

EIRLYS SOLAR FARM

EIA SCOPING REPORT

Submitted in respect of a request for a Scoping Direction under Regulation 33 of the
The Town and Country Planning (Environmental Impact Assessment) (Wales)
Regulations 2017

March 2023

Prepared by



On behalf of Octo Partners



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1 Introduction

1.1 Introduction

- 1.1.1 This Scoping Report has been prepared by Dulas Ltd on behalf of Octo Partners ('the Applicant'). It sets out the proposed scope of the Environmental Statement (ES) for the Eirlys solar farm and ancillary equipment (the 'Proposed Development') on land at Mynydd Margam, Neath Port Talbot.
- 1.1.2 The ES will be prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) Wales Regulations 2017.
- 1.1.3 As a scheme greater than 10 megawatts (MW) in capacity, the Proposed Development is classed under art 2, Regulation 4 of *The Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales) Regulations 2016* as a Development of National Significance (DNS). The ES will accompany a full DNS planning application to be submitted to Planning and Environment Decisions Wales (PEDW), who manage the process on behalf of Welsh Ministers.
- 1.1.4 The aim of this Scoping Report is to provide information to the Welsh Ministers to enable an EIA Scoping Direction under Regulation 15 of the EIA Regulations. A letter requesting such a direction accompanies this Report.
- 1.1.5 This Scoping report is also informed by a Screening opinion which was provided by the Planning and Environment Division Wales. The outcome of which was that EIA would be required for the development.¹

1.2 The Applicant

- 1.2.1 Octo Partners ('The Applicant'), is a Wales-based renewable energy company. Their management team have significant expertise in the renewable sector, having delivered over 400MW of clean energy projects within the UK including the 34MW Mynydd y Bettws Wind farm in Carmarthenshire and the 40MW Raventhorpe Solar Project in North Lincolnshire.
- 1.2.2 The Applicant is committed to delivering sustainable projects by working in partnership with the stakeholders and by combining their expertise with a sense of clarity and integrity. Octo is a development partner of EDF Renewables UK.
- 1.2.3 The Applicant has appointed an independent renewable energy specialist consultancy, Dulas Ltd., to advise them on the scope of environmental impact assessment (EIA) work and environmental issues, and to provide sufficient environmental information to enable the

¹ Eirlys Solar and Storage EIA Screening Report, June 2022, Octo Partners

formulation of an Environmental Statement (ES) which will accompany an application for development consent for the Proposed Development.

1.3 Purpose of the Scoping Report

1.3.1 This Scoping Report supports a request by the Applicant for a Scoping Direction to the Welsh Ministers via the PEDW under Regulation 33 (1) of *The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017*, hereinafter referred to as the 'Regulations'. In accordance with Regulation 33 (2), the following information is provided:

- a) *a plan sufficient to identify the land;*
- b) *a brief description of the nature and purpose of the development including its location and technical capacity;*
- c) *its likely significant effects on the environment;*
- d) *a statement that the request is made in relation to a development of national significance for the purposes of section 62D of the 1990 Act; and*
- e) *such other information or representations as the person making the request may wish to provide or make.*

1.3.2 The purpose of this Scoping Report is to inform the PEDW and Statutory Consultees on relevant aspects of the Proposed Development prior to the formulation of a formal Scoping Direction. The information contained herein is indicative only and several iterative alterations to the design and layout of the proposed energy project are likely to be considered before they are finalised prior to completion of the application documentation.

1.3.3 Regard has been made to Appendix 3: Environmental Impact Assessment of the guidance notes for DNS projects (*Guidance on Developments of National Significance – Appendix 3, EIA: PINS Wales March 2016*), which advises in more detail on information to inform a scoping request. The guidance advises that a Scoping Report should contain:

- *an outline of the main alternatives considered and the reasons for selecting a preferred option;*
- *results of desktop and baseline studies where available;*
- *a record of consultation undertaken with relevant bodies (including any public engagement) to date;*
- *referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal;*
- *guidance and best practice to be relied upon, and whether this has been agreed with the relevant bodies (for example the statutory nature conservation bodies or local authorities) together with copies of correspondence to support these agreements;*

- *methods used or proposed to be used to assess impacts and the significance criteria framework used;*
- *any mitigation proposed and the extent to which these are likely to reduce impacts;*
- *where impacts from consequential or cumulative development have been identified, how developers intend to assess these impacts in the ES (for example, a high level assessment of the grid connection where this does not form part of the Proposed Development for a power station);*
- *an indication of any European designated nature conservation sites that are likely to be significantly affected by the Proposed Development and the nature of the likely significant impacts on these sites;*
- *key topics covered as part of developers' scoping exercise; and*
- *an outline of the structure of the proposed ES*

1.3.4 Such information has been incorporated into this Scoping Report except where no relevant information is currently available.

1.3.5 It is stressed that this is an early stage in the project development and therefore only brief technical details and a provisional site boundary are provided. This is to allow comment and feedback from consultees, together with information from the environmental assessment, to guide the most appropriate design and layout of an energy project at this location.

1.4 EIA Competency

1.4.1 Part 5, Regulation 17 (4) of the EIA Regulations requires that: *"An environmental statement must—(a) be prepared by persons who in the opinion of the relevant planning authority or the Welsh Ministers, as appropriate, have sufficient expertise to ensure the completeness and quality of the statement."* In this respect any developer for a DNS scheme is required under sub-paragraph (b) to include a statement regarding the expertise of the person (company) undertaking the EIA and composing the ES.

1.4.2 The Applicant has engaged Dulas Ltd, a renewable energy consultancy located in Machynlleth, Powys with 40 years' experience of designing, planning and installing renewable energy schemes. Dulas has through its history managed the undertaking of in excess of 45 published ESs for renewable energy schemes throughout the UK and across a variety of different consenting regimes.

1.4.3 For a decade, Dulas has maintained the Quality Mark accreditation through the Institute of Environmental Assessment and Management (IEMA). The accreditation is awarded

annually subject to meeting a number of commitments, inclusive of reviews of key EIA personnel and ESs in order to ensure they meet the required standards.

- 1.4.4 Through maintaining the IEMA accreditation, Dulas ensures it has the required competency to conduct and coordinate EIAs, resulting in the production of ESs which are routinely reviewed by IEMA for their quality and accuracy.

2 The Site and the Proposed Development

2.1 Site Location

- 2.1.1 The Proposed Development lies within the administrative boundary of Neath Port Talbot County Borough Council (NPTCBC) (the LPA) and is located to the south-east of Port Talbot and immediately east of Margam Country Park.
- 2.1.2 The site is formed principally by a single farm on the upland plateau surrounding Moel Tonmawr (319m AOD). It sits approximately 3Km from the M4. The Site location is shown in Figure 2-1.
- 2.1.3 The Proposed Development site extends to 99.5 hectares and consists of several parcels of land, irregular in size and comprising of agricultural fields which are a mix of grades 4 and 5. The development boundary is presented in Figure 2-2.
- 2.1.4 The Proposed Development land use is currently enclosed agriculture, and largely comprise improved and semi-improved grassland, with small areas of higher quality habitat. The fields are bounded by dry stone walling, post and wire fencing and low hedges. Small blocks of conifer are present around the periphery of the site. The altitude of the site ranges from approximately 215 to 300m AOD at its most elevated points. As the Proposed Development is in a former coal mining region, a review of publicly available Coal Authority maps indicates that the site is surrounded by high risk development areas. It is anticipated that a coal risk mining assessment will be a validation requirement of the planning application, with the adoption of any risk amelioration measures as required.
- 2.1.5 The closest town to the Proposed Development is Port Talbot, approximately 3km to the west. The closest villages to the Proposed Development are Pyle and Kenfig Hill, 3km south and 2.9km south east respectively.
- 2.1.6 In terms of human settlement, the surrounding valleys to the east and west and the coastal plain to the south are densely populated.

2.2 Site Identification

- 2.2.1 The site was identified as suitable for a solar and battery development principally because it complies with national and local planning and renewable energy policy. The site is situated on a lower grade agricultural land classification and does not pose an unacceptable landscape and visual impact. Figure 2-3 shows Nationally designated assets within 5Km of the site boundary.
- 2.2.2 A Grid Connection Agreement has been agreed and procured with National Grid Energy Transmission. This will ensure that the Proposed Development is delivered within a defined

timeline. The indicative grid connection route, which will follow the main road, is shown in Figure 2-4.

- 2.2.3 The site has a sufficient solar irradiance and terrain characteristics to support the generation of a solar PV and battery project.
- 2.2.4 Vehicular access to the site boundary has been identified utilising existing infrastructure.
- 2.2.5 The site will retain the ability for the existing land use to be maintained in its existing use as upland grazing land suitable for farming.
- 2.2.6 Detailed desktop studies informed the initial understanding of technical and environmental constraints that were then examined further in a series of site visits and meetings with landowners and a range of interested stakeholders, including representatives of Neath Port Talbot Council for Voluntary Services (NPT CVS) and Egni Co-Op to inform preliminary ground mounted solar designs for Eirlys Solar Farm.

2.3 Project Description

The Applicant proposes to develop a solar PV electricity generating project with an installed generating capacity of approximately 79 MW, and associated ancillary architecture including a substation and battery energy storage systems (BESS). The proposed Development will contribute to renewable energy and decarbonisation targets for Wales as follows:

- Estimated annual solar PV electricity output of 49,494 Megawatt Hours using a capacity factor of 10.6%²
- Clean electricity generation equivalent to the domestic requirements of 18,910 homes annually³.
- Reduction in carbon dioxide (CO₂) emissions of approximately 75,000 tonnes per year⁴

- 2.3.1 Storage of output from the solar arrays comes in the form of battery energy storage systems (BESS), which uses groups of batteries to store electrical energy and release at required times. BESS is a fast responding dispatchable source of power to grids, bringing grid stability they can transition from standby to full power rapidly when there are grid failures. BESS are generally

² Digest of UK Energy Statistics (DUKES): renewable sources of energy (www.gov.uk), <https://www.gov.uk/government/statistics/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes> - Table 6.3: Solar PV load factor of 10.6% (2022).

³ Average household consumption from Energy consumption in the UK 2022 - GOV.UK (www.gov.uk), ECUK 2022: Consumption data Tables (OCU), table C9 - Domestic; average consumption (2022) of 3,898 kWh (temperature corrected). [Energy consumption in the UK 2022 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2022)

⁴ Based upon BEIS's "All non renewable fuels" (Coal, oil, gas and other solid fuels, including non renewable waste) emissions statistic of 430 tonnes of carbon dioxide per GWh of electricity supplied in the Digest of United Kingdom Energy Statistics (DUKES) 2022: main chapters and annexes A to D dataset Table 5.14 (published July 2022). <https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2022>

designed to output for up to a few hours and are used for short-term term peak power, such as providing operating reserve and frequency control to minimize the chance of power outages. BESS will be incorporated into the development proposal, which will maximise the benefits of delivering clean energy to the grid and contributing towards grid stabilisation.

2.3.2 The physical footprint of the solar and storage components (i.e. arrays, inverters and substation, BESS, fencing, tracks etc.) would be approx. one-third of the red line boundary area, and therefore comprise an equivalent landtake of approx. 33ha. The pole-mounted solar PV table systems raise the panels above the ground such that much of the ground underneath remains unaffected, once site remediation has been affected. Agricultural activities in the form of grazing can continue alongside any agreed biodiversity enhancement measures.

2.3.3 The main components of the solar farm are as follows:

- Photovoltaic (PV) arrays (fixed) formed by PV panels on mounting tables screw-piled into the ground;
- Site Substation;
- Underground cabling;
- Battery energy storage system;
- Storage containers for maintenance equipment and spare parts etc;
- Site tracks (unbound) connecting site infrastructure including inverter/transformer units;
- Boundary fencing (e.g. deer fencing) to ensure public safety and control levels of grazing in accordance with agreed stocking plans;
- CCTV Units mounted on poles on the perimeter of the site;
- Inverter and transformer stations located at various positions within and around the arrays; and
- Grid Connection.

2.3.4 During construction temporary site compounds will be required to host staff facilities, take delivery of components and store plant and equipment securely when not in use.

2.3.5 No significant groundworks are required for the development – support frame uprights are pile driven into the ground and string inverters are usually mounted onto the support frames while some excavation is required for the transformer's foundations.

2.3.6 The majority of the cabling will be run underground.

- 2.3.7 Several access points will be explored further and confirmed prior to the submission of the planning application.
- 2.3.8 A solar farm is temporary and fully reversible, with all equipment removed from the site at the end of the project's operational life (approximately 40 years). The methods used in construction mean that remediation work following the removal of panels and associated infrastructure are relatively minor and will return the site to its previous character.
- 2.3.9 The Proposed Development will be designed so that sheep can graze beneath and between the rows of panels, providing an efficient use of the land
- 2.3.10 Solar photovoltaic (PV) modules are generally manufactured from silicon PV cells. These are typically categorised into either monocrystalline or multicrystalline modules. This gives the panels a distinctive, shingled appearance. Most panels are in a rectangular format for ease and efficiency of installation.
- 2.3.11 The final design of the module units, rows and arrays will depend on the final procurement of modules and detailed design of the scheme. Typically, the individual panels are expected to be arranged in module units comprising 3 panels in landscape or 2 panels in portrait orientation, one above the other, by 24 panels wide, joined together by the mounting frame, with multiple module units connected to form rows or arrays. Each row would be elevated above ground on the mounting frame, with the bottom (southern) edge at a height of up to 0.9m above ground level and the top (northern) edge at a maximum height of 3m. The module units are orientated southwards, and will have an inclination/angle varying between 18 and 25 degrees.
- 2.3.12 Metal mounting frames would be installed on piles (fabricated from extruded aluminium, and the piles will be galvanised steel) across the Site, driven into the ground at up to a depth of 1.5m using a hydraulic ram, although depths may differ slightly depending on ground conditions.

2.4 Consideration of Alternatives

- 2.4.1 The Applicant is pursuing development of a portfolio of renewable energy and energy storage projects across Wales. The two principal site identification and design considerations were the site's proximity to suitable grid infrastructure and the limited landscape and visual impact. For these reasons, the selection of this development site is shown to be an appropriate location for large-scale solar energy generation, and evidence of a more detailed site selection procedures should not be necessary in the EIA.
- 2.4.2 Details of the alternative designs considered for this development scheme, including the location and scale of energy infrastructure, alongside a description of the evolution of the

design in response to site-specific, environmental and amenity factors, will be presented in detail in the ES.

3 Environmental Impact Assessment

3.1 General Assessment Approach

3.1.1 The EIA process is designed to be capable of, and sensitive to, changes that occur because of changes to the design, including any mitigation measures that are incorporated during the EIA.

3.1.2 The assessment of each environmental topic will form a separate chapter of the ES. The EIA is based on a number of related activities, as follows:

- Establishing existing baseline conditions;
- 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;
- reference to current legislation and guidance; and
- Specialist Opinion.

3.1.3 Each ES assessment chapter will identify the potential impacts of the Proposed Development during the construction, operation and decommissioning phases and will identify robust mitigation for such potential impacts as and when appropriate. As well as identifying likely significant impacts, each will set out whether those impacts are positive or adverse, and explain how these conclusions are arrived at.

