longer distance routes lie within the study area:

8.6.4.3.1 Roads

- **A477** (0.2km south) – This main transport route transects the study area to the south of the site from Sageston in the east to Pembroke Dock in the west. This route is considered further in Section 8.8.
- **A4075** (0.4km, southeast) – This route extends south west from the main A477 junction south of the development site to Pembroke. This route is considered further in Section 8.8.

434 Other roads in the study area are more likely to be used for local journeys and are considered within the receptor group areas they lie within.

8.6.4.3.2 Recreational Routes

435 The Landsker Borderlands Trail long distance footpath and National Cycle Route 4 (The Celtic Trail) are located c.3km north and c.2.2km south of the development site respectively. Both routes lie outwith the ZTV and are not considered within the detailed assessment.

436 No other long distance recreational routes with potential visibility are located within the study area.

8.6.4.4 Specific Viewpoints

437 No individual panoramic or valued viewpoints have been identified within the study area.

8.6.5 Landscape Designations and Value

8.6.5.1 Designated areas

8.6.5.1.1 Pembrokeshire Coast National Park

438 The Pembrokeshire Coast National Park is located within the study area. As illustrated by Figure 8.5 it lies on the northern side of the minor road to the north of the site, 0.1km north of the site at its closest point. It is also located over 2.5km south east of the site, within the south eastern most parts of the study area.

439 Effects on this designation are considered in Section 8.8.

8.6.5.1.2 Registered Historic Landscape

440 The Milford Haven Waterway, CADW Registered Historic Landscape is located within northern parts of the study area, broadly following the national park boundary and extending to the west of Cosheston. Whilst designated as Outstanding, the Registered Historic Landscape report record does not materially add to information on the historic landscape provided within the Pembrokeshire Council Landscape Character Assessment. Effects on this designation would be a heritage consideration, and do not form part of this chapter, being considered further in Appendix A10.4. However, in considering effects on landscape character in this area, it is treated as being of National Value.

8.6.5.1.3 Registered Landscapes, Parks and Gardens

441 Also identified on Figure 8.5 are a number of Registered Landscape, Parks and Gardens within the study area, the nearest of which is Upton Castle Gardens approximately 0.9 km north of the site. As illustrated by Figure 8.5 ZTV there would be little to no visibility of the Proposed Development from these designations and effects are not considered further.

8.6.5.2 Landscape and Townscape Value

442 All areas covered by the designations identified above are considered to be of National Value within this assessment. Other designations of relevance include the Conservation Areas which indicate areas of townscape (such as Cosheston) to be of local value.

8.7 The Proposed Development Impact Assessment

443 The proposal and design approach are described Chapter 6.

8.7.1 The Proposal

444 In summary the proposed development would comprise the installation of fixed PV panels mounted on steel frames and set out in parallel rows that run east to west across the existing agricultural land. The panels would be tilted at an angle between 15-35 degrees from the horizontal giving rise to a maximum height to the top of the panel of no more than 3.5m from ground level. The panels are designed to absorb light and hence minimise solar glint and glare.

445 The associated infrastructure includes inverter cabins and a control building approximately 4m in height. Deer fencing 2.5m high would be installed around each field (around the inside of the boundary hedgerows). CCTV cameras would be installed at several locations around the perimeter (locations to be determined by the final security contractor).

446 The proposed solar farm would be operational for around 40 years and would give rise to long term operational effects on the landscape. The proposals would be fully reversible on decommissioning of the site.

8.7.2 Mitigation

- 447 The landscape mitigation proposals are illustrated on Figure 8.6. The site is predominantly surrounded by well established existing hedgerows that are in good condition and woodland along the northern boundary. To strengthen this further existing perimeter vegetation would be retained and supplemented with new native species hedgerow planting as necessary where gaps in the existing hedgerows are located.
- 448 All perimeter hedgerows would also be managed to a height of 4m in order to visually contain the development and assisting its absorption into the surrounding landscape. The existing hedgerows that enclose the southern most field of the site would also be maintained at 4m high.
- 449 To aid visual containment, areas of mixed woodland planting would be planted along the northern boundary, as illustrated on Figure 8.6.

8.7.3 Construction

- 450 Construction of the solar park would involve the following operations:
- A temporary construction compound (including storage and welfare facilities);
 - Erection of perimeter fencing;
 - Installation of PV panels;
 - Excavations for cable runs;
 - Installation of inverter/transformer cabins;
 - Construction of control building;
 - Planting of new hedgerows and trees; and
 - Reinstatement works, including the removal of the temporary accommodation.
- 451 The works detailed above are likely to give rise to some landscape and visual effects. These effects would however be temporary and would mainly arise through the erection of the PV panels. The effects arising from other operations, including vehicle movements, construction of the fencing, excavation of the cable runs and construction of inverter cabins would be localised, and whilst potentially visible, would not appear prominently in views from the surrounding areas. Construction operations would take place over a period of approximately 4 months. These effects would be limited in extent and duration and are unlikely to be significant.

8.7.4 Operation

- 452 The landscape and visual effects of the operation of the proposal are outlined in the following sections.

8.8 Landscape and Visual Effects

453 This section sets out the effects that the proposed development may have on
landscape and visual receptors.

8.8.1 Effects on Site Fabric

454 Construction access to the site will be via an unnamed lane leading from the A477 to
Lower Nash Farm. For the duration of the construction phase the fields would be
disrupted and not used for agricultural pasture, resulting in a short term temporary
loss of the current landscape fabric. Field boundary hedgerows would be retained.

455 On completion of the construction operations, ground cover would be reinstated
where necessary and land under the PV panels returned to grassland pasture.

456 Landscape improvements would be implemented in line with Figure 8.6: Landscape
Proposals; including:

- Hedgerow improvements by way of gapping up of existing hedgerows and
maintenance to 4m height;
- 65 linear m of new native species rich hedgerow; and
- 0.3 ha of new native woodland planting.

457 As the new hedgerow and tree planting establishes, the network of field boundary
hedgerows would be strengthened in line with the existing pattern of strongly defined
field boundaries.

458 It is important to note that the residual effect upon landscape fabric would be
beneficial as the hedgerow improvements would be predominantly permanent.
Following the decommissioning and removal of the solar park, the benefit of the
hedgerow improvements and hedgerow trees to be retained would remain and the
land would return to agricultural use again.

8.8.2 Viewpoint Analysis

459 Viewpoint analysis has been undertaken from a total of 10 viewpoints. The final list of
viewpoints was prepared following consultation with NRW, PCNPA and PCC (as set
out at Section 8.2 above).

460 The viewpoints are illustrated on Viewpoint Photosheets 1-10. Photomontages are
also provided for Viewpoints 4 and 7.

461 The full viewpoint analysis is contained within Appendix A8.4: Viewpoint Analysis.
The findings are summarised in Table 8-4. In each case, distances are listed in
relation to the site boundary.

462 Please note that Appendix A8.4: Viewpoint Analysis considers the nature and the
scale of changes to character and views at each viewpoint location only. The
sensitivity of receptors and wider extent of the effect (beyond the individual viewpoint

location) and its duration are considered in the main body of the assessment text below as part of the consideration of the magnitude and significance of effects.

Table 8-4: Viewpoint Analysis Summary

Ref.	Viewpoint	Distance / Direction	Scale of Landscape effect	Scale of Visual effect
1	Minor Road to St Mary's Church	0km, SW	Medium	Large for people standing at gate. Medium for drivers reducing to Small as hedgerows grow to 4m.
2	A477 & footpath (SP30/5)	0.2km, S	Negligible	Negligible
3	Footpath south of Little Mayeston (SP8/11)	0.2km, NW	Small	Medium/Small
4	Footpath and minor road in National Park (SP8/12)	0.4km, NE	Small/Negligible	Small
5	Footpath at Upper Nash (SP30/9)	0.5km, S	Small	Medium reducing to Medium/Small as hedgerows grow to 4m.
6	Cosheston	0.5km, NW	Negligible	Negligible
7	Footpath in National Park (SP8/10)	0.4km, N	Small reducing to Negligible as hedgerow/hedgerow trees mature	Small reducing to Negligible as hedgerow/hedgerow trees mature
8	Minor road / Deer Park Lane junction	1.3km, S	Small	Medium/Small (for people standing at gate); Small for drivers
9	Footpath at Carew Newton (SP5/15)	2.4km, NE	Negligible	Negligible
10	Carew Castle	2.3km, NE	Negligible	Negligible

463 Each of the viewpoints is a 'sample' of the potential effects, representing a wide range of receptors – including not only those actually at the viewpoint, but also those nearby, at a similar distance and/or direction. From these viewpoints it can be seen that the distribution of effects would be as follows:

464 Effects on character:

- Large scale effects would be limited to the site itself, which would entirely change in character from pasture to a solar park. These effects would be Adverse.
- Effects would reduce to Medium scale outside the site as the perimeter hedgerows would create a sense of separation such that the solar farm would be a readily apparent local characteristic but would not dominate the character. These effects would not extend beyond the immediate vicinity of the site. These effects would be Adverse.
- Small scale effects would arise between 0.2-1.5km, with the larger of these distances reflecting the appearance of the solar park as a visual characteristic in the elevated views from higher ground to the south.
- Effects on landscape character are judged to be Negligible beyond these areas and in areas where there would be no visibility.

465 Effects on views:

- Large scale effects on views would arise in the few limited locations where public views arise adjacent to the site.
- Medium and Medium/Small scale visual effects would arise within 0.2-1.5km from the site, with the larger of these distances reflecting the availability of elevated views towards the site from higher ground to the south.
- Beyond these areas and effects would reduce to Negligible scale.
- Mitigation planting and maturing of hedgerows would primarily provide screening from near receptors and from the National Park directly north of the development.
- Roadside hedgerows provide screening of views for drivers throughout the study area.

8.8.3 Effects on Landscape Character

466 Descriptions for each of the character areas considered in detail are briefly summarised below, along with further observations from site based work. Areas are shown on Figure 8.4.

467 Based on the description of the potential extent of effects provided above, effects on the following character areas would be Negligible and are not considered further:

- Pembrokeshire County Council LCA29: Cosheston Peninsula (1.2km, NW)

8.8.3.1 LCA25: Hundleton and Lamphey

468 As shown on Figure 8.4, this Pembrokeshire County Council character area includes the site and extends from the site c.1km to the east and west. It also extends to the

National Park boundary over 2km to the south of the site and beyond the study area to the south west.

- 469 Key characteristics are identified within the Pembrokeshire County Council Landscape Character Assessment (Consultation Draft), July 2019 as:
- *'...Low escarpment ridges are evident to the east and north.*
 - *The majority of the area is rural with small local settlements and rural hamlets, with isolated farmsteads interspersed throughout the agricultural landscape. ...*
 - *The farmland landscape comprises small fields and minor roads. Field boundaries are hedged to the east, with stone walls more prevalent elsewhere with varying levels of management. Modern farm buildings are evident and generally form nucleated complexes alongside traditional buildings.*
 - *... Key elements of the historic environment include prehistory, and Bronze Age, Medieval buildings, and many small settlements have Medieval origins. Farm buildings are largely from the 19th Century. ...*
 - *Culturally this area is part of a wider area characterised by rich farmland, ... and residential and commercial expansion. Both the rail system and major road arteries of the A40 and A477 traverse the area ...*
 - *Landscape habitat is largely formed by improved grassland within a mosaic fieldscape with arable, buildings and woodland, including linear broadleaf and conifer plantation forming a very minimal part ... Hedgerows are dominant through the area with post and wire fencing limited.'*
- 470 As identified within Appendix A8.3, considering the Community value and Medium susceptibility together, the sensitivity of LCA 25 is judged to be Medium/Low. An existing solar park is located within this character area at Golden Hill, c.2km south west.
- 471 As described above, the introduction of PV panels to the agricultural landscape would result in a Large scale of change, limited to the agricultural land within the site itself. From localised parts of LCA 25 to the north east, the undulating landform would restrict visibility to the easternmost parts of the site, resulting in a Medium scale of change within its local environs. These effects would result in a Moderate/Slight magnitude of change. Taking into account the Medium/Low sensitivity of the character area this would result in a Moderate/Minor, Adverse level of effect (not significant) in the local vicinity of the site.
- 472 Whilst noticeable from localised parts of LCA 25 to the west, hedgerow and tree vegetation would limit visibility. From the south, the PV panels would be more openly visible, but at greater distance. Whilst hedgerows would be managed at an increased height, the existing medium to small field pattern and hedgerow characteristics of the landscape would be retained. This modern form of development would also be in keeping with the more modern, larger farm complexes and solar park at Golden Hill in the wider landscape.

- 473 There would be a Small scale of change, experienced over a Limited extent of LCA 25. Long term yet reversible effects would be Slight in magnitude and given the Medium/Low sensitivity of LCA 25, effects would be Minor and Adverse (not significant).

8.8.3.2 LCA 28 – Daugleddau

- 474 As shown on Figure 8.4, this LCA is located within the Pembrokeshire Coast National Park, occupying the northern most parts of the study area. It is located c.0.1km north of the site at its closest point and its visual and sensory quality is described as ‘... *a peaceful, enclosed and intimate landscape of estuarine river and associated riparian areas and mudflats, surrounded by rolling woodland mosaic landscape of parkland, mixed woodland and fields*’. Given the ‘*rolling lowland*’ landform, ‘*prevailing sense of a sheltered, well cared-for wooded farmland*’ and its ‘*historical significance within Wales*’ LCA 28 it is judged to be of Medium susceptibility to this form of development and of National value. When these judgements are combined, it is considered to be of High/Medium sensitivity.
- 475 Effects would be limited to the southernmost part of this landscape, where the central PV panels would just be noticeable within the landscape to the south, in part filtered by intervening tree cover. Proposed tree planting along the northern boundary would mature in the Short to Medium term, screening the northernmost part of the site and the peaceful quality of LCA 28 would not be affected by the proposals and the perception of a wider woodland and farmland mosaic landscape would be retained. The wider river estuary characteristics of this LCA and ‘*great sense of tranquillity here, produced by the enclosed large water body*’ would not be perceived concurrently with the proposal. The remaining parts of the development site would not be visible and there would be little or no visibility from the wider LCA 28 landscape.
- 476 Given the limited characterising influence of the proposals, the scale of change would be Small over a Limited extent of this LCA initially. This would result in a Slight magnitude of change and considering the High/Medium sensitivity of this LCA, Medium to Long term effects would be Moderate/Minor and Adverse (not significant). The maturing vegetation would screen views of the PV panels and the magnitude of change would be Negligible and the Long term effect Minor/Negligible and Adverse (not significant).

8.8.4 Visual Effects

8.8.4.1 Visual Receptor Groups

- 477 This section considers the extent of potential visibility with the sensitivity of each receptor group and the resulting visual effect from changes in views that would be experienced. The assessment of effects focuses on the visual amenity of public spaces, though views from groups of dwellings will also be noted in the descriptions.

Effects on private residential amenity are a separate matter, and as set out at Section 8.5.6, are assessed within Appendix A8.5.

- 478 **Minor road and footpaths within the National Park (0-0.6km N and NE)** – This receptor group comprises the minor road and footpaths within the national park to the north and north east of the site. From the majority of the minor road and large parts of the footpaths within the national park to the north of the site, views would be restricted by intervening landform, hedgerow and tree vegetation. Views of the eastern most parts of the development site would be possible from a short c.0.2km section of the minor road near Parkeston Hall (as illustrated by Viewpoint 4) and a short c.0.15km section of the footpath to the north of the site (as illustrated by Viewpoint 7).
- 479 From these locations the back of the panels would be visible, although in part screened by tree cover to the north of the site. Whilst there would be a change from agricultural land this would be noticeable only to a very small extent and the field pattern and grain of the landscape would be retained. As hedgerows grow to 4m high and tree planting matures, views of the proposed panels would reduce with increased filtering through vegetation. Given the elevated nature of these views, there would be a greater sense of distance from the site. The effects would initially be Small in scale over a Limited extent of this receptor group. This would result in Medium to Long term yet reversible effects of Slight/Negligible magnitude and, considering the High sensitivity of the receptor group, a Moderate/Minor level of effect (not significant). The magnitude and significance of effects would reduce over time in views from the footpath to Negligible and Minor, whilst from the minor road the proposed mitigation hedgerow and tree planting would better absorb the development into the wider landscape, albeit effects would remain unchanged.
- 480 **Rights of Way to south east of Cosheston (0km, W)** – This group comprises 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. Mature hedgerows limit visibility of the development site (see illustrative photograph Plates 1 – 3 Appendix 8.6), to the occasional field gate gap in hedgerow vegetation, as illustrated by Viewpoint 1. As set out in the viewpoint analysis, the scale of change for a person standing at the field entrance (which is slightly off the road) would be Large, both before and after planting matures. For people driving or walking past along the designated footpath route, the view is less open and the scale of change would be Medium, with the panels only seen as a glimpse through the field gates and above hedges initially (please refer to Appendix A8.6) and reducing to Small scale once boundary hedgerows mature to 4m high around the boundary.
- 481 From Greenplains and footpaths through open fields the majority of the site would be contained by existing mature hedgerows along the western site boundary. Only the upper most parts of the westernmost panels would be visible in Year 1, before hedgerows grow to 4m and the nearest panels are screened Long term. Panels on

- rising ground to the north would be visible Long term, filtered by intervening hedgerow and mature tree vegetation.
- 482 Long term reversible effects of up to Medium scale would occur over a Localised extent of this receptor group. These would result in a Moderate/Slight magnitude of change and, considering the High/Medium sensitivity of the receptor group, a Moderate level of effect. The increase in hedgerow height around the site boundary and nature of the existing hedgerows would screen the majority of the site for a large proportion of the operational life of the solar farm and effects are not considered significant.
- 483 Due to the gently undulating landscape there would be no views of central and eastern parts of the site. There are little to no views of the development site from Lower Nash Farm. Due to the localised tree cover around the property and intervening established hedgerow vegetation, there would be little to no views from Nash Villa.
- 484 **Mayeston and Cosheston (0-1km, NW)** – This group includes the footpaths and residents near Little Mayeston located between the site and minor road to the north of the site, and residents at Mayeston Farm and Cosheston. Due to intervening localised tree and hedgerow cover views of the development site are largely restricted from this receptor group, as illustrated by Viewpoint 6. Only panels in the westernmost field would be visible from the footpath to the immediate north of the site, filtered through mature field boundary tree vegetation, as illustrated by Viewpoint 3. Whilst visible during winter months the panels would not be prominent in views and would be largely screened in summer months.
- 485 Where visible the panels would be seen in the context of large electricity pylons in the foreground and on the distant, southern horizon ridgeline. The proposal would give rise to Small scale effects over a Limited extent of this receptor group. This would result in Long term reversible effects, of Slight/Negligible magnitude and, considering the High/Medium sensitivity of the receptor group, a Minor level of effect (not significant).
- 486 **Upper Nash to Deer Park Lane (0-1.2km, S)** – This receptor group includes footpaths, minor road users and residents at individual dwellings and Upper Nash within c.0.6km south of the development site. It also includes those dwellings and footpaths on rising ground out to c1.2km south and Deer Park Lane where intermittent, panoramic views to the north are possible. Views towards the development site are limited by intervening tree cover and mature hedgerow vegetation within the landscape. Where open views towards the site are possible, the undulating nature of the landscape, intervening vegetation and proposed hedgerow and tree planting on site would limit views of the proposed PV panels to those on rising ground in northern parts of the site (as illustrated by Viewpoint 5). The upper most part of the closest PV panels would be visible but barely noticeable within views between existing hedgerows in the short term (Year 1). The scale of change would be Medium but would reduce as hedgerows grow to a height of 4m and the closest

PV panels would be largely screened. From some elevated locations at Upper Nash and higher ground out to c.1.2km, the central panels would be visible as part of a wider, panoramic view (as illustrated by Viewpoint 8).

- 487 Where visible the panels would result in Long term reversible, Medium/Small scale effects, over a Localised extent of this receptor group. The magnitude of change would be Moderate/Slight and, considering the High/Medium sensitivity of the receptor group, this would result in a Moderate level of effect (not significant). The magnitude and significance of effects would not markedly reduce over time, but the proposed mitigation hedgerow and tree planting would increasingly break up the areas of panels visible and better absorb them into the wider landscape seen in the views from these routes.
- 488 It is worth noting distant views of the existing West Lane solar park to the west of Cosheston are possible in the wider landscape to the north west. These panels are not prominent in views and are barely distinguishable from the surroundings.

8.8.4.2 Key Routes

- 489 Users of A-roads within the study area are judged to be of Medium/Low susceptibility with views from these roads considered to be of Community value. Overall they are judged to be of Medium/Low sensitivity to the proposed development.
- 490 **A477 (0.1km south)** – This main transport route transects the study area to the south of the site from Sageston in the east to Pembroke Dock in the west. It passes c.0.1km south of the southern site boundary, near to the A4075 junction at its closest point. ZTV mapping (see Figure 8.5) indicates potential visibility of the proposals would be concentrated to within c.0.5-1km south west and south east of the site. On site verification confirms however localised raised embankments, roadside hedgerows and intervening tree vegetation within the landscape would restrict views towards the site when travelling in both directions. Hedgerows at the site would be managed at an increased height of 4m and would further limit views of the site in the Long term. As road users pass the site there would be no visibility of the PV panels as illustrated by Viewpoint 2. Effects on A477 road users would be Limited in extent, and Negligible in scale, magnitude and significance (not significant).
- 491 **A4075 (0.4km, south)** – This route extends south west from the main A477 junction south of the development site to Pembroke. The site is largely behind the direction of travel when travelling south west towards Pembroke. Localised raised embankments, roadside hedgerows and intervening tree vegetation within the landscape would predominantly restrict views towards the site when travelling north east. Open views towards the site would be possible over a short c.0.5km, north easternmost section of this route. The undulating nature of the landscape and intervening vegetation would limit views of the proposed PV panels to those on rising ground in northern parts of the site. From this distance the panels would not be prominent in views. Long term yet reversible, effects would be Small in scale over a Limited extent of the route. As a

result the magnitude of change would be Slight and, considering the Medium/Low sensitivity of road users, this would result in a Minor level of effect (not significant).

8.8.4.3 Specific Viewpoints

- 492 No individual panoramic or valued viewpoints have been identified within the study area.

8.8.5 Designated Areas

- 493 **Pembrokeshire Coast National Park (PCNP) (0.1km, N)** – National Parks are designated both for their scenic beauty and their recreational value. The proposed development would not affect recreational opportunities within the National Park, but views towards the Proposed Development would have the potential to impact some of the qualities which contribute to the scenic beauty of the National Park. The Management Plan for this designated area sets out its Special Qualities, which individually or in combination contribute to making the National Park unique. These are considered within the table below.
- 494 The judgement of susceptibility is based on a development of the nature proposed (i.e. a solar farm), situated near to but not within the National Park. The specific location, design and visibility of the proposals are taken account of in the judgement of scale of effect.

Table 8-5: Effects on special qualities of the National Park

Indicator / Quality	Susceptibility	Nature of effect	Scale and extent of effect
Coastal Splendour	High –Development of this nature could adversely affect coastal character.	The site is not located near coastal areas and would not be visible from coastal areas of PCNP.	Negligible
Richness of habitats and biodiversity	Low – the site is not within PCNP.	None	Negligible
Diverse Geology	Low – the site is not within PCNP.	None	Negligible
Islands	Low –As islands and adjacent coast are all within PCNP, development outside the designation is unlikely to affects the islands.	None	Negligible

Indicator / Quality	Susceptibility	Nature of effect	Scale and extent of effect
Diversity of landscape	High – Development of this nature could adversely affect landscape character.	As set out previously, there would be effects on LCA28 for up to 2km north of the site between Mayeston House and Parkeston Hall, beyond which visibility is limited.	Small scale, Limited extent
Accessibility	Medium – alterations to access routes into PCNP as a result of development could affect accessibility.	None – the development does not alter access routes.	Negligible
Distinctive settlement character	High – Development of this nature could adversely affect settlement character.	The nearest settlement with visibility would be Carew Newton from where visual effects would be negligible and character would not be affected.	Negligible
Space to breathe	Medium – Development of this nature could adversely affect the sense of open space, but lacks the height to become overbearing.	Views from the National Park southwards would retain their sense of openness as the development is set below the National Park boundary and does not interfere with distance views from the National Park.	Negligible

Indicator / Quality	Susceptibility	Nature of effect	Scale and extent of effect
Rich historic environment	Medium – Modern development close to PCNP could adversely affect the perception of time depth and distract from historic features, but would not physically affect these features.	The experience provided by the landscape of the historic assets it contains would not be materially affected by the proposed development.	Negligible
Remoteness, tranquility and wildness	High – Development of this nature could adversely affect these qualities.	The location of the site means that it is seen in conjunction with other modern features – in particular pylons; and the PCNP close to the site does not particularly exhibit these qualities. Visibility is limited to the area immediately north of the site out to approximately 2km.	Small scale, Limited extent.
Cultural heritage	Medium – Development of this nature could affect relationships between PCNP and culturally significant nearby locations, but would not physically affect these locations	There are no known culturally important relationships between PNCP and the site.	Negligible
Diversity of experiences and combination of individual qualities	Medium – Diversity is by nature tolerant of change, though change of this nature could be incongruous; or could reduce apparent diversity if it becomes very common.	The solar park would be a new feature in some views out from the PCNP, but not incongruous. The cumulative development pattern would remain low enough to retain diversity.	Negligible.

- 495 Most of the special qualities of the National Park are judged to have low or medium susceptibility, with only a small number judged to be of high susceptibility. Considering this combined with the judgement of National value, the National Park is considered to be of High/Medium sensitivity to this form of development located outside of the National Park boundary.
- 496 Based on the detailed considerations set out above, Long term reversible effects on the purposes of designation and Special Qualities of the National Park would include Small scale effects on 'remoteness, tranquillity and wildness' and landscape character within the Limited area up to 2 km north of the site between Mayeston house and Parkeston Hall. Effects would be Slight/Negligible magnitude, Minor (not significant) and Adverse.
- 497 As planting matures, visibility of the site would reduce and be more filtered through trees. Given the elevated position of nearby areas within the National Park compared to the site, this would tend to reduce visibility and create a greater sense of distance rather than screen the development. The magnitude and significance of effects would reduce over time to Negligible and Minor/Negligible respectively.

8.9 Summary of Potential Landscape and Visual Effects

- 498 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.
- 499 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.
- 500 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) reducing to Minor/Negligible in the Long term as mitigation planting matures. Beyond these

areas effects on the wider landscape character would be limited and would tend towards Negligible.

- 501 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 Moderate/Slight magnitude of change 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. Where open views towards the site are possible from receptors in the wider landscape to the south, the grain of the landscape would be retained. Effects would be Moderate/Slight in magnitude and of a Moderate level of effect.
- 502 Medium to Long term effects on the purposes of designation of the National Park would be Small scale and Limited in extent. Effects would be Slight/Negligible magnitude, Minor (not significant) and Adverse. The magnitude and significance of effects would reduce over time to Negligible and Minor/Negligible respectively in the Long term.
- 503 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.

Table 8-6: Summary of Effects

504 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
Landscape Character					
LCA 25 - Hundleton and Lamphey	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
LCA 28 – Daugleddau	Effects on character area to the north of the site within the National Park	High/Medium	Slight	Moderate-Minor	Adverse
Visual Receptor Groups					
Minor road and footpaths within the National Park (0-0.6km N and NE)	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
Rights of Way to south east of Cosheston (0km, W)	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
Mayeston and Cosheston (0-1km, NW)	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
Upper Nash to Deer Park Lane (0-1.2km, S)	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
Key Routes					
A4075 (0.1km, south)	Views of development when travelling north east over a short c.0.5km, north easternmost section of this route.	Medium/Low	Slight	Minor	Adverse
Specific Viewpoints					
None affected					

Receptor	Description	Sensitivity	Magnitude	Significance	Beneficial /Neutral /Adverse
Landscape Designations					
Pembrokeshire Coast National Park (0.1km, N)	See above in respect of effects on character and views.	High/Medium	Slight reducing to Negligible	Minor reducing to Minor/Negligible	Adverse

8.10 Cumulative Effects

- 505 As set out within Section 8.5.5, the following developments were identified by consultees as requiring consideration in relation to potential cumulative effects:
- 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;
 - Planning application for proposed extension to West Farm solar farm 1.6km 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;
 - Two 47 m turbines which were the subject of a 2013 screening request.
- 506 The two turbines which were the subject of a screening request have not progressed to application and are unlikely to do so given the time elapsed and are not further considered. The proposed extension to West Farm solar farm would be viewed in context of the existing solar scheme and has been considered as part of the assessment of effects together with the existing solar farm where relevant. No developments in planning requiring cumulative assessment have been identified. The existing developments are included within the baseline and effects of the development along with the existing developments are set out within the preceding assessment. This section summarises the interactions between the various sites.
- 507 The locations of the existing developments are shown on Figure 8.7. These form part of the existing landscape baseline and have been commented on where relevant within the assessment. The vertical axis turbines at London Road Industrial estate are associated with that industrial environment and sufficiently distant that there would be no cumulative effects with the proposed development.
- 508 The two existing turbines are both relatively small scale and more than 1.5 km from the site. The larger of the two turbines at Milton Manor is noticeable in more elevated open views from the north where it features on the skyline in views across the valley (e.g. viewpoints 6, 7 and 9) along with the more dominant pylons, whereas the smaller turbine at Warreston House is only noticed within its immediate surroundings. More distant turbines beyond the study area at Wear Point wind farm (Milford Haven) are seen together with West Farm solar farm in elevated views looking northwards (e.g. from viewpoints 5 and 8). Golden Hill solar farm is seen in some elevated views from near Cosheston (e.g. viewpoint 3).
- 509 Figure 8.8 shows a cumulative ZTV study illustrating the theoretical visibility of the two existing solar farms and the Proposed Development. This indicates the following:

-
- Areas with combined views of two or three solar farms tend to be located along a 1km wide corridor to the south of the site. Viewpoints 1, 2, 5 and 8 are located within this area.
 - Combined visibility from within the National Park would be limited to an area around viewpoint 7 to the north of the site and more distant areas near Carew.
- 510 The viewpoint analysis indicates that this theoretical visibility is reduced in practice by the frequency of hedges and trees within the landscape that tend to screen one or more of the theoretically visible developments, making combined visibility infrequent.
- 511 In terms of landscape character, most of the developments are in LCA25 Hundleton and Lamphey, with West Farm located within LCA29 Cosheston Peninsula and the London Road turbines within the developed area of LCA16 Southern Haven. People travelling through the landscape would notice that there are a number of renewable developments in the area, but they would be a key aspect of the character.
- 512 In terms of visual effects, more open elevated views within the study area would tend to feature one or more renewable developments, with either both being distant relatively minor features, or one being close and the other being distant. From the National Park it is noted that whilst combined theoretical visibility of Golden Hill and West Farm is indicated by the ZTV in the vicinity of viewpoints 4 and 7, views of the existing solar sites are limited to small parts of each development from discrete locations within the National Park by intervening trees, terrain and the built form of Cosheston. They do not form prominent features within the views and would not be noticeable in combination with the Proposed Development from views available within these areas. Sequential cumulative effects from footpaths in these areas would be limited to;
- occasional (if any) glimpsed views of part of West Farm (shown as darker blue and pink areas on the ZTV) from short stretches of the footpath near viewpoint 7;
 - more frequent, but distant views of part of Golden Hill solar farm (shown as green, darker blue and pink areas on the ZTV) through intervening trees and hedgerows; and
 - more open short distance views of the Proposed Development only (shown as orange, darker green and pink areas on the ZTV).
- 513 Views of both the Proposed development and Golden Hill solar farm would primarily affect southbound walkers as they leave the National Park.
- 514 Due to the screening effects of intervening tree cover and landform near Carew there would be little to no views of the Proposed Development in this area and little potential for incremental or sequential views combined with Golden Hill, as illustrated by viewpoints 9 and 10,

- 515 Cumulative effects on the Special Qualities of the National Park would be limited to some combined and sequential views from the vicinity of viewpoint 7. The proposed development would not in practice contribute to effects on the area around Carew.

9 Ecology and Ornithology

9.1 Introduction

- 516 This Chapter of the ES covers the assessment of likely significant effects on ecology and nature conservation arising as a result of the proposed Blackberry Lane Solar Park development.
- 517 This Chapter is supported by the following figures provided in the Environmental Statement Volume 3:
- Figure 9.1. Phase 1 Habitat Survey Plan;
- 518 This chapter is also supported by the following Technical Appendices provided in Environmental Statement Volume 2:
- Technical Appendix A9.1: Target Notes;
 - Technical Appendix A9.2: Protected Species Legislation
 - Technical Appendix A9.3: No Significant Effects Report
 - Technical Appendix A9.4: Landscape and Ecological Management Plan
- 519 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.
- 520 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.
- 521 The surrounding landscape is primarily rural in character, dominated by large tracts of arable land and small farmsteads.
- 522 The proposed development is for the installation of photovoltaic cells (PV) and associated infrastructure to be constructed within the site boundary. Further details of the Development can be viewed in Chapter 6 of the EIA. Access to the site is will be off the A477 via an existing unnamed road leading to an existing field entrance.
- 523 On completion of the operational stage, including in the event of the solar park no longer being required, all electrical apparatus and its foundations, panels and supports, fences etc will be lifted and removed from the site. The site will be restored to its pre-construction state for reuse for agriculture.
- 524 A decommissioning plan will be prepared and submitted to the local planning authority for approval 12 months prior to the commencement of decommissioning

works which will detail all necessary ecological survey requirements and mitigation measures representing best practice at that particular time.

9.2 Legislation, Policy and Best Practice

- 525 Whilst Chapter 7 discusses the local planning background against which the proposed development will be considered, including relevant nature conservation plans and policies, the following legislation, policy and guidance documents have been used to underpin the ecological impact assessment reported in this Chapter:
- Habitats and Species Directive (92/43/EEC) 1992;
 - Bern Convention (on the Conservation of European Wildlife & Natural Habitats; and on the Conservation of Migratory Species of Wild Animals) 1979;
 - The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019;
 - Wildlife & Countryside Act 1981 (and subsequent amendments);
 - Countryside and Rights of Way Act 2000;
 - Environment (Wales) Act Section 7 2016;
 - Technical Advice Note 5: Nature Conservation and Planning
 - Natural Environment and Rural Communities (NERC) Act 2006;
 - Protection of Badgers Act 1992;
 - The UK Biodiversity Action Plan (UKBAP) 1994; and
 - Pembrokeshire Biodiversity Action Plan (PBAP).

9.3 Assessment Methodology

- 526 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' (EZOI) relating to the proposed solar park development has been established.
- 527 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).

9.3.1 Baseline Methodology

9.3.1.1 Study Area

- 528 The proposed solar park is defined by the application red-line boundary (ES Vol 3: Figure 1.2) and is hereafter referred to as the 'site'.

- 529 To inform the scope of the assessment, consideration has been given to the Ecological Zone of Influence (EZoI) of the proposed development. The EZoI is defined as an area over which important ecological features may be affected as a result of biophysical changes caused by the proposed solar park and associated activities. The extent of such changes will typically reduce as the distance from the proposed solar park development increases, and whether effects are experienced is dependent on the sensitivity of individual habitats, species or other ecological features. As such it is problematic to define a specific EZoI which captures all potential effects arising from the proposed solar park on all ecological features that may be present and different search areas/study areas have been used for different species/habitats. The EZoI for the ecological features, which were subject to specific desktop or site survey work, are set out below.
- 530 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.

9.3.1.2 Ecological Zones of Influence

- Statutory designated sites within 10km of the site;
- Non-statutory designated sites within 3km of the central grid reference;
- Records search for protected/notable habitats and species within 3km of the central grid reference; and
- Extended Phase 1 Habitat Survey – the site and immediate surroundings.

9.3.1.3 Desk Study

- 531 A desktop study was undertaken in June 2019 and reviewed in June 2020 and involved conducting database searches for statutory and non-statutory designated sites, including Ramsar sites, Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Sites of Special Scientific Interest (SSSIs), as well as other features of interest located within and surrounding the proposed solar park.
- 532 The baseline conditions are based on a review of existing available information, which included the following:
- Multi-Agency Geographical Information for the Countryside (MAGIC) website (to identify statutory designated sites located within 10km of the site);
 - Ordnance survey mapping, including historic maps (to identify potentially notable habitats and past land use);
 - Aerial photography (to identify potentially notable habitats and past land use);
 - UK Biodiversity Action Plan;
 - Pembrokeshire Biodiversity Action Plan (reflect the aims and objectives of the national plans for the habitats and species found in the local area); and

- Consultation Data (including records of protected / notable species and habitats and non- statutory sites within 3 km of the central grid reference) provided by West Wales Biodiversity Information Centre (WWBIC) – *full consultation data is available electronically upon request due to the confidential nature of some protected species.*

9.3.1.4 Field Survey

- 533 SK Environmental Solutions Limited undertook an Extended Phase 1 Habitat Survey of a larger site boundary in June 2019. The survey was updated in November 2023.
- 534 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.
- 535 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.
- 536 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.
- 537 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.
- 538 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.

9.3.1.5 Limitations

- 539 It should be noted that the data search provided information on habitats and species already recorded and cannot be taken to represent a complete overview of all species present in the survey area. The consultation data from West Wales Biodiversity Information Centre was not updated in 2023. It is considered that the historic records, coupled with the site visits, provide a robust review of the potential presence of various notable/protected species and habitat types at the proposed solar park. This has allowed a general assessment of the proposed solar park's potential nature conservation value to be made and therefore this was not considered to be a significant limitation.

- 540 The survey in 2023 was undertaken outside of the optimal survey window for Extended Phase 1 Habitat ~survey. However, the aim of the survey was to determine if there had been any significant changes in the habitats present which could have implications for this assessment. No habitat changes were identified and therefore the survey work completed in 2019 and 2023 is considered appropriate and sufficient to carry out a robust ecological impact assessment.
- 541 The surveys in both 2019 and 2023 were conducted on a single site visit and therefore seasonal trends and inherent variations in ecosystem dynamics mean that some species of flora and fauna may not have been recorded. However, the purpose of the survey was to record habitat types and not to provide a comprehensive species list, therefore this was not considered to be a significant limitation.

9.3.2 Consultation

- 542 Consultation responses were received from various consultees as part of the previous DNS application for the larger Blackberry Lane site. The detail of these responses and how they have been addressed are included within the Pre-Application Consultation Report (DRN:BL007).
- 543 The table below sets out additional queries raised within the Pembrokeshire County Council (PCC) Local Impact Report (LIR) for DNS/324506 and how these have been addressed within this chapter.

Table 9-1: Summary of Pembrokeshire County Council (PCC) Local Impact Report (LIR) for DNS/3245065 and Proposed Actions

Consultation Response	Action
<i>“Much of the site is made up of species poor improved grassland and it is not anticipated that there would be a loss of any high value ecological habitats. The submitted ecological management scheme is welcomed and should result in an overall biodiversity enhancement for the site. Subject to the following caveats, the Proposal would not result in unacceptable impact and would accord with policies GN.1 and GN.37 as well as the Biodiversity SPG.”</i>	Section 9.12 of this EclA confirms no significant effects are anticipated for designated sites, habitats or species as a result of the proposed solar park.

Consultation Response	Action
<i>"Badgers – pre-commencement checks for badger setts have been proposed. Any works within 30m of an active sett will require a licence from NRW. Therefore, the pre commencement checks should include anything within 30m of any works."</i>	Badger have been assessed as a VER (Section 9.4) and are likely to use the site for foraging and commuting. Embedded mitigation (Section 9.6) commits to a pre-commencement survey for badgers and confirm that the survey scope will include all suitable habitat within 30m of any works. Should any setts be identified during the pre-commencement checks that could be affected by the proposed development, then an appropriate mitigation strategy will be prepared and agreed with NRW as part of a licence application.
<i>"Bats – NRW's response at pre-application did not anticipate significant impacts upon the Pembrokeshire Bat Sites and Bosherton Lakes Special Area of Conservation. The ES has concluded that the only foraging and commuting habitats are associated with the tree lines and hedgerows on and adjacent the development site. However, there doesn't appear to have been any consideration for impacts that the presence of the solar panels themselves will have in terms of collision risk. No trees are proposed for removal as part of the proposed development, however should any trees require works or felling at any time these should be subject to a bat survey to assess the potential for bat roosting."</i>	Section 9.8.2 assesses the potential for collision risk of the solar panels to bats. A study detailed within the European Commission's Potential Impacts of Solar, Geothermal and Ocean Energy on Habitats and Species Protected Under the Birds And Habitats Directives – Final Report (Lammerant, L., Laureysens, I. and Driesen, K. (2020) Final report under EC Contract ENV.D.3/SER/2017/0002 Project) suggests that although bats may confuse smooth flat surfaces with water bodies, it seems unlikely that this would have detrimental effects on local bat populations. Solar parks are unlikely to result in significant injury or mortality to bats as a result of collision above and beyond other flat/smooth built developments. Solar panels do not have moving parts and therefore bats should be able to detect them as well as any other man-made objects introduced into the environment. Therefore, Section 9.8.2 of this EclA concludes that a negligible (adverse) impact and a non-significant negligible (adverse) effect is anticipated on bat with regards to collision risk.

Consultation Response	Action
<i>"Tree and hedgerow buffer – to provide further confidence in the maintenance of the Root Protection Area for trees and ensure the hedgerow is adequately buffered, it is recommended that the 5m buffer starts from the edge of the hedgerow and woodland habitats rather than the centre."</i>	Section 9.6 of this EclA sets out the embedded mitigation which has been incorporated into the scheme. This section explains that 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.
<i>"Lighting – As stated in the ES there must be no external lighting during the construction, operation or decommissioning of the Proposal."</i>	No external lighting is proposed during the construction, operation or decommissioning of the proposed solar park.
<i>"CEMP – works must be undertaken in accordance with the CEMP with particular attention being paid to protection of the existing wet drainage ditches on site to ensure there are no impacts upon the Pembrokeshire Marine SAC. Included in the CEMP should be a note on checking for areas of silty run-off during construction and decommissioning during periods of heavy rainfall."</i>	Silt prevention methods are included within the Construction Environmental Management Plan (CEMP) submitted as part of this application (DRN: BL009). The CEMP includes 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.
<i>"Mitigation and Enhancement – All works must be undertaken in accordance with Section 9.6 of the submitted ES, Section 2.3 of the Ecological Mitigation and Management Plan and the Landscape Management Plan. The proposed enhancements are also likely to result in habitat improvements for several species. The addition of hibernacula opportunities as part of the enhancement scheme would be welcomed."</i>	Section 9.6 of this EclA sets out the embedded mitigation which has been incorporated into the scheme. This includes the creation of six permanent log and stone piles, as well as the collection and piling of arisings generated through hedgerow management activities. The locations of the hibernacula are shown on the Landscape Plan (Figure 8.6).

Consultation Response	Action
<i>"It has been recommended for previous Solar Farm applications that the applicants make contact with the Islands Conservation Advisory Committee (ICAC) of the Wildlife Trust of South and West Wales regarding opportunities to monitor solar park sites for disorientated Manx Shearwater. Manx Shearwater are one of the designating species of the Skomer, Skokholm and the Seas off Pembrokeshire Special Protection Area (SPA). At the end of August/September young Manx Shearwaters set off from the Islands for the first time and in certain weather conditions (onshore winds, low clouds and fog) the young birds will end up inland, become disorientated and will think wet roads and tarmac surfaces and rivers are the sea and attempt to land. However without rocky outcrops for them to climb on to and launch from the birds become stranded. They have been recorded in Milford, Spittal, Pembroke and luckily in these locations a member of the public is normally able to help. ICAC think that during these weather conditions the young birds may think the surface of the solar arrays are the sea and possibly try and land on them. Obviously as there will not be much activity in these areas it is unlikely the birds would be found until it was too late. They would be very keen during August/September should such weather conditions occur to be allowed access to solar farms to survey for any stranded birds so they can be released. This would involve one or two individuals surveying the site solely for the purpose of finding any disorientated birds. It would not impact on the use of the farm or reflect badly on the development itself but would be dependent on the land owner allowing access to the site."</i>	Section 9.8.2 assesses the potential for the proposed solar park to encourage disorientated, young Manx Shearwater into the site. Due to a lack of previous research it is not well known whether young Manx Shearwater would be likely to try to land at the solar park. As part of correspondence for the previous DNS application, Lisa Morgan, Head of Islands and Marine for the Wildlife Trust of South and West Wales, confirmed that in her experience, young birds are more likely to be attracted to well-lit areas than those which could be mistaken for the sea/water. The proposed solar park will not be lit during construction, operation or decommissioning and therefore artificial lighting will not impact young Manx shearwater. However, light reflected from other sources and moonlight could potentially attract the young birds. Therefore, Section 9.8.2 sets out a proposed monitoring program for young Manx Shearwater to determine if they are being mistakenly attracted to the solar park.

9.3.3 Assessment Criteria and Assignment of Significance

9.3.3.1 Valuation

- 552 The evaluation of ecological features and resources has been based on sound professional judgement whilst also drawing on the latest available industry guidance and research. The approach taken in this report is based on that described in 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal' published by the Chartered Institute of Ecology and Environmental Management (CIEEM 2018), whereby important ecological features are identified, and these are considered within a defined geographical context using the following frame of reference:
- International;
 - UK;
 - National (i.e. Wales);
 - Regional;
 - County;
 - District;
 - Local; and
 - Neighbourhood (site and its vicinity, including areas of habitats contiguous with or linked to those on site).
- 553 The valuation of sites makes use of established value systems e.g. Sites of Special Scientific Interest are of national importance and Sites of Importance for Nature Conservation are of county importance. Professional judgement is however required for the valuation of sites of less than district value.
- 554 The valuation of species populations, assemblages of species and habitats also uses accepted criteria, examples include:
- Species populations: the importance of populations can be evaluated on the basis of their size, recognised status (e.g. published lists of species of conservation concern, Biodiversity Action Plan (BAP) status) and legal protection status. Bird populations, for example, exceeding 1 percent of published biogeographic populations are considered to be of international importance, and those exceeding 1% of published national populations are considered to be of national importance, and so forth.
 - Species assemblages: in some instances, it is the species assemblage that is of importance. Criteria of use to evaluate the importance of assemblages included SSSI selection criteria. Fuller (1980) provides a framework for evaluating the relative importance of bird assemblages.
 - Habitats: criteria for the evaluation of habitats and plant communities include Annex III of the EC Habitats Directive, guidelines for the selection of biological SSSIs and, where available, Local Authority criteria for the selection of Local

Sites (e.g. County Wildlife Sites). Legal protection status is also a consideration for certain habitats.

555 In this assessment, designated sites, species and habitats are considered to be Valued Ecological Receptors (VER) if they meet the following minimum level of importance:

- **Sites** – local importance
- **Species** – local importance
- **Habitats** – local importance

556 Any potential impacts to identified VERs will be fully considered within this assessment. Any ecological features that do not meet the VER criteria, above, will be scoped out of the assessment. This is because it is considered that no significant effect can occur to features of less than local importance, except where a feature has high social or economic value.

557 The description and valuation of ecological features has taken account of any likely changes, including, for example, trends in the population size or distribution of species; likely changes to the extent of habitats; and the effects of other proposed developments or land-use changes.

9.3.3.2 Identification and Magnitude of Impacts

558 The CIEEM guidance also sets out a methodology for the assessment of likely impacts arising from proposed developments. The method used in this assessment is based on the CIEEM guidance and the *British Standards for Biodiversity: Code of Practice for Planning and Development (BS42020:2013)*, and is summarised below.

559 Based on the parameters of the proposed solar park, likely impacts have been determined with reference to aspects of the ecological structure and function on which the feature or resource depends. This includes factors such as the available resources, ecological processes, human influences, historical context, ecological relationships, ecological role or function and ecosystem properties. In this context, the nature of the impact has been characterised and considered using the following parameters set out in the CIEEM guidance:

- **Positive or negative** – will the activity lead to a beneficial or an adverse effect;
- **Extent** – the spatial or geographical area over which the impact may occur, the area of habitat or number of individuals affected;
- **Magnitude** – this refers to size, amount, intensity and volume, and should be expressed as quantitatively as possible;
- **Duration** – the time for which the impact is expected to last prior to recovery or replacement, i.e. short-term or long-term, as defined in relation to ecological characteristics (such as a species' lifecycle);

- **Frequency and Timing** – some changes may only cause an impact if they coincide with critical life-stages or seasons, whilst frequent events may cause a greater effect than a single event; and
- **Reversibility** – an effect may be irreversible in that recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it, i.e. permanent or temporary.

560 Based on the parameters outlined above, a broad scale has been produced using the terminology summarised in Table 9-2.

Table 9-2: Definition of Magnitude

Magnitude	Definition
High	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Medium	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

9.3.3.3 Significance of Effects

- 561 The effect is the term used to express the consequence of an impact (expressed as the significance of effect), which is determined by correlating the magnitude of the impact to the value of the receptor.
- 562 For habitat areas and species, an effect is considered to be significantly adverse if the favourable conservation status of a VER is compromised as a result of the proposed development. Conservation status is defined by CIEEM as being:
- **Habitats** – “conservation status is determined by the sum of the influences acting on the habitat and its typical species that may affect its long-term distribution, structure and functions as well as the long-term survival of its typical species within a given geographical area”.
 - **Species** – “conservation status is determined by the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within a given geographical area”.
- 563 The decision as to whether the favourable conservation status of a VER is likely to be compromised is made using professional judgement based on an analysis of the predicted effects of the development.
- 564 A similar process is used for designated sites that could be affected by the development, except that the focus is on the effects on the integrity of each site, defined as “the coherence of ecological structure and function, across a site’s whole area, that enable it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified.” This assessment is made with reference to the features for which a site has been classified/notified and involves combining assessments of the effects on the conservation status of each of these features.
- 565 For non-statutory designated sites, such features may not have been formally defined and will need to be agreed with the designating authority (e.g. local authority or county wildlife trust).
- 566 An effect is considered to be significantly beneficial if development activities cause:
- A non-valued ecological receptor to become valued;
 - Restoration of favourable conservation status for a habitat/species population; and/or,
 - Restoration of a site’s integrity (where this has been previously undermined).

9.4 Existing (baseline) Environment

9.4.1 Designated Sites

- 567 DEFRA’s MAGIC Map was used to identify statutory designated sites, located within 10km of the site. The locations of the statutory sites in relation to the proposed solar park site are shown on Plate 1, below.

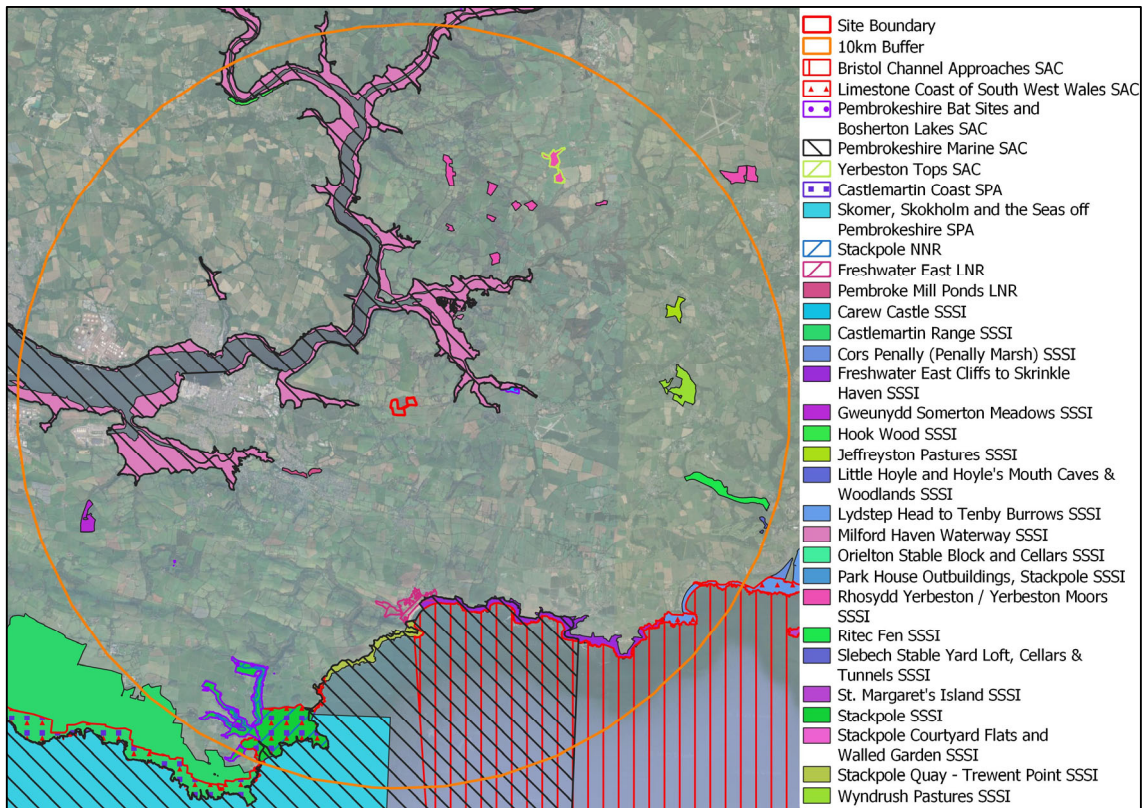


Plate 1 – Locations of statutory designated sites

568 MAGIC Map identified the following Special Areas of Conservation (SACs) located within 10km of the site:

- Pembrokeshire Marine / Sir Benfro Forol SAC is located approximately 870m west and 1km east of the site. Pembrokeshire Marine SAC is one of the best areas in the UK for large shallow inlets and bays, estuaries, reefs and grey seals *Halichoerus grypus*. The SAC is considered to be of **international importance** for nature conservation.
- Pembrokeshire Bat Sites and Bosherton Lakes/ Safleoedd Ystlum Sir Benfro a Llynnoedd Bosherton SAC is located approximately 2.3km east of the site, at its closest. Pembrokeshire Bat Sites and Bosherton Lakes SAC covers 121.26ha across several different sites, including Carew Castle SSSI (c.2.3km east of the proposed solar park site), Orielton Stable Block and Cellars SSSI (c.7km south west of the proposed solar park site), Park House Outbuildings, Stackpole SSSI (c.7.6km south west of the proposed solar park site), Stackpole Courtyard Flats and Walled Garden SSSI (c.7.9km south west of the proposed solar park site) and Stackpole SSSI (c.7.5km south west of the proposed solar park site, at its closest). It supports large populations of greater horseshoe bats and lesser horseshoe bats *Rhinolophus hipposideros* and Eurasian otter *Lutra*. The SAC considered to be of **international importance** for nature conservation.
- Bristol Channel Approaches / Dynesfeydd Mlir Hafren SAC, is located approximately 5.1km south of the site at its closest. The SAC covers a large area,

c. 582,169ha. The SAC is designated for Harbour porpoise *Phocoena*. The SAC considered to be of **international importance** for nature conservation.

- Yerboston Tops SAC covers an area of 18.7ha and is located approximately 6.9km north east of the site. The SAC is designated for its populations of the rare marsh fritillary butterfly *Eurodryas aurinia*. The SAC considered to be of **international importance** for nature conservation.
- Limestone Coast of South West Wales / Arfordir Calchfaen De Orllewin Cymru SAC is located approximately 7.3km south of the site, at its closest, and covers an area of 1595ha, including a number of SSSI sites. The SAC includes limestone cliffs which support an unusually high number of nationally rare and scarce plants within the maritime, dune and neutral/calcareous grassland. The cliffs also support large colonies of seabirds. Greater horseshoe bats are known to feed regularly over the grassland. The coastal caves support one of the most important greater horseshoe bat winter roosts in the UK. The SAC considered to be of **international importance** for nature conservation.

569 MAGIC Map identified the following Special Protection Areas (SPAs) located within 10km of the site:

- Skokholm and the Seas off Pembrokeshire SPA covers an area of 166800.74ha and is located approximately 8.1km to the south of the site. The SPA is designated due to supporting important assemblages of breeding birds. The SPA considered to be of **international importance** for nature conservation.
- Castlemartin Range SPA is located approximately 8.1km south west of the site and covers an area of 2122ha. The SPA is designated as a European protected site due to the presence of red-billed chough *Pyrrhocorax pyrrhocorax*. During the breeding season the area is home to over 3% of the UK breeding population. The SPA considered to be of **international importance** for nature conservation.

570 MAGIC Map identified a number of Sites of Special Scientific Interest (SSSIs) located within 10km of the site. The SSSIs are listed below:

- Milford Haven Waterway SSSI is located approximately 870m west and 1km east of the site. Milford Haven Waterway SSSI is the largest estuary in Wales and one of the deepest natural harbours in the world. It's sheltered, tidal waters are surrounded by a diverse two-hundred-mile coastline, providing habitats for an abundance of wildlife.
- Carew Castle SSSI is located approximately 2.3km east of the site. It forms part of the Pembrokeshire Bat Sites SAC and is designated for the important roosting and feeding sites it provides for greater horseshoe bats, as well as supporting other bat species, including lesser horseshoe. The limestone and geology and castle walls has facilitated the establishment of notable plant communities. Barn, tawny and little owls breed within the site, with peregrine also observed foraging and roosting, while wintering waders and waterfowl often rest within the site.
- Rhosydd Yerboston / Yerboston Moors SSSI is located approximately 4.1km north of the site at its closest. The SSSI covers an area of 91.1ha, comprising eleven areas of marshy grassland and neutral grassland. The SSSI supports populations of the rare marsh fritillary butterfly and the designated site is considered to be one of the most important for this butterfly in Europe. In recent

years the butterfly population has been centred on the moors north of Yerboston village, but in years when numbers are high, the butterfly will disperse several kilometres to colonise other moors where there are good populations of the caterpillar's food-plant, devil's-bit scabious *Succisa pratensis*. These small colonies perform an essential role by providing refuges for the species when the habitat becomes unsuitable on the main sites.

- The Freshwater East Cliffs to Sprinkle Haven SSSI which is located approximately 4.9km to the south of the site at its closest. Freshwater East Cliffs to Sprinkle Haven SSSI is a length of approximately 7km of coastline that is designated for geological as well as ecological reasons. The SSSI supports a number of rare and scarce plants and invertebrates and covers an area of 139.17ha. It is considered to be of **UK importance** for nature conservation.
- Lydstep Head to Tenby Burrows SSSI is located approximately 8.7km south east of the site and covers an area of 201ha. Part of the SSSI is included within the Limestone Coast of South West Wales / Arfordir Calchfaen De Orllewin Cymru SAC designation.
- Stackpole Quay - Trewent Point SSSI is located approximately 5.5km to the south of the site, along the coast and covers an area of 64Ha. Part of the SSSI is included within the Limestone Coast of South West Wales / Arfordir Calchfaen De Orllewin Cymru SAC designation.
- Wyndrush Pastures SSSI is located approximately 6.5km east of the site and covers c.46ha. The SSSI supports neutral and marshy grassland communities set amongst areas of broad-leaved woodland and scrub with some areas of dry acidic grassland and tall herb fen. Notable flowering plants include petty whin *Genista anglica* and dyer's greenweed *Genista tinctoria*.
- Jerrreyston Pastures SSSI is located approximately 7.1km east of the site and covers c.16ha. The SSSI is designated for its plant communities.
- Ritec Fen SSSI is located approximately 7.4km south east of the site and covers an area of c.43ha. The SSSI is designated for its fen and wetland communities.
- Gweunydd Somerton Meadows SSSI is located approximately 8.4km west of the site and covers c.19ha.
- Little Hoyle and Hoyle's Mouth Caves and Woodlands SSSI is located approximately 9.7km south east of the site and covers an area of c.2.94ha.
- Castlemartin Range SSSI is located approximately 9.6km south west of the site. The site is designated for both its geological and biological features including its plant communities, breeding and wintering bird assemblages, breeding grey seals and horseshoe bat species.
- Hook Wood SSSI is located approximately 8.8km north of the site and comprises an area of ancient estuarine woodland dominated by sessile oak *Quercus petraea*.
- Orielton Stable Block and Cellars SSSI is located approximately 7km south west of the site and forms part of the wider Pembrokeshire Bat Sites SAC. The stable block supports one of the largest nursery roosts of lesser horseshoe in Pembrokeshire, with smaller numbers of both lesser and great horseshoe in the cellars.