3.1.4 Impacts will be considered based on their magnitude, duration and reversibility. Cumulative and combined effects will also be considered where appropriate. Significance will be evaluated based on the scale of the impact and the importance or sensitivity of the receptors, in accordance with standard assessment methodologies (major, moderate, minor and negligible).

3.2 Mitigation and Net Gain

3.2.1 The mitigation of potentially adverse effects arising from the Proposed Development will, in the first instance, be inherent in the iterative design process followed during the EIA. Historic

data and new baseline data will provide constraints to, and opportunities for, the location of all energy project infrastructure. This, along with the technical constraints and requirements of the solar panels and other energy requirements, will be used to design a solar farm scheme which seeks to reduce environmental impacts as required. The relative importance of each environmental constraint will be balanced with other salient issues, such as the ability to develop designs which can be constructed safely, and detailed proposals discussed with the relevant consultees in order to arrive at a final design which minimises environmental impacts as far as is reasonably possible.

- 3.2.2 Where significant environmental impacts are still predicted to occur, site specific mitigation techniques, consistent with industry best practice will be developed in order to mitigate these.
- 3.2.3 Pertinent environmental enhancement programmes, such as with biodiversity, will be developed in conjunction with consultees that will seek to provide a net environmental benefit to the assets within the Proposed Development boundary in line with Criteria 5 of Policy 18 of Future Wales.

3.3 Proposed Scope of the EIA

- 3.3.1 A key step in the EIA process is to establish the scope of the assessment in a transparent manner. Consultation with relevant stakeholders is key to establishing scope and this scoping report is designed to provide stakeholders with sufficient information to form an opinion on the adequacy of the proposed scope, to ensure that any likely significant effects will be addressed by the EIA.
- 3.3.2 Based on information currently available regarding the Proposed Development, and an early review of information relating to the site undertaken on behalf of the Applicant, a judgement has been made by specialist assessors as to which areas should be 'scoped in' and 'scoped out' of the EIA.
- 3.3.3 Topics scoped into the EIA are likely, in the absence of mitigation, to have the potential to cause significant environmental effects. Conversely, those scoped out are unlikely to lead to significant effects (see Chapter 12). Where insufficient information is available at this time, a precautionary approach has been taken and the issue has been scoped in.
- 3.3.4 Further information regarding the reason for scoping in a topic area is given in the relevant chapter.

Environmental Topics Proposed to be Scoped into the EIA

3.3.5 Based on the assessments made by our specialist assessors, where the baseline environmental information and potential environmental effects of the Proposed Development, the following technical topic areas are proposed to be scoped in:

- Landscape and Visual;
- Ecology and Ornithology;
- Transport and Access;
- Archaeology and Cultural Heritage;
- Socioeconomics;
- Hydrology, Hydrogeology and Geology

Environmental Topics to be Scoped out of the EIA

3.3.6 The following topics have been scoped out, the rationale for which is included in Chapter 12

- Glint and Glare;
- Air Quality and Climate Change;
- Noise;
- Population and Human Health

3.3.7 Areas within scoped in topics may also be scoped out and these will be within the relevant topic chapter.

Environmental Statement (ES) Structure

3.3.8 The ES will comprise three volumes as set out in table below:

Table 3.3.1 Structure of the ES

Non-Technical Summary	
A separate document that summarises the ES using non-technical language. This document will be available in both Welsh and English.	
Volume 1 – Written statement	
Chapter 1	Introduction
Chapter 2	Assessment methodology and Significance Criteria
Chapter 3	Planning Policy Context

Chapter 4	Project Description
Chapter 5	Landscape and Visual Amenity
Chapter 6	Ecology and Ornithology
Chapter 7	Transport and Access
Chapter 8	Archaeology and Cultural Heritage
Chapter 9	Socio-economics
Chapter 10	Hydrology, Hydrogeology and Geology
Volume 2 – Figures	
Including all figures and drawings to accompany the text	
Volume 3 – Appendices	
Including specialist reports which relate to the assessment chapters in Volume 1	

3.3.9 A confidential annex may be provided which would contain any sensitive, confidential information, e.g. ornithological information. Initial circulation will be restricted to NRW and RSPB, with circulation to other parties subject to agreement by both organisations.

Other documents

3.3.10 A separate Planning Statement will be prepared in support of the application for consent. The Planning Statement will not be part of the ES. It will discuss the relevant energy, environment and planning policies of relevance and assess the identified impacts against those. The Planning Statement will also set out the wider policy context for renewable energy development at the European and national levels.

3.3.11 In addition, the following supporting DNS application documents will be provided in order to fulfil regulatory requirements:

- Pre-application Consultation Report;
- Design and Access Statement;
- Outline CEMP; and
- Outline Transport Management Plan.

Structure of Technical Chapters

3.3.12 Each ES chapter will follow the headings set out below to ensure the final document is transparent, consistent and accessible.

- Introduction;

- Planning Policy Context;
- Assessment Methodology;
- Baseline Conditions;
- Likely Significant Effects;
- Mitigation Measures;
- Residual Effects;
- Cumulative Effects; and
- Summary

Cumulative and Combined Impacts

- 3.3.13 Cumulative effects are those that are insignificant on their own but can become significant when joint with other changes over time or in one location. In-combination effects are those that originate from interactions between project and activities.
- 3.3.14 Relevant developments will be identified with the relevant advisors at NPTCBC and NRW for the purposes of the relevant topic-specific assessments, and at an advanced stage of the EIAs the cumulative baseline will be confirmed with these stakeholders. There are currently no known cumulative solar farm developments.
- 3.3.15 In order to be able to do this effectively the Applicant will seek to agree with the relevant consultees a cut-off date beyond which no further developments (e.g. revision to layouts, refusal, granting of consent, etc.) amongst other solar farms will be taken into account within the cumulative assessments of the various relevant chapters of the ES.
- 3.3.16 The way in which cumulative assessment will be dealt within each ES chapter is described in the relevant topics below.

4 Noise Assessment

4.1 Introduction

- 4.1.1 Ion Acoustics are appointed to advise on noise issues in relation to the proposed development. The facility comprises solar panels, battery storage units and associated electrical equipment such as inverters and transformers.
- 4.1.2 Solar farms are not inherently loud outside of development boundaries but various electrical components such as inverters, transformers and associated cooling systems emit low levels of noise. As such operational noise has been considered in this scoping report initially. Noise levels can be assessed against initial absolute noise limits which are set sufficiently low to protect residential amenity irrespective of the background noise. These limits may be re-evaluated in the future if a baseline noise survey is carried out. Operational noise can be predicted using computer modelling to determine noise levels at nearby noise-sensitive receptors.
- 4.1.3 Similarly, the transportation of equipment and components will increase noise levels on local roads and there can be some noise associated with pushing in, or driving the solar panel frame supports and other associated construction work. Similarly, some noise will be generated during decommissioning. However, any construction noise will be temporary and carried out during normal working hours only.
- 4.1.4 This noise chapter provides an initial commentary on construction and operational noise.

4.2 Legislative Provisions and Published Guidance: Operational Noise

Technical Advice Note 11: Noise (1997) (TAN 11)

- 4.2.1 The current Welsh planning guidance in respect of planning and noise in Wales is TAN 11. With regards to a noise generating development, such as the case here, the document states:

“Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions.

Noise characteristics and levels can vary substantially according to their source and the type of activity involved. In the case of industrial development, for example, the character of the noise should be taken into account as well as its level. Sudden impulses, irregular noise or noise which contains a distinguishable continuous tone will require special consideration. In addition to noise from aircraft landing and taking off, noise from aerodromes is likely to result from engine testing as well as ground movements. The

impact of noise from sport, recreation and entertainment will depend to a large extent on frequency of use and the design of facilities. Advice on assessing noise and on factors to consider in relation to the major noise sources including roads, railways, airports, industrial and recreational noise and their measurement is given in Annex B.”

- 4.2.2 The principles set out above, such as considering the character of the noise as well as its absolute level, are broadly in line with the assessment principles of BS 4142:2014 +A1: 2019, which is discussed below. The link to BS 4142 is explicitly made in Section B17 of TAN 11, although it is noted that the version of the standard being referred to is now outdated. Section B17 is set out below.

“B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'. Since background noise levels vary throughout a 24 hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987.”

BS 4142:2014 +A1: 2019

- 4.2.3 The standard method for assessing operational noise of a commercial or industrial nature affecting housing is the current version of British Standard BS 4142:2014 “Method for rating and assessing industrial and commercial sound”. A BS 4142 assessment is typically made by determining the difference between the industrial noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the industrial noise. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.
- 4.2.4 Noise from the solar farm under consideration is assessed in terms of the ambient noise level, L_{Aeq} , with a character correction where the noise exhibits certain characteristics audible at the

receptor location such as distinguishable tones, impulsiveness or, if the noise is distinctively intermittent. The ambient noise level, L_{Aeq} is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The industrial noise level (L_{Aeq}) with the character correction (if necessary) is known as the rating level, L_{Ar} , and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The standard then states:

- “Typically, the greater the difference, the greater the magnitude of the impact.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

4.2.5 The standard outlines a number of methods for defining appropriate ‘character corrections’ to determine the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency.

4.2.6 The standard also highlights the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact. The absolute sound level is of particular importance where the measured background sound levels are low, which is typically taken as L_{A90} 30dB and below. In regard to low sound levels, the standard states:

“Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

BS 8233:2014 and WHO Guidelines

4.2.7 Examples of absolute noise limits can be found in British Standard BS 8233:2014 and in the World Health Organisation (WHO) guidelines. These are detailed in Table 4.2.1 below.

Table 4.2.1: BS 8233: 2014 and WHO (1999) Noise Limits

Location	Critical Health Effect	07:00 to 23:00	23:00 to 07:00
Outside Bedroom Windows	Sleep Disturbance (Windows Open)	--	45dB $L_{Aeq, 8hr}$ ⁽¹⁾
Amenity Spaces (Gardens / Patios)	Moderate Annoyance Serious Annoyance	50dB $L_{Aeq, 16 hours}$ ⁽²⁾ 55dB $L_{Aeq, 16 hours}$ ⁽²⁾	--
Notes: (1) From WHO Community Noise Guidelines (1999) (2) BS 8233: 2014 and WHO Community Noise Guidelines			

- 4.2.8 The daytime limits apply to relatively anonymous noises without character and are commonly applied to traffic noise. The WHO night-time threshold of 45 dB $L_{Aeq, 8hr}$ represents an 8-hour L_{Aeq} outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level at 1m from the façade. Therefore, the equivalent free-field level would be approximately 3dB lower, that is 42 dB L_{Aeq} .

Construction and Decommissioning Noise

- 4.2.9 The following legislation and standards are of relevance to construction and decommissioning noise:
- The Control of Pollution Act 1974 (CoPA 1974);
 - BS 5228: 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites.
- 4.2.10 CoPA 1974 provides local authorities in England and Wales with powers to control noise and vibration from construction sites. Section 60 of the Act enables a Local Authority to serve a notice to a contractor of its requirements for the control of site noise. Section 61 of the Act allows for those carrying out construction work to apply to the Local Authority in advance for consent to carry out the works.
- 4.2.11 Construction noise can be assessed using British Standard BS 5228:2009 which provides a calculation method and general guidance on controlling noise and vibration from construction sites. This standard:
- Refers to the need for the protection against noise and vibration of persons living and working in the vicinity of and those working on construction sites;
 - Recommends procedures for noise and vibration control in respect of construction operations; and
 - Stresses the importance of community relations, stating that early establishment and maintenance of these relations throughout the site operations will go some way towards allaying people's fears.

- 4.2.12 There are no noise limits within the main text of BS 5228 and in fact, the preferred approach is to use best practicable means to reduce noise rather than setting limits. This means that everything practicable should be done to reduce noise. This strategy will be adopted here.
- 4.2.13 However, Annex E of the BS 5228-1 gives "example criteria for the assessment of the significance of noise effects" e.g. for use in Environmental Statements. For quiet areas, where the existing ambient noise levels are low, a significant noise effect is deemed to occur if the construction noise (plus the ambient noise) exceeds the following threshold values:
- 65 dB L_{Aeq} Daytime (07.00-19.00) and Saturdays (07.00-13.00)
 - 55 dB L_{Aeq} Evenings and Weekends (19.00-23.00 Weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays)
 - 45 dB L_{Aeq} Night-time (23.00-07.00)
- 4.2.14 These values can be used in a preliminary assessment to assess the significance of any construction works.
- 4.2.15 Noise can also occur during construction from traffic on local roads during the transportation of construction materials, solar panels and batteries. Where traffic data is available the increase in noise due to construction traffic can be calculated according to the Government guidance "The Calculation of Road Traffic Noise" (CRTN) and rated in accordance with the significance criteria stated in the Design Manual for Roads and Bridges (DMRB).
- 4.2.16 The acceptability of construction noise is likely to be affected by the location of the site relative to the noise sensitive premises; existing ambient noise levels; the duration and working hours of site operations; the characteristics of the noise produced and the attitude of local residents to the site operator.
- 4.2.17 Given that construction noise is generally not substantial and that it is a short-term effect, occurring during the daytime, it is not always necessary to consider construction noise within the scope of an Environmental Impact Assessment (EIA).
- 4.2.18 It is therefore proposed that a construction/decommissioning noise assessment is scoped out of the EIA. This assumes that the solar panel frame supports would be pushed into the ground rather than impact driven, and that there is no other noisy activity such as blasting required. This would need to be confirmed by the client.
- 4.2.19 The local planning authority would confirm whether it is appropriate to scope out the construction and decommissioning noise assessments.

4.3 Baseline Conditions and Receptors

- 4.3.1 The site is some 3km east of the M4 motorway and therefore it is expected that traffic noise will be heard throughout the site. Most of the residential locations are to the west and south

of the site and therefore closer to the motorway. Nevertheless, often with solar farms it is not necessary to carry out a noise survey as predicted noise levels are low enough to protect amenity irrespective of the background noise, especially as the sources are mainly operational during the daytime only. However, the cooling fans for the battery units and the battery inverters can operate at night and so consideration of night-time noise levels will also be required.

- 4.3.2 For this application, preliminary modelling has been carried out which indicates that a background noise survey is not necessary as the predicted noise levels can meet absolute noise limits which are low enough to protect amenity irrespective of the background noise. This can be reviewed as the design develops. In the event that a survey is required, this would be carried out over a minimum period of 48 hours to determine the variation in background noise levels at representative locations.
- 4.3.3 There are several residential locations in the vicinity of the site. Various receptors have been identified following an inspection of various mapping sources as indicated in Table 9.3.1.

Table 4.3.1 Nearby Receptors

Location	Easting	Northing	Approx Distance (m) to Site Boundary
AP1 - Ton Mawr	282461	186250	Inside site Boundary
AP2 - Graig Goch	281940	186076	55
AP3 – Troed-y-rhiw	283437	185460	505
AP4 - Hirwaun Farm	281852	185196	780
AP5 - 2 East Lodge	281462	185133	1100
AP6 - Margam Castle	280541	186291	1350
AP7 - Cwm-Maelwg	280555	187182	1480
AP8 - Gilfach Cottages	284587	188061	1200
AP9 - Gilfach-Ganol	284848	187587	1500

- 4.3.4 AP1 Ton Mawr is an uninhabited farmhouse owned by the solar farm landowner and is not currently occupied, nor is it expected to be in the future. As such noise limits have not been applied here as it is not noise sensitive, however the calculated noise level has still been reported for informative purposes only.