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- Park House Outbuildings, Stackpole SSSI is located approximately 7.6km south of the site and forms part of the wider Pembrokeshire Bat Sites SAC. Like Oriulton Stable Block and Cellars SSSI, it supports a large nursery roost of lesser horseshoe bats.
 - Slebech Stable Yard Loft, cellars & Tunnels SSSI is located approximately 9.7km south east of the site. The citation states the site supports one of only two greater horseshoe roosts in Wales, however, the range of this species has substantially expanded since designation of this site.
 - Stackpole SSSI is located approximately 7.5km south west of the site. It is designated for a number of notable plant communities present across the site, which in turn support populations of notable invertebrates, birds and mammals.
 - Stackpole Courtyard Flats and Walled Garden SSSI is located approximately 7.9km south west of the site. It is one of a number of SSSIs which form part of the Pembrokeshire Bats SAC and is designated for the greater horseshoe bat roost it supports.
- 571 The SSSIs are all considered to be of **UK importance** for nature conservation.
- 572 MAGIC Map identified one National Nature Reserve (NNR) and two Local Nature Reserves (LNRs) located within 10km of the site. These are listed below:
- Pembroke Mill Ponds LNR is located approximately 2.4km south west of the site.
 - Freshwater East LNR is located approximately 4.6km south of the site.
 - Stackpole NNR is located approximately 7.6km south west of the site
- 573 The NNR is considered to be of **national importance** for nature conservation, whilst LNRs are considered to be of **regional importance** for nature conservation.
- 574 The locations of non-statutory designated sites and ancient woodlands located within 3km of the site are shown on Plate 2, below.

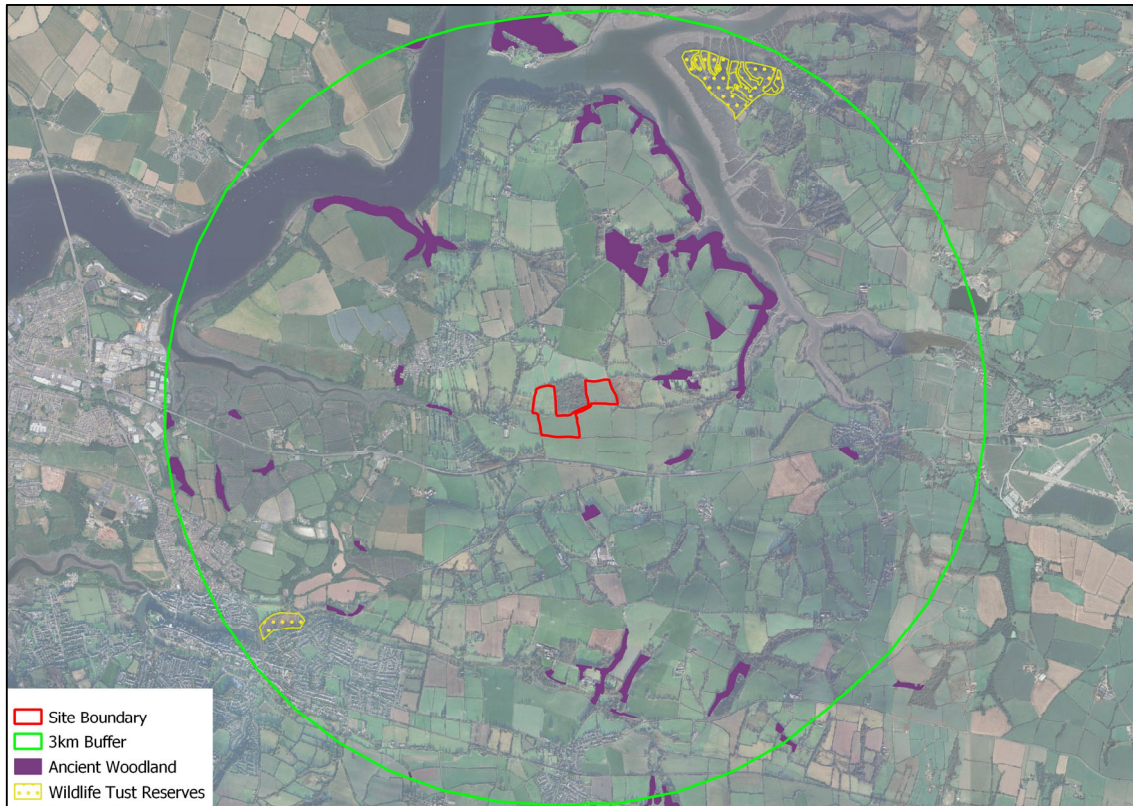


Plate 2 – Locations of non-statutory designated sites

575 West Wales Biodiversity Information Centre (WWBIC) identified two non-statutory designated sites located within 3 km of the site:

- West Williamston Wildlife Trust Reserve (WTR) is located approximately 2.4km north-east of the site. West Williamston WTR comprises 20ha of tidal creeks, saltmarsh, limestone rock outcrops and soil heaps with woodland. The reserve is promontory on the confluence of the Carew and Cresswell rivers both of which hold SSSI and SAC protection. Large numbers of waders and wildfowl frequent the site including curlew *Numenius arquata*, mute swan *Cygnus olor*, cormorant *Phalacrocorax carbo* and oystercatcher *Haematopus ostralegus*. The LNR is considered to be of **county importance** for nature conservation; and
- Pembroke Upper Mill Pond WTR is located approximately 2.4km south-west of the site. Pembroke Upper Mill Pond WTR comprises 5ha of developing reed bed, fen and carr with adjoining woodland. The pond was formerly part of a tidal creek, which extended eastwards from below Pembrokeshire Castle. The vegetation represents a transition from estuarine to freshwater conditions lesser duckweed *Lemna minor* and horned pondweed *Zannichellia palustris* occur in the open water with emergent vegetation dominated by common reed *Phragmites australis*. Bird species are varied due to the range of habitats present. The WTR is considered to be of **county importance** for nature conservation.

576 There are approximately twenty-one areas of Ancient Woodland scattered within a 3km buffer of the proposed solar park. These woodlands are disconnected, with the nearest to the site being located approximately 180m to the north, 200m to the east, 650m to the west and 450m to the south.

9.4.2 Habitats

577 The Extended Phase 1 Habitat Plan (Figure 9.1) shows the habitat types recorded within the site. Target notes (TN) are used to identify features of particular interest within the survey area (see Appendix A9.1).

578 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.

579 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.

9.4.2.1 Improved Grassland

580 The majority of the site comprises improved grassland, seeded with ryegrass mix *Lolium Sp. Var.* (see Target Note 1). The sward is dominated by perennial rye grass *Lolium perenne*, with occasional velvet bent *Agrostis canina*, creeping bent *Agrostis stolonifera*, cock's-foot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus* and rough meadow grass *Poa trivialis*. Forbs include sticky mouse-ear *Cerastium glomeratum*, dandelion *Taraxacum agg.*, creeping buttercup *Ranunculus repens*, broadleaved dock *Rumex obtusifolius* and common nettle *Urtica dioica*, with cuckoo flower *Cardamine pratensis*, soft rush *Juncus effusus*, creeping thistle *Cirsium arvense*, spear thistle *Cirsium vulgare*, hogweed *Heracleum sphondylium* and curled dock *Rumex crispus* being recorded rarely. The sward is short, and evidence of sheep grazing was observed.

- 581 The improved grassland is a species poor, highly managed habitat and is therefore considered to be of **neighbourhood importance** for nature conservation. Improved grassland is not a VER and is not considered further within this assessment.

9.4.2.2 Agriculturally Improved Pasture

- 582 The south eastern corner of the eastern most field comprises a wetter area of ground that is best described as agriculturally improved rush pasture (see Target Note 11). Overall, the species composition is similar to the improved grassland areas but with a higher occurrence of rush species such as soft rush, hard rush *Juncus inflexus* and sharp-flowered rush *Juncus acutiflorus*. The sward is short, and evidence of sheep grazing was observed.
- 583 The rush pasture habitat is a highly managed habitat and it is therefore considered to be of **neighbourhood importance** for nature conservation. Agriculturally improved rush pasture is not a VER and is not considered further within this assessment.

9.4.2.3 Semi-natural Broadleaved Woodland

- 584 A broadly square area of pedunculate oak *Quercus robur* dominated woodland is surrounded on three sides by the northern site boundary. It is likely that the woodland block was originally planted, however over time it has taken on the characteristics of a semi-natural habitat, in the main due to management. The southern and northern ends of the woodland differ in character with tall (approximately 16m) oak and ash *Fraxinus excelsior* forming the canopy to the south (see Target Note 5). It should be noted that there has been considerable ash dieback at the site.
- 585 The north of the woodland is scrubbiest in nature and more windswept, with stunted oak and grey willow *Salix cinerea* more prevalent in the canopy (see Target Note 4). The woodland is bound by an earth bank and ditch located approximately 2.5m from the more recently installed fence line (see Target Note 10). Bramble *Rubus fruticosus* agg. is abundant and other woody species present include holly *Ilex aquifolium*, silver birch *Betula pendula*, yew *Taxus baccata*, blackthorn *Prunus spinosa*, sycamore *Acer pseudo-platanus*, hazel *Corylus avellana* and gorse *Ulex europaeus*.
- 586 The semi-natural broadleaved woodland is considered to be of **district importance** for nature conservation.

9.4.2.4 Tall Ruderal Vegetation

- 587 Bramble, bracken *Pteridium aquilinum* and other common tall ruderal species are found in small discrete patches along field margins and at headlands.
- 588 The tall ruderal habitats are species poor and considered to be of **neighbourhood importance** for nature conservation. Tall ruderal vegetation is not a VER and is not considered further within this assessment.

9.4.2.5 Trees

- 589 Individual and groups of trees are confined in the main to the field boundaries in the northern half of the site. Early mature to mature ash and sycamore dominate, with occasional elm *Ulmus procera*, grey willow and rare overgrown hawthorn *Crataegus monogyna* and hazel present. Many of the trees show signs of being wind damaged or subject to ash dieback and contain cavities or other features that may be used by roosting bats (see Target Notes 3, 8 and 10).
- 590 The tree habitats are considered to be of **district importance** for nature conservation.

9.4.2.6 Hedgerows

- 591 Ten hedgerows were recorded on site. The hedgerows are summarised in Table 9-3.

Table 9-3: Hedgerows

No.	Hedgerow Description	Species Rich?
H1	Hawthorn with ash, sycamore, and blackthorn. Defunct. Tree standards present	N
H2	Blackthorn, hawthorn, sycamore, holly, gorse, honeysuckle <i>Lonicera periclymenum</i> , bramble. Mature oak trees. Somewhat intact. Tree standards present.	N
H3	Blackthorn, hawthorn, hazel, ash, dog rose. Intact. Tree standards present. Flail managed.	N
H4	Gorse, hawthorn, holly, oak, dog rose, willow, blackthorn. Defunct. Tree standards present. Flail managed.	N
H5	Sycamore, hazel, hawthorn, blackthorn. Mature tree standards, including elm, sycamore, ash. Flail managed.	N
H6	Blackthorn, hazel, hawthorn, sycamore, elder and bramble. Intact. Flail managed.	N
H7	Sycamore, hawthorn, blackthorn, ash, elder, hazel, willow. Intact. Flail managed.	Y
H8	Elder, blackthorn, hawthorn. Mature ash tree standards. Flail managed.	N
H9	Blackthorn, hazel, willow, sycamore, hawthorn, elder and gorse. Very gappy and grassy. 1.5m bank. Tree standards present. Flail managed.	N

H10	Willow, blackthorn, hawthorn, hazel, ivy, elder and gorse. Tree standards present. Flail managed.	N
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- 592 There are ten intact and defunct hedgerows present on site (see Target Notes Target Note 2, 3 and 6). They tend to be earth banked and woody species recorded include hazel, blackthorn, ash, elder, grey willow and hawthorn. Climbers and scramblers are rare and include bindweed *Convolvulus arvensis*, black bryony *Dioscorea communis*, honeysuckle and dog rose *Rosa canina*. Many of the hedgerows contain gaps and are not stockproof, with bracken and grasses currently filling the voids. .
- 593 Arable field margins are a local Pembrokeshire BAP habitat. The species rich hedgerow (H7) is considered to be of **district importance** for nature conservation, whilst the species poor hedgerows (H1-H6 and H8-H10) are considered to be of **local importance** for nature conservation.

9.4.2.7 Drains and Spring

- 594 Two seasonally wet drains are located along field boundaries to the north of the site (see Target Notes 10 and 8). They are inundated with leaf litter, heavily shaded and holding little water.
- 595 A spring is located to the west of the site (see Target Note 2). This is flowing and heavily overgrown.
- 596 The drains and spring serve a similar function to hedgerows in enhancing the habitat connectivity across the site and the wider landscape and also increase the habitat diversity within the site. They are considered to be of **local importance** for nature conservation.

9.4.3 Notable species

9.4.3.1 Invasive Non-Native Flora Species

- 597 WWBIC identified five records of common cord-grass *Spartina anglica*; the closest record is located approximately 1.9km north east of the site.
- 598 No invasive non-native flora species were recorded on site during the survey.
- 599 Invasive species are therefore considered to be of **negligible importance** with regards to the solar park development. Invasive non-native species are not considered to be a VER and are not discussed further in this chapter.

9.4.3.2 Flora

- 600 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 site. 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 approximately 580m east of the site and lungwort *Lobaria pulmonaria*, which was located approximately 1km north of the site.

- 601 No notable flora species were recorded during the Extended Phase 1 Habitat Survey. The improved grassland which makes up the majority of the site is intensively managed and considered to have limited potential to support a diverse flora mix or protected floral species. The boundary hedgerows and adjacent woodland and drains/spring have more potential to support notable flora species although no notable/protected species were identified during the field survey.
- 602 Overall, the solar park site is considered to be of **neighbourhood importance** with regard to protected/notable flora species. Notable flora is not considered to be a VER and is not discussed further in this chapter.

9.4.3.3 Invertebrates

- 603 WWBIC returned six hundred and forty records of forty-one species of terrestrial invertebrates from within 3km of the site.
- 604 Table 9-4 summarises the moth and butterfly species present. Those listed in Table 9-4 are protected under Section 5 of the Wildlife and Countryside Act (1981) and are UK Biodiversity Action Plan Species (UKBAP). The Marsh Fritillary and Brown Hairstreak are also listed in Section 7 of the Environment (Wales) Act 2016.

Table 9-4: Moth and Butterfly Species Records

Common Name	Scientific Name	Number of Records	Species Group
Marsh Fritillary	<i>Euphydryas aurinia</i>	7	Butterfly
Brown Hairstreak	<i>Thecla betulae</i>	279	Butterfly
Purple Hairstreak	<i>Favonius quercus</i>	13	Butterfly
White-letter hairstreak	<i>Satyrrium w-album</i>	12	Butterfly

- 605 No invertebrate species of note were recorded during the survey. Given the simple structure of the improved grassland habitat that covers the majority of the site, and its low floral species diversity, it is considered unlikely that the fields within the site support rare or protected invertebrate species.
- 606 The boundary features, such as hedgerows, trees and drains/spring and the adjacent woodland, are comprised of common species assemblages but do have some potential to support a range of common terrestrial invertebrates.
- 607 Overall, the solar park site is considered to be of **neighbourhood importance** for invertebrates. Invertebrates are not considered to be a VER and are not discussed further in this chapter.

9.4.3.4 Amphibians

- 608 WWBIC returned twelve records of amphibian species from within 3km of the site. Seven of these records are of common toad *Bufo Bufo* with the closest being situated 1.1km north east of the site. Four of the records are for common frog *Rana temporaria*, the closest of which was located 2.1km south-west of the site. One record is of palmate newt *Lissotriton helveticus* located 2.6km north east of the site.
- 609 WWBIC returned no records of great crested newt located within 3km of the site.
- 610 There are no ponds located within the site although there are two seasonally wet drains. These drains were not considered to be suitable for great crested newts or other amphibians as they are heavily shaded and inundated with leaf litter which has led to them holding little water. The spring located to the west of the site, is not considered suitable to support great crested newts due to its flow.
- 611 The terrestrial habitat within the site is considered to be sub-optimal with regards to great crested newts and other amphibian species as it is predominantly improved grassland, which provides limited foraging opportunities and/or cover. Suitable hibernacula habitat is limited to the hedgerows, boundary tree lines and adjacent woodland with their associated features; the tree lines and hedgerows have some potential to be used as commuting corridors as they provide connectivity to the wider landscape.
- 612 Aerial photography and Ordinance Survey maps were used to identify waterbodies located within 500 m of the proposed solar park site boundary. Ten were identified and are shown on Plate 2, below.

Plate 3 – Locations of waterbodies within 500m of the site



- 613 The closest waterbody to the site is P6, which is located approximately 185m north of the site.
- 614 Given that there are no records of great crested newt within 3km of the site for the site, it is considered unlikely that this species is present. There are a small number of common amphibian species records located within 3km of the site for the site, therefore despite the lack of suitable aquatic habitat within the site boundary and the terrestrial habitat being sub-optimal, the site is considered to be of **local importance** in respect of common amphibians due to the potential role of the hedgerows and tree lines as migration routes.

9.4.3.5 Reptiles

- 615 WWBIC returned twelve records of reptiles located within 3km of the site. Nine of these are of common lizard *Zootoca vivipara*, with the closest being located approximately 2.1km south west of the site. The other three records are of slow worm *Anguis fragilis*, one of these slow worm records is of a deceased slow worm. Of the remaining two slow worm records, the closest is located approximately 2.2km south-west of the site.
- 616 The improved grassland and arable land, which makes up the majority of the site, is considered to be sub-optimal for reptile species due to low foraging potential and a lack of resting and basking opportunities. Suitable hibernacula habitat is limited to the

boundary habitats such as hedgerows and woodland edges with their associated features; the boundary habitats have some potential to be used as commuting corridors as they provide connectivity to the wider landscape.

- 617 The proposed solar park is considered to be of **local importance** for reptiles due to the potential role of the boundary habitats as commuting routes.

9.4.3.6 Birds

- 618 WWBIC provided two thousand two hundred and sixty-four records of one hundred and four bird species identified within 3km of the site. Protected/notable species records have been summarised in Table 9-5 along with comments regarding the suitability of the habitats present within the site in relation to each species and any relevant observations from the field survey.
- 619 **NB** - It is important to note that locations for the majority of the bird records were only provided to an accuracy of a four figure grid reference which denotes a 2km grid square. The distances given are from the site boundary to the centre point of the given grid reference and, as such, the actual record may be up to approximately 1.4km closer or further from the site than stated.

Table 9-5: Notable/Protected Bird Species Records Summary

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
Curlew	<i>Numenius arquata</i>	Y	N	65	1.1	No suitable breeding habitat present.

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
Barn Owl	<i>Tyto alba</i>	N	Y	6	1.1	No potential nest sites were identified in hedgerow/ boundary features during the habitat survey and the improved grassland habitats which cover the majority of the site are unlikely to support a small mammal population large enough to be of interest for the species.

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
House Sparrow	<i>Passer domesticus</i>	Y	N	80	0.3	No potential nest sites were identified in hedgerow/ boundaries during the habitat survey; however these habitats have some potential to support the species.
Shoveler	<i>Anas clypeata</i>	N	N	14	1.9	No suitable breeding habitat present.
Lapwing	<i>Vanellus vanellus</i>	Y	N	51	0.3	No suitable breeding habitat present.
Reed Bunting	<i>Emberiza schoeniclus</i>	Y	N	21	1.8	No suitable breeding habitat on site.

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
Song Thrush	<i>Turdus philomelos</i>	Y	N	63	0.1	Breeding habitat potential is confined to hedgerows and adjacent woodland. The improved grassland provides limited foraging.
Teal	<i>Anas crecca</i>	N	N	55	0.3	No suitable breeding habitat present.
Starling	<i>Sturnus vulgaris</i>	Y	N	71	1.1	No suitable habitat present.
Wigeon	<i>Anas penelope</i>	N	N	49	1.1	No suitable habitat present.

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
Kestrel	<i>Falco tinnunculus</i>	Y	N	2	3.1	No potential nest sites were identified in hedgerow/ boundary habitats during the habitat survey and the improved grassland habitats which cover the majority of the site are unlikely to support a small mammal population large enough to be of interest for kestrel.
Black-tailed Godwit	<i>Limosa limosa</i>	N	Y	24	1.1	No suitable habitat present.

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
Herring Gull	<i>Larus argentatus</i>	N	N	79	0.3	No suitable breeding habitat identified.
Snipe	<i>Gallinago gallinago</i>	N	N	29	1.1	No suitable habitat present.
Black Redstart	<i>Phoenicurus ochruros</i>	N	Y	1	3.1	No suitable habitat present.
Redshank	<i>Tringa totanus</i>	N	N	65	0.3	No suitable habitat present.
Mistle Thrush	<i>Turdus viscivorus</i>	N	N	31	0.3	Breeding habitat potential is confined to hedgerows and adjacent woodland. The improved grassland provides limited foraging.

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
Shelduck	<i>Tadorna tadorna</i>	N	N	51	0.3	No suitable habitat present.
Bullfinch	<i>Pyrrhula pyrrhula</i>	Y	Y	29	0.1	Breeding habitat potential is confined to hedgerows and adjacent woodland. The improved grassland provides limited foraging.
Brambling	<i>Fringilla montifringilla</i>	N	Y	2	3.5	Primarily a wintering visitor that is unlikely to breed in the UK.
Bittern	<i>Botaurus stellaris</i>	Y	Y	2	2.4	No suitable habitat present.
Bar-tailed Godwit	<i>Limosa limosa</i>	Y	N	5	1.1	No suitable habitat present.

Common Name	Scientific Name	Section 7 Priority Species Environment (Wales) Act	Sch.1 WCA	No. of Records	Min Distance (km)	Breeding Potential based upon Field Survey Results
Oyster-catcher	<i>Haematopus ostralegus</i>	N	N	29	1.5	No suitable habitat present.
Black-Headed Gull	<i>Chroicocephalus ridibundus</i>	Y	N	75	0.3	No suitable breeding habitat present.
Gadwall	<i>Anas strepera</i>	N	N	5	3.1	No suitable habitat present.

620 The woodland, trees and hedgerows that bound the improved grassland fields have the potential to provide nesting and feeding habitat for birds. This is likely to be restricted to small passerine species between the months of March and August. The improved grassland fields are considered to provide limited foraging habitat for birds due to low floral species diversity and the management/disturbance also reduces the suitability for ground nesting birds.

621 No birds of note were recorded within the site during the habitat survey.

622 The site is considered to be of **local importance** for birds.

9.4.3.7 Bats

623 WWBIC returned one hundred and thirteen records of which five are classed as unidentified bats five records of unidentified pipistrelle and one record of unidentified long-eared bat species.

624 N.B. Where locations are disclosed, not all records are given to an accuracy of a six-figure grid reference.

625 Five records of unknown bat species were identified from field observations, the closest of these were located approximately 1.3km north east of the site.

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- 626 Eight records were provided of unknown pipistrelle bats, the nearest of which was a roost which was located approximately 640m east of the site.
- 627 The only record of an unknown long-eared bat species was located approximately 2.3km north of the site.
- 628 Sixteen records of common pipistrelle *Pipistrellus pipistrellus* were identified, the nearest of which was located approximately 860m east of the site and concerned two individuals seen emerging from behind a fascia.
- 629 Fourteen records of soprano pipistrelle *Pipistrellus pygmaeus* were supplied by WWBIC. Four of these records were of roosts of which the closest was located approximately 1.3km north of the CGR. The other ten records were recorded from field observations.
- 630 Eighteen records of brown long-eared bat *Plecotus auritus* were identified and the nearest record was located approximately 860m east of the site. Of these records six are confirmed bat roosts, and two confirmed maternity roosts. The last ten records were all from field observations.
- 631 Seven records of Greater Horseshoe bat *Rhinolophus ferrumequinum* were identified, the nearest of which is approximately 860m east of the site and concerned a roost..
- 632 Thirty-eight records of Lesser Horseshoe bat *Rhinolophus hipposideros* were identified with two of these records being from a roost and a maternity roost. The closest of these to the site was approximately 860m east. The other thirty-six records were from field observations.
- 633 There were six records of noctule *Nyctalus noctula* bat supplied by WWBIC. The nearest record is approximately 1.5km south-west of the site with all from field observations.
- 634 The site is considered to provide moderate foraging and commuting habitat for bats as per Table 4.1, of the Bat Survey Guidelines (2016). The hedgerows and tree lines provide continuous habitat connected to the wider landscape that could be used by bats for commuting. They also provide foraging habitat in their own right.
- 635 The site does not contain any existing buildings so potential roosting sites are limited to the trees found on the field boundaries. A number of the boundary trees contained features that would be considered suitable for use by roosting bats (see Target Note 3, 4, 5 and 8).
- 636 Given the potential roost features in trees, the foraging habitat that is intrinsic to the proposed solar park itself and the connectivity that the tree lines and hedgerows on site provide to the wider landscape, it is considered that the site is of **local importance** in respect to bats.

9.4.3.8 Hazel Dormouse

- 637 WWBIC returned no records of hazel dormouse *Muscardinus avellanarius* from within 2km of the site.
- 638 The improved grassland and arable habitats that comprise the majority of the site are not suitable for dormouse. The hedgerows on site include hazel and honeysuckle *Lonicera periclymenum*, two food plants of the dormouse and provide connectivity to the adjacent woodland to the north.
- 639 The most suitable habitat for dormouse is located outside but adjacent to the site, this coupled with the lack of records and the fact that dormice rarely travel more than 70m from their nest (Dormouse Conservation Handbook 2nd Edition (2006), means that it is considered unlikely that dormouse would be resident within the site. The site is considered to be of **local importance** in respect of dormouse.

9.4.3.9 Otter and Water Vole

- 640 WWBIC returned nine records of otter *Lutra* within 3km of the site. Four of these records are confirmed sightings with the closest being located approximately 590m west of the site. The other five records are of spraint and tracks, the closest of these is located approximately 1.6km north of the CGR.
- 641 WWBIC returned no records of water vole *Arvicola amphibius* within 3km of the CGR.
- 642 There is no suitable habitat for water vole or otter located within the proposed solar park site.
- 643 The proposed solar park site is therefore considered to be of **negligible importance** in respect of water voles and otters. These species are not considered further within the assessment.

9.4.3.10 Badger

- 644 WWBIC returned twenty-eight records of badger *Meles* from within 3km of the site. Six of these records are road casualties. Three of these are recorded setts; the closest of which is located approximately 1.6km south west of the site. Seven of the records are sightings of badgers; the closest being located approximately 410m south of the site. The remaining twelve records are of field signs such as digging and latrines.
- 645 Field signs of badger, including tracks, snuffle holes and push throughs at fence lines were recorded occasionally throughout the site. No evidence of any setts was identified within the hedgerows, tree lines or tree groups bounding the site at the time of survey. It is likely the site is used by badgers for foraging and commuting only.
- 646 Although the proposed site provides foraging and commuting habitat for badgers, the proximity and extent of alternative suitable foraging habitat in the wider landscape means that the site is considered to be of **local importance** in respect of badgers.

9.4.3.11 Other Notable Species

- 647 WWBIC returned one record of roe deer *Capreolus* which is located approximately 0.1km north of the site.
- 648 WWBIC returned two records of polecat *Mustela putorius*, which is listed as a Section 7 priority species under the Environment (Wales) Act 2016. One record is for a deceased polecat and the second record is located approximately 1km south west of the site.
- 649 WWBIC returned four records of European hedgehog *Erinaceus europaeus*, which is listed as a Section 7 priority species under the Environment (Wales) Act 2016. The closest record is situated approximately 2.4km south west of the site.
- 650 The site has some potential to support hedgehog and polecat, within the boundary features. The proposed site also has some potential to be used by roe deer and European hare *Lepus europaeus*. However, the habitats are common in the surrounding area and therefore the proposed site is considered to be of **neighbourhood importance** for deer, hare, polecat and hedgehog and these species are not considered further within this assessment.

9.4.4 Assessment of valued ecological receptors

- 651 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 this assessment.
- 652 A summary of the valuation assessment and the identified VERs that have been identified for the proposed development are summarised in Table 9-6.

Table 9-6: Summary of Valued Ecological Receptors

Site/Habitat/Species	Value	VER?
Designated Sites		
Statutory sites - Special Protection Area (SPA)	International	VER
Statutory sites - Sites of Special Scientific Interest (SSSI)	UK	VER
Statutory sites – National Nature Reserve (NNR)	National	VER
Statutory sites – Local Nature Reserve (LNR)	Regional	VER
Non-Statutory sites - Local Nature Reserve (LWS)	County	VER
Habitats located within the proposed site		
Improved Grassland	Neighbourhood	Not VER

Site/Habitat/Species	Value	VER?
Arable	Neighbourhood	Not VER
Semi-natural Broadleaved Woodland	District	VER
Tall Ruderal Vegetation	Neighbourhood	Not VER
Tree Lines	District	VER
Hedgerows (species rich)	District	VER
Hedgerows (species poor)	Local	VER
Drains/Spring	Local	VER
Swale	Neighbourhood	Not VER
Species		
Invasive Species	Negligible	Not VER
Notable/Protected Flora	Neighbourhood	Not VER
Invertebrates	Neighbourhood	Not VER
Amphibians	Local	VER
Reptiles	Local	VER
Bird species	Local	VER
Bat species	Local	VER
Dormouse	Local	VER
Otter/Water Vole	Negligible	Not VER
Badger	Local	VER
Hedgehog/Polecat/Hare/Deer	Neighbourhood	Not VER

9.5 Do Nothing Scenario

- 653 In the absence of the proposed development, it is not anticipated that the features of the proposed solar park would change, although some habitats will mature, and trees will grow taller/larger over time.
- 654 Climate change could influence future ecological baseline if changes in temperature were to put stress on local ecosystems. However, changes resulting from climate change will be gradual and over a long period of time. Therefore, within the operational lifeline of the proposed solar park any changes would be predicted to be very small.

9.6 Mitigation, Compensation and Enhancement Measures Adopted as Part of the Proposed Solar Park Design

- 655 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).
- 656 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.
- 657 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.
- 658 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.
- 659 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.

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- 660 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.
- 661 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.
- 662 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.
- 663 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.
- 664 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.

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- 665 Overall, the development will result in the creation/enhancement of approximately 14ha of species rich grassland.
- 666 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 as 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.
- 667 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.
- 668 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.
- 669 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;
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- 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.

9.7 Potential Effects

- 670 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.
- 671 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.
- 672 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.

9.8 Impact Assessment

9.8.1 Site Preparation, Construction and Decommissioning Impacts

9.8.1.1 Statutory Designated Sites

- 673 No direct or indirect impacts are anticipated to any statutory designated sites as a result of the proposed solar park development due to their distance from the site. The closest statutory designated site is Pembrokeshire Marine SAC/Milford Haven Waterway SSSI, which is located approximately 870m west of the site boundary at its closest. Due to the distance of the site from the statutory designated sites there are not anticipated to be any direct impacts as a result of the proposed solar park development.
- 674 With the exceptions of Pembroke Bats Sites SAC and Limestone Coast of South West Wales SAC (and their associated SSSIs), the solar park site does not include habitats or have the potential to support species for which the remaining statutory designated sites are designated, and therefore it is considered to have little to no

interaction in terms of biodiversity and nature conservation and no impact to these statutory designated sites is anticipated.

- 675 Pembroke Bats Sites SAC is located approximately 2.3km east of the site at its closest and Limestone Coast of South West Wales SAC is located c.7.3km south of the site at its closest; both SACs cover large areas and include a number of SSSIs. Both SACs are designated for bats, including greater horseshoe bats. The proposed solar park site has the potential to support bats. However, all trees on and adjacent to the site (some of which have features suitable for roosting bats) will be retained within the proposed solar park development and no works will be undertaken within the RPA of any retained trees. In addition, all hedgerows and drains will be retained with buffer zones (the minimum buffer zone will be 5m from the centreline off all hedgerows).
- 676 An additional c.65m of new native, species rich hedgerow and c.0.3ha of new native woodland will be planted. The retained hedgerows will be enhanced through the infilling of existing gaps with a species rich hedgerow mix. These habitat measures will strengthen the continuity of the hedgerow, tree line and woodland network which will benefit commuting and foraging bats.
- 677 The areas that are currently improved grassland will be enhanced to promote wildflower and species rich grassland (with a small loss associated with the laying of access track and inverter construction), thus increasing their potential to provide foraging habitat for bats.
- 678 It is proposed that five Schwegler 2F bat boxes will be erected on boundary trees of a suitable size in order to increase roosting opportunities for local bat populations.
- 679 As detailed in the Landscape and Ecological Management Plan, the trees on site will be inspected every 10 years to ensure their condition remains compatible with the proposed solar park development. If at any point trees should require remedial works or removal, then they will first be assessed by a licenced bat ecologist to determine if they include features that have the potential to support roosting bats. Should such features be present the licenced bat ecologist will advise on further survey work and mitigation requirements.
- 680 Additional lighting will not be required on site as it should be possible to install the panels during daylight hours, therefore there will be no impact to bats as a result of lighting.
- 681 Therefore, the impact of the construction/decommission phase on Pembroke Bats Sites SAC/ Limestone Coast of South West Wales SAC is anticipated to be **negligible** and a **non-significant negligible** effect is anticipated.
- 682 In accordance with the Habitats Regulations, an assessment has been completed to identify the likely effects on nearby European sites. The assessment concludes that there are no likely significant effects to any European sites as a result of the proposed solar park development (see Appendix A9.3: No Significant Effects Report).

9.8.1.2 Non-Statutory Designated Sites

- 683 It is not anticipated that the proposed solar park development will result in any direct or indirect impacts to non-statutory designated sites as they are located approximately 2.4km from the site and do not have any habitat or species connectivity/interactions.
- 684 The impact of the construction/decommissioning phase on non-statutory sites is anticipated to be negligible and a non-significant negligible effect is anticipated.

9.8.1.3 Habitats

- 685 The construction phase will result in a small-scale loss of improved grassland habitat (to allow for access tracks, control building and inverters); all other habitats, including hedgerows, trees, drains, and woodland edge habitats, will be retained within the proposed development with appropriate RPAs as detailed in Appendix A9.5: Arboricultural Survey, Impact Assessment and Method Statement.
- 686 The loss of improved grassland habitat will be mitigated for through the enhancement of the remaining improved grassland habitats. Currently the grassland fields are species poor, highly managed habitats subject to the application of fertilisers and pesticides. It is proposed that once the fields come into use as part of the proposed solar park, fertiliser and pesticide use will cease, and the land will be cultivated using regenerative agriculture techniques and sown with a species rich grass and wildflower/herb mix. Once established the grassland 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, reptiles, amphibians, birds and small mammals.
- 687 In addition, the buffer zones between the development and the retained hedgerows and woodland edges will be sown with a species rich wildflower seed mix and managed to promote biodiversity. 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.
- 688 It is proposed that c.65m of new native, species rich hedgerow and c.0.3ha of new native woodland be planted as well as additional hedgerow planting to infill gaps within retained hedgerows using a species rich native mix..
- 689 In built mitigation means that construction works will adhere to best practice guidelines to prevent dust and pollution.
- 690 Increased traffic during construction and decommission will be temporary and is considered unlikely to impact habitats within the site.

691 The impact of the construction phase on habitats would be **low (beneficial)** and a **non-significant minor (beneficial)** effect is anticipated.

9.8.1.4 Species

Amphibians

692 The habitat loss associated with the proposed solar park is not likely to result in any impact to local amphibian populations. All hedgerows, tree lines, drains and woodland edge habitats associated with the site will be retained. Hedgerows and trees will have stand-off of at least 5m from the centreline of hedgerows and no works will be undertaken within the RPA of any trees or hedgerows. Existing drains will have a stand-off of 7m except over exiting drain crossing points and gateways.

693 An additional c.65m of new native, species rich hedgerow and c.0.3ha of new native woodland will be planted. Retained hedgerows will be enhanced through the infilling of existing gaps with a species rich hedgerow mix; this will strengthen the continuity of the hedgerow, tree line and woodland edge network which will benefit commuting amphibians.

694 As part of the management of the hedgerows, arisings will be collected into piles. It is also proposed that six permanent hibernacula features be incorporated into the Landscape Plan; these will comprise log/stone piles. These measures will provide additional sheltering opportunities for common amphibians.

695 The improved grassland habitat is currently sub-optimal for foraging amphibians. With the exception of small losses associated with the laying of access track and construction of the control building and invertors, the improved grassland fields will be enhanced to promote wildflower and species rich grassland, thus increasing their potential to provide foraging habitat for amphibians.

696 In built mitigation means that construction works will adhere to best practice guidelines to prevent dust and pollution.

697 Traffic movements during construction and decommissioning will generally be during daylight hours; amphibians are usually more active at night so increased traffic is unlikely to impact common amphibian species.

698 Additional lighting will not be required on site as it should be possible to install the panels during daylight hours, therefore there will be no impact to amphibians as a result of lighting.

699 Therefore, the impact of the construction/decommission phase on common amphibians would be **negligible (beneficial)** and a **non-significant negligible (beneficial)** effect is anticipated.

Reptiles

700 The habitat loss associated with the proposed solar park is not likely to result in any impact to local reptile populations. All hedgerows, tree lines, drains and woodland edge habitats associated with the site will be retained and will have stand-off of at

least 5m from the centreline of all hedgerows; no works will be undertaken within the RPA of any trees or hedgerows.

- 701 The habitat measures proposed at part of the solar park development are likely to enhance the site for reptiles. An additional c.65m of new native, species rich hedgerow and 0.3ha of new native woodland will be planted. Retained hedgerows will be enhanced through the infilling of existing gaps with a species rich hedgerow mix; this will strengthen the continuity of the hedgerow, tree line and woodland network which will benefit commuting reptiles.
- 702 The hedgerows will be managed for wildlife, and when cut, the arisings will be collected and assembled into small refuges at the base of hedgerows. It is also proposed that six permanent hibernacula features be incorporated into the Landscape Plan; these will comprise log/stone piles. These measures will provide additional sheltering opportunities for reptile species.
- 703 The improved grassland habitat is currently sub-optimal for foraging amphibians. With the exception of small losses associated with the laying of access track and construction of the control building and invertors, the improved grassland fields will be enhanced to promote wildflower and species rich grassland, thus increasing their potential to provide foraging habitat for reptiles.
- 704 In built mitigation means that construction works will adhere to best practice guidelines to prevent dust and pollution and there will be no additional lighting.
- 705 Increased traffic during construction and decommission will be temporary and is considered unlikely to impact reptiles.
- 706 Therefore, the impact of the construction/decommission phase on reptiles would be **negligible (beneficial)** and a **non-significant negligible (beneficial)** effect is anticipated.

Birds

- 707 All suitable breeding bird habitat will be retained within the proposed development and will be protected through buffer zones (minimum of 5m from the centreline of all hedgerows and no works within any RPAs for trees or hedgerows). The site will be enhanced for birds through the planting of an additional c.65m of new native, species rich hedgerow and 0.3ha of new native woodland planting.
- 708 The improved grassland habitat is considered to be sub-optimal to support ground nesting birds such as skylark, due to the low sward height which appears to be maintained through heavy sheep grazing. However, in order to ensure ground nesting birds are safeguarded during the installation of the solar panels these works should be undertaken outside of the breeding bird season (March to August inclusively). If this is not possible any areas of suitable ground nesting bird habitat will be mown outside of the breeding bird season to ensure it remains unsuitable for ground nesting birds whilst the solar panels are installed. The loss of ground nesting

bird habitat will be temporary and once the panels have been installed the grasslands will be managed for biodiversity.

- 709 With the exception of small losses associated with the laying of access track and construction of the control building and invertors, the improved grassland fields will be enhanced to promote wildflower and species rich grassland, thus increasing their potential to provide foraging habitat for birds. The improved species richness of the grassland habitats and buffer zones will also encourage small mammals which would be of benefit to birds of prey, such as barn owl and kestrel.
- 710 There is only a limited amount of research available on how farmland birds use solar farms, however, a study undertaken by R. Shotton between 2018 and 2020 in partnership with the RSPB Centre for Conservation Science and energy solutions company Anesco (<https://community.rspb.org.uk/ourwork/b/science/posts/bird-use-on-solar-farms-final-results>) found that *"Solar farms are being used by birds at a similar level compared to other land use types. There was also a significantly higher variation of species found on solar farms compared to arable fields which suggest that solar farms provide a habitat for a range of farmland birds"*.
- 711 It is proposed that five bird boxes and one barn owl box be erected on suitably mature trees across the site.
- 712 In built mitigation means that construction works will adhere to best practice guidelines to prevent dust and pollution.
- 713 Increased traffic and noise during construction and decommissioning will be temporary and is considered unlikely to be sufficient to alter the behaviour of birds within the proposed site for any period of time.
- 714 Additional lighting will not be required on site as it should be possible to install the panels during daylight hours, therefore there will be no impact to birds as a result of lighting.
- 715 Therefore, the impact of the construction/decommission phase on birds would be **negligible (beneficial)** and a **non-significant negligible (beneficial)** effect is anticipated.

Bats

- 716 All trees on and adjacent to the site (some of which have features suitable for roosting bats) will be retained within the proposed solar park development and no works will be undertaken within the RPA of any retained trees. All hedgerows and drains will be retained and a stand-off of at least 5m will be maintained between the works and these retained habitats. Given the proposed site layout it was not considered necessary to undertake bat surveys at the site, as all potential bat features/habitats will be protected during site preparation, construction and decommissioning.
- 717 The habitat measures proposed at part of the solar park development are likely to enhance the site for bats. An additional c.65m of new native, species rich hedgerow

and 0.3ha of new native woodland will be planted and existing gaps within retained hedgerows will be infilled. This will strengthen the continuity of the hedgerow, tree line and woodland network which will benefit commuting and foraging bats.

- 718 The improved grassland habitat is currently sub-optimal for foraging bats. With the exception of small losses associated with the laying of access track and construction of the control building and invertors, the improved grassland fields will be enhanced to promote wildflower and species rich grassland, thus increasing their potential to provide foraging habitat for bats.
- 719 It is proposed that five Schwegler 2F bat boxes (or similar) will be erected on boundary trees of a suitable size in order to increase roosting opportunities for local bat populations.
- 720 As detailed in the Landscape and Ecological Management Plan (Appendix A9.4), the trees on site will be inspected every 10 years to ensure their condition remains compatible with the proposed solar park development. If at any point trees should require remedial works or removal, then they will first be assessed by a licenced bat ecologist to determine if they include features that have the potential to support roosting bats. Should such features be present the licenced bat ecologist will advise on further survey work and mitigation requirements.
- 721 In built mitigation means that construction works will adhere to best practice guidelines to prevent dust and pollution.
- 722 Increased traffic and noise during construction and decommissioning will be temporary and is considered unlikely to be sufficient to alter the behaviour of bats within the proposed site for any period of time.
- 723 Additional lighting will not be required on site as it should be possible to install the panels during daylight hours, therefore there will be no impact to bats as a result of lighting.
- 724 Therefore, the impact of the construction/decommission phase on bats would be **negligible (beneficial)** and a **non-significant negligible (beneficial)** effect is anticipated.

Dormouse

- 725 The habitat loss associated with the proposed solar park is not likely to result in any impact to local dormouse populations should they be present. All hedgerows, tree lines and woodland edge habitats associated with the site will be retained. Hedgerows and trees will have a stand-off of at least 5m from the centreline of hedgerows and no works will be undertaken within the RPA of any trees.
- 726 An additional c.65m of new native, species rich hedgerow and 0.3ha of new native woodland will be planted. Retained hedgerows will be enhanced through the infilling of existing gaps with a species rich hedgerow mix; this will strengthen the continuity of the hedgerow, tree line and woodland network which will benefit commuting

dormice. The retained and new hedgerows will be managed for wildlife. They will cut on a rotational basis and maintained at a height of at least 4m.

- 727 In built mitigation means that construction works will adhere to best practice guidelines to prevent dust and pollution.
- 728 Traffic movements during construction and decommissioning will generally be during daylight hours; dormice are nocturnal so increased traffic is unlikely to impact the species.
- 729 Additional lighting will not be required on site as it should be possible to install the panels during daylight hours, therefore there will be no impact to dormice as a result of lighting.
- 730 Therefore, the impact of the construction/decommission phase on common amphibians would be **negligible (beneficial)** and a **non-significant negligible (beneficial)** effect is anticipated.

Badger

- 731 Badger activity was identified within the site, but it is considered likely that badgers are only using the site for commuting and foraging as no setts were identified. Given that only small-scale loss of sub-optimal improved grassland habitat is proposed, it is not expected that the development will have a detrimental impact on badgers using the site.
- 732 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 new 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 any setts be identified a method statement will be prepared and a disturbance licence applied for as appropriate.
- 733 Additional species rich hedgerow planting, new native woodland planting and the enhancement of the arable and improved grassland habitats through the cessation of fertiliser/pesticide use and sowing of species rich wildflower seed mixes will all be beneficial to foraging and commuting badgers.
- 734 Where fencing is to be installed, to prevent damage to the solar panels, it 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. The pre-commencement badger survey will help inform if specific locations for the 'badger gaps' are required, i.e., where existing mammal paths are recorded.
- 735 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.

- 736 In built mitigation means that construction works will adhere to best practice guidelines to prevent dust and pollution.
- 737 Increased traffic and noise during construction and decommissioning will be temporary and is considered unlikely to impact commuting and foraging badgers as the increased traffic will be during the day, whilst badgers are active at night.
- 738 Additional lighting will not be required on site as it should be possible to install the panels during daylight hours, therefore there will be no impact to badgers as a result of lighting.
- 739 Therefore, the impact of the construction/decommission phase on commuting and foraging badger would be **negligible (beneficial)** and a **non-significant negligible (beneficial)** effect is anticipated.

9.8.2 Operational Impacts

9.8.2.1 Collision Risk - Bats

- 740 In terms of potential collision risk of the solar panels to bats, a study detailed within the European Commission's Potential Impacts of Solar, Geothermal and Ocean Energy on Habitats and Species Protected Under The Birds And Habitats Directives – Final Report (Lammerant, L., Laureysens, I. and Driesen, K. (2020) *Final report under EC Contract ENV.D.3/SER/2017/0002 Project*) suggests that although bats may confuse smooth flat surfaces with water bodies, it is unlikely that this would have detrimental effects on local bat populations. Solar parks are unlikely to result in significant injury or mortality to bats as a result of collision above and beyond other flat/smooth built developments. Solar panels do not have moving parts and therefore bats should be able to detect them as well as any other man-made objects introduced into the environment. Therefore, a **negligible (adverse)** impact and a **non-significant negligible (adverse)** effect is anticipated.

9.8.2.2 Manx Shearwater

- 741 Due to a lack of previous research, it is not well known whether young Manx Shearwater would be likely to try to land at the solar park. Lisa Morgan, Head of Islands and Marine for the Wildlife Trust of South and West Wales, articulated that in her experience, young Manx shearwaters are more likely to be attracted to well-lit

areas than those which could be mistaken for the sea/water (personnel comms). The proposed solar park will not be lit during construction, operation or decommissioning and therefore artificial lighting will not impact young Manx shearwater. However, light reflected from other sources and moonlight could potentially attract the young birds. Therefore, in order to establish if young Manx Shearwater are mistakenly attracted to the solar park, two years of monitoring/checks from mid-August to mid-October are proposed in the first instance. Following the completion of the two years of monitoring if no young birds have been found during the site checks then no further regular checks would be recommended in future years; however, if young Manx Shearwater are found then a detailed, long term monitoring programme will be agreed with the Islands Conservation Advisory Committee (ICAC) of the Wildlife Trust of South and West Wales.

- 742 The initial two years of monitoring is likely to involve the site being walked by a suitably experienced/trained person, every other day between mid-August to mid-October. A careful and systematic search for grounded birds would be undertaken. Any birds found would be carefully captured and taken to an appropriate place for welfare care or release as appropriate. The specific details of the monitoring will be agreed in writing with the ICAC, should planning permission be granted.
- 743 A **negligible (adverse)** and a **non-significant negligible (adverse)** effect is anticipated on Manx shearwater populations.

9.8.2.3 Other Operational Impacts

- 744 Given the in-built mitigation, which will ensure that the perimeter fencing does not result in habitat fragmentation by making sure that mammals and other species are still able to access the full site during the operational phase, it is not anticipated that there will be any further impacts arising from the operational phase of the proposed development.
- 745 Table 9-7 summarises the potential impacts during both construction and operation, and their significance for all VERs associated with the proposed development.

Table 9-7: Summary Impacts

VER	Value	Phase	Type of Impact	Magnitude and extent of impacts	Confidence, duration and reversibility	Significance of impact
Site Habitats	Local - District	Construction	Habitat loss/creation/enhancement	Low (beneficial)	Certain Long term Reversible	Not significant
			Disturbance	Negligible (adverse)	Potentially Temporary Reversible	Not significant
			Pollution	Negligible (adverse)	Unlikely Temporary Reversible	Not significant
Amphibians	Local	Construction	Habitat loss/creation/enhancement	Negligible (beneficial)	Certain Permanent Not reversible	Not significant
			Disturbance	Negligible (adverse)	Potentially Temporary Reversible	Not significant
			Pollution	Negligible (adverse)	Unlikely Temporary Reversible	Not significant
Reptiles	Local	Construction	Habitat loss/creation/enhancement	Negligible (beneficial)	Certain Permanent Not reversible	Not significant
			Disturbance	Negligible (adverse)	Potentially Temporary Reversible	Not significant
			Pollution	Negligible (adverse)	Unlikely Temporary Reversible	Not significant

VER	Value	Phase	Type of Impact	Magnitude and extent of impacts	Confidence, duration and reversibility	Significance of impact
Birds	Local	Construction	Habitat loss/creation/enhancement	Negligible (beneficial)	Certain Permanent Not reversible	Not significant
			Disturbance	Negligible (adverse)	Potentially Temporary Reversible	Not significant
			Pollution	Negligible (adverse)	Unlikely Temporary Reversible	Not significant
Manx Shearwater	n/a	Operational	Collision Risk	Negligible (adverse)	Unlikely Long Term Not reversible	Not significant
Bats	Local	Construction	Habitat loss/creation/enhancement	Negligible (beneficial)	Certain Permanent Not reversible	Not significant
			Disturbance	Negligible (adverse)	Potentially Temporary Reversible	Not significant
			Pollution	Negligible (adverse)	Unlikely Temporary Reversible	Not significant

VER	Value	Phase	Type of Impact	Magnitude and extent of impacts	Confidence, duration and reversibility	Significance of impact
		Operational	Collision Risk	Negligible (adverse)	Unlikely Long Term Not reversible	Not significant
Dormouse	Local	Construction	Habitat loss/creation/enhancement	Negligible (beneficial)	Certain Permanent Not reversible	Not significant
			Disturbance	Negligible (adverse)	Potentially Temporary Reversible	Not significant
			Pollution	Negligible (adverse)	Unlikely Temporary Reversible	Not significant
Badger	Local	Construction	Habitat loss/creation/enhancement	Negligible (beneficial)	Certain Permanent Not reversible	Not significant
			Disturbance	Negligible (adverse)	Potentially Temporary Reversible	Not significant
			Pollution	Negligible (adverse)	Unlikely Temporary Reversible	Not significant

9.9 Assessment of residual effects

746 There are no significant residual effects anticipated as a result of the proposed solar park development.

9.10 Assessment of cumulative impacts

747 This assessment is completed with reference to Section 2.3.5.1 of this ES. The majority of the potential cumulative projects listed are already operational and so would result in no cumulative construction activity related impacts. The proposed extension to the solar farm at West Farm is over 1.5km from the proposed site and

as no significant construction impacts are anticipated as a result of the proposed Phoenix Solar Park, no cumulative construction impacts are anticipated.

- 748 The proposed solar park will have no operational impacts upon habitats or species and therefore the proposed development will not result in any cumulative impacts with the developments considered.
- 749 The timing of any decommissioning of the existing developments is unknown. However, given the distance of the developments from the proposed solar park site (>1km) and the nature of any potential impacts during the decommissioning of the proposed solar park, no cumulative impacts are predicted to occur during decommissioning.

9.11 Summary of Avoidance, Mitigation, Compensation and Enhancement Measures

9.11.1 Avoidance/Mitigation

- 750 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.

9.11.2 Compensation

- 751 Compensation measures are those that have been incorporated to off-set potential impacts. For the proposed solar park site, the following compensation measures are embedded within the scheme:

- The small-scale loss of low quality improved grassland habitat to accommodate the installation of the access track, control building and inverters, 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 14ha of high quality species rich grassland created as a result of the proposed development.

9.11.3 Enhancement

752 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.

9.12 Statement of Significance

753 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

10.1 Introduction

- 754 This Chapter has been prepared by Landgage Heritage Limited. In accordance with Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, as amended.
- 755 This Chapter of the ES 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) (Appendix A10.1);
 - A geophysical survey (Appendix A10.2);
 - A programme of archaeological trial trenching, including a walkover survey (Appendix A10.3); and
 - A Settings Impact Assessment (SIA), to assess the potential for effects to surrounding historic assets through changes to their setting (Appendix A10.4).
- 756 These reports were produced in support of an earlier DNS application for a larger site at the same location which included the whole of the Application Site currently proposed. Therefore, these previous studies provide a sufficient evidence base to inform the cultural heritage baseline for this chapter, and also to inform the impacts and effects of the proposed development on that baseline.
- 757 This chapter also includes the following figures:
- Figure 10.1 – Showing the location of the Areas of Archaeological Interest (AAIs) within the Application Site.
 - Figure 10.2 – Showing the proposed development layout in relation to the AAIs.
 - Figure 10.3 – Showing the location of archaeological and built heritage resources assessed within this chapter in relation to the Application Site.

10.2 Nature of Evidence Examined

- 758 Archaeological and Cultural Heritage resources vary in scope from buried archaeological remains up to late 20th century industrial structures. Cultural heritage can be broadly divided into the following two categories:

Archaeology

- Scheduled Ancient Monuments (SAMs) (statutory); and
- Archaeological finds and sites (non-statutory).

Built Heritage

- Conservation Areas (statutory);

- Listed Buildings (statutory);
- Non-designated built heritage assets (non-statutory).
- Registered Parks and Gardens
- Registered Historic Battlefields, Shipwrecks, World Heritage Sites and Locally Listed Buildings are not considered within this Chapter because there are no such designations within, or adjacent to the Application Site.

759 This Chapter describes the methods used to establish baseline conditions currently existing on the Application Site; the methodology used to determine potential effects and the mitigation measures required to prevent, reduce or offset (where possible) any significant adverse effects; and the likely residual effects after these measures have been implemented.

10.3 Consultation

Several rounds of consultation were held during the previous planning application with both the Dyfed Archaeological Trust (DAT) in relation to archaeological remains, and with Cadw with regard to potential effects to the setting of historic assets. These previous consultations and how they have been addressed are all set out in the Pre-Application Consultation Report (DRN:BL007).

760 Given the level of previous consultation and the fact that the Proposed Development has been significantly reduced in terms of both archaeological and any potential heritage effects, it was not necessary to consult further with either DAT or Cadw prior to the production of this chapter.

10.4 Study Area

761 Data was collected from a wider study area, around the Application Site, in order to inform the results of the baseline investigations. The study area for the assessment of archaeological potential was 1km from the Application Site boundary. The study area for the assessment of effects to the setting of historic assets was 5km from the Application Site boundary.

10.5 Legislation, Policy and Best Practice

10.5.1.1 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017

762 The EIA Regulations 2017 require that the local planning authority has a full understanding of the potential significant environmental effects which would result from a proposed development, when deciding whether to grant consent for that development. The regulations set out a process by which projects which should be subject to EIA are identified, and for assessing, consulting and coming to a decision on those projects which are likely to have significant environmental effects.

10.5.1.2 *Historic Environment (Wales) Act 2023*

- 763 The Historic Environment (Wales) Act was given Royal Assent in June 2023. This Act provides the legislative framework for managing the historic environment in Wales. The Act consolidated requirements from:
- The Historic Buildings and Ancient Monuments Act 1953
 - Parts 1 and 3 of the Ancient Monuments and Archaeological Areas Act 1979 (c. 46)
 - Parts 14 and 15 of the Town and Country Planning Act 1990 (c. 8)
 - The Planning (Listed Buildings and Conservation Areas) Act 1990 (c. 9)
 - Part 5 of the Planning and Compulsory Purchase Act 2004 (c. 5) and
 - The Historic Environment (Wales) Act 2016
- 764 Section 11 of the Act protects the fabric of Scheduled Monuments but does not afford statutory protection to their settings.
- 765 Section 96(2) of the Act sets out a general duty with regard to developments that affect a listed building, and states:
- (2) *In considering whether to grant listed building consent, a planning authority or the Welsh Ministers must have special regard to the desirability of preserving—*
- (a) *the listed building to which the application relates,*
- (b) *the setting of the building, and*
- (c) *any features of special architectural or historic interest the building possesses.*
- 766 Section 158 of the Act requires local authorities to define as conservation areas any ‘areas of special architectural or historic interest the character or appearance of which it is desirable to preserve or enhance’ and Section 160 gives local authorities a general duty to pay special attention ‘to the desirability of preserving or enhancing the character or appearance of that area’ in exercising their planning functions. These duties are taken to apply only within a Conservation Area. The Act does not make specific provision with regard to the setting of a Conservation Area.

10.5.1.3 *Planning Policy Wales*

- 767 The Welsh Government has published Planning Policy Wales (PPW), currently updated to Version 11 from February 2021. This sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs). Procedural advice is given in circulars and policy clarification letters.
- 768 Section 6.1 of PPW, entitled ‘The Historic Environment’, provides policy for planning authorities, property owners, developers and others on the conservation and

investigation of historic assets. Section 6.1.6 sets out the Welsh Governments specific objectives for the historic environment as seeking to:

- protect the Outstanding Universal Value of the World Heritage Sites;
- conserve archaeological remains, both for their own sake and for their role in education, leisure and the economy;
- safeguard the character of historic buildings and manage change so that their special architectural and historic interest is preserved;
- preserve or enhance the character or appearance of conservation areas, whilst the same time helping them remain vibrant and prosperous;
- preserve the special interest of sites on the register of historic parks and gardens; and
- protect areas on the register of historic landscapes in Wales.

769 Section 6.1 of PPW defines the historic environment as:

The historic environment comprises all the surviving physical elements of previous human activity and illustrates how past generations have shaped the world around us.

10.5.1.4 Technical Advice Note (TAN) 24: The Historic Environment

770 The purpose of the TAN is to provide guidance on how the planning system considers the historic environment during development plan preparation and decision making on planning and Listed Building applications. This TAN provides specific guidance on how the aspects of the historic environment should be considered, broken down into the following categories:

- World Heritage Sites;
- Scheduled Monuments;
- Archaeological remains;
- Listed Buildings;
- Conservation Areas;
- Historic Parks and Gardens;
- Historic Landscapes; and
- Historic assets of special local interest.

10.5.1.5 Local Planning Policy

771 Planning policy for the study site is provided by The Pembrokeshire County Council Local Development Plan (adopted 2013). This contains the following policies relevant to this assessment:

GN.38 Protection and Enhancement of the Historic Environment

Development that affects sites and landscapes of architectural and/or historical merit or archaeological importance, or their setting, will only be permitted where it can be demonstrated that it would protect or enhance their character and integrity.

10.5.1.6 Conservation Principles for the Sustainable Management of the Historic Environment in Wales 2011

- 772 This document provides the basis upon which Cadw discharges certain statutory duties on behalf of the Welsh Ministers. Conservation Principles should be used by others (including owners, developers and other public bodies) to assess the potential impacts of a development proposal on the significance of any historic asset/assets and to assist in decision making where the historic environment is affected by the planning process.
- 773 The document sets out six conservation principles:
- Historic assets will be managed to sustain their values;
 - Understanding the significance of historic assets is vital;
 - The historic environment is a shared resource;
 - Everyone will be able to participate in sustaining the historic environment;
 - Decisions about change must be reasonable, transparent and consistent; and
 - Documenting and learning from decisions is essential.
- 774 Conservation Principles also provides definitions of the historic environment and historic assets:
- Historic Environment - All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried, or submerged, and deliberately planted or managed.
 - Historic Assets - An identifiable component of the historic environment. It may consist or be a combination of an archaeological site, an historic building, or a parcel of historic landscape. Nationally important historic assets will normally be designated.
- 775 Conservation Principles defines the significance of a historic asset as: “the sum of the cultural heritage values, often set out in a Statement of Significance”. The document also sets out that to properly assess the significance of a historic asset, its four component values must be understood:
- Evidential value
 - Historical value
 - Aesthetic value
 - Communal value

10.5.1.7 Cadw Setting Guidance

- 776 Guidance on setting in Wales is provided by the Cadw Setting of Historic Assets in Wales (2017). This guidance defines setting as follows:
- 777 The setting of a historic asset includes the surroundings in which it is understood, experienced and appreciated, embracing present and past relationships to the surrounding landscape. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive, negative or neutral contribution to the significance of an asset.
- 778 The guidance also provides a four-step process for the assessment of setting:
- Stage 1: Identify the historic assets that might be affected by a proposed change or development.
 - Stage 2: Define and analyse the settings to understand how they contribute to the significance of the historic assets and, in particular, the ways in which the assets are understood, appreciated and experienced.
 - Stage 3: Evaluate the potential impact of a proposed change or development on that significance.
 - Stage 4: If necessary, consider options to mitigate or improve the potential impact of a proposed change or development on that significance.
- 779 This staged process allows the setting of the historic asset to be understood and for development proposals to be responsive to their settings where potential impacts may occur.