4.4 Assessment Methodology

Construction Noise

- 4.4.1 As discussed above, a construction noise assessment, if required, would be carried out according to BS 5228 with noise limits set in accordance with the significance threshold in Annex E of that standard.
- 4.4.2 Construction traffic noise would also be assessed if required.

Operational Noise

4.4.3 Operational noise will be predicted using IMMI noise modelling software to determine noise levels at the nearest noise-sensitive receptor locations. Within the modelling software, propagation of noise has been calculated in accordance with International Standard ISO 9613-2 with the following input parameters:

- Downwind propagation (noise levels under crosswind and upwind conditions will be less);
- Soft ground between the noise source and the receiver locations ($G = 1.0$),
- Ambient air temperature of 10°C and 70% Relative Humidity; and,
- Barriers and screening influence including the effect of the solar panels calculated in accordance with ISO 9613-2.

4.4.4 Noise information on the equipment will be taken from manufacturer's data where provided, and from library data used on previous assessments. In most cases, the manufacturer's information does not provide any information on tonality. However, it is known that inverters and transformers can produce tones. For the inverters, this would be generally high frequency tones which are readily dissipated by atmospheric absorption and are often not audible at the receptor location, or beyond site boundaries. Tonality has been considered in this initial scoping noise assessment.

Operational Noise Limits

4.4.5 In instances of low rating noise levels, BS 4142 indicates that assessment in line with absolute noise limits might be as, or more, appropriate than a relative assessment.

Noise Targets

4.4.6 To ensure the proposed development is not a significant or prohibiting factor in achieving the relevant WHO night-time values at sensitive residential receptors, noise generated by the development would need to be approximately 10dB below the guidance levels in Table 9.2.1.

4.4.7 Therefore, a target of 32 dB L_{Aeq} (free field) is proposed at residential receptors where background noise levels are otherwise low. This is set on the basis of the night-time noise limit to ensure that sleep is protected. Specifically, this is based on a value 10dB below the L_{Aeq} 45dB façade limit from WHO guidance, corrected for façade levels (i.e. $45 - 3 - 10 = 32$). This limit is a low absolute level which will protect amenity irrespective of the background noise level.

4.5 Anticipated Noise Effects

Operational Noise

- 4.5.1 The proposed development is for a renewable energy facility. This will include the following noise generating equipment
- 4.5.2 For the Solar Farm:
- 196 String Inverter units; and
 - 11 Transformer units (3 no. 3kVA, 8 no. 6kVA)
- 4.5.3 The string inverters and transformers are distributed across the site with the string inverters behind panels. The panels therefore provide an element of screening to some receptors in practice, however this is not currently modelled at this stage. The orientation of the panels ensures there is most screening to the south with other directions less screened.
- 4.5.4 The nature of solar farms is such that electricity is only generated during daylight hours. This may extend into times considered to be part of the night (that is early mornings before 07:00 hours) and during evenings (after 19:00 hours) during the summer. Note that the early morning periods would often coincide with the dawn chorus. The solar farm would not be operational at the quietest times of the night, nor during the late evening when most people would be trying to get to sleep.

Battery Storage Area

- 10 Containerised Battery Units with Cooling Systems;
 - 6 Battery Inverters / Transformers (Conversion Units);and
 - Additional transformers switchgear and a substation with a distributed network operator (DNO) transformer.
- 4.5.5 The battery units would typically operate (discharge) at periods of peak demand. This is typically dark winter evenings when people have returned from work. The batteries would be charged during periods of low demand or when the solar farm is at peak capacity. Note however the facility is required to be available on a 24-hour basis so that it is available to compensate for problems elsewhere in the grid. For most of the time, the batteries make no noise, and the batteries are in a quiescent mode neither charging nor discharging.
- 4.5.6 The noise predictions are presented in the first instance as a daytime noise contour plot in Figure 9.5.6 below, showing the predicted daytime noise levels (dB L_{Aeq}) and the nearest houses. The contours assume that all equipment is running at full capacity, which is only likely to occur in the middle of a sunny day when all plant is operating at 100%. The battery storage area is also assumed to be operational with the cooling fans on high cooling demand.

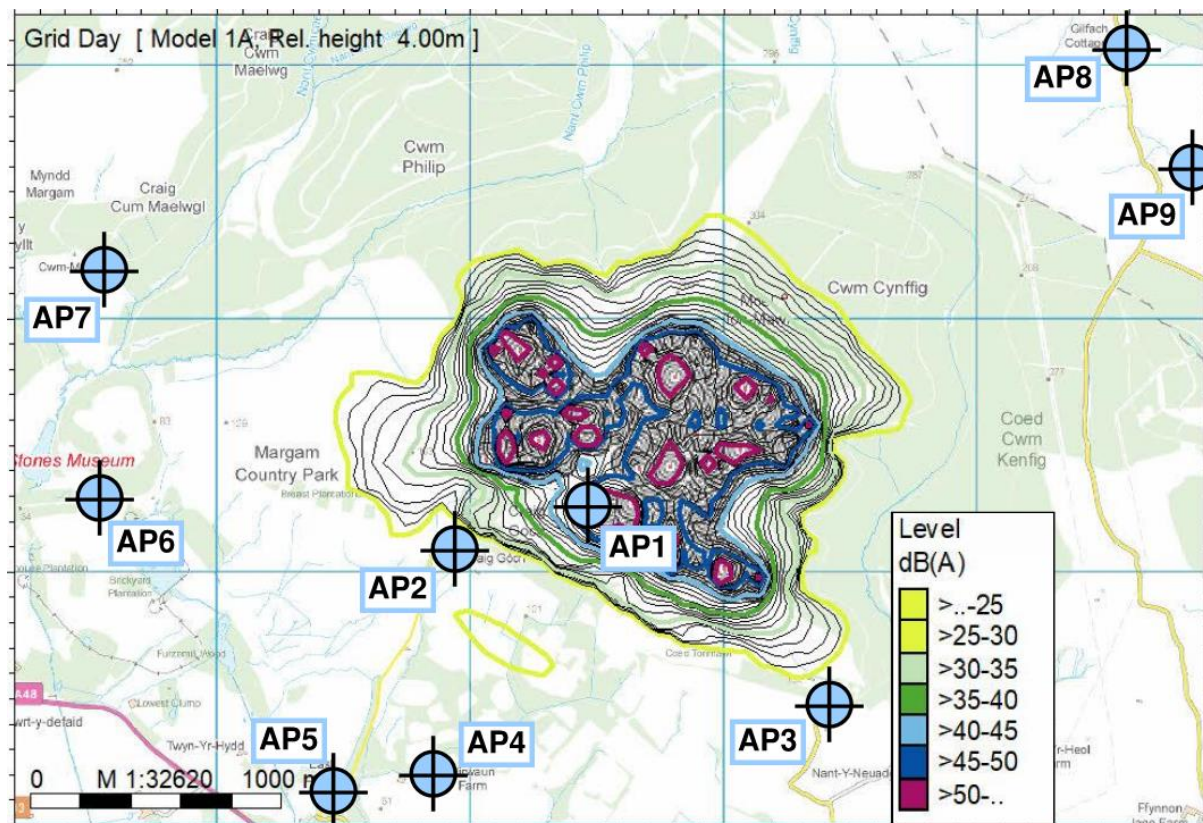


Figure 4.5.1 – Noise contours with all equipment operating at 100%

- 4.5.7 At all noise sensitive receptors (AP1 is not noise sensitive) the specific noise from plant is no higher than 21 dB L_{Aeq} . The calculated specific noise is sufficiently low that character corrections are not applicable, as any character is not expected to be audible at any receptors and therefore the highest rating level at any noise sensitive receptor would be 21 dB L_{Ar} .
- 4.5.8 The calculated highest rating level of 21 dB L_{Ar} is far below the proposed limit of 32 dB L_{Ar} .
- 4.5.9 Therefore, on the basis of the preliminary assessment with all equipment running at 100% capacity, it is possible to meet the day and night absolute noise limits.
- 4.5.10 The calculated noise levels are so low that a noise survey is not expected to be necessary, and a full assessment of the operational noise could be scoped out of the EIA as the significant distances between the site and the noise sensitive receptors alone provides more than sufficient mitigation to provide amenity whatever the proposed technology.
- 4.5.11 It would be down to the local authority to determine if the operational noise assessment and/or survey could be scoped out of the EIA.
- 4.5.12 It is reiterated that traffic noise from the M4 is expected to be audible at receptors if a survey was completed. However, in this case amenity is expected to be provided irrespective of the baseline noise levels as very low absolute noise levels are expected.

4.6 Mitigation

- 4.6.1 In principle, mitigation is best provided at source. If operational noise has not been scoped out of the EIA a detailed assessment of the equipment noise levels will be completed to refine a mitigation strategy, however low absolute noise levels are expected without further mitigation provided such as barriers etc as the distances to the receptors are so great.
- 4.6.2 As mentioned, the solar panels themselves provide partial screening for the string inverters and other sources. This has not currently been implemented into the noise model however can be if further assessment if necessary.

4.7 Assumptions, Limitations and Uncertainties

- 4.7.1 The prediction methodology in ISO 9613-2 is thought to be accurate to $\pm 3\text{dB}$ but further uncertainty can occur in the source noise levels.
- 4.7.2 Further operational noise predictions can be made as the design develops if operation noise is not scoped out of the EIA. It will be assumed that equipment is running at 100% capacity which is only expected to occur during peak daytime periods. This will ensure a conservative assessment.
- 4.7.3 At present, it is not intended to address construction and decommissioning noise during the EIA as construction noise levels are temporary and noise occurs during the daytime only. However best practical means will be used to control construction noise.

5 Landscape and Visual Amenity

5.1 Introduction

- 5.1.1 Tir Collective is instructed by Dulas on behalf of Octo Partners to prepare the Landscape and Visual Amenity input to this scoping report, which relates to the proposed solar farm development on land by Ton Mawr farmstead, north of Pyle, Neath Port Talbot (NPT).

5.2 Policy and Relevant Guidance

Legislation and Policy

- 5.2.1 Policy relevant to the site and the proposed solar farm development is set out below.

Future Wales: The National Plan

- 5.2.2 Future Wales: The National Plan 2040, published 24 February 2021, which sets out the development plan for Wales, influencing “all levels of the planning system in Wales and will help shape Strategic and Local Development Plans.”⁵ The plan promotes development that enhances our wellbeing and our quality of life”⁶ and embeds the principles of the Well-being of Future Generations (Wales) Act 2015. The plan sets out development policies for Wales, dividing it into 4 regions: The North, Mid Wales, The Southwest, and The Southeast, the site is located in the southeast region.

- Policy 9 – Resilient Ecological Networks and Green Infrastructure aims “To ensure the... provision of green infrastructure, the Welsh Government will work with key partners to: - [...]

identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature-based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well-being.

- - ... In all cases, action towards securing the maintenance and enhancement of... green infrastructure assets must be demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment.”

⁵ <https://gov.wales/future-wales-national-plan-2040-0>

⁶ Page 4, Future Wales The National Plan 2040

- Policy 17 – Renewable and Low Carbon Energy and Associated Infrastructure states “The Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs...
- New strategic grid infrastructure for the transmission and distribution of energy should be designed to minimise visual impact on nearby communities.”
- Policy 18 – Renewable and Low Carbon Energy Developments of National Significance states “Proposals for renewable and low carbon energy projects (including repowering) qualifying as Developments of National Significance will be permitted subject to policy 17 and the following criteria:
 - ...the proposal does not have an unacceptable adverse impact on the surrounding landscape (particularly on the setting of National Parks and Areas of Outstanding Natural Beauty);
 - there are no unacceptable adverse visual impacts on nearby communities and individual dwellings; [...]
 - 11. There are acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration.
- The cumulative impacts of existing and consented renewable energy schemes should also be considered.”

Planning Policy Wales

- 5.2.3 Planning Policy Wales (PPW) Edition 11 published 24 February 2021 sets out the land use planning policies of the Welsh Government. Its primary objective 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 and resultant duties such as the Socio-economic Duty.
- 5.2.4 PPW translates The Welsh Government’s commitment to sustainable development into the planning system, to be taken into account when preparing development plans, so that it can play an appropriate role in moving towards sustainability. The key policies that are of relevance to the development include:

- **Chapter 2 People and Places, paragraph 2.1** states “Everyone engaged with or operating within the planning system in Wales must embrace the concept of placemaking... in order to achieve the creation of sustainable places and improve the well-being of communities.”
- **Paragraph 2.17** states ... the creation of sustainable places and in recognition of the need to contribute to the well-being of future generations in Wales through placemaking, development plans and development proposals must seek to deliver developments that address the national sustainable placemaking outcomes.”
- **Paragraph 2.27** states “Planning authorities should ensure that social, economic, environmental and cultural benefits are considered in the decision-making process... to implement the Well-being of Future Generations Act and the Sustainable Development Principle.” A key factor is environmental considerations, which are listed as:
 - “will important features of the natural and built environment be protected and enhanced;
 - are the environmental impacts of development on... amenity limited to acceptable levels...;
 - is environmental protection for people and natural resources, property and infrastructure maximised and environmental risks prevented or appropriately managed; [...]
 - will the causes and impacts of climate change be fully taken into account through location, design, build, operation... [...]
- **Chapter 3 Strategic and Spatial Choices, paragraph 3.9** states “The special characteristics of an area should be central to the design of a development. The layout, form, scale and visual appearance of a proposed development and its relationship to its surroundings are important planning considerations.”
- **Paragraph 3.10** goes on to state “In areas recognised for their particular landscape or historic character and value, it can be appropriate to seek to promote or reinforce local distinctiveness. In those areas, the impact of development on the existing character, the scale and siting of new development... will be particularly important.”

- **Chapter 5 Productive and Enterprising Places paragraph 5.7.1** states “Low carbon electricity must become the main source of energy in Wales.”
- **Paragraph 5.9.1** states “Local authorities should facilitate all forms of renewable and low carbon energy development...”
- **Paragraph 5.9.20** states “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... to safeguard quality of life for existing and future generations;
 - the impact on the natural and historic environment;
 - cumulative impact; [...]
 - grid connection issues where renewable (electricity) energy developments are proposed; and
 - the impacts of climate change on the location, design, build and operation of renewable and low carbon energy development.”
- **Paragraph 5.9.21** goes on to state “Prior to an application being submitted, developers for renewable and low carbon energy developments should, wherever possible, consider how to avoid, or otherwise minimise, adverse impacts through careful consideration of location, scale, design and other measures.
- **Chapter 6 Distinctive & Natural Places, paragraph 6.0.2** states “The special and unique characteristics and intrinsic qualities of the natural and built environment must be protected in their own right, for historic, scenic, aesthetic and nature conservation reasons.”
- **Section 6.2 Green infrastructure, paragraph 6.2.5** states “The quality of the built environment should be enhanced by integrating green infrastructure into development through appropriate site selection and use of creative design.”
- **Section 6.3 Landscape, paragraph 6.3.3** states “All the landscapes of Wales are valued for their intrinsic contribution to a sense of place, and local authorities should protect and enhance their special characteristics, whilst paying due regard to the social, economic, environmental and cultural benefits they provide, and to

their role in creating valued places.” **Paragraph 6.3.4** goes on to state “Where adverse effects on landscape character cannot be avoided, it will be necessary to refuse planning permission.”