10.6 Assessment Methodology

10.6.1.1 Assessment of Significance

- 780 Assessing Heritage Significance
- 781 The significance of a historic asset is defined by Cadw (in Conservation Principles) as “*the sum of the cultural heritage values...*” In the case of many heritage assets their importance has already been established through the designation (i.e. scheduling, listing and register) processes applied by Cadw.
- 782 The criteria for establishing significance of heritage assets for this assessment are presented in Table 10-1. These criteria have been informed by guidance on the designation of historic assets provided in Annex A, B, and C of TAN 24.

Table 10-1: Determining the heritage significance of a Heritage Asset

Importance / value	Description
Very High	World Heritage Sites

High	Scheduled Monuments and archaeological sites of demonstrable schedulable quality & importance; Protected Wreck Sites Listed buildings Designated registered parks and gardens with highly graded listed buildings Registered Landscapes with highly graded listed buildings and/or scheduled ancient monuments and other significance historic assets Conservation Areas with highly graded listed buildings or scheduled ancient monuments
Medium	Local Authority designated sites and their settings; Conservation areas with limited numbers of designated heritage assets Registered parks with a limited number of lower graded listed buildings Undesignated sites of demonstrable regional importance
Low	Sites with specific and substantial importance to local interest groups; Sites whose importance is limited by poor preservation and poor survival of contextual associations.
No importance	Sites with no surviving archaeological or historical component.

783 **Assessing the Magnitude of Impact**

- 784 The nature and likelihood of the impacts of the proposed development is assessed in both the long and short term, on archaeological and heritage features against clearly defined criteria.
- 785 The significance of effect has been assigned to effects relative to the heritage significance, its sensitivity to change and the magnitude of impact in accordance with best practice.
- 786 It is widely recognised that the heritage significance of an asset is not the same as its sensitivity to changes to its setting. Thus, in determining effects upon the setting of assets by a proposed development, both importance and sensitivity to changes to

setting need to be considered. Factors considered when assessing sensitivity to change include, but are not limited to, heritage significance (Table 10-1), condition, type and period of asset and landscape positioning.

- 787 Archaeological and built heritage resources are susceptible to a range of direct impacts during site preparation as well as construction related activities, including:
- Site clearance / site preparation activities that disturb archaeological remains;
 - Demolition or alteration of designated and non-designated built cultural heritage assets;
 - Excavation that extends into archaeological sequences, for example foundations, basements or re-landscaping (for example swales) resulting in the removal of the resource;
 - Piling activities resulting in disturbance and fragmentation of the archaeological resource; and
 - Dewatering activities resulting in desiccation of waterlogged remains and deposits.
- 788 The magnitude of effect to buried archaeological remains which would result from activities such as those listed above would depend on the extent of the development impact, as well as the extent, nature, and importance of any buried archaeological remains within the Application Site.
- 789 In terms of non-physical impacts on historic assets, the impacts of the development include the impact on the setting of a Listed Building / Conservation Areas / Scheduled Ancient Monument / non-designated historic asset through changes that would result to their setting.
- 790 The magnitude of the impact is a product of the extent of development impact on an asset. Impacts are rated as High, Medium, Low and Negligible/Neutral. Impacts can be direct or indirect, adverse or beneficial. The criteria for assessing the magnitude of impact are set out in Table 10-2.

Table 10-2: Magnitude of Impact

Level of effect	Description
Major Adverse	- Total or substantial loss of the significance of a historic asset. - Harm to a historic asset through effects to its setting, such that the significance of the asset would be totally lost or substantially reduced (e.g. the significance of a designated historic asset would be reduced to such a degree that its designation would be questionable; the significance of an undesignated historic asset would be reduced to such a degree that its categorisation as a historic asset would be questionable).
Moderate Adverse	- Moderate harm to a historic asset, such that the asset's significance would be materially affected/considerably devalued, but not totally or substantially lost.

Level of effect	Description
Minor Adverse	- Low level of harm to the significance of a historic asset. - This could include the removal of fabric that forms part of the historic asset, but that is not integral to its significance (e.g. the demolition of later extensions/additions of little intrinsic value). - Low level of harm to the historic asset's significance through effects to its setting.
Slight Adverse	- A slight effect to the significance of a heritage asset. - An example would be limited disturbance of an archaeological asset, but which does not actually damage the archaeological interest of the asset in any way. - A limited degree of effect through changes to setting, but the degree of effect would not be readily discernible, or meaningfully affect appreciation.
Negligible	- A change to a historic asset or its setting that involves no loss of significance or any harm.
No Impact	- No change to a historic asset or its setting.
Low Beneficial	- Alterations to a built heritage asset or Conservation Area resulting in minor beneficial impacts. - Land use change resulting in improved conditions for the protection of archaeological remains. - Minor enhancement to the setting of a built heritage asset or Conservation Area. - Decrease in visual or noise intrusion on the setting of a building, archaeological site or monument.
Moderate Beneficial	- Alterations to a built heritage asset or Conservation Area resulting in moderate beneficial impacts. - Land use change resulting in improved conditions for the protection of archaeological remains plus interpretation measures (heritage trails, etc.) - Significant reduction or removal of visual or noise intrusion on the setting of a building, archaeological site or monument. - Improvement of the wider landscape setting of a built heritage asset, Conservation Area, archaeological site or monument. - Improvement of the cultural heritage amenity, access or use of a built heritage asset, archaeological site or monument. - Moderate enhancement to the setting of the built heritage asset and Conservation Area.

Level of effect	Description
Major Beneficial	- Arrest of physical damage or decay to a built heritage asset or structure. - Alteration to a built heritage asset or Conservation Area resulting in significant beneficial impact. - Significant enhancement to the setting of a built heritage asset. - Conservation Area or archaeological site, its cultural heritage amenity and access or use.

791 It is acknowledged that Table 10-2 primarily deals with visual factors affecting setting. Whilst the importance of visual elements of settings, e.g. views, intervisibility, prominence etc., are clear, it is also acknowledged that there are other non-visual factors which could potentially result in impacts to setting. Such factors could be other sensory factors, e.g. noise or odour, or could be associative. In coming to a conclusion about magnitude of change upon setting, this assessment makes reference to traffic, noise, air quality, and townscape and visual assessments, reported in the ES, as appropriate.

792 **Significance of Effect**

793 The significance of the impact of the proposed development on archaeological remains and historic assets is determined by the heritage significance of the asset and the magnitude of impact to the asset. Table 10-3 below presents a matrix that demonstrates how the significance of effect is established:

Table 10-3: Evaluation of Significance of Effect for Adverse Effects

Level of Importance (Table 10-1)	Degree of adverse effect (Table 10-2)				
	Major	Moderate	Minor	Slight	Negligible
Very High	Very Large	Large	Moderate / Large	Minor	Negligible
High	Large	Moderate / Large	Moderate/ Minor	Minor	Negligible
Medium	Moderate / Large	Moderate/ Minor	Minor	Slight	Negligible
Low	Moderate/ Minor	Minor	Slight	Negligible	Negligible

794 The categories of significance of effect defined in Table 10.3, above, have been devised with reference to best practice as set out in ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (ICOMOS 2011) as well as the Design Manual for Roads and Bridges volume 11 (Standards for Highways).

- 795 The categories of significance of effect are not meant to be proscriptive, but are rather meant to allow the professional judgement of the assessor to be articulated clearly and consistently across different types of effects to historic assets of varying nature, quality and significance, allowing for nuance where necessary. In recognition of this, where there are two options within a category of significance of effect, the assessor will provide evidence for one or the other of the options. For example, if an asset of high importance is subject to a moderate degree of adverse effect, the significance of that effect may be Moderate or Large, depending on the nature of the effect and of the asset in question. Ultimately, the most appropriate categorisation of the significance of effect must be chosen, using professional judgement which is informed by a thorough understanding of the significance of the heritage asset and the nature of the effect.
- 796 Where the significance of effect is assessed as being Moderate or higher, this is considered to be a significant effect as referred to in the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017.

10.7 Cumulative

- 797 The developments which need to be considered for potential cumulative effects are set out in **Section 2.3.5.1** of this ES (see also **Figure 8.8**). The potential effect of these developments on the historic assets assessed within this chapter will be considered together with any effects of the proposed development to determine whether the combined effect would be greater than that assessed for the Proposed Development alone.

10.8 Assessment limitations

- 798 The assessments are based on data available from the historic environment record, as well as the results of archaeological investigations undertaken.
- 799 Assessments of effects of the proposed development to historic assets is informed by information on the scale and nature of the proposed development provided by third parties, based on Parameter Plans.

10.9 Baseline Conditions

10.9.1.1 *Archaeological Remains*

- 800 As has been noted, the archaeological potential of the Application Site and the surrounding area has been informed by a comprehensive programme of works, including a DBA, geophysical survey, and trial trenching work. These investigations have confirmed that the Application Site does not contain buried archaeological remains of interest. The land to the south of the Application Site which formed part of the previous planning application has three areas of archaeological interest (AAls), which are described below.
- 801 The location of the AAls is provided in **Figure 10.1**.

AAI 1 Potential Barrow Cemetery

- 802 The geophysical survey detected a series of circular features near to the centre of the Application Site. Many of these contained small anomalies in their centre. The trial trenching targeted these features and found that they were truncated by ploughing, and that the central anomalies could not be found in the ring ditches that were tested, although it is possible that remnants may survive in other ring ditches that were not tested (Trenches 46 and 51; see Appendix A10.3).
- 803 No finds of any kind were recovered from the ring ditches, despite considerable sampling. The ring ditches seemed to have been located within an enclosure (feature C in the geophysical survey; see Appendix A10.2). The southern extent of this enclosure, which was detected by geophysical survey, was present, however, the postulated remainder of the enclosure to the north was not present and is likely to have been lost due to ploughing. No human remains were recovered, again any which were present may well have been lost to the plough.
- 804 It has been concluded that the ring ditches are likely to represent barrows that have been truncated by ploughing, as the ditches are too wide for a drip gully for a hut. Also, the absence of any artefacts also suggests that the features were not the remains of occupation activity.
- 805 Despite the degree of plough damage encountered, the potential barrow cemetery in AAI 1 consists of a number of features, which have group value, and a fuller level of archaeological investigation may well reveal additional evidence of considerable interest that that which could be retrieved by a programme of evaluation trenching, which is by necessity a targeted exercise. On this basis, while these remains are not considered to be of schedulable quality, they are considered to be of potential regional importance, as defined in Table 10-1.

AAI 2 Neolithic / Bronze Age Enclosure

- 806 The geophysical survey detected a circular enclosure in the southern-central area of the Application Site, which measured 30m-35m in diameter. The trial trenching tested this feature with two evaluation trenches (Trenches 39 and 40; see Appendix A10.3). The ditch proved to be substantial, with multiple phases of silting and washing, suggesting that the ditch was left open over a considerable time. The evaluation recovered a single find from the ditch, a worked and polished stone, thought to be an unfinished hand axe head, of likely Neolithic date.
- 807 Based on this find, and also the proximity of the potential barrow cemetery in AAI 1, it is thought, based on current evidence, that the enclosure in AAI 2 is likely to comprise a Neolithic or Bronze Age enclosure. At present the purpose of the enclosure is not clear, and it could have been put to numerous uses. However, the size of the ditch encountered suggests a significance investment of time and energy, and the absence of any animal bone, pottery and other evidence of occupation is intriguing.

- 808 Due to the size of the ditch encountered, the potential Neolithic hand axe found in the enclosure, and the proximity of the potential barrow cemetery to the northeast in AAI 1, the enclosure in AAI 2 is considered to be of regional importance as defined in Table 10-1.

AAI 3 Small Enclosure

- 809 A small enclosure was detected in the north of field 4 by the geophysical survey, and was tested by the evaluation trenching in Trench 35 (Appendix A10.3). The small enclosure was present, however no finds were encountered. Given the scale of the feature it is considered that this could represent an animal enclosure.
- 810 The enclosure is not noted on any historic maps, and given its shape and size, is thought to be of likely prehistoric date. The enclosure is considered to be of local importance as defined in Table 10-1.

Other Remains

- 811 The other remains detected by the geophysical survey and tested by the trial trenching within the Application Site were found to comprise field boundaries from the historical period. These features are of limited interest and the implementation of the proposed development would not result in any significant effects to these features. As such it is not necessary to assess them further in this chapter.

10.9.1.2 Historic Buildings

- 812 The potential effects of the proposed development on historic assets in the surrounding area due to changes to their settings were considered in detail in the settings impact assessment (SIA) which was produced for the previous planning application. The SIA is provided in **Appendix A10.4** for ease of reference. The SIA assessed the likely effects of the previously proposed development on the significance of designated historic assets in the surrounding area, as well as whether the potential indirect effects to the settings of historic assets would comprise significant effects, as referred to in the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, and would therefore warrant full assessment within the environmental impact assessment (EIA).
- 813 The SIA found that the previously proposed development would not result in any significant environmental effects, and that the only historic asset which would be subject to an adverse effect would be the Church of St Mary, which is situated 225m to the west of the Application Site. As the current Application Site is smaller in scale than was assessed within the SIA, these conclusions are considered to be valid in relation to the Proposed Development.
- 814 Given the significance of the church, and its relative proximity to the western boundary of the Application Site, it is considered as part of the cultural heritage baseline below. A summary of the assessment provided in the SIA is reproduced

within this Chapter; photographs of the church and its setting can be found in **Appendix A10.4**.

- 815 The SIA confirmed that the remaining historic assets in the surrounding area would not be affected by the Proposed Development, and it is therefore not necessary to consider these further within this chapter.

Church of St Mary

- 816 The Church of St Mary is Grade II listed and is located 225m to the west of the Application Site at the nearest point. Cadw provide a useful summary of the history and special interest of the church (Cadw ref 5988):

History

- 817 *The church was rebuilt on earlier foundations, 1841-2, by George Gwyther, architect, of Pembroke Dock. It was repaired in the 1890's but retains its early C19 arrangement virtually intact. The parish is closely connected to Upton, and there are Tasker and Neale graves in the churchyard and memorials within the church.*

Exterior

- 818 *The church is of rubble masonry, rebuilt on the foundations of the earlier church, and part of the masonry, especially near the W end, may be retained from the earlier structure. The church now consists of nave cum chancel under one roof and there is a small N vestry. Larger stones at quoins. Ashlar bellcote with single bell above gable coping at W end. The E and W windows are of three lights, round headed, with flat arches. Other windows are similar but of two lights. Four-centred W doorway.*

Interior

- 819 *There is no marked division into nave and chancel. There is no chancel arch, and the plain plaster ceiling is continuous from end to end. At the W is a gallery with a handrail on turned balusters, above a small internal porch. The vestry is at the N reached under stone archway. Rough stonework is exposed at the reveals of the E window. Plain coloured glass throughout. Box pews.*

Reason for designation

- 820 *Listed as an important example of a pre-Ecclesiological Movement C19 church, retaining most of its original character.*
- 821 As can be seen from the list description, the significance of the church is multi-faceted, deriving from both architectural interest and historic interest, as well as communal value. There may also be some archaeological interest in the form of buried remains of the earlier church, although these are likely to be limited. The church is considered to be of national significance, as defined in Table 10-1.

- 822 The church is situated within a churchyard which is the key part of its setting, in particular the western part of the churchyard, where a seat is located, and a good prospect of the modest church tower and entrance are afforded.
- 823 Any experience of the church from the wider area is limited due to the presence of substantive and mature trees and hedgerows in the intervening landscape. A view of the church is possible from the western boundary of the Application Site, where there is an opening in the hedgerow, and also a gap in the trees within the churchyard.
- 824 However, views from elsewhere in the wider area are limited, and no further views of the church were noted from within the Application Site during the site visit. The immediate churchyard setting of the church makes an important contribution to its significance, providing the best appreciation of its architectural interest, as well as of its communal value. Views from the surrounding area are limited, and provide some appreciation of the architectural interest of the church, and also of its historic function as a small rural church. As such views from the wider area make a modest contribution to the significance of the church. As has been noted above, there are views of the church from the western boundary of the Application Site. During the site visit, it was also noted that some limited views of the Application Site, through small gaps in the hedgerow, may be possible from the more elevated parts of the churchyard.
- 825 Therefore the Application Site is considered to form a small part of the wider setting of the church, but is not considered to make a meaningful contribution to the significance of the church.
- 826 **Summary of cultural heritage baseline**
- 827 Table 10-4 provides a summary of the cultural heritage receptors discussed above. The receptors listed are also shown in **Figure 10.3**.

Table 10-4: Summary of Identified Receptors and their Significance/Sensitivity

Ref.	Cadw/LPA reference if applicable	Description	Assessment of significance/sensitivity (Table 10-1)
AAI 1	-	Potential barrow cemetery	Regional
AAI 2	-	Neolithic / Bronze Age Enclosure	Regional
AAI 3	-	Small Enclosure	Local
LB1	Cadw ref 5988	Church of St Mary	National

10.10 Do nothing scenario

10.10.1.1 Archaeological Remains

828 The archaeological investigations undertaken within the Application Site found no evidence of buried archaeological remains of interest. As such no effects to archaeological resources are anticipated in a do nothing scenario.

10.10.1.2 Historic Assets in the surrounding area

829 No effects are anticipated to the identified built heritage historic assets in the event that the Proposed Development is not implemented.

10.11 Impact Assessment

10.11.1 Embedded Mitigation

830 In response to the archaeological and built heritage historic assets identified in the baseline studies, a number of embedded mitigation measures have been adopted into the design of the proposed development, which have been designed to mitigate any impacts to the identified cultural heritage receptors. These are set out below.

10.11.1.1 Archaeological Mitigation

831 The AAIs were previously agreed with DAT and include a 10m buffer from recorded archaeological remains. The Proposed Development has now entirely removed the fields that contained the AAIs, which will ensure that there would be no impacts to the archaeological remains.

10.11.1.2 Measures to Protect the Setting of the Church of St Mary

832 The potential for the proposed development to be visible from the churchyard of the Church of St Mary was noted in the SIA provided in **Appendix 10.4**. In response, targeted planting has been proposed to gap up the hedgerow along the western boundary of the Application Site, and to introduce additional planting within the development area, in order to screen panels on higher elevations. This would ensure that any glimpsed views of the proposed development from within the easternmost part of the churchyard would be screened within 5 years of operation.

10.11.2 Construction

833 The proposed development would consist of solar photovoltaic (PV) panels with a maximum overall height of 3.5m, the upgrade of an existing access track into the study site, fencing, security cameras and a number of small buildings to house transformers and other electrical equipment. The panels would be mounted on small piled foundations which would be driven to the ground. On average the piled foundations for the solar arrays would be driven approximately 1.5m into the ground and each pile would measure no more than 0.01m² in area.

834 Additional information regarding the design, location and foundations for the transformers/inverter cabins and control building are provided in Chapter 6. No large-scale ground reduction or landscaping is planned for the development.

10.11.2.1 Archaeological Impacts

835 The impact of the construction of the proposed development on the Application Site is very limited, comprising a total below ground impact of less than 1% of the Application Site area. The “H”-piles used results in localised impacts, no large-scale ground reduction or landscaping is planned. Furthermore, some impacts such as for cable trenches and access roads, can also impact buried remains.

836 However, as the Application Site now excludes all of the AAls, the construction phase activities would not result in any damage to the AAls. As such the construction phase of the proposed development would have no impact on the AAls.

10.11.2.2 Impacts through changes to Setting of Historic Assets

837 During the installation of the proposed development, there would be some additional activity on the Application Site, as well as on the access lane from the south, including plant and vehicular movements required to move the panels and materials, install the panels and also build the small buildings within the Application Site. This will add some movement and additional noise during the course of the construction of the proposed development, although this would be short-lived and no longer than 6 months on site.

838 The effect of this would be to perhaps momentarily distract a visitor within the churchyard of the Church of St Mary, leading to a small detraction from the contribution made by the wider setting to the significance of the church. However, this would not detract from the overall appreciation of the church provided from within the churchyard, no affect any other aspect of the church’s significance. On this basis, it is considered that the construction phase of the proposed development would result in a short term minor adverse degree of effect to the significance of the church. Given the brief duration of this effect, the significance of effect is considered to be **minor adverse**.

10.11.2.3 Summary of Construction Phase Effects

839 Table 10-5 provides a summary of the construction phase effects of the proposed development.

Table 10-5: Summary of Construction Phase Effects

Ref.	Cadw/LPA reference if applicable	Description	Assessment of significance/ sensitivity (Table 10-1)	Degree of Effect (Table 10-2)	Significance of Effect (Table 10-3)
AAI 1	-	Potential barrow cemetery	Regional	No impact	Neutral
AAI 2	-	Neolithic / Bronze Age Enclosure	Regional	No impact	Neutral
AAI 3	-	Small Enclosure	Local	No impact	Neutral
LB1	Cadw ref 5988	Church of St Mary	National	Minor Adverse	Temporary short-term Minor Adverse

10.11.3 Operation

840 During operation, the proposed development would not emit light pollution, sound or result in any significant additional traffic, with only occasional maintenance visits required. Further details on traffic movements are provided in Chapter 13.

10.11.3.1 Archaeological Effects

841 No additional effects to the identified AAls would occur during operation.

10.11.3.2 Impacts through changes to Setting of Historic Assets

842 At the start of operation, the westernmost panels within the Application Site may be glimpsed from the eastern part of the churchyard of the Church of St Mary. As has been noted, in response to this potential effect the proposed development includes a planting strategy which would gap up and maintain the hedgerow along the western boundary of the study site, and would manage these to an eventual height of 4m. This would effectively screen the proposed development within 5 years. This measure would effectively screen the proposed development from the setting of the church. The surrounding landscape also contains a number of substantial hedgerows and trees, and so the screening would be consistent with this, and would not change the character of the setting of the church. Finally, views of the church from the western boundary of the study site and adjacent field would still be possible, and any limited views from the footpath to the west of the study site would be unaffected.

843 It is therefore considered that, with the benefit of the embedded mitigation within the proposed development, the proposed development would have no more than a

slight adverse effect in the first 5 years of operation, reducing to **negligible** after 5 years. This effect is not considered a significant effect.

10.11.3.3 Summary of Operation Phase Effects

844 Table 10.6 below, provides a summary of the construction phase effects of the proposed development.

Table 10-6: Summary of Operation Phase Effects

Ref.	Cadw/LPA reference if applicable	Description	Assessment of significance/ sensitivity (Table 10-1)	Degree of Effect (Table 10-2)	Significance of Effect (Table 10-3)
AAI 1	-	Potential barrow cemetery	Regional	No impact	Neutral
AAI 2	-	Neolithic / Bronze Age Enclosure	Regional	No impact	Neutral
AAI 3	-	Small Enclosure	Local	No impact	Neutral
LB1	Cadw ref 5988	Church of St Mary	National	Slight adverse, reducing the negligible within 5 years	Minor Adverse, reducing to negligible within 5 years.

10.11.4 Decommissioning

845 The effects of decommissioning would be similar to those of construction, with plant and vehicular movements and activity required to disassemble and remove the installation and take out the piles which will support the panels.

10.11.4.1 Archaeological Impacts

846 The AAIs are located outside of the Application Site and any working areas associated with the Proposed Development. As such the decommissioning phase of the Proposed Development would have no impact on the AAIs.

10.11.4.2 Impacts through changes to Setting of Historic Assets

847 During the decommissioning of the proposed development, the potential impacts would be similar to those during construction but over a shorter time period.

848 On this basis, it is considered that the decommissioning phase of the proposed development would result in a short term minor adverse degree of effect to the significance of the church. Given the brief duration of this effect, the significance of effect is considered to be **minor adverse**.

10.11.4.3 Summary of Decommissioning Phase Effects

849 Table 10.7 below, provides a summary of the construction phase effects of the proposed development.

Table 10-7: Summary of Decommissioning Phase Effects

Ref.	Cadw/LPA reference if applicable	Description	Assessment of significance/ sensitivity (Table 10-1)	Degree of Effect (Table 10-2)	Significance of Effect (Table 10-3)
AAI 1	-	Potential barrow cemetery	Regional	No impact	Neutral
AAI 2	-	Neolithic / Bronze Age Enclosure	Regional	No impact	Neutral
AAI 3	-	Small Enclosure	Local	No impact	Neutral
LB1	Cadw ref 5988	Church of St Mary	National	Minor Adverse	Temporary, short-term Minor Adverse

10.11.5 Cumulative

850 A total of two solar farms and four wind turbine schemes were considered for cumulative effects with the proposed development. These are:

851 Solar Farms

- West Farm, COSHESTON, Pembroke Dock, SA72 4UN
- Land East of Mylett's Hill, Golden Hill, Pembroke, Pembrokeshire
- 9MW 'extension' west of the existing West Farm Solar Farm.

852 Wind Turbine Schemes

- Warreston House, Cosheston
- London Road Industrial Estate
- Land to the North West of Barn Hill Farm, The Ridgeway, Manorbier

- Milton Manor, Milton, Tenby

10.11.5.1 Archaeological Effects

853 There are no known archaeological resources within the Application Site, which continue into any of the schemes under consideration for cumulative effects. Furthermore, the assessment provided in this Chapter has shown that the proposed development would not affect the identified areas of archaeological interest within the Application Site. As such there would be no cumulative effects to buried archaeological remains.

10.11.5.2 Impacts through changes to Setting of Historic Assets

854 The site visit confirmed that none of the schemes under consideration for cumulative assessment are intervisible with the setting of the church. Furthermore, all of the schemes are located more than 1km from the church, such that any other associated activity related to them other than visual impact would not affect the setting of the church. As such, there would be no cumulative effect to the church which would result from the implementation of the proposed development.

10.12 Mitigation

855 Given the effectiveness of the embedded mitigation measures, no additional mitigation measures are required to avoid significant environmental effects.

10.13 Residual Effects

856 The residual effects of the Proposed Development would remain as previously assessed.

10.14 Statement of Significance

857 This Chapter has 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 (AAls) identified by archaeological investigations within the original study site, by excluding them from all development activities. This would result in a **neutral** significance of effect.

858 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**.

859 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 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.

- 860 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

- 1 This Chapter 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.
- 2 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.
- 3 A description of the technical terminology used in this chapter is provided in Appendix A11.1.
- 4 Appendices submitted with the chapter are:
 - Appendix A11.1 - Glossary of Terminology
 - Appendix A11.2 – Construction phases and plant
- 5 This Chapter is also supported by Figure 11.1; Noise Sensitive Receptors.

11.2 Insignificant Effects

11.2.1 Operational Phase

- 6 Noise effects associated with the operational phase are not considered to be significant due to the Sites inherently quiet operation.
- 7 Noise impacts associated with operational phase have not been considered further and have been scoped out of the noise and vibration assessment for the EIA. Consideration of the potential impacts of operational noise is provided in a separate report; Non-EIA Technical Assessments (DRN: BL005).

11.2.2 Construction Traffic

- 8 A 25% increase in traffic flows is required to result in a 1 dB increase in basic noise levels, described as a negligible short-term magnitude of change within guidance outlined within the Design Manual for Roads and Bridges (DMRB) LA111 Noise and Vibration.
- 9 As detailed in Chapter 13; Traffic and Infrastructure, the increase in traffic flows on the surrounding road network will be below 25 percent. Therefore, noise impacts associated with construction traffic noise have been scoped out of the acoustic assessment for the EIA as no significant effects are likely.

11.3 Consultation

- 10 Consultation responses were received from various consultees as part of the previous DNS application for the larger Blackberry Lane site. The detail of these responses and how they have been addressed are included within the Pre-Application Consultation Report (DRN:BL007).
- 11 Further to the above, consultation was undertaken with the Environmental Health department at Pembrokeshire County Council (13th July 2020). It was agreed that the assessment of construction phase noise and vibration impacts could be based on the threshold levels set in BS 5228-1 and 2:2009+A1:2014.
- 12 Baseline environmental sound surveys were not required on the basis that:
 - DEFRA noise mapping is available indicating that noise levels are likely to fall below the lowest threshold levels; and
 - Adherence to the lowest threshold levels in BS5228 represents a worst-case assessment.

11.4 Study Area

- 13 The study area for the construction phase assessment is defined by the noise and vibration sensitive receptors that have the potential to be affected by noise and vibration caused by construction activities.
- 14 Within the Design Manual for Roads and Bridges, LA111 Noise and Vibration, dated May 2020, it states that a “study area of 300 m from the closest construction activity is normally sufficient to encompass noise sensitive receptors.”
- 15 Furthermore, BS 5228-1:2009+A1:2014 advises that noise predictions over 300 m must be treated with caution, due to meteorological effects including wind speed and direction, atmospheric pressures and temperature inversions.
- 16 Based on the above guidance, this ES chapter considers the potential construction impacts at receptors within 300 m of the site boundary.
- 17 Table 11-1 provides details of noise sensitive receptors identified in the vicinity of the site. Figure 11.1 details the approximate locations of the identified receptors.

Table 11-1: Identified Noise and Vibration Sensitive Receptors

Noise and Vibration Sensitive Receptor	Receptor Reference
Mayeston Barn Holiday (Residential use)	A
Lower Nash Farm (Residential use)	B
Nash Villa (Residential use)	C
The Crane (Residential use)	D
Pakeston Lodge (Residential use)	E
Green Plain (Residential use)	F

11.5 Legislation, Policy and Best Practice

11.5.1 Control of Pollution Act

- 18 The Control of Pollution Act (CoPA) (HMSO, 1974) covers a wide range of environmental pollution including noise. Parts of the Act have been superseded by the Environmental Protection Act 1990.
- 19 Section 60 of the Act relates to the 'Control of Noise on Construction Sites' and Section 61 relates to obtaining 'Prior Consent for Work on Construction Sites'. These parts of the Act are often used in conjunction with other standards to determine acceptable noise levels in relation to demolition and construction, hours of operation and specific working methods or mitigation.
- 20 A Section 61 application outlines the proposed demolition and construction works, hours of operation and a mitigation plan to reduce noise and vibration impact through the use of Best Practicable Means. It allows prior consent to be agreed between the contractor and the council and assists with protecting the contractor from legal action being taken under Section 60 of CoPA or Section 80 of the Environmental Protection Act 1990.

11.5.2 Environmental Protection Act

- 21 The Environmental Protection Act (EPA) (HMSO, 1990) requires local authorities to investigate noise complaints from premises (land and buildings) and vehicles, machinery or equipment in the street. This includes noise arising from demolition and construction sites.
- 22 If the local authority is satisfied that noise from a development amounts to a statutory nuisance then the authority must serve an abatement notice on the person responsible or in certain cases the owner or occupier of the property. The notice may require that the noise or nuisance is completely stopped or limited to certain times of the day.

11.5.3 Regional Policy

11.5.3.1 Planning Policy Wales 11

- 23 The Planning Policy Wales Edition 11 (PPW11), adopted in 2021 sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.
- 24 Within PPW it states that Planning authorities should also identify and require suitable ways to avoid, mitigate or compensate adverse impacts of renewable and low carbon energy development. The construction, operation, decommissioning, remediation and aftercare of proposals should take into account "...the need to

minimise impacts on local communities, such as from noise and air pollution, to safeguard quality of life for existing and future generations..”

11.5.3.2 Planning Guidance (Wales), Technical Advice Note (Wales) 11, 1997

- 25 The Technical Advice Note 11 (TAN 11) provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.
- 26 With regards to noise from construction sites the notes states that detailed guidance on assessments can be found in BS 5228.

11.5.4 Local Policy

11.5.4.1 Pembrokeshire County Council Local Development Plan, Adopted 2013 (up to 2021)

- 27 Chapter 6: General Policies of the Pembrokeshire County Council Local Development Plan references noise.
- 28 It states that development will be permitted where the following criteria are met:
“It would not result in a significant detrimental impact on local amenity ion terms of visual impact, loss of light or privacy, odours, smoke, fumes, dust, air quality or an increase in noise or vibration levels.”

11.5.5 Standards

11.5.5.1 British Standard 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1 Noise

- 29 BS 5228-1:2009+A1:2014 gives recommendations for basic methods of noise control relating to construction sites, including sites where demolition, remediation, ground treatment or related civil engineering works are being carried out, and open sites, where work activities/operations generate significant noise levels, including industry-specific guidance.
- 30 Annexes C and D detail current and historical sound level data associated with different construction and demolition operations that can be used to calculate the impact of noise from construction sites.
- 31 Annex E outlines example criteria for the assessment of the potential significance of noise effects and describes methods to identify the likely significance of noise levels from surface construction activity.

11.5.5.2 British Standard 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 2 Vibration

- 32 BS 5228-2:2009+A1:2014 provides advice on the human response to demolition and construction vibration. BS 5228-2 suggests that, for demolition and construction

activities, it is considered appropriate to provide guidance in terms of the Peak Particle Velocity (PPV) as measured outside the building.

- 33 Table B.2 of BS 5228-2:2009+A1:2014 provides guidance on PPV vibration limits for transient excitation for different building types. Table 11-2 outlines the transient vibration guide values for cosmetic damage to buildings.

Table 11-2: Transient Vibration Guide Values for Cosmetic Damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or Framed Structures. Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above	
Un-reinforced or light framed structures. Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
NOTE 1 Values referred to are at the base of the building.		
NOTE 2 At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not be exceeded.		

11.6 Assessment Methodology

11.6.1 Significance Criteria

- 34 The assessment of noise and vibration in EIA terms has considered both the sensitivity of the identified receptor to noise and vibration, and the magnitude of impact in noise and vibration terms. This section summarises the approach adopted to apply planning policy and industry standard guidance to the EIA process.
- 35 Table 11-3 defines the sensitivity to noise and vibration of the types of receptors generally considered as part of the EIA assessment process.

Table 11-3 : Summary of Receptor Sensitivity

Sensitivity to Noise and Vibration	Description	Example Receptor
High	Receptors where people or operations are particularly sensitive	Residential Theatres/Auditoria/Studios Schools and Nurseries Hospitals/residential care homes Places of worship
Medium	Receptors where noise or vibration may cause some distraction or disturbance	Offices Retail areas and other commercial developments Bars/Cafes/Restaurants where external noise may be intrusive
Low	Receptors where distraction or disturbance from noise and vibration is minimal	Industrial areas Sports ground Night clubs

36 Table 11-4 defines the magnitude of the impact in noise and vibration terms and the associated human response.

Table 11-4: Magnitude of Impact in terms of Noise or Vibration

Impact in Terms of Noise and Vibration	Human Response
Substantial	Noise/vibration causes significant changes in behaviour and/or inability to mitigate the effect of noise/vibration leading to physiological or psychological effects. Potential for regular sleep disturbance. Quality of life diminished due to changes in character of the area. Perception – Physically Harmful
Major	Noise/vibration causes a material change in attitude and/or behaviour e.g. avoiding activities. Potential for awakening sleep disturbance. Quality of life diminished due to change in character of the area. Perception - Disruptive
Moderate	Noise/vibration is perceptible but causes a small change in behaviour/attitude. Potential for non-awakening sleep disturbance. Affects the character of the area such that there is a perceived change in the quality of life. Perception - Intrusive

Impact in Terms of Noise and Vibration	Human Response
Minor	Noise/vibration is perceptible but does not cause a change in behaviour/attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life. Perception – Non-Intrusive
Negligible	Noise/vibration has no discernible effect on the receptor

- 37 The noise and vibration effect in EIA terms is determined by considering both the sensitivity of the receptor and the impact in noise and vibration terms.

11.7 Construction Noise

- 38 BS 5228:2009+A1:2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites' does not provide specific limits for construction noise, but it does define methods of assessing the significance. The standard also provides information on demolition and construction noise and vibration reduction measures promoting a 'Best Practice Means' approach to control noise and vibration. A method for determining the sound levels associated with demolition and construction activities is also detailed and considers the numbers and types of equipment operating, their associated Sound Power Level (L_w), and the distance to receptors, along with the effects of any screening.
- 39 Based on the guidance detailed in the BS 5228:2009+A1:2014 construction noise adverse effect levels have been derived.
- 40 Normal demolition and construction hours are assumed to be Monday to Friday between 08:00 to 18:00. No demolition or construction work will take place on Saturdays, Sundays or Bank Holidays. For any works outside of these times, agreement with the local authority will be required.
- 41 Information provided by the Developer with regards to plant and phasing has been used to inform the assessment where necessary.
- 42 Table 11-5 defines the construction noise adverse effect levels.

Table 11-5: Construction Noise Effect Levels for Residential Buildings

Impact in Noise Terms	Construction Sound Level L _{Aeq,T} (dB) at Residential Receptor
Substantial	Above or equal to the Threshold Level* +10 dB

Major	Above or equal to the Threshold Level* +5 dB and below the Threshold Level* +10dB
Moderate	Above or equal to the Threshold Level* and below the Threshold Level* +5dB
Minor	Above or equal to the Ambient Sound Level and below the Threshold Level*
Negligible	Below the Ambient Sound Level
*Threshold level determined as per BS 5228:1 Section E3.2 and Table E.1	

43 Construction noise shall constitute a significant effect in EIA terms where it is determined that a substantial, major or moderate magnitude of impact will occur for a duration exceeding:

- 10 or more days or nights in any consecutive 15 days or nights.
- A total number of days exceeding 40 in any 6 consecutive months.

11.8 Construction Vibration

44 The effects of human response to whole body vibration in buildings are defined in BS 6472-1: 2008. This explains effects in terms of Vibration Dose Value (VDV). However, for human response to construction-related vibration, it is considered more appropriate to use the Peak Particle Velocity (PPV) measure, as suggested in BS 5228-2:2009+ A1:2014 Code of practice for noise and vibration control on construction and open sites (BSI, 2014). Part 2: Vibration.

45 The limit of human perception to vibration is between approximately 0.15 mm.s⁻¹ and 0.3 mm.s⁻¹. The sensitivity of the human body also varies according to different frequencies of vibration, with perception generally possible between 1 Hz to 80 Hz.

46 Based on the above guidance Table 11-6 details the proposed assessment criteria.

Table 11-6: Guidance on Effects of Vibration Levels

Impact in Vibration Terms	Vibration Level PPV mm/s	Description of Effects
Substantial	>10	Vibration is likely to be intolerable for any more than a very brief exposure

Moderate to Major	1 to 10	Increasing likelihood of complaint in residential environments, but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents
Minor	0.3 to 1	Increasing likelihood of perceptible vibration in residential environments
Negligible	<0.3	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction

11.9 Cumulative

- 47 A review of committed developments in the vicinity of the application site has been undertaken. Comments have been provided on the potential impact from the cumulative impacts of the developments.

11.10 Assessment limitations

- 48 The assessment is based on the likely plant and construction programme as provided by the developer and variations in plant and construction programme may occur when development commences.
- 49 However, the list of plant and programme is based on the developers experience in Solar Farms and is therefore considered representative and acceptable to inform this assessment.

11.11 Baseline Conditions

- 50 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.
- 51 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.

- 52 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.
- 53 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.
- 54 A summary of the predicted ambient levels at the nearby receptors and the threshold levels set for each receptor are provided below in Table 11-7.

Table 11-7: Ambient Noise levels and Construction Threshold Levels

Receptor	Ambient Noise Levels(dB, L _{Aeq,T})	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		

- 55 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.

11.12 Impact Assessment

11.12.1 Construction Noise

- 56 The construction of the proposed development is likely to include activities such as site levelling/clearance, ground excavation, rolling, piling and welding.
- 57 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 Appendix A11.2

- 58 As a detailed construction methodology and sequence is yet to be determined, the assessment considers a worst-case scenario, where each activity occurs continuously at a point on the site boundary closest to the receptor for a 10-hour period and without any mitigation measures (e.g. screening or operational constraints) in place. Table 11-8 details the results of the assessment for typical construction activities, calculated as the dB LAeq,10hours at the noise sensitive receptors.

Table 11-8: Calculated Indicative Construction Activity Noise Levels at Receptors

Receptor	Site Preparation	Excavation	Rolling and Compaction	Piling	Welding
	dB LAeq,10hrs				
Mayeston Barn Holiday	47	54	51	56	48
Lower Nash Farm	44	50	48	54	45
Nash Villa	53	58	57	62	54
The Crane	43	48	46	52	44
Pakeston Lodge	40	45	44	49	41
Green Plain	54	59	58	63	55

- 59 Based on the calculated noise levels outlined above, Table 11-9 assesses the significance effect of each of the considered construction phases at the receptors, without mitigation in place.

Table 11-9: Assessment of Construction Noise Significance Effects

Receptor	Site Preparation	Excavation	Rolling and Compaction	Piling	Welding
	dB LAeq,10hrs				
Mayeston Barn Holiday	Minor	Minor	Minor	Minor	Minor
Lower Nash Farm	Negligible	Minor	Minor	Minor	Negligible

Receptor	Site Preparation	Excavation	Rolling and Compaction	Piling	Welding
	dB LAeq,10hrs				
Nash Villa	Negligible	Negligible	Negligible	Minor	Negligible
The Crane	Negligible	Negligible	Negligible	Negligible	Negligible
Pakeston Lodge	Negligible	Negligible	Negligible	Minor	Negligible
Green Plain	Minor	Minor	Minor	Minor	Minor

- 60 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.
- 61 Based on a worst-case scenario, the magnitude of impacts in noise terms are likely to a minor short-term adverse impact. This is considered to be a minor level of significance in EIA terms which is not significant.

11.12.2 Construction Vibration

- 62 Construction of this type of development is not normally a significant source of vibration. Vibration is normally only associated with piling activity.
- 63 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 peak particle velocity (PPV) at 30 m
- 64 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.

11.12.3 Cumulative

- 65 Cumulative schemes identified in the area include West Farm Solar Farm and 'extension' and Golden Hill Solar Farm. Two of these solar farms are already built and so no cumulative construction effects can occur.

- 66 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.

11.13 Mitigation

11.13.1 Construction Noise

- 67 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.
- 68 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.

11.14 Residual Effects

11.14.1 Construction Noise

- 69 Construction noise is considered to be negligible in EIA terms and therefore not significant. Therefore, residual effects are likely to be insignificant.

11.14.2 Construction Vibration

70 Construction vibration is considered to be negligible in EIA terms and therefore not significant. Therefore, residual effects are likely to be insignificant.

11.15 Statement of Significance

71 A summary of the significance for each potential effect is detail in Table 11.10 below.

Table 11-10: Summary of Noise and Vibration Effects

Effect	Receptor	Receptor Sensitivity	Magnitude	Significance of Effects	Further Mitigation	Residual Effect
Construction Noise	Six dwellings surrounding the site	High	Minor	Temporary, Short-Term, Minor, Adverse, Not Significant	Additional measures CEMP to be implemented during the construction	Temporary, Short-Term, Negligible, Not Significant
Construction Vibration	Six dwellings surrounding the site	High	Negligible	Temporary, Short-Term, Negligible, Not Significant	N/A	Temporary, Short-Term, Negligible, Not Significant
Construction Traffic	Scoped out Temporary, Short-Term, Negligible, Not Significant					
Operational Phase	Scoped out Temporary, Negligible, Not Significant					

12 Geology, Hydrology and Hydrogeology

12.1 Introduction

- 72 This section 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.
- 73 This chapter is also supported by the following Technical Appendices provided in Environmental Statement Volume 2:
- Technical Appendix A5.3; Land Quality Implications Assessment;
 - Technical Appendix A6.1: Outline Decommissioning and Restoration Plan; and
 - Technical Appendix A12.1: Flood Consequence Assessment (FCA);
- 74 It also makes reference to the following documents:
- Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) DRN BL009.

12.2 Consultation

- 75 Consultation responses were received from various consultees as part of the previous DNS application for the larger Blackberry Lane site. The detail of these responses and how they have been addressed are included within the Pre-Application Consultation Report (DRN:BL007).
- 76 No further consultation has been undertaken in relation to geology, hydrology or hydrogeology.

12.3 Study Area

- 77 The Core Study Area includes all areas where construction activity is proposed. Throughout this Section the term “the site” has been used for this area and refers to the redline boundary of the site shown in Figure 1.2 of this Environmental Statement. However, the actual area of underlying land which will be impacted by the excavation of foundations for panels, access roads and the inverter and transformer cabins only forms a small proportion of the overall site.
- 78 A Hydrology Wider Study Area includes 5 km around the Core Study Area.
- 79 At distances greater than 5 km within lowland catchments, it is considered that schemes such as solar parks are unlikely to contribute to a hydrological effect, in terms of chemical or sedimentation effects, due to attenuation and dilution over distance of potentially polluting chemicals.

- A smaller 1 km study area is based on the Hydrology Core Study Area and is used to assess Private Water Supplies.
- 80 These study areas are defined based on professional judgement and experience assessing similar scale developments and similar hydrological catchments in the UK.

12.4 Legislation, Policy and Best Practice

- 81 Baseline conditions and the potential impact of the development have been assessed with reference to the legislation, guidance and policy documents;
- Water Framework Directive (2000/60/EC) as implemented in Wales via the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. The Water Framework Directive (WFD) establishes a framework for the protection, improvement and sustainable use of all water environments;
 - The Groundwater Directive (GWD) (2006/118/EC) as implemented by the Groundwater (Water Framework Directive) (Wales) Direction 2016;
 - The Groundwater Daughter Directive to WFD (2006/118/EC) as implemented by Environmental Permitting (England and Wales) Regulations 2016;
 - Flood and Water Management Act 2010; and
 - Land Drainage Act 1991.
 - Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017,
 - the Environmental Protection Act (1990),
 - the Contaminated Land (Wales) (Amendment) Regulations 2012,
 - the Construction (Health, Safety and Welfare) Regulations (1996),
 - British Standard BSI 6031 (2009) – ‘Code of Practice for Earthworks, and
 - CLR 11 – Model Procedures for the Management of Land Contamination.
- 82 In addition, the policies of Pembrokeshire County Council have been considered as appropriate (see discussion in Chapter 7).

12.5 Assessment Methodology

- 83 This assessment has involved the following elements, further details of which are provided in the following sections:
- Consultation with relevant statutory and non-statutory bodies;
 - Desk study, including review of available maps and published information;
 - Site walkover;
 - Input to design process to minimise effects;
 - Identification and evaluation of potential effects;

-
- Evaluation of the significance of these effects;
 - Identification of measures to avoid and mitigate potential effects;
 - Assessment of residual effects;
 - Proposed monitoring; and
 - Statement of significance.
- 84 The assessment approach has been undertaken with a clear understanding of the following:
- Previous land uses – through a review of historical maps;
 - Underlying ground conditions – through a review of British Geological Survey (BGS) maps;
 - Existing physical baseline conditions;
 - Development proposals;
 - Sensitivity to change;
 - Magnitude of change; and
 - Potential to mitigate impacts resulting from the proposed development.
- 85 The baseline geological, hydrological and hydrogeological conditions of the proposed Solar Park have been assessed with reference to the following:
- British Geological Survey (BGS) online digital viewer;
 - OS Mapping;
 - Envirocheck Report – which included the following:
 - Groundwater Vulnerability Map;
 - Historical plans (see archaeological report);
 - Details of discharge and waste consents, contaminated land sites and areas of sensitive land use for the site and its immediate vicinity; and
 - Geological and mining hazards.
 - The Natural Resources Wales (NRW) online flood maps at <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>

12.5.1 Methodology for the Assessment of Effects

- 86 The assessment methodology outlined in this Chapter of the ES 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.
- 87 Tables 9.1 to 9.3 have been used to assess the attribute importance of receptors and the significance criteria against which the magnitude of potential impacts from the

development may have on soils, geology, hydrogeology and human health where appropriate.

- 88 To determine the significance of any potential impact, Table 12-1 and Table 12-2 are first used to separately (and respectively) determine the importance / sensitivity of the receptor and the magnitude of change. These two elements are then combined, via the use of Table 12-3, to determine the significance of the impact.

12.5.1.1 *Sensitivity*

- 89 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.
- 90 These criteria are outlined in Table 12-1 and are based on professional judgement and experience.

Table 12-1: Defining the Importance / Sensitivity of the Receptor

Importance / Sensitivity of Receptor	General Criteria	Geology / Soils	Other Local Land Uses	Waters	Ecological Systems	End Users
High	Receptor of high quality and rarity / Receptor susceptible to rapid large change	Designated SSSI or SPZ for geology or soils / Grade 1 Agricultural Land / Land supports nationally rare plant species	Greenfield site / residential area	Principal or major aquifer / groundwater abstraction for drinking water / surface water in close proximity	EU designated sites, habitats and species of national or district value	Residential / allotments / play areas

Importance / Sensitivity of Receptor	General Criteria	Geology / Soils	Other Local Land Uses	Waters	Ecological Systems	End Users
Medium	Receptor of intermediate quality and rarity / Receptor susceptible to large change	Grade 2 Agricultural Land / Currently used for important crops / Land supports regionally or locally rare plant species	Open space / commercial area	Secondary A or minor aquifer / groundwater abstraction for irrigation	Nationally designated statutory sites, habitats and species of local value	Landscaping or public open space
Low	Receptor of intermediate quality and rarity / Receptor quality susceptible to detectable or observable change	Brownfield or industrial site / Site of medium agricultural value	Industrial area	Secondary B or minor aquifer / groundwater abstraction for 'general use' / no surface water in close proximity to the site	Locally designated ecological sites, habitats and species of neighbourhood value	'Hard' end use (e.g. industrial, car parking)
Negligible	Receptor of low quality and rarity / Receptor quality buffered	Brownfield or industrial site / Site of little or no agricultural value	Industrial area	Unproductive strata or non-aquifer / groundwater abstraction for cooling / no surface water in close proximity to the site	No sites of ecological importance close by, habitats or species of negligible value e.g. invasive species or hard standing	'Hard' end use (e.g. industrial, car parking)

12.5.1.2 Magnitude

91 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 Table 12-2.

Table 12-2: Defining the Magnitude of Change

Magnitude		Description
Major	Adverse	A permanent / long term large scale adverse impact on the quality / value of a receptor, or receptor exposure to acutely toxic contaminants.
	Beneficial	A permanent / long term large scale improvement of quality / value of a receptor (i.e. extensive restoration or enhancement).
Moderate	Adverse	An adverse impact on the quality and / or value of a receptor. Recovery may be possible in the medium term and no permanent impacts are predicted.
	Beneficial	A benefit to, or addition of, key characteristics, features, or elements or improvement of quality of a receptor.
Minor	Adverse	An adverse impact on the quality and / or value of a receptor. Recovery may be expected in the short-term and no permanent impacts are predicted.
	Beneficial	A minor benefit to, or addition of, key characteristics, features, or elements or improvement of quality of a receptor.
Negligible / No Impact		No impact would be detectable, either positive or negative.

12.5.1.3 Significance

- 92 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 as defined in Table 12-3. Effects of moderate significance or greater are considered significant in terms of the EIA Regulations.

Table 12-3: Significance Criteria

		Magnitude of Effect			
		Major	Moderate	Minor	Negligible
Sensitivity of Receptor	High	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Minor
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor	Minor	Negligible	Negligible
	Key:	Significant		Not Significant	

12.5.2 Cumulative Assessment Methodology

- 93 A cumulative effect is considered to be an additional effect on hydrological resources arising from the Development in combination with other proposed developments (either under construction, consented but not built or at application stage) likely to affect the hydrological environment. At distances greater than 5 km, it is considered that schemes are unlikely to contribute to a cumulative hydrological effect due to attenuation and dilution over distance of potentially polluting chemicals. Therefore, for the purposes of the assessment of potential cumulative effects on the immediate catchment and hydrological regime, only proposed developments within approximately 5 km of the Development have been considered. These are as listed in Section 2.3.5.1.
- 94 The methodology followed to assess cumulative effects is the same as that used for the Development in isolation.

12.5.3 Assessment Limitations

- 95 All data considered necessary to identify and assess the potential significant effects resulting from the Development was available and was used in the assessment reported in this chapter.

12.6 Baseline Conditions

12.6.1 Site History, Contamination and Ground Stability

- 96 The site is understood to have been used as farm, land for its entire recent history. Further information on the site's history is detailed in Appendix A10.1.
- 97 It is understood that the site has not previously been the subject of any landfill or mineral extraction. The site has very low potential for landslip ground stability hazards, very low potential for collapsible ground stability hazards, and no potential for compressible ground stability hazards.

- 98 There is no record of any historical land use which would result in contamination being present across the site.

12.6.2 Topography

- 99 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.
- 100 There are also two shallow valley features located in and near to the site. The first trends from west to east and slopes down towards Blackberry Lane to approximately 20m 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.

12.6.3 Geology and Soils

- 101 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).
- 102 The online BGS 1:50 000 scale superficial geology map indicates that there are no deposits across the site.
- 103 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'.
- 104 The Agricultural Land Classification Survey (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	5.5	39.7%
3a	1.84	13.3%
3b	6.5	47%
Total	13.84	100%

- 105 It is understood that the proposed Solar Park site has not previously been the subject of any mining activity.

12.6.4 Hydrogeology

- 106 The geology underlying the southern field is classified as a Principal Aquifer. This classification is given to areas which usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
- 107 The two northern most fields are classified as a Secondary Aquifer Category A (formally referred to as minor aquifers). This vulnerability classification is given to fractured or potentially fractured rocks which do not have a high primary permeability, or other formations of variable permeability including unconsolidated deposits. These formations do not produce large quantities of water for abstraction, but may be important for local supplies and in supplying base flow to rivers.
- 108 The site is partially 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.

12.6.5 Hydrology

- 109 Further details of the hydrological baseline for the site and the surrounding area are provided within the Flood Consequence Assessment. These are summarised below.
- 110 There are no designated 'main rivers' located on site.
- 111 The site lies within the catchment of the Cleddau and Pembrokeshire Coastal Rivers. Ford Pill discharges into the River Carew and is located approximately 1km 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.
- 112 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.
- 113 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 wooded area before flowing into the second drainage feature and continuing west.
- 114 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.
- 115 Despite the above, due to the size of the development site a Flood Consequence Assessment has been completed. The Flood Consequence Assessment (FCA; 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.

- 116 The Envirocheck report identifies a small area in the east 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.

12.6.6 Abstractions and Discharge Consents

- 117 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.
- 118 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.

12.6.7 Sensitivity Summary

- 119 The sensitivities of the identified receptors, and their relationship to the potential effects from all phases of the Development, are outlined in Table 12.6 below.

Table 12-6: Receptor Sensitivity

Receptor	Potential Effects	Sensitivity	Comment
Watercourses and Drainage Ditches	Increased run-off, erosion and sedimentation, stream flow impediments and pollution as a result of construction groundworks and chemical handling / storage.	Low	As defined within Chapter 9: Ecology and Ornithology, the springs and drains are considered to be of local importance for nature conservation so would be low ecological sensitivity.

Receptor	Potential Effects	Sensitivity	Comment
Groundwater	Pollution as a result of erosion and sedimentation from construction activities and uncontained spills from chemical handling / storage.	High	Site is partially located within zone 1 of a source protection zone.
Soils / Superficial geology	Pollution as a result of track construction and chemical handling / storage.	Medium	Considered Medium sensitivity due to the presence of grade 2 agricultural land
Solid Geology (bedrock)	Loss of strata as a result of excavations.	Low	The bedrock underlying the Development is not of limited resource across Wales and can function normally throughout all phases of the Development.
Private Water Supplies	Pollution as a result of erosion and sedimentation from construction activities and uncontained spills from chemical handling / storage.	Low	There is only one water abstraction point within 1km of the site boundary. The abstracted water is impounded before being used for agricultural purposes not human consumption. It is located approximately 500m south west across land and 1.2km down flow of the point at which the ditch leaves the site boundary.

12.7 Do Nothing Scenario

- 120 In the absence of the Development it is likely that the future baseline conditions for geology, hydrology and hydrogeology within the site will remain relatively constant, and that agricultural practices will continue to contribute to nitrates and phosphates entering the hydrological environment. This may result promote eutrophication in the future but this is not certain.
- 121 Chapter 9: Ecology and Ornithology states that “n the absence of the proposed development, it is not anticipated that the features of the proposed solar park site

would change, although some habitats will mature, and trees will grow taller/larger over time. Climate change could influence future ecological baseline if changes in temperature were to put stress on local ecosystems. However, changes resulting from climate change will be gradual and over a long period of time. Therefore, within the operational lifeline of the proposed solar park any changes would be predicted to be very small.'

12.8 Impact Assessment

- 122 The effect of the Development on geological and 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.
- 123 The effects of the Development upon the soil present across the site do not form part of the scope of this assessment. Any potential impacts upon soils are considered in the context of land quality within the Land Quality Implications Assessment (A5.3). However, where effects such as compaction of soil are directly related to potential impacts upon geological and hydrogeological receptors, these are considered below.

12.8.1 Potential Construction Effects

- 124 The nature and magnitude of effects that could result from construction activities, as described in Chapter 5: Development Description, are assessed in the following paragraphs, which includes:
- Installation of the PV module array and racking system;
 - Construction of a new access tracks, hardstanding areas, and security fencing;
 - Construction of inverter/transformer cabins and control building foundations
 - Construction of a temporary construction compound; and
 - Installation of cabling linking to the Development substation.

12.8.1.1 Chemical Pollution

- 125 Potential chemical pollution effects involved with the construction phase of development are considered to be a risk management issue, with the effects being assessed should the risk be realised. Should the Development proceed as described in Chapter 5: Development Description, i.e., with no spills or pollution incidents then there would be no effects.
- 126 Potential risks include the spillage or leakage of chemicals, fresh concrete, foul water, fuel or oil, during use or storage onsite. These pollutants have the potential to adversely affect soils, subsurface water quality, soils, surface water quality, and groundwater, and hence effects on the biodiversity of receiving watercourses.

Surface Hydrology

- 127 Existing drainage ditches could be at risk from a pollution incident during construction. As detailed in Table 12.6 the existing ditches are considered to be of medium sensitivity.
- 128 Buffer distances of at least 7m between proposed construction works and drainage ditches reduces the potential for chemical pollutants to be transferred to the water environment.
- 129 The proposed construction works will result in the storage and use of only small volumes of chemicals such as petroleum fuels within construction vehicles and machinery. The nature of the works and the short duration of the proposed construction phase combined with the low volumes of potentially polluting chemicals means that any impacts would be short-term and reversible and therefore minor adverse. In accordance with Table 12-1, the existing drainage ditches are considered to be of medium sensitivity and therefore in accordance with Table 12-3, any impacts would be of minor significance and not significant.

Groundwater, Near-surface water and Bedrock

- 130 Pollutants coming into contact with bedrock also have the potential to indirectly alter the pH of the groundwater resource. pH and chemical alterations to bedrock are difficult to rectify due to the fractured nature of the rock and the lengthy attenuation and dispersal of chemicals. As noted previously, based on the trial trenching completed across the site, despite the site being located within zone 1 of a source protection zone, groundwater is unlikely to be present near the surface across the site.
- 131 Construction activities will not be carried out at depths that will interfere with either the bedrock or at any significant depth with regards to groundwater resources meaning there is limited potential for pollutants to come into contact with groundwater or bedrock. For this reason the potential magnitude of any chemical pollution impacts is considered to be negligible. In accordance with Table 12-3, potential impacts upon bedrock (low sensitivity) would therefore be of negligible significance and on groundwater (high sensitivity) would be potentially of minor significance and therefore not significant.

12.8.1.2 Erosion and Sedimentation

- 132 Construction activities may, if uncontrolled, cause changes to erosion and sedimentation as a result of:
- The creation of access tracks;
 - The creation of laydown / material stockpiles;
 - Compaction of soil due to the movement of heavy construction plant / equipment;
 - The severance / interruption of natural drainage systems;
 - The removal of vegetated top soil; and,
 - The dewatering of excavated foundations / trenches.