Local Planning Policy

- 5.2.5 The site lies within Neath Port Talbot (NPT). Planning policy for the area is provided by the Neath Port Talbot County Borough Council Local Development Plan 2011 – 2026, adopted January 2016. Policies relevant to the potential development of the site include:

Neath Port Talbot LDP 2011-2026

- **Strategic Policy SP 1: Climate Change** states “The causes and consequences of climate change will be addressed by implementing the following measures. In relation to the causes of climate change: [...]
 4. Provision will be made for the County Borough’s appropriate contribution to renewable and low carbon energy generation.”
- **Policy TO 4 Walking and Cycling Routes** states “Any proposals that would prevent or have any adverse impact on their implementation will be resisted. Several public footpaths, sections of the St Illtyd’s Walk and Ogwr Ridgeway Walk Long Distance Footpaths transect the site.
- **SP 14: The Countryside and the Undeveloped Coast** states “The countryside... including landscapes... and agricultural land, will be protected and where feasible enhanced through the following measures:
 1. The protection of the open countryside through the control of inappropriate development outside settlement limits; [...]”
- **Policy EN 2 Special Landscape Areas** identifies six Special Landscape Areas (SLAs) that have been designated in NPT “to protect areas of high landscape quality.” The policy goes on to state “Development within the designated Special Landscape Areas will only be permitted where it is demonstrated that there will be no significant adverse impacts on the features and characteristics for which the Special Landscape Area has been designated.”

The site located in SLA EN2/5 Margam.

- **Policy EN 7 Important Natural Features** states “Development proposals that would adversely affect ecologically or visually important natural features such as trees,

woodlands, hedgerows / field boundaries, watercourses or ponds will only be permitted where:

1. Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or
2. The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.

- **SP 18: Renewable and Low Carbon Energy** states “A proportionate contribution to meeting national renewable energy targets and energy efficiency targets will be made while balancing the impact of development on the environment and communities.

This will be achieved by:

1. Encouraging where appropriate, all forms of renewable energy and low carbon technology development; [...]
3. Ensuring that development will not have an unacceptable impact on the environment and amenity of local residents.”

- **Policy RE 1 Criteria for the Assessment of Renewable and Low Carbon Energy Development** states “Proposals for renewable and low carbon energy development will only be permitted subject to the following criteria: [...]

4. All renewable energy or low carbon energy development proposals will be required to demonstrate that:

(a) Measures have been taken to minimise impacts on visual amenity and the natural environment;

(b) There will be no unacceptable impacts on residential amenity; [...]

(e) There are satisfactory proposals in place for site restoration as appropriate.”

- **SP 21 Built Environment and Historic Heritage** states “The built environment and historic heritage will, where appropriate, be conserved and enhanced through the following measures:

1. Encouraging high quality design standards in all development proposals [...]

4. The identification of the following designated sites to enable their protection and where appropriate enhancement: [...]

(d) Scheduled Ancient Monuments [...]

- **Policy BE 1 Design** states “All development proposals will be expected to demonstrate high quality design which fully takes into account the natural, historic and built environmental context and contributes to the creation of attractive, sustainable places.

Proposals will only be permitted where all of the following criteria, where relevant, are satisfied:

1. It complements and enhances the character and appearance of the site... in terms of siting, appearance, scale, height, massing...
2. It respects the context of the site and its place within the local landscape... and it takes account of the site topography and prominent skylines or ridges;
3. It utilises materials appropriate to its surroundings and incorporates hard and soft landscaping and screening where appropriate; [...]

Important local features (including... green infrastructure, biodiversity and ecological connectivity) are retained and enhanced as far as possible; [...]

Guidance and Best Practice

- 5.2.6 The methodology that will be used for the Landscape and Visual Impact Assessment (LVIA) will be based on the recommendations in Guidelines for Landscape and Visual Impact Assessment 3rd Edition, published by The Landscape Institute and the Institute of Environmental Management & Assessment in 2013 (GLVIA3), see section 5.4 below for the methodology.
- 5.2.7 In addition to GLVIA3, the following guidance will also be referred to:
- Landscape Institute’s Technical Guidance Note 02/21 Assessing landscape value outside national designations⁷
 - Landscape Institute’s Technical Guidance Note 06/19, Visual Representation of Development Proposals, September 2019.⁸
- 5.2.8 Relevant policy, landscape character assessments, and other contextual information sources will also be referred to, including:

⁷ <https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2021/05/tgn-02-21-assessing-landscape-value-outside-national-designations.pdf>

⁸ <https://www.landscapeinstitute.org/visualisation/>

- LANDMAP Assessment information and Guidance Note 46 (GN46)⁹
- Policies relevant to the landscape and visual amenity in national and local policy including the Neath Port Talbot Local Development Plan 2011-26.
- Neath Port Talbot LANDMAP Landscape Assessment, Final Report, December 2004.

5.2.9 For the viewpoint photography, the Landscape Institute (LI) advises using a lens with a focal length equivalent to 50mm for a 35mm Single Lens Reflex (SLR) camera, and a horizontal field of view of a little under 40 degrees. The equipment used for the LVIA photography includes:

- A Canon EOS 5D Mark iii digital SLR camera with a full frame sensor.
- Canon 50mm EF 1:1.8 II lens.
- Manfrotto tripod and panoramic head.

5.2.10 Photographs will be taken with a focal length of 50mm.

5.2.11 Landscape photography includes wide angle or panoramic views requiring a sequence of photographs to be taken across the view. Where this approach is taken, a series of overlapping photographs are digitally spliced together in PTGui Pro using a cylindrical projection to provide a panorama approximating to the normal field of view in a landscape context. Where necessary, the contrast and brightness of individual photographs is slightly manipulated in order to create a consistent panorama without visible joins.

5.2.12 The viewpoint locations will be established using a camera mounted GPS device and verified against site survey or Ordnance Survey grid reference and height Above Ordnance Datum (AOD).

5.3 Assessment Methodology and Significance Criteria

5.3.1 Solar farm developments have particular characteristics which are potential sources of impact on landscape character and on visual amenity:

Table 5.3.1 characteristics of solar farm developments

Character	Criteria
Location	The location of solar energy developments is typically dictated by the availability and capacity of the grid connection. To make the best of the solar resource over land, solar farms are frequently located in larger fields of consistent or gentle gradient.

⁹ <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/using-landmap-in-landscape-and-visual-impact-assessments-gn46/?lang=en>

Character	Criteria
Glint & glare	The effect of reflection from the solar panels or galvanised array frames when viewed from the south could increase their visual prominence. Glint is the direct reflection of sunlight, whereas glare is the diffuse reflection (or reflection of the bright sky around the sun). Glint is typically more intense than glare. Solar cells are designed to absorb light to generate electricity rather than reflect it, so are less reflective than other sources of glint.
Ground disturbance	Solar arrays can be installed with minimal ground disturbance by being pinned directly to the ground. Cable trenching and the formation of access tracks also result in ground disturbance.
Construction plant	Smaller plant such as telehandlers is typically used to transport the array frames and panels around the solar development for installation, once delivered to a central location.
Activity for maintenance and repair	Personnel, with vehicles and equipment, visiting the solar farm at regular intervals, and the activities associated with the maintenance operations.
Views	Solar farms are generally constructed over several fields within existing and sometimes enhanced hedgerow boundaries. Views of entire solar farm proposals may not be possible due to screening effects of existing and proposed features.
Duration	The solar farm would be in place and operational for 40 years. Effects during the operational period are considered long term, but fully reversible. The construction and decommissioning phases would be in the order of 3-6 months', and the effects during these periods are considered short term.

Landscape Effects Assessment

- 5.3.2 Baseline studies for assessing the landscape effects included a mix of desk study and field work to identify and record the character of the landscape and the elements, features and aesthetic and perceptual factors which contribute to it.
- 5.3.3 The elements that make up the landscape in the study area were recorded, including:
- physical influences - geology, soils, landform, drainage and water bodies;
 - land cover, including different types of vegetation and patterns and types of tree cover;

- the influence of human activity, such as, land use and management, the character of settlements and buildings, the pattern and type of fields and enclosure; and
- the aesthetic and perceptual aspects of the landscape, e.g.: its scale, complexity, openness, tranquillity, wildness.

5.3.4 The overall character of the landscape in the study area will be considered, including the particular combinations of elements and aesthetic and perceptual aspects that make each distinctive, usually by identification as key characteristics of the landscape. Evidence about change in the landscape was considered, including the condition of the different landscape types and/or areas, and their constituent parts and evidence of current pressures causing change in the landscape.

Landscape Value

5.3.5 The European Landscape Convention promotes taking account of all landscapes, including ordinary or undesignated landscapes. The relative value attached to the landscape was considered at the baseline stage to inform the judgments about the effects likely to occur, whether to areas of landscape as a whole or to individual elements, features and aesthetic or perceptual dimensions, at the community, local, national or international levels.

5.3.6 Landscape designation is a starting point in understanding landscape value, but value may also be attached to undesignated landscapes. Special Qualities, reasons for designation, relevant policies in management plans or designation-specific policies in development plans, were consulted in assessing the relative value of the landscape within designated areas.

5.3.7 Areas of landscape whose character is judged to be intact and in good condition, and where scenic quality, wildness or tranquillity, and natural or cultural heritage features make a particular contribution to the landscape, or where there are important associations, are likely to be highly valued. For “ordinary, everyday landscapes”, the judgement was based upon the degree to which they are representative of typical character, the intactness of the landscape and the condition of its elements, scenic quality, sense of place, aesthetic and perceptual qualities.

5.3.8 When determining the landscape value, the following elements were considered, in addition to consideration of values associated with designations:

- The importance of the landscape, or the perceived value of the landscape to users or consultees, as indicated by, for example, international, national or local designations;

- The importance of elements or components of the landscape in the landscape character of the area or in their contribution to the landscape setting of other areas;
- Intrinsic aesthetic characteristics, scenic quality or sense of place, including providing landscape setting to other places
- Cultural associations in the arts or in guides to the area, or popular use of the area for recreation, where experience of the landscape is important;
- The presence and scale of detractors in the landscape and the degree to which they are susceptible to improvement or upgrading; and
- Conservation interests: The presence of features of wildlife, earth science or archaeological or historical and cultural interest can add to the value of the landscape as well as having value in their own right.

5.3.9 The following table indicates the criteria used to determine the Landscape value.

Table 5.3.2 Criteria to determine landscape value

Value	Criteria
High Value	Landscapes subject to international or national designations, and non-designated landscapes where the following considerations apply: Areas of landscape whose character is judged to be intact and in good condition; Scenic quality, wildness or tranquillity, and/or natural or cultural heritage features make a particular contribution to the landscape; There are important cultural and artistic associations; They are representative of typical character of the area or have a character or elements that are valued for their rarity; Particular components may be identified as important contributors to the landscape character; The landscape is valued for recreational activities where experience of the landscape is important.
Medium Value	Landscapes subject to local designations, and non-designated landscapes where the following considerations apply: Areas of landscape whose character is judged to be intact with few detractors;

Value	Criteria
	Scenic quality, wildness or tranquillity, and/or natural or cultural heritage features make a contribution to the landscape; There are cultural and artistic associations; They are representative of typical character of the area or have a character or elements that are identified for their rarity; Particular components may be identified as contributors to the landscape character; The landscape is a setting for recreational activities where experience of the landscape forms part of the experience.
Low Value	Areas of non-designated landscapes whose character is in poor condition; Scenic quality, wildness or tranquillity, and/or natural or cultural heritage features are not key characteristics of the landscape; Cultural and artistic associations are absent; They are not representative of typical character of the area, but are also not valued for rarity; Particular components may be identified as contributors to the landscape character; There is little scope for recreational activities where experience of the landscape is important.

5.3.10 The landscape baseline report aims to:

- describe, map and illustrate the character of the landscape of both the wider study area and the site and its immediate surroundings;
- identify and describe the individual elements and aesthetic and perceptual aspects of the landscape, particularly those that are key characteristics contributing to its distinctive character;
- indicate the condition of the landscape, including the condition of landscape elements or features;
- project forward drivers and trends in change and how they may affect the landscape over time, in the absence of the proposal; and
- evaluate the landscape and, where appropriate, its components, aesthetic and perceptual aspects, particularly the key characteristics.

Assessing the Landscape Effects

- 5.3.11 The baseline information about the landscape was combined with understanding of the details of the proposal to identify and describe the landscape effects. The landscape receptors were identified, that is, the components or aspects of the landscape likely to be affected, such as, overall character or key characteristics, individual elements or features, or specific aesthetic or perceptual aspects.
- 5.3.12 Interactions between the landscape receptors and the components or characteristics of the development at its different stages were considered: construction and operation, and the different types of effect: direct and indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, adverse and beneficial.
- 5.3.13 Landscape effects considered include:
- change in and/or partial or complete loss of elements, features or aesthetic or perceptual aspects that contribute to the character and distinctiveness of the landscape;
 - addition of new elements or features that will influence the character and distinctiveness of the landscape; and
 - combined effects of these changes on overall character.
- 5.3.14 The landscape effects were categorised as adverse, beneficial, or negligible in their consequences for the landscape, judged from the degree to which the proposal fits with existing character and the contribution the development makes to the landscape in its own right, even if in contrast to existing character.
- 5.3.15 The assessment of the landscape effects will be based on assessment of the sensitivity of the landscape receptors and the magnitude of the change in the landscape arising from the proposal.

Sensitivity of landscape receptors

- 5.3.16 The sensitivity of landscape receptors combines judgments of their susceptibility to the type of change arising from the development proposal and the value attached to the landscape.
- 5.3.17 Susceptibility to change means the ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies.
- 5.3.18 The value attached to the landscape receptors will be established in the baseline study.

5.3.19 The sensitivity of landscape receptors to change is categorised as high, moderate or lesser, in accordance with the criteria set out below to determine the susceptibility and value of the landscape receptor.

5.3.20 When determining the landscape susceptibility, the following elements will be considered:

- The ability of the landscape receptor to accommodate the proposed development without undue consequences for the maintenance of the landscape character and/or the achievement of landscape planning policies and strategies;
- The degree to which the changes arising from the development would alter the overall character, quality/condition of a particular landscape type or area;
- The degree to which the changes arising from the development would alter individual elements or features or aesthetic and perceptual aspects important to the landscape character; and
- Existing landscape studies may identify the sensitivity of the landscape type or area or its characteristics to the general type of development that is proposed.

5.3.21 The following table indicates the criteria used to determine the landscape susceptibility:

Table 5.3.3 Criteria for landscape susceptibility

Susceptibility	Criteria
High Susceptibility	The changes arising from the type of development would alter the overall character, quality/condition of a particular landscape type or area. The changes arising from the type of development would alter or remove individual elements or features or aesthetic and perceptual aspects important to, or add new elements incongruous to, the landscape character. The type of development would compromise the achievement of landscape planning policies and strategies for the landscape. The changes arising from the type of development would alter or remove elements or features or aesthetic and perceptual aspects important to the landscape character or add new elements that would reinforce the key characteristics of the landscape character.
Low Susceptibility	The changes arising from the type of development would not alter the overall character, quality/condition of a particular landscape type or area.