12.8.1.2.1 Surface Hydrology

- 133 Erosion and sedimentation can occur from excavations, de-watering, ground disturbance and overburden stockpiling. Sediment entering drainage ditches has the potential to affect water quality, ecology and flood storage capacity.
- 134 The installation of interception swales and new access tracks prior to the commencement of the main construction activities will reduce the potential for ground disturbance and subsequent sedimentation. Any sediment which does result from the construction activities will be prevented from entering existing drainage ditches by the presence of the new swales which will be regularly cleared as detailed in the draft CEMP.
- 135 As such, there will be limited potential for sediment or erosion effects on existing drainage ditches, including flow and water quality.
- 136 For these reasons, the magnitude of this effect will be negligible. Given the low sensitivity of the existing ditches and negligible magnitude of effects, the significance of effects associated with erosion and sedimentation is assessed as being negligible and not significant. This is not significant in terms of the EIA Regulations.

12.8.1.2.2 Sub-surface Hydrology

- 137 Sediment also has the potential to change near-surface water flow in superficial geology deposits by creating a physical barrier within naturally occurring drainage micropores. Sediment entering near-surface water in superficial deposits also has the potential to impact on groundwater quality within bedrock deposits / fissures.
- 138 The installation of new access tracks and the designated construction compound prior to any other construction works taking place will minimise the removal of vegetated topsoil by minimising vehicle movement across the site to designated routes. It will also reduce the potential for uncontrolled ground disturbance and subsequent erosion and sedimentation. These measures will in turn maintain the structural integrity of the vegetated topsoil and subsoil beneath, therefore limiting the potential for sediment to enter sub-surface hydrology.
- 139 For these reasons, the magnitude of this effect will be negligible. Given the high sensitivity of the groundwater, the significance of the effect associated with erosion and sedimentation is considered to be minor and therefore not significant.

12.8.1.3 *Impediments to Flow*

- 140 The proposed Development will not require any works on the existing drainage ditches. Nor will the proposed works impact upon the baseline hydrology (flow or lack thereof) within the ditches. Any potential impacts on the flow of the existing drainage ditches will therefore be negligible.
- 141 Given the low sensitivity of the drainage ditches, the significance of the effect associated with flow is considered to be negligible and therefore not significant.

12.8.1.3.1 Changes in Soil Interflow Patterns

- 142 Foundations for the inverter/transformer cabins and control building have the potential to change sub-surface water flow by creating physical barriers within naturally occurring drainage macropores in soil. Any foundations will be at a depth of approximately 1m and would be equal to approximately 0.15% of the total site area. The potential magnitude of any change to soil interflow patterns as a result of the foundations is therefore considered to be negligible.
- 143 It is also considered that installing racking system posts to a depth of 2 m will have a negligible effect on the displacement or change in sub-surface water flow underlying the Development, due to the small cross sectional area of the support posts (0.016sqm). The total area of the support posts would be approximately 100sqm which is equal to approximately 0.07% of the total site area.
- 144 Consequently, any effects on soil (moderate sensitivity receptor) would be of minor significance and not significant. Further details are provided in Appendix A5.3 (Land Quality Implications Assessment).
- 145 Any effects on existing drainage ditches (low sensitivity) would be negligible significance and not significant.

12.8.1.4 *Compaction of Soils*

- 146 Construction of access tracks and movement of construction traffic, in the absence of construction good practice, can lead to compaction of the soil. This can reduce soil permeability, potentially leading to increased run-off rates and increased erosion.
- 147 The installation of new access tracks and the designated construction compound prior to any other construction works taking place will minimise the uncontrolled movement of vehicles around the site reducing the potential for site wide compaction impacts. Further details are provided in Appendix A5.3 (Land Quality Implications Assessment)
- 148 As detailed within the FCA any increase in surface water run-off as a result of the proposed Development will be accommodated by the proposed new swales to be created on site.
- 149 For these reasons, the magnitude of this effect will be negligible. Given the medium sensitivity of soils and negligible magnitude of effect, the significance of effects associated with the compaction of soils is considered to be minor adverse and not significant.

12.8.1.5 *Migration of Pollutants from Contaminated Land*

- 150 Desk studies have not identified any contaminated land within 1km of the site boundary. Therefore, potential impacts from the migration of pollutants from contaminated land are not considered further in this assessment.

12.8.1.6 *Increase in Runoff and Flood Risk*

- 151 The Welsh Governments Development Advice Map (DAM) indicates that the whole site is located within Flood Zone A and is therefore considered to be at little or no risk of fluvial or tidal/coastal flooding.
- 152 The nature of the proposed Solar Park is such that the majority of the site will remain as greenfield land, retaining the existing drainage regime. The exceedance in surface water runoff will come from the minor increase in impermeable area from: the PV Panel support structures, the Inverter Cabins and the Control Building.
- 153 The new onsite access track construction is proposed to comprise Type 1 and Type 2 Aggregate. It has been assumed that due to the nature of the track, it will have low vehicular usage and thus low compaction, remaining permeable.
- 154 A Flood Consequence Assessment is provided in Technical Appendix A12.1. The FCA concludes that with the implementation of a sustainable urban drainage system in the form of 725m of new swales, the Development will not experience an increased risk of flooding or increase the risk of flooding across the site.

12.8.1.7 *Effects on PWS*

- 155 The desk study has revealed only one current abstraction point within 1km of the site. The abstraction point is a surface water abstraction point. Given the distance between the Development and the abstraction point (500m across land and 1.2km down flow of the nearest drainage ditch) it is considered that the Development will not impact upon the quality or quantity of water abstracted at this PWS.
- 156 As such, effects on the PWS (low sensitivity) will be of negligible magnitude and therefore of negligible significance.

12.8.2 *Potential Operational Effects*

- 157 Potential effects associated with the operation of the Development are:
- Increased run-off rates;
 - Sedimentation from runoff from areas of hardstanding and the PV panels; and
 - A risk of a pollution event from minor spills from maintenance vehicles.
- 158 The nature of these effects has been discussed in relation to the construction phase. As there would be substantially less activity during operation, and as there is unlikely to be any significant ground disturbance during operation, the magnitude of these effects is similarly reduced, with the exception of rainfall run-off which is expected to increase slightly. As detailed within the FCA (Appendix A12.1), the increase in surface water run-off is not expected to be significant and will be controlled via swales which will be created as part of the Development proposals. The swales will also act as interception features preventing the release of sediment into existing ditches.

- 159 No fluid filled cables will be installed on site and there are no know existing fluid filled cables which cross the site.
- 160 Approximately 400 litres of oil will be contained within the switchgear to be located on site within an electrical building. In the event of a leak of this oil this would be entirely contained within a bund beneath the transformer and could not escape the building.
- 161 As a result, the magnitude and significance of all effects associated with operation of the Development are assessed as being negligible and not significant.

12.8.3 Potential Decommissioning Effects

- 162 Potential effects of decommissioning the Development are similar in nature to those during construction, as some ground-work would be required to remove substation foundations and hardstanding. These effects would be substantially lesser in magnitude than during construction.
- 163 The concrete foundations would be removed upon decommissioning. It is possible that they may be partially left in the ground after decommissioning of the site. It is common for concrete foundations to remain in the ground for many years following decommissioning of sites. The environmental impact of their complete or partial removal is predicted to be negligible as the foundations will be constructed of an appropriate grade of concrete to resist attack from any soil and groundwater contamination. Access tracks materials will be removed from site.
- 164 The ground will be reinstated back to its original state with suitably clean topsoil and grass covering where appropriate. Further details are provided in Appendix A5.3 (Land Quality Implications Assessment) and Appendix A6.1 (Outline Decommissioning and Restoration Plan).
- 165 As a result, the magnitude and significance of all effects associated with decommissioning are assessed as being negligible, and not significant.

12.9 Mitigation and Residual Effects

- 166 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.

12.9.1 Construction

12.9.1.1 Chemical Pollution

- 167 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.
- 168 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).

- 169 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.
- 170 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.

12.9.1.2 Erosion and Sedimentation

- 171 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.
- 172 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.
- 173 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.

12.9.1.3 Water Use and Disposal and Hydrology

- 174 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.
- 175 A temporary wheel washing facility will be installed, if required, to prevent transfer of soil onto nearby public roads and discharging into highway drains.
- 176 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.

- 177 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.
- 178 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.

12.9.2 Operation

- 179 Any foundations will be designed appropriately to the underlying ground conditions to make sure the panels have maximum stability.
- 180 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.
- 181 Disposal of all waste materials, whether hazardous or not, will only be via appropriate and authorised routes as detailed within the SWMP (DRN: BL009).

12.9.3 Decommissioning

- 182 An Outline Decommissioning and Restoration Plan has been prepared (A6.1). A more detailed 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.
- 183 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.
- 184 Dust suppression measures will be put in place to minimise dust levels on the site and in the surrounding environment.

- 185 No additional soil materials are anticipated to be necessary. However, should this be required any 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.
- 186 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

12.10 Cumulative Effect Assessment

- 187 The methodology followed to assess the cumulative impacts is the same as that used for the Development in isolation.
- 188 A cumulative effect is considered to be an additional effect on hydrological resources (within the same hydrological catchment) arising from the Development in addition to the combination of other developments likely to affect the hydrological environment. Taking into consideration the type of developments detailed in Section 2.3.5.1 and the fact that they are all operational, no cumulative effects on hydrological resources are predicted.

12.11 Residual Effects

- 189 No significant residual effects are predicted.

12.12 Statement of Significance

- 190 This chapter has assessed the significance of effects of the Development on geology, 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.
- 191 Given that only effects of moderate significance or greater are considered significant in terms of the EIA Regulations, the potential effects on geology, hydrology, hydrogeology, flood risk and ground conditions are considered to be not significant.

13 Traffic and Infrastructure

13.1 Introduction

- 192 This Chapter presents information regarding the potential traffic and infrastructure impacts associated with the proposed Phoenix Solar Park, Lower Nash, Pembroke.
- 193 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.
- 194 This chapter of the ES 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
- 195 The following figures support this chapter:
- Figure 1.1 Site Location
 - Figure 13.1 Construction Traffic Route
- 196 This chapter is also supported by the following Technical Appendices provided in Environmental Statement Volume 2:
- Appendix A13.1 Draft Construction Traffic Management Plan
 - Appendix A13.2 Access Assessment
 - Appendix A13.3 Road Condition Survey
- 197 The development is fully detailed in chapter 6 of this ES. In summary, from a highways perspective it includes the transportation and installation of photo voltaic (pv) modules, and accompanying electric cables, inverter/transformer cabins, a control building, and associated access.

13.2 Consultation

- 198 Consultation responses were received from various consultees as part of the previous DNS application for the larger Blackberry Lane site. The detail of these responses and how they have been addressed are included within the Pre-Application Consultation Report (DRN:BL007).
1. Further to the above responses, additional correspondence took place throughout the determination period for the DNS application. As a result, a variety of management and mitigation measures were agreed upon to ensure safe use of the proposed traffic route and access point for construction traffic and other road users:
- a) A pre-commencement survey of the A477/Lower Nash priority junction and a subsequent scheme for any upgrading or widening works deemed necessary;
 - b) The retention and maintenance of the shared use path;
 - c) 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;
 - d) A commitment to a pre and post construction condition survey along Nash Lane;
 - e) 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; and
 - f) The provision and agreement of a construction schedule and details of the off-site management of vehicle movements including layover areas.
- 199 These measures are included within the Draft CTMP (Appendix A13.1)

13.2.1 Planning Policy Wales

- 200 Planning Policy Wales – Edition 11 (PPW11) dated February 2012 indicates at paragraph 1.2 that:
- “The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation. A well functioning planning system is fundamental for sustainable development and achieving sustainable places.”*
- 201 At figure 4 of PPW there are five key planning principles identified of:
- i) Growing our economy in a sustainable manner including fostering economic activity,
 - ii) Making the best use of resources,
 - iii) Facilitating accessible and healthy living environments, including being accessible by means of active travel and public transport, not car dependent, minimising the need to travel, and having good connections,
 - iv) Creating and sustaining communities, and
 - v) Maximising environmental protection and limiting environmental impact.

202 In our opinion, this proposal would accord with the sentiments of this paragraph of PPW.

203 Paragraph 4.1.10 indicates under the heading “Sustainable Transport” that:

“The planning system has a key role to play in reducing the need to travel and supporting sustainable transport, by facilitating developments which:

- are sited in the right locations, where they can be easily accessed by sustainable modes of travel and without the need for a car;*
- are designed in a way which integrates them with existing land uses and neighbourhoods; and*
- make it possible for all short journeys within and beyond the development to be easily made by walking and cycling.”*

13.2.2 TAN18

204 Regarding access, TAN18 paragraph 9.17 indicates:

“Many proposed developments will require access to the existing highway network. The number of accesses permitted will depend upon the type and nature of the road. Similarly, the type of access provided should reflect the type of road and the volume and character of traffic likely to use the access and the road (taking into account the street design guidance in paragraphs 5.4 to 5.13). It may be appropriate to require major road or junction improvements if the volume or character of traffic or type of road warrants it. Other options may include traffic calming or other traffic management measures. The combining of individual access points along a road should be encouraged to help improve road safety. Whatever the access, good visibility is essential for drivers and non-drivers alike.”

13.3 Assessment Methodology and Significance Criteria

13.3.1 Assessment Methodology

205 The assessment of the likely effects of the Development in environmental terms follows the Institute of Environmental Assessment’s (IEA) “Guidelines for Environmental Assessment of Road Traffic” dated 1993. A draft CTMP has been prepared as part of the application. This will provide the methodology for managing the traffic associated with the construction phase of the project. The draft CTMP is included as appendix A13.1.

206 The IEA Guidelines state that to assess the environmental impact of a potential project upon the transportation network, the following need to be considered as a baseline:

- The existing highway characteristics;
- The existing volume of traffic; and
- The existing traffic composition.

- 207 Therefore, the assessment first identifies the existing highways characteristics (i.e. the roads in the vicinity of the proposed Solar Park site most likely to be affected). The assessment then considers the existing volume of traffic and traffic composition. This was taken from the Department for Transport Annual Average Daily Traffic (AADT) estimates for the roads in the vicinity of the proposed Solar Park site. For the purposes of this assessment, the peak hours have been defined as the hours (AM and PM) with the greatest hourly traffic volume. Accordingly, the AM peak is defined as the hour beginning 08:00 and ending 09:00, and the PM peak is defined as the hour beginning 17:00 and ending 18:00.
- 208 The baseline conditions are then compared to the potential impacts of the proposed Solar Park by analysing;
- The proposed access route to site;
 - The proposed vehicle generation caused as a result of the proposed Solar Park; and,
 - The proposed construction timetable.
- 209 The assessment of the impact of the proposed Solar Park on the local traffic and infrastructure network has been based on worst case assumptions of the vehicle trip generation for the project. Accordingly, as the construction phase will generate the highest number of vehicle trips, the assessment of impacts has focussed on this phase.

13.3.2 Significance Criteria

- 210 The Guidance suggests that significant traffic related impacts may occur if the traffic generated by the development increases the baseline traffic flows by more than 30 per cent (or where the number of Heavy Goods Vehicles (HGVs) is predicted to increase by more than 30 per cent).

13.4 Baseline Conditions / Traffic and Infrastructure Requirements

13.4.1 Access Provisions for the Construction / Operation / Decommissioning of the Solar Park

- 211 In terms of the likely access provisions, the investigations undertaken for the purposes of the planning application indicate that the road network in the vicinity of the proposed Solar Park site should be used.
- 212 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, A477, turning onto the access lane to Lower Nash Farm, all of which are frequently used by large vehicles.

- 213 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.
- 214 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.
- 215 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.
- 216 Figure 1.2 illustrates the proposed layout of the key elements of the Project as envisaged, subject to any minor micro-siting. The key elements include: the PV panels; the Inverter / Transformer Cabins; the Electrical Control Building; and, the onsite access track. The onsite access track would be approximately 3 m wide and would be placed to avoid known ground hazards, environmental constraints and steep gradients. 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 this ES.

- 217 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.

13.4.2 Existing Volume of Traffic / Traffic Composition

- 218 Possible routes for construction traffic are discussed above.
- 219 Department for Transport traffic data expressed as annual average daily traffic flow (AADF) is available for a number of count locations along this route the majority of which are on the M4 itself. The nearest count location on the A477 is between the A4075 and A4075 at Milton (count location 10551). A summary of the information is provided in Table 13-1.

Table 13-1: Summary of DfT AADF Data⁴

Count Location	Total AADF	Year	HGV	Year
A477 between A4075 and A4075 (Milton)	13862	2022	659	2022

13.4.3 Traffic Generated as a Results of the Construction of the Solar Park

- 220 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.

13.4.3.1 Construction Workforce Movements

- 221 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.

⁴ Average Annual Daily Flow - Traffic figures at regional and national level are robust and are reported as National Statistics. However, this is not the case for road traffic at a local level.

13.4.3.2 *Delivery of Construction Plant / Equipment*

- 222 Construction plant / equipment (i.e. excavators, compactors and generators) will be delivered to site on Low Loaders. This construction plant / equipment will be delivered to site in the first few weeks of the construction programme, such that the access tracks and Temporary Site Compound / Laydown Area can be constructed and the delivery of the Solar Park plant / equipment / materials can begin. Up to approximately 8 Low Loaders will be required to deliver the construction plant / equipment. At the end of the construction phase, the construction plant / equipment will be removed from site on Low Loaders. Again, up to approximately 8 Low Loaders will be required.
- 223 In addition, a small crane (pivoting radius approximately 7 m, used to unload the inverters and place them on their foundations) will be delivered to the site on a Low Loader. This will be delivered to site immediately prior to the delivery of the Inverters. At the end of the construction phase, the small crane will be removed from site on a Low Loader.

13.4.3.3 *Delivery of the Solar Park Plant / Equipment / Materials*

Access Tracks / Permanent Access Road

- 224 Standard 20 tonne tipper trucks would be used for the delivery of aggregate for the construction of the access tracks. Approximately 136 lorry (HGV) loads will be required to deliver aggregate that will also be required. A conscious effort would be made to source materials locally where possible to minimise traffic generation, and to reduce overall journey lengths where possible, and hence to maximise the benefit to the local economy.
- 225 Trucks bringing deliveries of aggregate to site are likely to be spread throughout the working day and are not expected to impact significantly on local traffic levels.

Foundation Pouring

- 226 Use of concrete on site is not expected to be extensive and would likely be limited to the creation of the foundations for the electrical buildings. Up to 37 conventional concrete mixer trucks are expected to bring concrete to site (each carrying 5m³ of concrete).
- 227 There are a number of places which are relatively local to the site which would be able to supply the necessary concrete materials for the site's construction. As for the delivery of aggregate and other construction materials the trucks bringing deliveries of concrete to site would be spread throughout the working day and are not expected to impact significantly on local traffic levels.

PV Panels / PV Panel Support Structures / PV Panel Mounting Systems

- 228 Panels will be delivered to site in HGVs. Based on information from turnkey contractors it is anticipated that approximately 20 deliveries of panels will be required. One HGV can carry up to 1,300 panels.

- 229 The mounting systems on which the panels would be fixed would be delivered to site by HGV. Approximately 13 trucks would be required.

Inverters and Transformer

- 230 The prefabricated cabins, inverters and transformers will be delivered to site on HGVs (with low loader). Depending on the inverters selected, approximately 10 HGVs (with low loader) will be required to deliver the inverters and transformers.

Cabling

- 231 Cables, to connect the PV Panels to the Inverters and the Inverters to the Transformer, will be delivered to site by trucks. Approximately 8 trucks will be required. The trenches, excavated to install the underground electrical system / cables, would be backfilled with the excavated soils. If sand is used approximately 30 HGVs may be required to deliver the sand. If available, sand would be sourced from local suppliers to minimise traffic generation, and to reduce overall journey length where possible, and maximise the benefit to the local economy.

Switch gear and Housing

- 232 The switchgear and housing will be delivered to site by HGVs (with low loader). Up to approximately 5 HGVs (with low loader) will be required.

Fencing and Miscellaneous Items

- 233 Stock proof security fencing would be installed around the site. This would comprise wooden posts and wire mesh. Any other miscellaneous equipment would also be brought to site by truck. It is anticipated that no more than 35 trucks would be required for these items.

13.4.4 Summary of Traffic Generated and the Indicative Programme of Deliveries

- 234 A summary of the deliveries of construction plant / equipment and the deliveries of Solar Park plant / equipment / materials is provided in Table 13-2.
- 235 Further to this summary, an indicative programme of deliveries is provided in Table 13-3. 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 13-2: Summary of Deliveries

<i>Item being Delivered</i>	<i>Vehicle Used</i>	<i>Quantity</i>
Construction Plant / Equipment (Delivery and Removal)	Low Loader	16
Aggregate for the Access Roads	HGVs	136

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

Table 13-3: 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
Total	206	43	54	9	312

13.4.5 Traffic Generated as a Result of Operation of the Solar Park

- 236 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.
- 237 Parking for site associated traffic during the operational phase would be on site at the site entrance.
- 238 It is proposed that the existing access point in the south west corner of the site would be improved for construction and operational traffic.

13.4.6 Traffic Generated as a Result of Decommissioning of the Solar Park

- 239 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.
- 240 The traffic generated during decommissioning would be similar to that generated during construction. Impacts during decommissioning are therefore considered to be as for construction.

13.4.7 The Location of the Solar Park and the Route of Existing Roads / Public Footpaths

- 241 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.
- 242 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, although retention and maintenance of this shared path is proposed.

13.5 Potential Impacts

13.5.1 Access Provisions for the Construction / Operation / Decommissioning of the Solar Park

243 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.

13.5.2 Traffic Generated as a Result of the Construction of the Solar Park

13.5.2.1 Construction Workforce Movements

244 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.

245 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.

246 The magnitude of change would be negligible. Therefore, the potential impacts due to the construction workforce would be negligible, and not significant.

13.5.2.2 Delivery of Construction Plant / Equipment and Delivery of Solar Park Plant / Equipment / Materials

247 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.

248 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.

249 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). No more than 2 vehicles (i.e. 4 traffic) movements per working hour are expected.

250 The anticipated maximum increase in traffic of up to 10 deliveries per day 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.

- 251 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.

13.5.3 Traffic Generated as a Result of Operation of the Solar Park

- 252 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.
- 253 Accordingly, the magnitude of change would be negligible. Therefore, the potential impacts due to operation would be minor/negligible, and not significant.

13.5.4 Traffic Generated as a Result of Decommissioning of the Solar Park

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

13.5.5 The Location of the Proposed Solar Park and the Route of Existing Roads / Public Footpaths

- 255 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)⁵. This footpath will not be affected by the proposed construction works.
- 256 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.
- 257 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.

⁵ Footpath numbers taken from the Pembrokeshire Definitive Footpath Map: ⁵
<https://www.pembrokeshire.gov.uk/definitive-map/view-the-consolidated-definitive-map>; accessed 20/08/2020

13.6 Mitigation Measures and Monitoring Programmes

- 258 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 the measures set out within the Construction Traffic Management Plan (CTMP).
- 259 Accordingly, in terms of further minimising potential traffic and infrastructure impacts, measures are included in the CTMP covering the enforcement of:
- 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.
- 260 A draft CTMP is provided as Appendix A13.1.
- 261 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.

13.7 Statement of Significance

- 262 This Chapter has presented information regarding the potential traffic and infrastructure impacts associated with the proposed Phoenix Solar Park. The potential impacts resulting from the development of the proposed Phoenix 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.
- 263 For each of these potential impacts, this assessment has shown that the environment and amenity in the area surrounding the proposed Solar Park should not be unduly affected by traffic resulting from the development of the Solar Park, and the existing infrastructure will be able to accommodate the development of the Project. Accordingly, the potential impacts are considered to be not significant.
- .

14 Climate Change

14.1 Introduction

- 264 This chapter of the ES 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.
- 265 This chapter is also supported by the following Technical Appendices provided in Environmental Statement Volume 2:
- Technical Appendix A12.1: Flood Consequence Assessment (FCA);

14.2 Consultation

- 266 The Scoping Direction issued by PINS Wales is the only consultation response to have mentioned climate change. The Direction identifies that the ES should include an assessment of the impact of the Development on climate and the vulnerability of the project to climate change. It is not prescriptive in terms of the expected content of the assessment.

14.3 Legislation, Policy and Guidance

- 267 A detailed discussion of climate change policy at a national and local level is included in Chapter 7 of this ES with other relevant information in Chapter 3.
- 268 The UK and Welsh Governments both recognise that planning plays a key role in minimising vulnerability, providing resilience and managing the risks associated with climate change.
- 269 Guidelines on the approach to Climate Change Impact Assessment (CCIA) in the UK comprise two main documents: 'Environmental Impact Assessment Guide to: Climate Change Resilience and Adaption' published by The Institute of Environmental Management and Assessment (IEMA) in June 2020, and 'Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance'⁶ published by IEMA in 2017. These documents provide the framework for the assessment detailed within this chapter.

14.4 Assessment Methodology and Significance Criteria

- 270 Future climate projections are published by the Met Office through the UK Climate Projections website. The UK Climate Projections Report 2018 (UKCP18) is the official source of information on how the climate of the UK may change over this century⁷. For this assessment the UKCP18, RCP8.5 emissions scenario have been

⁶ IEMA (2017) IEMA Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance' [Online] Available at: <https://www.iema.net/policy/ghg-in-eia-2017> (Accessed 25/10/2018)

⁷ UKCP18 Project Q&A. <http://ukclimateprojections.metoffice.gov.uk/24126> (Accessed 08/07/20)

utilised as the future baseline (broadly equivalent to the high emissions scenario, A1F1 of UKCP09). This scenario is based on fossil fuel intensive energy technologies only and is considered to represent a worst case scenario. Although a more likely scenario is likely to include the introduction of new, more efficient technologies with a balance of non-fossil fuel and fossil fuel intensive energy technologies, this cannot be relied upon. Therefore, any conclusions can be considered to represent a worst case assessment.

- 271 The following assessment areas are considered in terms of the Development:
- The vulnerability of the Development to climate change;
 - The influence of the Development on climate change; and
 - A summary of effects on environmental receptors sensitive to climate change.
- 272 The assessment of the vulnerability of the Development to climate change considers effects on the Development as a receptor. In contrast the other two assessments consider effects on environmental receptors as a result of the Development.

14.5 Vulnerability of the Development to Climate Change

- 273 This section of the CCIA identifies aspects of the Development which are potentially vulnerable to the effects of climate change. Where identified, these vulnerabilities can then be mitigated through embedded mitigation or the application of other measures.
- 274 Taking into account the location of the Development site, the following climate-related parameters are considered to have the potential to effect on the Development and the surrounding environment:
- Temperature
 - Wind Speed; and
 - Cloud Amount.
- 275 Variation in other climatic factors would not have the potential to substantially affect the Development.
- 276 As reported in the Flood Consequence Assessment (Technical Appendix A12.1), the Development site is not currently at risk of flooding and due to it's location is not expected to experience any increased risk of flooding as a result of climate change.

14.6 Influence of the Development on Climate Change

- 277 This section of the CCIA seeks to quantify the effect of the Development on climate change in order to undertake an assessment of significance of the effect. The predicted greenhouse gas emissions, and emissions saving of the Development will be calculated and used to undertake this assessment.

14.6.1 Assessment Limitations

- 278 It is important to note that climate change projections are based on global models for a range of greenhouse gas emissions scenarios and generally consider regional responses to climate change rather than local.
- 279 The UK Climate Projections (UKCP18) website⁸ provides future climate projections for land and marine regions as well as observed climate data for the UK. Future predictions for regional and national climatic changes are assessed to 2080.

14.6.2 Significance Criteria

- 280 The IEMA guidelines⁹ for CCIA state the following with regards to the assessment of receptor sensitivity, magnitude of effect and significance:
- 281 “A combination of susceptibility and vulnerability in addition to value/importance of the receptor should be used to reach a reasoned conclusion on sensitivity. The greater the susceptibility and/or vulnerability of the receptor, the greater the likelihood that receptor would also be of higher sensitivity. As an example, a high-value receptor that has very little resilience to changes in climatic conditions should be considered more likely to have a higher sensitivity than a high-value receptor that is very resilient to changes in climatic conditions...
- 282 A combination of probability and consequence should be used to reach a reasoned conclusion on the magnitude of the effect. It is likely that if the probability and/or consequence of the effect is high that the magnitude of the effect would also be high...
- 283 The uncertainty of the combined effect needs to be taken into account. If uncertainty about how a receptor will adapt to a changing climate or how the severity of environmental effect could be modified with a future climate is high, then it is recommended that a more conservative position is adopted within the evaluation in terms of sensitivity and/or magnitude of the effect.”
- 284 In summary, to determine whether effects are significant under the EIA Regulations, it is appropriate to consider the sensitivity (value and resilience) of the receptor and the magnitude of the effect, taking into account uncertainty. This is based on the professional judgement of the assessor.
- 285 Categories of significance are set out below:

⁸ UKCP18 Project Q&A. <http://ukclimateprojections.metoffice.gov.uk/24126> (Accessed 08/07/20), UKCP (2009) Climate Projections Report (version 2, July 2009) [Online] Available at: <http://ukclimateprojections.metoffice.gov.uk/22530> (Accessed 25/10/2018)

⁹IEMA (2015) IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaption [Online] Available at: [https://www.iema.net/assets/templates/documents/iema_guidance_documents_eia_climate_change_resilience_a_nd_adaptation%20\(1\).pdf](https://www.iema.net/assets/templates/documents/iema_guidance_documents_eia_climate_change_resilience_a_nd_adaptation%20(1).pdf) (Accessed 10/05/2018)

- Negligible – no detectable or material change to a location, environment, species or sensitive receptor;
- Minor – a detectable but non-material change to a location, environment, species or sensitive receptor;
- Moderate – a material, but non-fundamental change to a location, environmental, species or sensitive receptor; or
- Major – a fundamental change to location, environment, species or sensitive receptor.

286 Significance combines the sensitivity of climate change receptors with the magnitude of the effect. Whilst receptors may be considered “high-value”, a non-material magnitude of effect would result in any effect being considered not significant.

14.6.3 Baseline Conditions

14.6.3.1 Current Climate Baseline

287 Observed changes in climatic variables between 1961 and 2006 for Wales are detailed within The Climate of the UK and Recent Trends, Jenkins *et al.* 2008¹⁰. The data is summarised in Table 14-1.