Susceptibility	Criteria
	The type of development would not compromise the achievement of landscape planning policies and strategies for the landscape. The changes arising from the type of development would not alter or remove individual elements or features or aesthetic and perceptual aspects important to, or add new elements incongruous to, the landscape character.

5.3.22 Where the susceptibility identified falls between high and low, an intermediate level of susceptibility is assigned, e.g., “moderate”. The basis for the scale of susceptibility assigned to the landscape receptor is linked back to evidence from the baseline study.

Table 5.3.4 Criteria for assessing landscape sensitivity

Category	Criteria
High sensitivity	A highly valued landscape e.g., of national or international importance, whose character or key characteristics are very susceptible to change; Aspects of the landscape character are highly valued as “key characteristics” and, often identified as susceptible to change in national or local character assessments; The landscape character is highly valued as intact and in good condition and particularly vulnerable to disturbance; A highly valued landscape with no or limited potential for substitution or replacement.
Moderate sensitivity	A landscape of local importance or value, whose character or key characteristics are susceptible to change; Other characteristics of the landscape character also valued in national or local character assessments and susceptible to change; The landscape character is valued for moderate condition and not particularly vulnerable to disturbance; A moderately valued landscape with some potential for substitution or replacement.
Lesser sensitivity	No or little evidence of value or importance attached to the landscape area, its features or characteristics; Few features, characteristics or qualities susceptible to disturbance or particularly susceptible to improvement or upgrading Good potential for substitution or replacement

Magnitude of Landscape Change

- 5.3.23 Effects on landscape receptors are assessed in terms of size or scale, the geographical extent of the area influenced, and its duration and reversibility.

Table 5.3.5 Considerations for assessing magnitude of landscape change

Consideration	Criteria
Size or scale of change	Categorised on a scale of Large, Medium, Small, Negligible or None, based upon: The extent of existing landscape elements that will be lost (or added), the proportion of the total extent that this represents and the contribution of that element to the character of the landscape; The degree to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or additions of new ones; Whether the effect changes the key characteristics of the landscape, which are critical to its distinctive character.
Geographical area over which the landscape would be changed	Categorised on a scale of: Small: at site level, within the development site itself or at the level of the immediate setting of the site; Medium: at the scale of the landscape type or character area within which the proposal lies; Large: where the development influences several landscape types or character areas.
The duration of the changes	The durations of changes due to the development are categorised as: Short term: zero to three years; Medium term: three to twenty years; Long term: twenty to forty years; Permanent: more than forty years.
Reversibility	The prospect and the practicality of the effect being reversed

- 5.3.24 Criteria used to determine the magnitude of change is as follows:

Table 5.3.6 Criteria for assessing magnitude of landscape change

Magnitude of Change	Landscape Change
Great change	Major size or scale of change, affecting the landscape type or character of the area within which the proposal lies or extending over the wider area; likely to be longer term or permanently, with low prospect of reversibility
Medium change	Intermediate size or scale of change, affecting part of the landscape type or character of the area within which the proposal lies, or larger scale of change at the level of the site or immediate context; likely to continue into the medium term, with good prospect of reversibility
Small change	A minor proportion of the extent of the character type or area is affected or smaller scale of change over a larger extent; the changes occur at the level of the site or immediate context and might be short term with good prospect of reversibility.
Negligible	No apparent change to landscape characteristics

- 5.3.25 While GLVIA3 includes the duration of the change in the consideration of the magnitude of change, in some cases a major size or scale of change of shorter duration may be considered a “great change”.

Significance of landscape effects

- 5.3.26 Final conclusions about the degree of effect, whether adverse or beneficial, relate the separate judgements about sensitivity of the receptors and magnitude of the changes combined, based upon the following indicative considerations and criteria:

Table 5.3.7 Criteria for assessing landscape effects

Landscape effect	Indicative criteria
Major	Highly sensitive landscape completely degraded or greatly changed, with little or no scope for mitigation; Great improvement, sufficient to upgrade overall landscape character. Irreversible adverse or beneficial effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes.

Landscape effect	Indicative criteria
Moderate	Medium change to moderately sensitive landscape or its character; lesser change to higher sensitivity landscape or greater change to less sensitive landscape.
Minor	Small or limited adverse change to the existing landscape or its character; greater change to less sensitive landscape; Considerable scope for mitigation; Small improvement to the existing landscape. Reversible adverse or beneficial effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of landscapes of community value.
Negligible	No perceptible change to the existing landscape or its character; The change is difficult to discern.

5.3.27 Intermediate conditions may be described, such as Moderate-Major, where the criteria for Moderate may be exceeded but not qualify as Major. Where there is no magnitude of change the effect would correspondingly be Negligible.

5.3.28 Effects may be adverse or beneficial. In some instances, the effect may be offset by other considerations, for example, through the mitigation or landscape proposals, and the resulting effect may be neither beneficial nor adverse.

5.3.29 The criteria for significance of landscape effects are based upon the following considerations:

- Major loss or irreversible negative effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes are likely to be of the greatest significance.
- Reversible negative effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of landscapes of community value, are likely to be of least significance and may be judged not significant.
- Where assessments of significance place landscape effects between these extremes, judgments are made about whether they are significant.

- Where landscape effects are judged to be significant and adverse, proposals for preventing/avoiding, reducing or offsetting or compensating for them are set out (referred to as mitigation).

5.3.30 The significant landscape effects remaining after mitigation are summarised as the final step in the process.

Visual Effects Assessment

5.3.31 Baseline studies for visual effects establish:

- the area in which the development may be visible;
- the different groups of people who may experience views of the development;
- the location where they will be affected;
- the nature of the views at those locations; and
- the different groups of people who may be affected by the changes in views or visual amenity.

5.3.32 The potential areas where the site and development proposal are likely to be visible were mapped. Landscape components affecting visibility, like buildings, walls, fences, trees, hedgerows, woodland and banks, were identified through field surveys and mapped where relevant.

5.3.33 The people within the area who may be affected by the changes in views and visual amenity – the visual receptors – were identified, for example:

- people living in the area;
- people passing through on roads and the local lanes;
- people visiting promoted landscapes or attractions; and
- people engaged in recreation of different types, including users of public rights of way, bridleways and access land.

5.3.34 Where relevant, views that form part of the experience and enjoyment of the landscape were noted, for example, from promoted paths, tourist or scenic routes and associated viewpoints.

5.3.35 The proposed viewpoints will be discussed with the local authority, and informed by the visual appraisal, field surveys, and by desk-based research on various issues, for example, access and recreation, valued landscapes, tourist attractions and destinations, popular

vantage points, and relative distribution of population. Viewpoints will be selected to represent the experience of different types of visual receptors.

5.3.36 The details of viewpoint locations were mapped and catalogued, sufficient to allow someone else to return to the location and record the same view. Photography was carried out in accordance with the Landscape Institute, Advice Note 06/19 Visual Representation of Development Proposals (2019).

5.3.37 The baseline report aims to describe, map and illustrate:

- the type of people (visual receptors) likely to be affected, making clear the activities they are likely to be involved in when enjoying the view;
- details of the viewpoints and of the visual receptors likely to be affected at each;
- the nature, composition and characteristics of the existing view, noting any particular horizontal or vertical emphasis, and any key foci; existing views have been illustrated in annotated photographs identifying important components of the view;
- elements, such as landform, buildings or vegetation, which may interrupt, filter or otherwise influence the views; and
- whether or how the view may be affected by seasonal or weather variation.

Predicting and describing visual effects

5.3.38 The baseline information about the visual receptors was combined with understanding of the details of the proposal to identify and describe the visual effects, considering:

- changes in views and visual amenity arising from elements of the development;
- the distance of the viewpoint from the development and whether the viewer would focus on the development due to its scale and proximity or whether the development would be only a small or minor element in a panoramic view;
- whether the view is stationary or transient or one of a sequence of views;
- the nature of the changes: changes in the skyline, creation of a new visual focus in the view, introduction of new elements, changes in visual simplicity or complexity, alteration of visual scale or the degree of visual enclosure; and
- seasonal differences in effects, arising from the varying degree of screening and/or filtering of views by vegetation in summer and winter.

- 5.3.39 Categorising the visual effects as adverse or beneficial (or neutral) in their consequences for views and visual amenity was based on judgments about whether the changes affect the quality of the visual experience, and the nature of the existing views and the nature of the changes to the views.
- 5.3.40 The visual effects were assessed, based on assessment of the nature of the visual receptors and their sensitivity, and the nature of the effect on views and visual amenity, that is, the magnitude of visual change.

Sensitivity of visual receptors

- 5.3.41 The people or groups of people likely to be affected at a specific viewpoint – the visual receptors – are assessed in terms of their susceptibility to change in views and visual amenity and the value attached to particular view locations and views.
- 5.3.42 The susceptibility of visual receptors to changes in views and visual amenity is a function of the occupation or activity of people experiencing the view at particular locations and the extent to which their attention or interest is focused on the views or the visual amenity they experience at particular locations. The context of the location also contributes to susceptibility, for example, people viewing from residential properties or from a valued landscape are likely to be more susceptible to change than people viewing from an industrial context. Table 5.3-8 provides indicative criteria used to determine visual receptor susceptibility:

Table 5.3.8 Criteria for assessing landscape effects

Susceptibility	Criteria
High Susceptibility	Residents at home. People engaged in outdoor recreation, including use of public rights of way, whose attention or interest is likely to be focused on the landscape and on particular views. Visitors to designated landscapes, heritage assets, or other attractions, where views of the surroundings are an important contributor to the experience. Communities where views contribute to the landscape setting enjoyed by residents in the area.
Low Susceptibility	People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape.

Susceptibility	Criteria
	People at their place of work whose attention may be focused on their work or activity not on their surroundings and where the setting is not important to the quality of working life. Travellers on road, rail or other transport routes, except along recognised scenic routes, where awareness of views is likely to be high.

- 5.3.43 Where the susceptibility identified falls between high and low, an intermediate level of susceptibility is assigned, e.g., “medium”. The basis for the scale of susceptibility assigned to the visual receptor is linked back to evidence from the baseline study.
- 5.3.44 Judgments were made about the value attached to the views identified, taking account of recognition, for example, in relation to heritage assets, or through planning designations, appearance in guidebooks or on tourist maps, promotion of particular locations or provision of facilities provided for their enjoyment, such as parking places, sign boards and interpretive material, or references to them in literature or art.
- 5.3.45 The sensitivity of visual receptors to change is categorised as high, moderate or lesser, in accordance with the criteria set out below.

Table 5.3.9 Criteria for assessing visual sensitivity

Category	Indicative criteria
High sensitivity	Viewers in residential or community properties. Views experienced by many viewers. Daily, prolonged or sustained views available over a long period, or where the view of the landscape is an important attractant. A view from a landscape, recreation facility or route valued nationally or internationally for its visual amenity.
Moderate sensitivity	Viewers in residential or community properties with partial or largely screened views of the site. Frequent open views available. Viewers are pursuing activities such as sports or outdoor work, where the landscape is not the principal reason for being there or the focus of attention is only partly on the view. A view from other valued landscapes, or a regionally important recreation facility or route.

Category	Indicative criteria
Lesser sensitivity	A view of low importance or value, or where the viewer's attention is not focused their surroundings. A view from a landscape of moderate or less importance, or a locally important recreation facility. Occasional open views or glimpsed views available; passing views available to travellers in vehicles. A view available to few viewers.

Magnitude of visual change

- 5.3.46 The visual effects identified are evaluated in terms of size or scale, the geographical extent of the area influenced, duration and reversibility.

Table 5.3.10 Considerations for assessing magnitude of visual change

Consideration	Indicative criteria
Size or scale of change	Categorised on a scale of major, moderate, minor or none, based upon: The degree of the loss or addition of features in the view; The extent of changes in the composition of the view, including the proportion of the view occupied by the proposed development; The degree of contrast or integration of the changes with the existing or remaining landscape elements and characteristics; The nature of the view of the proposed development, whether full, partial or glimpsed, or the relative amount of time over which it will be experienced.
Geographical area over which the changes would be experienced	The geographic extent reflects: The extent of the area over which the changes would be visible; The angle of view in relation to the main activity of the receptor; The distance of the viewpoint from the proposed development.
The duration of the changes	Categorised as: Short term: zero to three years; Medium term: three to twenty years; Long term: twenty to forty years

Consideration	Indicative criteria
	Permanent: more than forty.
Reversibility	The prospect and the practicality of the effect being reversed.

5.3.47 Criteria used to determine the magnitude of change is as follows:

Table 5.3.11 Criteria for assessing magnitude of visual change

Magnitude of Change	Visual Change
Great change	Major size or scale of change, affecting a large proportion of the angle of the view, or affecting views from a wide area; continuing into the longer term or permanently, with low prospect of reversibility.
Medium change	Intermediate size or scale of change, affecting part of the angle of the view, or affecting some views from the wider area, or larger scale of change in views from within the immediate context of the site; continuing into the medium term, with good prospect of reversibility.
Small change	A minor proportion of the angle of view is affected or the contribution of the changed elements or characteristics to the composition of the view is not important; the changes are viewed from longer distances; and might be short term with good prospect of reversibility.
Negligible	Barely perceptible change or the change is difficult to discern; No change in the view or the changes due to the development are screened from view.

Judging the overall significance of visual effects

5.3.48 Final conclusions about the degree of visual effects, whether adverse or beneficial, relate the separate judgements about sensitivity of the receptors and magnitude of the changes, as provided in the criteria shown in Table 5.3-11.

Table 5.3.12 Criteria for assessing visual effects

Visual effect	Indicative criteria
Major	Great change or visual intrusion experienced by highly sensitive viewers or from highly sensitive public viewpoints; The proposal would cause a great deterioration in the existing view available to highly sensitive viewers;

Visual effect	Indicative criteria
	Great improvement in the view, sufficient to upgrade overall visual amenity. Large scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view, especially where affecting people who are particularly sensitive to changes in views and visual amenity or people at recognised and important viewpoints or from recognised scenic routes.
Moderate	Medium change or visual intrusion experienced by moderately sensitive viewers; Smaller change to higher sensitivity viewers or greater change to less sensitive viewers.
Minor	Small or localised visual intrusion in the existing view, especially for less sensitive viewers. Small or localised reduction in visual intrusion, or improvement in the view. Reversible short-term changes, in views available to people for whom the view of the landscape is not the principle focus of interest.
Negligible	Negligible change in the view or the change is difficult to discern even for a highly sensitive viewer.

5.3.49 In addition to these criteria, in some instances the effect may be discernible or greater, but offset by other considerations, for example, through the mitigation or landscape proposals for the development, and the resulting effect is neither beneficial nor adverse.

5.3.50 The following factors inform the judgment about the significance of visual effects:

- Major effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant.
- Major effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant.
- Large scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features already present within the view.

- As for landscape effects, where visual effects are judged to be significant and adverse, proposals for preventing/avoiding, reducing or offsetting or compensating for them are set out (referred to as mitigation).

5.3.51 The significant visual effects remaining after mitigation are summarised as the final step in the process.

Assessing Cumulative Effects

5.3.52 The cumulative assessment considers the potential effects upon landscape character and potential effects upon visual amenity that may arise as an indirect consequence of the proposed development.