Table 14-1: Observed Changes in Climate Variables for Wales (1961-2006)

Climate Variables	Annual Observed Change (1961 – 2006)
Daily mean temperature	+ 1.33 degrees Celsius (°C)
Daily maximum temperature	+ 1.52 °C
Daily minimum temperature	+ 1.19 °C
Change in days of air frost	- 22.4 days
Change (days) in days of rain > 1mm	+ 5.7 days
Percentage change in total precipitation	+ 13.6 %

288 Mean windspeed across Wales at 10m above ground level (m s⁻¹) in Winter (December, January, February) 2019 was 4.67 (m s⁻¹) and in summer (June, July, August) 2019 was 3.34 (m s⁻¹).

289 Mean total cloud cover across Wales in 2019 was 80.5 percent.

14.6.3.2 Future Baseline – Climate Projections Relevant to the Assessment

290 The climate parameters considered relevant to the assessments referenced within this CCIA are temperature, wind speed, and cloud amount. It should be noted that

¹⁰ Jenkins *et al.*, (2008). The Climate of the UK and Recent Trends. Met Office, Hadley Centre, Exeter, UK.

climate change does not necessarily mean warming of the climate at a specific location. Changes in local climate depend in a complex way on global temperature rise, and in the UK are expected to include a rise in the frequency of more extreme weather events, and average or long-term statistics would not capture this.

291 Temperature

292 This section is based on the UK Climate Projections Science Report (UKCP), 2018. Table 14-2 summarises the UKCP18 predictions for Central Wales.

Table 14-2: Temperature Variations in the Future Baseline

Season	By 2070s (Low emission scenario)*	By 2070s (high emission scenario)*
Summer	0 to +3.3 °C	+0.9 to +5.9°C
Winter	+0.1 to +2.4°C	+0.7 to +4.1°C

*All results are for the 10th-90th percentile range for the 2060-2079 period relative to 1981-2000

293 Wind Speed

294 This section is based on the UKCP18 predictions for Wales up to 2080.

Table 14-3: Wind Speed Variations in the Future Baseline

Season	2020-2080 Predicted Mean Annual Windspeed at 10m (m s ⁻¹)	Change in Mean Annual Windspeed at 10m (m s ⁻¹) from 2019
Summer	3.11 to 3.39	-0.23 to +0.05
Winter	4.43 to 5.02	-0.24 to +0.35

RCP 8.5 (broadly equivalent to UKCP09 High emission scenario)

295 These changes are relatively small compared to the mean observed and predicted summer and winter wind speeds across Wales.

296 Cloud Amount

297 This section is based on the UKCP18 predictions for Wales up to 2080.

298 Cloud cover is a key meteorological factor in determining the amount of solar radiation reaching the Earth's surface and is therefore, an imperative climate parameter in a solar development.

299 Cloud amount projections are based on annual cloud cover across Wales up to 2080. Between 2020 and 2080, mean annual total cloud cover is predicted to be between 71.76% and 80.36% with a generally declining trend.

14.6.3.3 Greenhouse Gas Emissions

- 300 A substantial reduction in greenhouse gas emissions is imperative to avoid irreversible damage caused by the effects of climate change. In 2019 the UK became the first major economy in the world to pass laws to end its contribution to global warming by 2050. The target requires the UK to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels
- 301 The Climate Change Act 2008 requires local authorities to act in a way that contributes and helps deliver these emission targets. Additionally, the IEMA 'EIA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance' assists greenhouse gas emissions assessment and mitigation in statutory and non-statutory EIA.
- 302 The UK electricity sector is making significant strides in achieving this ambition with records for renewable energy generation regularly being broken in recent years. In 2020, Great Britain went two months without generating any electricity from coal fired power stations.
- 303 The UK Government produces regular 'Energy Trends' reports¹¹ identifying the production and use of energy in the UK. The most recent Energy Trends Report BEIS, Energy Trends, September 2023¹² shows that although renewable and low carbon sources continue to meet an increasing proportion of UK electricity demand, fossil fuels continue to be a significant source of supply and, therefore, GHG emissions.

14.6.4 Assessment of Potential Effects

14.6.4.1 Vulnerability of the Development to Climate Change

- 304 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.
- 305 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.

¹¹ <https://www.gov.uk/government/collections/energy-trends#2020-data>

¹² Department for Business, Energy & Industrial Strategy (2018) Digest of United Kingdom Energy Statistics 2018 [Online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/736148/DUKES_2018.pdf (Accessed 25/10/18)

- 306 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.
- 307 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.
- 308 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.

14.6.4.2 Impacts of the Development on Climate Change

- 309 The impact of the Development on climate (change) is estimated through the emission or reduction in emissions of carbon dioxide (CO₂). 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.
- 310 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.
- 311 Constructing the Development will involve sourcing materials, manufacturing components, transporting them to site and installing them.
- 312 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.
- 313 Decommissioning the Development will involve removing components and reinstating the land, and transporting the components away from site.
- 314 Each of these requires energy, and the production of much of that energy will involve the emission of CO₂ to the atmosphere. The IPCC (2014)¹³ estimated full life-cycle emissions of CO₂ for a range of electricity generation types. For utility scale solar photovoltaic cells, it estimated an emission of 48 gCO₂eq/kWh (based on the median value from a range between 18 and 180 kgCO₂eq/MWh) based on a 25 year operational lifetime and an in-plane solar irradiation figure of 1700 kWh/m²/year. For

¹³ 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 [accessed on 25/10/2018]

comparison, this figure is 820 gCO₂eq/kWh for coal and 490 gCO₂eq/kWh for gas, which are the generation technologies most likely to be displaced by the proposed Development.

- 315 Adjusting for the proposed 40 year operational life of the Development and a site specific in-plane irradiation figure of 1226 kWh/m²/year, the lifecycle emissions of CO₂ caused by the Development can be estimated to be 42 gCO₂eq/kWh¹⁴.
- 316 The Development is forecast to generate approximately 492,000,000 kWh of electricity over its lifetime. Therefore, the total production of CO₂ associated with the Development can be estimated to be approximately 20,664 teCO₂.
- 317 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 phased out by the introduction of energy storage (e.g. batteries), in order to achieve a zero-carbon network.
- 318 For the year from June 2019 to June 2020 the 'carbon intensity' of the British electricity network was calculated to be 194 gCO₂/kWh¹⁵. 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 CO₂ emissions associated with the generators.
- 319 If it were to be assumed that the Development was displacing gas-fired generation, which the IPCC estimates to have direct emissions of 370 gCO₂/kWh and total lifecycle emissions of 490 gCO₂/kWh, then it could be considered to be avoiding the emissions of 241,080 tonnes CO₂ when adjusting for its own lifecycle emissions.
- 320 Therefore, the CO₂ emissions avoided by the proposed Development would be a net benefit and a positive impact upon predicted climate change
- 321 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.

14.6.5 Mitigation Measures and Residual Effects

- 322 This CCIA has not identified any significant adverse effects on climate change and therefore no mitigation is required under the EIA Regulations or recommended as best practice. In addition, there is no significant effect on the Development predicted as a result of changes in temperature, wind speed or cloud cover and no further mitigation is required.

¹⁴ 48 gCO₂eq/kWh * (1700 kWh/m²/year / 1226 kWh/m²/year) * (25 years / 40 years) = 42 gCO₂eq/kWh

¹⁵ <https://electricityinfo.org/carbon-intensity-archive/#data>

14.6.6 Cumulative Effects

- 323 The UK Government has set ambitious targets for reducing greenhouse gas emissions to net zero by 2050. The Development, in conjunction with other renewable energy developments, will contribute to the UK's aims to reduce carbon emissions and achieve its ambitious greenhouse gas emissions reduction targets.
- 324 The cumulative effect of the Development with other UK renewables generation is considered to be a fundamental change in the climate effects of UK energy supply, which is a major, positive, environmental effect that is significant under the EIA Regulations and will contribute to the UK's legally binding emission reduction targets.

14.6.7 Summary of Effects

- 325 As a result of design measures, the predicted future climatic baseline conditions will not affect the operation of the Development.
- 326 The Development will have a moderate (and significant) beneficial effect on carbon emission savings and therefore climate, and a major (and significant) positive effect when considered cumulatively with UK-wide renewable energy deployment.

15 Miscellaneous

- 327 This chapter 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).
- 328 Relevant legislation and guidance that has been consulted with respect to this chapter is listed in each of the following sections, as appropriate.
- 329 Baseline conditions have been established through desk-based assessment and consultation in relation to the topics covered by this chapter, where appropriate. The assessment methods used within this chapter are described in greater detail in the relevant subsections below.
- 330 This Chapter makes reference to the following documents:
- Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) (DRN BL009).

15.1 Waste

15.1.1 Construction

- 331 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).
- 332 Exact quantities and types of waste likely to be generated during the construction phase are unknown, however it is expected that waste streams could include those in Table 15-1:

Table 15-1: Waste Types

Waste Type		Generating Activity	Likely Material Classification	EWC Code
Uncontaminated Spoil	Top Soil	Excavation of landscaped / undeveloped areas prior to construction.	Inert / Non Hazardous	17 05 04
Vegetation	Vegetation	Trimmed from around access point	Non Hazardous	20 02 01
Wastewater	Wash water	Washing of vehicles and plant (e.g. truck wheel wash, ready-mixed concrete trucks etc.).	Not Applicable	See Chapter 19 of

	Runoff	Storm water laden with dirt and oils washed off hardstanding during heavy rain.		EWC 2002
Construction & Demolition Activities				
Metal (mixed)		Generated during construction (e.g. off cuts of reinforcing mesh, banding, steel work, cabling etc.)	Non Hazardous	17 04 07
Wood / Timber		Generated during building demolition and construction.	Non Hazardous	15 01 03 or 17 02 01
Bricks, tiles and ceramics		Wastes generated during construction of buildings	Inert / Non Hazardous	10 12 08
Insulation materials			Non Hazardous	17 06 04
Gypsum based materials			Inert / Non Hazardous	17 08 01
Work Site/Office Activities				
Sewage / foul effluents		Effluents from portable toilet facilities.	Non Hazardous	20 03 04
Hydrocarbon contaminated effluents		Rainwater from fuel and drum storage areas and bunds and oil/water separators	Non Hazardous / Hazardous	13 05 07
Waste mineral oils (e.g. hydraulic, lubricating, fuels etc.)		Equipment and plant maintenance, spillages etc.	Hazardous	13 01
Domestic Waste	Paper	Wastes generated from site office/canteen facilities.	Non Hazardous	20 01 01
	Cardboard		Non Hazardous	20 01 01
	Plastic		Non Hazardous	20 01 39
	Glass		Inert	20 01 02
	Cans		Non Hazardous	20 01 40
	Biodegradable food / canteen waste		Non Hazardous	20 01 08
Medical / hygiene		Generated by on-site first aid and female toilet facilities.	Non Hazardous	18 01 04
Miscellaneous / Unknown		Litter, illegal deposits of waste (i.e. fly tipping), sharps and needles etc.	Unknown	Use EWC 2002

- 333 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.
- 334 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.
- 335 WSE 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

- 336 During the operational phase of the Development the site would be unmanned.
- 337 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.
- 338 Any waste generated by maintenance activities will be removed from site and disposed of appropriately.

15.1.3 Decommissioning

- 339 The number of vehicles associated with the removal of waste material associated with decommissioning and construction is considered within Chapter 13: Access and Traffic.
- 340 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.
- 341 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.

- 342 Disposal of all waste materials will only be via appropriate and authorised routes.
- 343 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

- 344 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.
- 345 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.
- 346 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.
- 347 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.
- 348 Potential health impacts are therefore related primarily to construction related impacts, and operational impacts on residential amenity.
- 349 Significance is assessed as in the assessments drawn from.

15.2.2 Air Quality and Climate

350 The potential air quality effect of the Development is assessed in the Air Quality Assessment (DRN BL005).

15.2.2.1 Assessment of Effects Construction Phase

351 The effects of air quality from construction traffic emissions will be negligible and no mitigation is considered necessary.

352 Construction activities have the potential to create a dust nuisance in dry, windy conditions.

353 Mitigation measures are embedded within the Draft Construction Environmental Management Plan (DRN BL009), and following implementation of this mitigation, negligible construction dust effects are predicted on human receptors.

15.2.2.2 Operational Phase

354 As detailed within the Air Quality Assessment (DRN BL005), the only operational effects on air quality will result from the reduction in CO₂ emissions from other types of electricity generation. This is considered to represent a beneficial effect.

15.2.2.3 Decommissioning Phase

355 Decommissioning effects are assessed as the same as construction effects, and therefore no significant air quality impacts are predicted.

15.2.2.4 Conclusions

356 Providing best practice construction working methods are implemented as detailed within the draft CEMP (DRN BL009), no significant air quality impacts are predicted during construction, operation or decommissioning of the proposed solar park.

15.2.3 Traffic and Transport

357 The potential effect that traffic and transport associated with the Development has been considered in Chapter 13: Access and Traffic.

15.2.3.1 Baseline Conditions

358 Traffic considerations have the potential to affect people in the local area and along the transport route leading to the Development.

359 The highest number of vehicles resulting from the Development will be during the construction phase, consisting of construction workers, cranes, construction vehicles and construction material deliveries using HGVs.

15.2.3.2 Assessment of Effects Construction Phase

360 A number of potential traffic effects are assessed in Chapter 13: Access and Traffic. Mitigation measures are both embedded in the design of the Development, and put

forward in addition, namely the Draft Construction Traffic Management Plan (Technical Appendix A13.1), in order to reduce the traffic effects arising from the Development, particularly along the construction route. The following are the key potential effects associated with access and traffic:

- Severance;
- Driver, pedestrian and cyclist delay and amenity; and
- Fear and intimidation.

- 361 Severance is the effect of splitting communities that exist on both sides of an access route, caused by increases in traffic levels and will not occur as a result of the proposed Development.
- 362 Driver delays usually occur at junctions and occur when junctions are operating close to or at capacity. The increase in traffic as a result of construction of the Development does not warrant the need for any junction capacity assessments and there are no existing capacity issues at any junction within the vicinity of the Development. Given the infrequent nature of potential delays and the avoidance of sensitive time-periods, congested junctions are considered to be moderate sensitivity. However, the level of effect in terms of percentage increase of vehicles is classed as negligible and therefore, the effect is expected to be slight. Any delays will be infrequent and of short duration, and hence not significant.
- 363 Pedestrian and cycle delay and amenity has been considered. As detailed in Chapter 13 disruption to existing public rights of way may occur but will be minimal with acceptable alternative routes available should user wish to avoid the construction route entirely. Effects on pedestrian and cycle amenity, and on delay to public transport, are assessed as slight or negligible, and not significant.
- 364 With regards to fear and intimidation, the strategic highway network to the site is relatively straight with good visibility along its extent. The proposed construction traffic route is along Motorways, A and B roads except for the short stretch of unnamed road leading from the A447 to the site entrance. Signage will be used to educate drivers of potential on coming HGVs and a banksman will ensure minimal disruption to the limited number of users of the unnamed road. Cyclists, horse riders and pedestrians are receptors of high sensitivity. The magnitude of any impacts will be negligible and so any potential impacts will be of minor significance and not significant. Drivers are considered to be of medium sensitivity. The magnitude of any impacts will be negligible and so any potential impacts will be of minor significance and not significant.

15.2.3.3 Operational Phase

- 365 Traffic during the operation phase will consist of movements by staff that will conduct routine maintenance. This is unlikely to involve HGVs and is considered to be of negligible magnitude, and hence any related effects will not be significant.

15.2.3.4 *Decommissioning Phase*

- 366 Effects during decommissioning are likely to be less adverse than those during the construction phases as less plant and material will be required and will therefore be of the same, or lesser significance than construction effects. It is expected that a Decommissioning Traffic Management Plan would be produced and agreed with the Local Highways Authority prior to decommissioning commencing. Any potential impacts would be of negligible significance and not significant.

15.2.4 Noise

- 367 A full assessment of the potential effects of noise and vibration during construction is provided in Chapter 10: Noise and Vibration.

15.2.4.1 *Baseline*

- 368 Potential noise-sensitive receptors are identified as houses in the vicinity of the Development. Potential noise effects are limited to residential amenity in the localised area which reduces as the distance from the Development increases. Houses which are closest to the Development were selected for assessment, in order to represent the worse-case effects and those most likely to be affected by any potential effects.

15.2.4.2 *Assessment of Effects Construction Phase*

- 369 As detailed in Chapter 10, noise effects during the construction phase have been found to be not significant at the identified sensitive receptors in terms of the EIA Regulations.

15.2.4.3 *Operational Phase*

- 370 The effects of noise from operation have been scoped out of the EIA for the proposed development. They are considered in a separate document (DRN BL005) and will not be significant.

15.2.4.4 *Decommissioning Phase*

- 371 Predicted noise effects arising from decommissioning are likely to be of a similar nature to those predicted for the construction phase and have been found to be not significant. As for construction, decommissioning effects will be managed through best practice measures.

15.2.5 Residential Visual Amenity

- 372 An assessment of residential visual amenity has been undertaken in Technical Appendix A8.5.
- 373 Residents are considered to be of high sensitivity to the Development as they are static 'receptors' whose enjoyment of the property is likely to be affected by the quality of visual amenity experienced there. Four properties located within 250m of the development site were included within the assessment. Beyond this distance, the

Development is likely to form such a small feature as to be a negligible part of any view and not reasonably likely to be affected by the Development.

- 374 The Residential Visual Amenity Assessment identified that, out of the four properties assessed, none would experience substantial magnitude effects which would result in potentially significant impacts.

15.2.6 Security

- 375 The Development is located within a rural and isolated area and houses infrastructure considered to be vulnerable to illegal interference including theft. The Development will include security measures to regularly monitor access to the Development. This section therefore assesses the effect of security measures of the Development upon the health and well-being of neighbouring residents and future occupiers.
- 376 The Development will be enclosed by a 2.5 m 'deer fence'. Pole mounted internal facing closed circuit television (CCTV) systems are also proposed to be deployed around the perimeter of the operational areas of the Development. CCTV will act as a visible deterrent to vandalism and other anti-social behaviour.
- 377 Vehicular access will be restricted to authorised personnel only and will be monitored, therefore reducing the likelihood of transport being used for the removal of equipment.
- 378 Effects from theft and vandalism are not predicted to cause any negative health effects on the people in the vicinity of the Development. This will be further minimised by the implementation of security measures.

15.2.7 Public Access

- 379 There will be no access to the site by members of the general public. Warning signs would be installed to alert the public to the danger of entering the inverter and transformer and control building with a 2.5 m fence erected behind the existing on site hedgerows to ensure no unauthorised access to the site. There are therefore negligible impacts on human health through public access to the Development site during all phases of the Development.

15.2.8 Health and Safety at Work

15.2.8.1 Construction

- 380 There are various health and safety considerations particularly for workers during construction and decommissioning of the Development. Workers are in the closest proximity to the Development and as a result are considered to be the most at risk group.
- 381 Comprehensive health and safety assessments are an essential part of the construction process and would be carried out prior to construction by the contractor in accordance with legislation. A Construction, Design and Management (CDM) co-

ordinator will be appointed and be responsible for the provision of a pre-construction information pack, as required under the Construction (Design and Management) Regulations 2015. The appointed contractor will be required to provide a construction phase plan.

- 382 The construction of the Development would be managed in accordance with the Health and Safety at Work Act 1974 and would comply with all other relevant Health and Safety Regulations, including:
- The Construction (Health, Safety and Welfare) Regulations 1996;
 - Construction (Design and Management) Regulations 2015; and
 - Electricity Safety, Quality and Continuity Regulations 2002.
- 383 Appropriate PPE will be worn on site at all times during construction including gloves, high visibility clothing, protective boots, hard hat and appropriate eye protection. If deemed necessary dust masks will also be required to be worn. Any additional PPE requirements will be identified as part of the site investigation.
- 384 Dust suppression measures will be put in place to minimise dust levels on the site and in the surrounding environment as appropriate however there is not considered to be a great potential for dust creation to arise given the nature of the proposed works.

15.2.8.2 Operation

- 385 PV Panels are inherently safe. They have no moving parts, they are held firmly in position by steel / zinc-plated supports and they are designed to ensure that the PV Panels cannot become detached (even in the strongest winds). Any maintenance works on site would be completed in accordance with the most up to date health and safety guidance through out the operational lifetime of the solar park.

15.2.8.3 Decommissioning

- 386 There are various health and safety considerations particularly for workers during construction and decommissioning of the Development. Workers are in the closest proximity to the Development and as a result are considered to be the most at risk group.
- 387 As for construction comprehensive health and safety assessments will form an essential part of the decommissioning process and would be carried out prior to any works in accordance with legislation. A Construction, Design and Management (CDM) co-ordinator will be appointed as appropriate at the time of decommissioning. Any works on site will be completed in accordance with the most up to date health and safety legislation and guidance.

15.2.9 Conclusion

- 388 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.

389 As a result, no adverse significant effects are predicted for any phase of the Development.

390 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

15.3.1 Vulnerability of the Development

391 The development is not considered to be vulnerable to any type of major accident or disaster.

15.3.2 Potential for the Development to Cause Major Accidents or Disasters

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

15.3.2.1 *Construction and Decommissioning Phase*

393 Health and Safety during construction is addressed in Section 15.1. In summary, the risk both to construction workers and the general public is low and not significant during the construction and decommissioning phases.

15.3.2.2 *Operational Phase*

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

15.3.3 Conclusion

395 The development is not considered to be vulnerable to any type of major accident or disaster.

396 The Development is not likely to lead to any major accidents or disasters.

397 No potential has been identified for the Development to lead to increased risk of a major accident or disaster in combination with cumulative developments.

16 Grid Connection

16.1 Introduction

398 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 below.

399 This chapter is supported by the following Figures:

- Figure 16.1 - Grid Connection Route

400 It also makes reference to the following documents:

- Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) DRN BL009.

16.2 Consultation

401 Consultation responses were received from various consultees as part of the previous DNS application for the larger Blackberry Lane site. The detail of these responses and how they have been addressed are included within the Pre-Application Consultation Report (DRN:BL007).

402 No further consultation has been undertaken in relation to the grid connection route.

16.3 Study Area

403 The study area is defined by the grid connection route. The grid connection route proposed by NGED is shown in Figure 16.1.

16.4 Legislation, Policy and Best Practice

404 Relevant legislation, policy and best practice is as specified within the relevant technical assessment detailed in Chapters 8-13 above.

16.5 Assessment Methodology

405 The assessment methodology for the potential impacts of the grid connection works are as detailed within the relevant technical assessment in Chapters 8-13 above.

16.5.1 Cumulative

406 The assessment methodology for the potential cumulative impacts of the grid connection works are as detailed within the relevant technical assessment in Chapters 8-13 above.

16.5.2 Assessment limitations

407 Although NGED have proposed a route for the underground cable, the exact nature of the installation works has not yet been finalised. It is expected that the cable could be installed along the roadside verge or within the road itself. The worst case scenario for each environmental aspect is considered below.

16.6 Baseline Conditions

408 The proposed route flows existing roads from the site all the way to the substation. The route can be split into four sections:

- Section 1 – the unnamed 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 unnamed road leading to the substation.
- Section 4 – the unnamed road leading from Myletts Hill to the substation.

409 Table 16-1 provides details of the baseline condition of these road sections.

Table 16-1: Baseline Conditions

Road Section	Road Class	Verge Present	Access	PROW Route	Approximate Length
Section 1	One-way unnamed paved road	Yes	A few residents and visitors to the church	Yes	220m
Section 2	Two-way A road	Yes	Public	No	1.6km
Section 3	Two-way C road	Yes	Public	No	1km
Section 4	One-way unnamed paved road	Yes	A few residents, operators of the Golden Hill Solar Park and NGED maintenance staff in relation to the existing substation	Yes	150m

16.7 Do nothing scenario

- 410 In a do-nothing scenario it is unlikely that any roadworks will take place along these roads in the next few years. As far as we are aware there are currently no other planned works along this route.

16.8 Impact Assessment and Mitigation

16.8.1 Construction

- 411 It is considered possible that the proposed cable installation may have the following potential impacts:

- Habitat and Wildlife Destruction and Disturbance
- Disturbance to wildlife
- Creation of dust
- Noise disturbance
- Disruption to geology, hydrology and hydrogeology
- Disruption to traffic flow

- 412 Each of these potential impacts is considered in greater detail below

16.8.1.1 *Landscape and Visual*

- 413 Due to the nature and location of the works, no significant landscape and visual impacts are anticipated.

16.8.1.2 *Ecology*

- 414 If the underground cable is installed within the roadside verge then this would result in the destruction of the existing verge habitat. From a review of the available ecological data records and imagery, the verges appear likely to support common flora and fauna typical of verge habitat in the area.
- 415 The works will not require the removal of or damage to any existing trees or hedgerows.
- 416 Therefore, any potential impacts as a result of direct destruction or disturbance will be negligible and a non-significant minor adverse effect is anticipated.
- 417 The trench excavation works for the installation of the cable are likely to result in the creation of dust. NGED will implement best practice measures where necessary to reduce any dust creation (similar to those set out in the Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) DRN BL009). These measures may include damping down during dry conditions and the use of hand tools as opposed to mechanical equipment to reduce dispersion. Therefore,

any potential ecological impacts as a result of dust creation will be minor adverse and not significant.

- 418 Any noise disturbance will be for a very short period and focussed over a small area, moving along the cable route. All works will take place during daylight. For these reasons the potential disturbance to fauna will be negligible and any effects also negligible and not significant.
- 419 NGED will undertake all necessary ecological surveys prior to the commencement of any works and will acquire any necessary permissions and licences. They will ensure that any contractors adhere to best practice construction methods and measures in order to limit any potential ecological impacts (similar to those set out in the Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) DRN BL009).

16.8.1.3 Cultural Heritage

- 420 Due to the nature and location of the works, no significant impacts are anticipated on any archaeological or designated heritage assets.

16.8.1.4 Noise

- 421 Noise associated with the potential cable installation will be from the use of excavating diggers, vehicles and construction workers. If the cable is installed within the road, then the limited use of a hammer drill or breaker may be required to break up the existing tarmac surface. The noise created will be for a short period of time and focussed over a small area, moving along the cable route.
- 422 There are very few residential properties along the proposed cable route. Construction vehicles will be parked away from residential properties and no works are expected to take place during the evening or at weekends.
- 423 Although some noise disturbance may be experienced, the timing, duration and type of noise disturbance means that any impacts are unlikely to be significant.

16.8.1.5 Geology, hydrology and hydrogeology

- 424 The installation depth of the cable will be between 600mm and 1.5m.
- 425 It is not anticipated that any ditches or drains which will need to be crossed or disturbed during the cable installation.
- 426 Any excavated material will be used to backfill the trench.
- 427 The cable will not be fluid filled.
- 428 Taking the above into consideration no significant impacts on geology, hydrology or hydrogeology are anticipated.

16.8.1.6 Traffic and Access

- 429 Some disruption to existing traffic flow will occur as a result of the proposed works. It is likely that the two unnamed 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 (SP30/3 and SP32/72) 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 SP30/3 which follows road section 1, 250m to the west. Access to this alternative route from the footpath link to the south (SP30/6), 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 via footpath SP30/4. There is not an alternative route available for the PROW which follows road section 4 (SP32/72). 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.
- 430 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.
- 431 It is anticipated that any works along each road section (1-4) will take place consecutively rather than concurrently 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.
- 432 Although some disruption will occur, the duration of any works and the continued use of the roads as appropriate will mean that any impacts will not be significant.

16.8.2 Operation

- 433 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.

16.8.3 Decommissioning

- 434 Once the solar park is decommissioned the underground cable will remain in situ and so there will be no decommissioning impacts.

16.8.4 Cumulative

- 435 There are no other developments or road works currently proposed within the vicinity of the proposed route during the anticipated construction period which would result in any potential cumulative impacts.
- 436 The exact timing of the grid connection works remains unknown. It is anticipated that the required grid connection works will take place after the construction of the solar park site. However, this is not certain and in the interests of assessing a worst case scenario the potential for cumulative impacts to arise should both the construction and grid connection works take place simultaneously are considered below.
- 437 No off-site impacts upon cultural heritage, ecology, geology, hydrology and hydrogeology are predicted as a result of the construction phase for the proposed solar park Development. As a result, no cumulative impacts upon these environmental aspects are predicted should the grid connection works occur simultaneously.
- 438 Any landscape and visual impacts as a result of the proposed grid connection works would be extremely limited and localised due to the nature of the proposed works. As a result, no landscape and visual cumulative impacts are predicted should the grid connection works occur simultaneously.
- 439 Although some noise disturbance may be experienced as a result of the grid connection works, the timing, duration and type of noise disturbance means that cumulative impacts are unlikely to arise. The first phase of construction within the solar park boundary will take place near to the site entrance and will involve the creation of the site compound and access roads. Once this work is completed the majority of the construction noise will be generated at some distance from the site entrance (Chapter 11) and therefore away from any source of noise produced by the grid connection works in the immediate vicinity of the site, minimising the potential for cumulative impacts to occur. The short duration of the grid connection works near to the site, combined with the short duration of any works near to the site entrance means that it is unlikely that these works will take place simultaneously. However, should this occur, the duration and type of noise disturbance means that any cumulative impacts are unlikely to be significant.
- 440 Should the solar park construction works take place at the same time as the grid connection works then there is the potential for an increase in traffic along the A477 as a result of the construction phase of the solar park to coincide with a section closure or narrowing along the A477 associated with the grid connection works. However, taking into consideration the small increase in vehicle numbers along this road due to the construction works and the time limited and localised disruption to traffic flow as a result of the grid connection works, no significant cumulative impacts are predicted.
- 441 As detailed above no potential significant cumulative impacts are predicted as a result of the solar park construction and associated grid connection works.

16.9 Mitigation

- 442 As no significant impacts have been identified, no additional mitigation measures are proposed beyond the implementation of best practice construction measures. As detailed above, it is expected that NGED will apply best practice construction working measures and procedures in order to minimise any potential disruption and environmental effects (similar to those set out in the Draft Code of Construction Practice and Construction Environmental Management Plan (CEMP) DRN BL009).

16.10 Residual Effects

- 443 There will be no residual effects as a result of the cable installation works.

16.11 Statement of Significance

- 444 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.

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