Types of Cumulative Effects

5.3.53 Cumulative landscape and visual effects result from additional changes to landscape and visual amenity caused by the proposed development in conjunction or in combination with other proposed solar farms. The types of cumulative effects assessed are:

- **Additive effects:** landscape and/or visual effects combined with or in addition to the effects of the other solar farms;
- **Sequential effects:** experience of first one effect, and later another at different places as one moves through the landscape;
- **Temporal effects:** effects accumulating over a period of time on the landscape or visual amenity, from this proposal and the other solar farms that are either operational, under construction, or have planning approval.

5.3.54 Cumulative landscape and visual effects that may introduce new types of change and/or increase or extend effects of the main project are identified and whether the proposed project adds to or combines with the other solar farms to create a significant cumulative effect.

Assessing Cumulative Landscape Effects

5.3.55 The assessment considers cumulative effects on the fabric of the landscape and its individual elements or features; on the aesthetic, perceptual or experiential aspects of the landscape, such as scale, sense of enclosure, diversity, pattern, colour, sense of naturalness, remoteness or tranquillity, and on the overall character of the landscape, especially modification to key characteristics and possible creation of new landscape character.

- 5.3.56 Final conclusions about the degree of the cumulative effect on the landscape of this proposed project with the other solar farms considered are based upon the following considerations:

Table 5.3.13 Criteria for assessing cumulative landscape effects

Visual effect	Indicative criteria
Major	Large irreversible effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes. Cumulatively, the solar farms are a key characteristic of the landscape, defining a new landscape character type or area.
Moderate	Cumulatively, the solar farms are becoming a characteristic of the landscape, but not of sufficient dominance to be a defining characteristic of the area.
Minor	Cumulatively, the solar farms are not an important or key characteristic of the landscape and have little effect on the values and experiences associated with the landscape e.g., wildness, sense of history; Reversible effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of the landscape.
Negligible	The solar farms have little effect on the landscape character cumulatively.

Assessing Cumulative Visual Effects

- 5.3.57 Cumulative visual effects, resulting from changes in the content and character of the views due to introduction of new elements or removal of or damage to existing ones, are identified and the nature of views available and the contribution of project being assessed to cumulative visual effects. Additive effects may occur either when developments are seen together in one angle of view or where they are seen when looking in different directions from one location. The effects on viewers as they follow linear routes and move through the landscape are considered as sequential effects.
- 5.3.58 Final conclusions about the degree of the cumulative effect on the visual amenity of this proposed project with the other solar farms considered will be based upon the following considerations:

Table 5.3.14 Criteria for assessing cumulative visual effects

Visual effect	Indicative criteria
Major	Cumulatively, the solar farms dominate the view, seeming to define a new visual aesthetic; Large scale effects arising from new, non-characteristic or discordant or intrusive elements into the view of highly sensitive receptors, or at recognised and important viewpoints, or from recognised scenic routes.
Moderate	Cumulatively, the solar farms are seen as a characteristic of the landscape in the view, but not of sufficient dominance to be a defining characteristic of the visual amenity.
Minor	Cumulatively, the solar farms are separate isolated elements of the landscape in the view, too infrequent and of insufficient importance to be perceived as a characteristic of the area; Cumulatively, the effects on visual amenity are reversible, of short duration, or occur over a restricted area.
Negligible	The solar farms have little effect on the visual amenity cumulatively.

Judging the overall significance of cumulative landscape and visual effects

5.3.59 Major effects are likely to be considered “significant”, especially if adverse and long term or not reversible, and Minor or Negligible effects “not significant”. The significance of intermediate effects is determined on a case-by-case basis and, even if the effects are not considered significant, they may be important considerations in decision making about the proposed development.

5.3.60 Effects may be adverse or beneficial. In some instances, the effect may be offset by other considerations, for example, through the mitigation proposals, and the resulting effect is neither beneficial nor adverse.

5.4 Potentially Significant Effects and Approach to Mitigation**Baseline**

5.4.1 The site is located on south facing upland slopes, to the north of Pyle and northeast of Margam Park. It is located within Special Landscape Area (SLA) Margam. There is ancient woodland adjacent to a small part of the southern and northeast site boundaries.

- 5.4.2 In relation to historic and cultural designations, which is a consideration in the preparation of LVIAs, the site is located in the south of Margam Mountain Landscape of special Scientific Interest. Within the most northern extent of the site is the southern tip of Roman Camp scheduled monument, adjacent to the east boundary of the site is Camp 530m East of Tonmawr scheduled monument, and adjacent to the west boundary of the site is Camp North of Tonmawr scheduled monument. Adjacent to the southwest boundary of the site is Margam Park registered historic park and garden, which is Grade I listed deer and landscape park; pleasure grounds; garden; and former kitchen garden. There are no conservation areas or listed buildings within 1.25km of the site boundary.
- 5.4.3 Several footpaths transect the site, which connect the adjacent woodland blocks, surrounding public rights of way, and the Ton Mawr farmstead. St Illtyd's Long distance footpath (LDFP) and the Ogwr Ridgeway LDFP transect the southwest of the site before skirting the west and northwest boundary within the site. The LDFPs within the site follow the same route before they head off in separate directions just north of the site. St Illtyd's Walk heads north-westwards through the coniferous woodland and beyond. Ogwr Ridgeway Walk heads eastwards, along the northern edge of the coniferous woodland before transecting upland pasture and continuing beyond.
- 5.4.4 Beyond the site boundary there are several public rights of way, including the alternative and main route of the Wales Coast Path. A section of National Cycle Route 4 is located to the south of the site and follows part of the alternative and main route of the Wales Cast Path.
- 5.4.5 Open access land is located adjacent to the east and northwest boundary of the site, which covers the coniferous woodland areas of Coed Cwm Kenfig and the majority of Mynydd Margam. Adjacent to the southwest corner of the site, access land extends westwards, covering steep slopes within Margam Park, but excludes the five small squares of coniferous woodland.
- 5.4.6 In relation to LANDMAP, the site has overall evaluations of low for Landscape Habitats; moderate for Geological Landscape, and Visual and Sensory; and Outstanding for Historic Landscape. The Historic Landscape evaluations include multi-period archaeological remains and features, including those associated with Margam Park. The Landscape Habitats is noted for its fairly intensive farmland, and Visual and Sensory identifies the site's exposure to the south with some enclosure to the north by the adjacent forestry, its moderate scenic qualities but outstanding panoramic views to the south.

- 5.4.7 The site is comprised of pasture fields, a small valley covered with bracken and deciduous trees, and steep strips of land covered in scrub. An overgrown hedgerow is located in the northeast of the site and forms a distinctive feature. Pasture fields in the southwest of the site are generally bounded by individual trees from remnant hedgerows with stone walls around some boundaries in the southeast. In the northern half of the site, pasture fields are generally bounded by post and wire fencing.
- 5.4.8 Large blocks of coniferous woodland are located adjacent to the northwest, north, and northeast of the site. The northeast of Margam Park is located adjacent to the west of the site with the boundary defined by a stone wall. A distinctive ridgeline heads southwest from the site and is transected with public rights of way.
- 5.4.9 The site is exposed and open, although close to the adjacent conifer woodland shelter is provided. There is a sense of isolation with no road access and Ton Mawr farmstead being the only dwelling. There are long distant panoramic views to the south whereas to the north, a combination of the adjacent conifer woodland, and the topography of the site and its context screen distant views.
- 5.4.10 An initial Zone of Theoretical Visibility (ZTV) plan has been prepared, which was calculated to the proposed solar array height of 3m Above Ordnance Datum (AOD) to represent the 'worst case scenario'. The ZTV was based on the majority of the site being covered by solar panels with some exceptions, including the narrow thin strip of land in the north and valley locations in the south. It shows that topography influences the potential visibility of the solar farm, particularly to the north of the site where topography would screen views. To the south, on the lowlands, there would be of the potential solar farm, including from coastal locations. It is therefore suggested that the LVIA is based on an off-centre study area that extends 1km to the north, 10km to the south, and 3km to the west and east.
- 5.4.11 Potentially sensitive visual receptors include residents and people in settlement to the south of the site including at Coed Hirwaun, Eglwys, and Pyle; users of public rights of way including users of St Illtyd's Walk and Ogwr Ridgeway LDFPs, users of the Wales Coast Path and National Cycle route; and users of local roads to the south and southeast of the site.
- 5.4.12 It is suggested 10 viewpoints are photographed, the initial selection is provided in Table 5.4-1 below, including visual receptors represented and reasons for selection:

Table 5.4.1 Initial viewpoint selection details

Viewpoint reference	Location	Distance and direction from site	Receptors represented and reasons for selection
01	St Illtyd's Walk/ Ogwr Ridgeway Walk LDFPs to the southwest of the site	200m to the southwest	Users of the LDFPs • The viewpoint is located close to the site on an elevated ridgeline. • The viewpoint is located in the SLA, Registered Historic Park and Garden, and the Landscape of Special Historic Interest. • The ZTV indicates that a moderate part of the proposed development would be visible from the ridgeline.
02	Margam Park	1.5m to the southwest	Visitors to Margam Park and users of nearby rights of way. • The viewpoint is located at a popular tourist attraction. • The viewpoint is located in the SLA, Registered Historic Park and Garden, and the Landscape of Special Historic Interest. It is also close to a conservation area, listed buildings, and scheduled monuments. • The ZTV indicates that moderate and minor parts of the proposed development would be visible from the park.
03	Eglwys Nynydd Road	2.4km to the southwest	Residents and local road users • The viewpoint represents key receptors, including residents. • The viewpoint is located in the Landscape of Special Historic Interest. • The site forms part of the elevated backdrop to views. • The ZTV indicates that the majority of the proposed development would be visible.
04	Coed Hirwaun Road	1.95km to the south	Nearby residents, nearby users of the Wales Coast Path, and local road users • The viewpoint represents key receptors, including residents. • The site forms part of the elevated backdrop to views.

Viewpoint reference	Location	Distance and direction from site	Receptors represented and reasons for selection
			The ZTV indicates that a moderate part of the proposed development would be visible.
05	B4283 Water Street	2.9km to the southwest	Local road users. - The site forms part of the elevated backdrop to views. - The ZTV indicates that the majority of the proposed development would be visible.
06	B4281 Cefn Road between Pyle and Cefn Cribwr	175m to the south	Residents, nearby users of public rights of way, and local road users. - The viewpoint represents key receptors, including residents. - The site forms part of the elevated backdrop to views. - The ZTV indicates that the majority of the proposed development would be visible.
07	Pyle	3.4km to the south	Residents, users of nearby public rights of way, and local road users - The viewpoint represents key receptors, including residents. - The site forms part of the elevated backdrop to views. - The ZTV indicates that the majority of the proposed development would be visible.
08	Kenfig Burrows	5km to the southwest	Visitors to the National Nature Reserve and nearby users of public rights of way - The site forms part of the elevated backdrop to views. - The viewpoint is located at an important visitor attraction. - The ZTV indicates there would be views of the proposed development.
09	Meadow Street, North Conelly	4.3km to the south	Residents and local road users - The viewpoint represents key receptors, including residents. - The site forms part of the elevated backdrop to views.

Viewpoint reference	Location	Distance and direction from site	Receptors represented and reasons for selection
			• The ZTV indicates that the majority of the proposed development would be visible.
10	Rest Bay visitor car park	8.25km to the south	Visitors to Rest Bay and nearby users of the Wales Coast Path • The viewpoint is located at a popular visitor destination • The site forms part of the elevated backdrop to views. • To represent distant views from the south.

5.4.13 The initial viewpoint selection is to be discussed and agreed with the Council.

Design Mitigation

5.4.14 Designated areas are a key consideration. Appropriate buffers between adjacent ancient woodland blocks and development would be incorporated, as well as buffers between adjacent scheduled monuments and development. Buffers would also be included between public rights of way that transect the site and development.

5.4.15 There are some very steep parts of the site that maybe omitted from development.

5.4.16 Other design mitigation may include omitting parts of the site from potential solar farm development that maybe more sensitive in landscape and visual terms. This includes locations close to Margam Park and associated designated areas, or areas of the site that are more prominent in views.

5.4.17 Design mitigation may also include the planting of trees and some hedgerow restoration and planting.

Impact Prediction and Mitigation

5.4.18 Mitigation measures which would be implemented in order to avoid, reduce or offset adverse effects, especially those identified as significant, and, where possible, incorporate these in the scheme design. The LVIA will assess the significance of effects on landscape and visual receptors as residual effects with mitigation measures in place.

Cumulative Assessment

- 5.4.19 Cumulative landscape and visual assessments will be undertaken for surrounding solar farm developments that are either operational, in construction, or have planning consent that are located within 3km of the site to the west and east, and 10km to the south.
- 5.4.20 Schemes that are to be included in the cumulative assessments are to be agreed with the Council.

6 Ecology and Nature Conservation

6.1 Introduction

6.1.1 The ecological assessment of the Proposed Development on flora and fauna (birds are considered separately under Section 7) will be conducted by RSK ADAS Ltd. ADAS has worked on the Ecological Impact Assessment (EclA) of more than 20 large solar farm proposals. All of these EclAs have encompassed the full range of relevant surveys (e.g., vegetation, ornithology, bats, otter, water vole, dormouse, badger, Great Crested Newt) as well as ancillary surveys underpinning ecology (e.g. peat assessment). All of the ADAS proposed surveyors for this project have extensive experience of standard and accepted survey methodologies.

6.2 Policy and Relevant Guidance

6.2.1 An analysis of the legislative and policy framework relevant to the EclA is presented below.

Table 6.2.1: Relevant legislation and planning policy - Ecology

Scale	Legislation/ Planning Policy	Description
International	Natura 2000	Natura 2000 is a network of core breeding and resting sites for rare and threatened species, and some rare natural habitat types which are protected in their own right. Sites are present across all 27 member states as well as the United Kingdom, owing to the UK's membership of the European Union at the time of inception. Sites comprise a combination of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), designated for species or habitats valued at a European level.
	The Wildlife and Countryside Act 1981 (as amended) (WCA)	This piece of legislation remains the primary UK mechanism for statutory site designations (e.g. Sites of Special Scientific Interest (SSSI)) and the protection of individual species listed under Schedules 5 and 8 of the Act, each subject to varying levels of protection.
National	Protection of Badgers Act 1992	Affords protection to individual badgers from disturbance, injury or killing, and protects their setts from interference.
	Environment (Wales) Act 2016	This piece of legislation places a duty to conserve biodiversity and protected areas on local authorities, and replaces the Natural Environment and Rural Communities Act 2006 in Wales. The act put into place the necessary legislation to enable the planning and

Scale	Legislation/ Planning Policy	Description
		management of the natural resources of Wales in a more sustainable, pro-active and joined-up way.
Regional	Future Wales – The National Plan 2040	Future Wales is the national development framework, setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system, including sustaining and developing a vibrant economy, achieving decarbonisation and climate-resilience, developing strong ecosystems and improving the health and well-being of our communities. Policy 18, Criterion 5 requires that all renewable energy Developments of National Significance (DNS) must include enhancement measures to provide a net benefit to biodiversity.
	Planning Policy Wales – Chapter 6: Distinctive and Natural Places (11th ed. 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government’s objectives for Biodiversity and Ecological Networks among other environmental and cultural components of ‘Placemaking’. In particular, the Biodiversity and Ecological Networks section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by NRW. In this sense PPW now requires information of ecosystem resilience as well as protected and priority species as outlined by Section 6 and Section 7 of the Environment (Wales) Act 2016.
	Technical Advice Note (TAN) 5 - Nature Conservation and Planning (2009)	Technical Advice Note 5 (TAN5) contains a set of principles which includes integrating nature conservation into all planning decisions and for development to provide a net benefit for biodiversity conservation in Wales with no significant loss of habitat or populations of species, locally or nationally.
	The Countryside and Rights of Way (CROW) Act 2000	This legislation strengthens the provisions of the 1981 Wildlife and Countryside Act, both in respect to statutory sites such as Sites of Special Scientific Interest (SSSIs) and protected species. It also places a statutory obligation on Local Authorities and other public bodies to further the conservation of biodiversity in the exercise of their functions, thus

Scale	Legislation/ Planning Policy	Description
		providing a statutory basis to the Biodiversity Action Plan (BAP) process which began in 1994. Section 74 of the Act lists the habitat types and species of principal importance in England.
Local	Neath Port Talbot Council – Local Development Plan 2011 - 2026	The Neath Port Talbot Council Local Development Plan contains a set of policies which identify the need to conserve species and/or habitats as part of the planning consultation process, integrating nature conservation into all planning decisions and for any development to provide a net benefit for biodiversity conservation in Wales with no significant loss of habitat or populations of species, locally or nationally. Additionally, renewables projects must demonstrate that appropriate measures have been taken to minimise the impact on the natural environment.
	SP15 – Biodiversity and Geodiversity	Important habitats, species and sites of geological interest will be protected, conserved, enhanced and managed through the following measures: 1. The identification of the following Internationally and Nationally designated sites within the County Borough to enable their protection: (a) SACs and Ramsar Sites; (b) SSSIs; (c) National Nature Reserves (NNRs). 2. The identification and protection of sites of regional and local importance; 3. The protection of important natural heritage features.
	EN6 – Important Biodiversity and Geodiversity Sites	Development proposals that would affect RIGS, LNRs, SINCs, sites meeting SINC criteria or sites supporting LBAP or S42 habitats or species [now Section 7 habitats and species] will only be permitted where: 1. They conserve and where possible enhance the natural heritage importance of the site; - Or 2. The development could not reasonably be located elsewhere, and the benefits of the development outweigh the natural heritage importance of the site. Mitigation and/or

Scale	Legislation/ Planning Policy	Description
		compensation measures will need to be agreed where adverse effects are unavoidable.
	EN7 – Important Natural Features	Development proposals that would adversely affect ecologically or visually important natural features such as trees, woodlands, hedgerows/field boundaries, watercourses or ponds will only be permitted where: 1. Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or 2. The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.
	SP16 – Environmental Protection	Air, water and ground quality and the environment generally will be protected and where feasible improved through the following measures: 1. Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution levels; 2. Giving preference to the development of brownfield sites over greenfield sites where appropriate and deliverable; 3. Ensuring that developments do not increase the number of people exposed to significant levels of pollution.

6.2.2 The key legislation for individual species that are relevant to this EcIA scoping report is summarised in Table 6.2.2.

Table 6.2.2: Species-specific legislation

Species	Legislation
Plants	Section 13 (Schedule 8) of the Wildlife and Countryside Act 1981 (as amended) (WCA) and Regulations 46-52 (Schedule 5) of the Conservation of Habitats and Species Regulations 2017 (as amended) identify measures for the protection of wild plants. The legislation together protects all plants listed on both Schedules of both pieces of legislation against:

Species	Legislation
	> Intentionally picking, collecting, cutting, uprooting or destroying a wild plant; > Selling, offering or exposing for sale, or having in possession or transporting for the purpose of sale, any live or dead wild plant included in the Schedules, or any part of, or anything derived from, such a plant; or > Publishing or causing to be published any advertisement likely to be understood as conveying that he buys or sells, or intends to buy or sell, any of those things. Enforcement provisions of the WCA were extended by the Countryside Rights of Way Act 2000 (CRoW), Section 81 and Schedule 12. Section 14 of the WCA prohibits the planting in the wild of plants listed in Part 11 or Schedule 9 or otherwise causing them to grow there. This includes (amongst others) Himalayan balsam <i>Impatiens glandulifera</i> and Japanese knotweed <i>Fallopia japonica</i>.
All species of British bat <i>Chiroptera sp.</i>	All British species of bat are listed on Schedule 2 'European Protected Species of Animals' of the Conservation of Habitats and Species Regulations 2017 (as amended), and as such are known as European Protected Species (EPS). In addition, all British bats are protected under Section 9 (Schedule 5) of the WCA and eight species are listed on Section 7 of the Environment (Wales) Act 2016. In summary, the above legislation collectively prohibits the following: > Deliberate capture, injury or killing of a bat. In court, 'deliberate' is likely to be interpreted as someone who, although not intending to capture/injure or kill a bat, performed the relevant action whilst being sufficiently informed and aware of the consequence their actions will most likely have; > Intentional or reckless disturbance of a bat in its roost or deliberate disturbance of a group of bats; > Damage or destruction of a bat roosting place (even if bats are not occupying the roost at the time); > Possession or advertisement/sale/exchange of a bat (dead or alive) or any part of a bat; or > Intentional or reckless obstruction of access to a bat roost. Licences are issued by NRW for any actions that may compromise the protection of an EPS, including bats, under the Conservation of Habitats and Species Regulations 2017 (as amended). This includes all

Species	Legislation
	developments and engineering schemes, regardless of whether or not they require planning permission.
Hazel dormouse <i>Muscardinus avellanarius</i>	Hazel dormouse are an EPS and also fully protected under Schedule 5 of WCA. This makes it an offence to: > Capture, kill, disturb or injure hazel dormouse (on purpose or by not taking enough care). > damage or destroy a breeding or resting place (deliberately or by not taking enough care) > obstruct access to their resting or sheltering places (deliberately or by not taking enough care) > possess, sell, control or transport live or dead hazel dormouse, or parts of dormouse. Licenses are issued by NRW for any actions that may compromise the protection of an EPS including hazel dormouse, under the Habitats Regulations 2017. This includes all developments and engineering schemes, regardless of whether or not they require planning permission.
Eurasian badger <i>Meles meles</i>	Badgers are subject to legislation contained within the Protection of Badgers Act 1992. This means that it is unlawful to kill, capture, disturb or injure any individual or intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering by badgers.
Water vole <i>Arvicola amphibious</i>	The water vole is fully protected under Schedule 5 of the WCA and is a priority conservation species. This makes it an offence to: > Intentionally capture, kill or injure water voles; > damage, destroy or block access to their places of shelter or protection (on purpose or by not taking enough care); > disturb them in a place of shelter or protection (on purpose or by not taking enough care); or > possess, sell, control or transport live or dead water voles or parts of them (not water voles bred in captivity). Licences are not issued for 'development' under WCA by NRW. However, with the application of sufficient measures to avoid harm and preparation of a working method statement for the construction period, then it is unlikely that incidental offences will occur. This applies to both permitted development and development requiring planning permission.

Species	Legislation
Otter <i>Lutra lutra</i>	Otters are an EPS and also fully protected under Schedule 5 of the WCA. This makes it an offence to: > Capture, kill, disturb or injure otters (on purpose or by not taking enough care); > damage or destroy a breeding or resting place (deliberately or by not taking enough care); > obstruct access to their resting or sheltering places (deliberately or by not taking enough care); or > possess, sell, control or transport live or dead otters, or any part of an otter. Licences are issued by NRW for any actions that may compromise the protection of an EPS including otters, under the Conservation of Habitats and Species Regulations 2017 (as amended). This includes all developments and engineering schemes, regardless of whether or not they require planning permission.
Great Crested Newt <i>Triturus cristatus</i>	Great Crested Newt (GCN) are an EPS and fully protected under Schedule 5 of the WCA. This makes it an offence to: > Capture, kill, disturb or injure a GCN (deliberately, or by not taking enough care); > damage or destroy a breeding or resting place, both pond and terrestrial (deliberately, or by not taking enough care); > obstruct access to their resting or sheltering places, both pond and terrestrial (deliberately, or by not taking enough care); or > possess, sell, control or transport live or dead GCN, or parts of a GCN. Licences are issued by NRW for any actions that may compromise the protection of an EPS, including GCN, under the Conservation of Habitats and Species Regulations 2017 (as amended). This includes all developments and engineering schemes, regardless of whether or not they require planning permission.

6.3 Study Area and Zone of Influence

6.3.1 The assessment conducted for this report has considered the area in which ecological features could be subject to significant effects from the Proposed Development. The area of the potential effects is often wider than the actual perimeter of the development site and is known as the Zone of Influence (ZOI).

- 6.3.2 The ZOI varies for different ecological features and each designated site, habitat and species has been considered in relation to their sensitivity to the Proposed Development.

6.4 Assessment Methodology

Scope

- 6.4.1 The EcIA will follow guidelines developed by The Chartered Institute of Ecology and Environmental Management (CIEEM, 2018). These guidelines aim to promote good practice in EcIA relating to terrestrial, freshwater, coastal and marine environments in the UK and Ireland. The Biodiversity: Code of practice for planning and development published by the British Standards Institute (BS 42020:2013) cites the CIEEM EcIA Guidelines as the acknowledged reference on ecological impact assessment. The Guidelines are consistent with the British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.
- 6.4.2 The guidelines state that EcIA is a process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems. The findings of an assessment can help competent authorities understand ecological issues when determining applications for consent. EcIA can be used for the appraisal of projects of any scale including the ecological component of Environmental Impact Assessment (EIA). When undertaken as part of an EIA, EcIA is subject to the relevant EIA Regulations. Unlike EIA, EcIA on its own is not a statutory requirement. It is an evaluation process undertaken to support a range of assessments. EcIA is a process that is most effective if all contributing ecologists and other specialists work in collaboration. An EcIA report (or the ecological chapter of an EIA Environmental Statement (ES)) should clearly and simply describe the significant effects of any project so that all interested parties understand the implications of what is proposed. The Guidelines explain the key elements of the EcIA process. Key to this is a scientifically rigorous and transparent approach. EcIA should be undertaken by qualified professionals with an appropriate level of experience in ecological survey and impact assessment who are recognised by a relevant professional body such as CIEEM.
- 6.4.3 The CIEEM guidelines list the following principles that underpin EcIA:
- Avoidance. Seek options that avoid harm to ecological features (for example, by locating on an alternative site).

- Mitigation. Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed - for example, through a condition or planning obligation.
- Compensation. Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- Enhancement. Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

Determining Importance

6.4.4 The importance of the features on site are assessed and defined in a geographical context (see Table 6.4.1). The frame of reference for the habitat features in terms of their geographical importance is in line with guidance set out in CIEEM, 2018.

6.4.5 Species are assessed, where appropriate, against best practice guidelines.

Table 6.4.1: Definitions of nature conservation value for ecological features

Level of Value	Reference	Examples
Very High	International	Very high importance and rarity, international scale and limited potential for substitution. > An internationally designated site or candidate site SPA, SAC, Ramsar Site, Biogenetic reserve or an area which NRW has determined meets the published selection criteria for such designation, irrespective of whether or not it has yet been notified. > Internationally significant and viable areas of a habitat type listed in Annex 1 of the Habitats Directive. > Regularly occurring globally threatened species (i.e. International Union for Conservation of Nature - Red-listed) or species listed on Annex 1 of the Bern Convention. > Regularly occurring populations of internationally important species that are rare or threatened in the UK or of uncertain conservation status. > A regularly occurring nationally significant population/number of any internationally important species.
High	National / Regional (Wales)	High importance and rarity, national scale and limited potential for substitution.

Level of Value	Reference	Examples
		> A nationally designated site, e.g. SSSI, National Nature Reserve (NNR) or a discrete area which meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether it has yet to be notified. > A viable area of a Section 7 Environment Act Habitat of Principal Importance or of smaller areas of such habitat that is essential to maintain the viability of a larger whole, this could include a network of ancient species-rich hedges or even small groups of ancient trees. > A regularly occurring significant population/number of any nationally important species i.e. listed on the WCA 1981 (as amended). > Any regularly occurring population of a nationally important species that is threatened or rare in the county or region.
Medium	County (Neath – Port Talbot)	High or medium importance and rarity, regional scale, limited potential for substitution. > Regional/county significant and viable areas of key habitat identified as being of regional value. > Any regularly occurring significant population of a species listed as being nationally scarce, or in the LBAP or relevant Natural Area on account of its regional rarity or localisation. > Significant populations of a regionally/county important species. > Sites such as Sites of Importance for Nature Conservation (SINC) selected on Regional/County criteria. > Any regularly occurring significant population that is listed in a Local Red Data (RDB) or BAP on account of its rarity or localisation.
Low	Local	Low or medium importance and rarity, local scale. > Areas identified in a LBAP or in the relevant natural area profile. > Sites/features that are scarce within the locality or which appreciably enrich the local area's habitat resource. > A diverse and/or ecologically important valuable hedgerow network. > Diverse and/or ecologically valuable grassland.

Level of Value	Reference	Examples
		> A significant population of a local important species i.e. listed on a LBAP. > Species populations of local importance.
Negligible	-	Very low importance and rarity, local scale. > Areas of habitat considered to appreciably enrich the habitat resource within the context of the Parish or Neighbourhood. > An occasional occurrence or small population of a locally scarce species.

Characterising Potential Impacts

6.4.6 The descriptions in Table 6.4.1 are used to categorise the geographical 'importance' of species and habitats. In characterising potential impacts, the term 'ecological integrity' is used, as defined by the Office of the Deputy Prime Minister (ODPM) Circular 06/2005 on Biodiversity and Geological Conservation (ODPM, 2005) where the integrity of a designated site refers to "coherence of ecological structure and function...that enables it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified".

6.4.7 For species and for non-designated habitats, the ODPM Circular (and CIEEM guidance) refers to 'conservation status'. The Circular states (in Part IV, Paragraph 96) that species and habitats are normally legally protected because of their vulnerable conservation status (i.e. the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations). Conservation status is thus a key concept in the assessment of effects on species and non-designated habitats. The judgement on the severity of effects was based on a combination of the following: knowledge of the requirements of the species or habitat in question, and an evaluation of the effect itself. In describing the effects, reference was made to the following factors:

- Confidence in predictions;
- Spatial extent of effect;
- Temporal extent of effect;
- Reversibility of effect; and
- Timing and frequency of effect.

6.4.8 In reality, evaluation of the severity of effects is frequently made on the basis of 'professional judgement' (which would include such factors as the fragility of the habitat receiving the effect) and this was used where required.

Magnitude of Potential Effects

6.4.9 Table 6.4.2 outlines the criteria used to determine the magnitude of an impact. Table 6.4.3 outlines the criteria used to determine the temporal magnitude of impacts.

Table 6.4.2: General criteria to describe the magnitude / character of potential effects

Magnitude of Impact		Typical criteria
Major	Adverse	Complete or near-complete loss of resource, population/productivity and/or quality and integrity of the receptor, through mortality, displacement or disturbance. Severe damage to key characteristic features or elements. Quantified as approximately >80% of resource lost.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality. Quantified as approximately a >80% net gain for the resource, in comparison with the baseline.
Intermediate	Adverse	Significant effect on the resource or status of the population/productivity due to mortality, displacement or disturbance, but not adversely affecting the integrity. Partial loss of/damage to key characteristics, features or elements. Quantified as 21-80% of resource lost.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. Quantified as approximately a 21-80% net gain for the resource, in comparison with the baseline.
Minor	Adverse	Some measurable change/partial reduction in the status of the population/productivity of its attributes, via mortality, displacement or disturbance. Minor loss of or alteration to, one (or maybe more) key characteristics, features or elements of the resource. Quantified as 1-20% of resource lost.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring. Quantified as an approximate 1-20% net gain for the resource in comparison with the baseline.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements. Quantified as <1% of the resource lost.

Magnitude of Impact		Typical criteria
	Beneficial	Very minor improvement of the status of the population/productivity or quality of the resource. Quantified as a <1% net gain for the resource. No loss or alteration of characteristics, features or elements; no observable effect in either direction.
No change	Neutral	No loss or alteration of characteristics, features or elements; no observable effect either adversely or beneficially. Can also be considered a continuation of the baseline.

Table 6.4.3: Temporal magnitude/timeframe of potential impacts

Temporal Magnitude	Definition
Permanent	Impact continues beyond the span of lifetime of the development (>30 years)
Long-term	Between 15 and 30 years
Medium term	Between 5 and 15 years
Short term	6 months and up to 5 years
Negligible	Less than 6 months

Determining Significant Effects

6.4.10 In this assessment, the significance of an effect was determined through a combination of the ecological value of the species and/or habitat (Table 6.4.1) and the magnitude criteria from Table 6.4.2 and Table 6.4.3. As an example, a sustainable (i.e. ecologically viable) area of County BAP habitat would be valued at 'Medium' level of value (Table 6.4.1). If a substantial proportion of this were to be removed for solar panels or access tracks, this would mean the effect was of a large extent (meaning that what habitat remains no longer functions as a viable ecosystem). The effect would also be irreversible (at least for the foreseeable future). The magnitude of the impact is thus major – adverse and of long-term duration (Tables 6.4.2 and 6.4.3). A high degree of confidence can be placed in this prediction. . In cases such as this, where the significance falls within a range (e.g. between 'moderate' or 'large'), a decision is made as to which is the correct value. This decision is based on the factors listed in 6.4.7 and particularly on 'professional judgement'.

6.4.11 In this assessment, any effect that is of at least 'moderate' significance (with Ecological Value of at least medium i.e. 'County' level) is considered as significant in the overall context of the development and in terms of the EIA Regulations and CIEEM guidance. Where ecological value is assessed as Low level or below, effects of 'moderate' significance are considered to be not significant in terms of the EIA Regulations and CIEEM guidance. Professional judgement is an

important factor in determining the level of ecological value, the magnitude of the impact and the overall significance. An effect may be either negatively or positively significant.

Cumulative Effects

- 6.4.12 High quality habitats at the current site are limited to the areas of acid grassland and acid flush, and therefore there will be little or no cumulative impact with other sites. Further survey work is required to ascertain site importance for other species listed (mammals, reptiles, amphibians) and an assessment of the potential cumulative effects will take place once that's completed. The lack of nearby development means that significant cumulative impacts are unlikely, however the additional impacts of all developments within the zone of influence will be reviewed in relation to this proposal.

Avoidance and Mitigation

- 6.4.13 Appropriate strategies for avoidance and mitigation will be proposed following the required survey work (see Section 6.5.28). It is anticipated some elements of the mitigation in terms of the proposal will be in relation to the design of the development. In particular, the location of solar panels and tracks, as well as other associated infrastructure, will be critical in avoiding any significant impacts. It is highly likely that additional mitigation measures required will be identified following the completion of surveys.

Residual Effects

- 6.4.14 Residual effects on habitats and species will be assessed following completion of initial assessment and identification of appropriate avoidance and mitigation measures.

Compensation

- 6.4.15 Based on the results of baseline surveys (see section 6.5: Baseline Conditions), the need for compensation will be fully assessed, with recommendations provided for any subsequent on or off-site compensation.

Enhancement

- 6.4.16 Ecological enhancement of the site will be discussed with Neath Port Talbot Council and NRW, as appropriate.

6.5 Baseline Conditions

6.5.1 This section describes the baseline ecology conditions at the site, based on desk study and original field surveys. It outlines existing nature conservation designations. It also describes the species and habitats present in terms of current knowledge.

Desk Study

6.5.2 Nine statutory sites were located within 5km of the site and four non-statutory sites within 2km of the site. See Table 6.5.1 for further details.

Table 6.5.1: Statutory and non-statutory designated sites within 5km and 2km of the survey site

Site Name	Description	Designations	Distance from site
Statutory Designated Sites			
Kenfig	Kenfig is of special interest for its extensive sand dune habitats and standing waters together with a mixture of associated coastal habitats including saltmarsh, intertidal areas, swamp, woodland and scrub. In addition, the site is of special interest for the assemblages of plants, fungi and invertebrates that are associated with the sand dunes and standing waters. Designated an SAC for the presence of a number of Annex I habitats and Annex II species, namely: "Fixed Coastal Dunes with herbaceous vegetation (grey dunes), Dunes with Creeping Willow <i>Salix repens</i> ssp., Argentea <i>Salicion arenariae</i> , Humid Dune Slacks, Hard Oligo-mesotrophic waters with benthic vegetation of Common Stonewort <i>Chara</i> ssp, Atlantic Salt Meadow and Petalwort <i>Petalophyllum ralfsii</i> and Fen Orchid <i>Liparis loeselii</i> .	SAC and SSSI	4.2km SW
Cefn Cribwr Grasslands	Designated for the presence of the Annex I habitat Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>).	SAC and SSSI	4.2km SE
Kenfig Pool and Dunes	Consists of a large expanse of sand dunes which lead to the coast and Sker Point. Glamorgan's largest lake, Kenfig Pool, is	National Nature Reserve (NNR)	4.7km SW

Site Name	Description	Designations	Distance from site
	situated on the edge of the reserve. Home to several wild orchid species, including the rare <i>Epipactis neerlandica</i> and Fen Orchid. Kenfig NNR holds more than 90% of the total number of Fen Orchids found in the UK. The NNR also supports diverse birds and invertebrates.		
Eglwys Nunydd Reservoir	The largest body of fresh water in the county. On the site of Margam Moors which, before being reclaimed for the Abbey Steel Works, were a notable site for wildfowl. The reservoir attracts large numbers of wintering waterfowl and passage migrants.	SSSI	3.8km SW
Caeau Cefn Cribwr	One of four components which form part of Cefn Cribwr Grasslands SAC. This site is designated due to the presence of all seven SAC and SSSI units present, including Eu Molinion meadows, Marshy and dry neutral grasslands, and species including Viper's Grass <i>Scorzonera humilis</i> , Marsh Fritillary <i>Euphydryas aurinia</i> , Marsh Fern <i>Thelypteris palustris</i> and Bog Myrtle <i>Myrica gale</i> .	SSSI	4.3km SE
Cwm Risca Meadow	Designated due to the marshy grassland habitat on site which supports Marsh Fritillary.	SSSI	4.9km ESE
Pen y castell, Cefn Cribwr	One of four components which form part of Cefn Cribwr Grasslands SAC. This site is designated due to the presence of Eu Molinion meadows, Marshy and dry neutral grasslands, Marsh Fritillary and Bog Myrtle.	SSSI	4.7km SSE
Waun Cimla	One of four components which form part of Cefn Cribwr Grasslands SAC. This site is designated due to the presence of Eu Molinion meadows and Marsh Fritillary.	SSSI	3.9km SE
Margam Moors	The last remaining example of the once extensive coastal levels in West	SSSI	4km SW

Site Name	Description	Designations	Distance from site
	Glamorgan. Bounded to the seaward side by dunes and landward by high ground, the meadows provide an agriculturally-managed freshwater habitat which hosts many species of plant on the edge of their geographical range, and nationally important invertebrates. The nationally rare Crawling Water Beetle <i>Haliphus mucronatus</i>, Ruddy Darter <i>Sympetrum sanguineum</i> and the regionally rare scavenger beetle <i>Anacaena bipustulata</i>, have all been found in the ditches.		
Non-statutory Designated Sites			
Margam Country Park	Woodlands and wood pasture, neutral grassland, bats including Lesser and Greater Horseshoe and Barbastelle bats	Site of Importance for Nature Conservation (SINC) (Neath Port Talbot (NPT))	Adjacent to western boundary of site
Cwm Cerdin	Broad-leaved semi-natural woodland, unimproved neutral grassland	SINC (NPT)	700m north-east of eastern boundary of site
Gilfach Uchaf	Marshy grassland, semi-improved acid grassland, acid dry dwarf shrub heath and rock exposure	SINC (NPT)	Adjacent to eastern boundary of site
Nant y Castell grasslands	Unimproved neutral grassland.	SINC (NPT)	1km east of eastern boundary of site

6.5.3 Table 6.5.2 presents the results of the biological records search. Only data from the last ten years is presented. A large number of records were received from South East Wales Biodiversity Records Centre (SEWBReC) that related to historical records (majority pre-2000).

Table 6.5.2: Records of selected protected or notable species within 2km of the site

Species	Designation	Approx. location
Badger <i>Meles meles</i>	PBA	Forestry to east of site, Ton-Mawr farm area
Harvest Mouse <i>Micromys minutus</i>	EAW S.7	Margam Country Park
Noctule <i>Nyctalus noctula</i>	EPS; EAW S.7	Margam Country Park
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	EPS; EAW S.7	Margam Country Park
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	EPS, EAW S.7	Margam Country Park
Natterer's Bat <i>Myotis nattereri</i>	EPS	Margam Country Park
Daubenton's Bat <i>Myotis daubentonii</i>	EPS	Margam Country Park
Grass Snake <i>Natrix natrix</i>	WCA5, EAW S. 7	Forestry to west of site
Adder <i>Vipera berus</i>	WCA5, EAW S. 7	Margam Country Park
Slow-Worm <i>Anguis fragilis</i>	WCA5	WCA5, EAW S. 7
Common Lizard <i>Zootoca vivipara</i>	WCA5, EAW S. 7	Forestry to east of site
Common Frog <i>Rana temporaria</i>	WCA5, EAW S. 7	Forestry to east of site, forestry to west of site
Common Toad <i>Bufo bufo</i>	WCA5, EAW S. 7	Forestry to east of site
Small Heath <i>Coenonympha pamphilus</i>	EAW S. 7	Forestry east of site
Small Pearl-Bordered Fritillary <i>Boloria selene</i>	EAW S. 7	Open grassland in north of site

Species	Designation	Approx. location
Black Oil-Beetle <i>Meloe proscarabaeus</i>	EAW S. 7	Forestry east of site
Violet Oil-Beetle <i>Meloe violaceus</i>	EAW S.7	Ton-mawr farm area

1 Distances are given from the central point of the site.

EAW=Environment Act Wales 2016

EPS=European Protected Species (Habitats Directive/Birds Directive)

WCA5 = Wildlife and Countryside Act 1981 Schedule 5

WCA8 = Wildlife and Countryside Act 1981 Schedule 8

S7 = Environment (Wales) Act 2016 species

PBA = Protection of Badger Act 1992

Field Surveys

6.5.4 A Phase 1 Habitat Survey was conducted in July 2020 by Principal Ecologist Chris Forster Brown MCIEEM, based on the techniques and methodologies described in the Handbook for Phase 1 Habitat Survey (Joint Nature Conservation Committee (JNCC) 2010) and using standard nomenclature (Stace 2019). The habitats present were recorded on to a field map with written target notes providing supplementary information on, for example, species composition, structure and management where relevant. Plant species abundance was rated for each habitat using the DAFOR scale. The abundance of each species was used to determine the habitat type present.

6.5.5 This was extended to include notes on fauna and habitats which could potentially support protected species, an approach commonly referred to as an Extended Phase 1 Habitat Survey. The presence of, or potential for, protected species was noted on the field map during the survey.

6.5.6 The habitats identified within the Extended Phase 1 Habitat Survey are listed and described below.

- Semi-natural broadleaved woodland;
- Watercourse
- Line of trees;
- Improved grassland;

- Acid grassland;
- Marshy grassland;
- Bracken;
- Acid flush;
- Wall; and
- Coniferous plantation.

Semi-natural broadleaved woodland

- 6.5.7 Semi-natural broadleaved woodland was found in the south-west of the site. This was mainly comprised of Pedunculate Oak *Quercus robur*, with no associated ground flora.

Watercourse

- 6.5.8 The northern boundary of the site adjoined the river Kenfig (Afon Cynffig), running approximately north – south along the edge of the acid grassland. Waterside vegetation included Himalayan Balsam *Impatiens glandulifera* along much of its course.

Line of trees

- 6.5.9 Two lines of mature trees are found in the south-east of the site. These are almost entirely comprised of Beech *Fagus sylvatica* and appear to follow the line of footpaths in these areas.

Improved grassland

- 6.5.10 The majority of the site comprised improved to poor semi-improved grassland. The majority of areas were heavily sheep-grazed and therefore the vegetation was low. The agricultural indicators of improvement White Clover *Trifolium repens* and Perennial Rye-grass *Lolium perenne* were abundant throughout. Species indicative of a slightly less improved sward were relatively frequent, and in places the grassland was more akin to poor semi-improved rather than improved. These indicators included occasional Crested Dog's-tail *Cynosurus cristatus* and occasional Yorkshire-fog *Holcus lanatus*. The grassland towards the forestry edge in the west of the site was noticeably less improved and should be classed as semi-improved. Some of this less improved grassland was associated with the site of a fort or on steeper ground. An area of more semi-improved grassland was also found in the north-west of the site, close to the forest edge and near the tumuli marked in this area. Despite the grassland being less improved in places, it was not particularly diverse and did not support any species of more ecological value.

Acid grassland

- 6.5.11 A linear strip of acid grassland was found towards the south of the site, associated with a bank to the east of Ton Mawr farm and immediately above the track to the farm. This appeared to be ungrazed. It comprised frequent Sheep's-fescue *Festuca ovina*, frequent Common Bent *Agrostis capillaris*, rare Early Hair-grass *Aira praecox*, occasional Heath-grass *Danthonia decumbens*, occasional Tormentil *Potentilla erecta* and frequent/abundant Heath Bedstraw *Galium saxatile*. There was a noticeable abundance of Sheep's Sorrel *Rumex acetosella*, particularly associated with anthills. The whole area supported hundreds of Yellow Meadow Ant *Lasius flavus* anthills.

Marshy grassland

- 6.5.12 The area in the centre of the site (at the narrowest point between the two coniferous plantations) was marshy grassland. This was largely dominated by Soft Rush *Juncus effusus*, though Purple Moor-grass *Molinia caerulea* was also patchily present, and it is possible that this area once comprised peatland habitat.

Bracken

- 6.5.13 An area of scattered bracken, forming a mosaic with marshy grassland, was found to the north-west of Ton Mawr farm. This was associated with a small stream and valley. An area of more continuous, species-poor bracken was found in the south-east of the site, associated with a bank.

Acid flush

- 6.5.14 An area of acid flush, dominated by rush *Juncus* species and with patchy bog-moss *Sphagnum* species was situated in the north-west of the site. In places, this acid flush was more akin to marshy grassland (i.e. lacking the bog-moss species).

Wall

- 6.5.15 Drystone walls were found in the south of the site, demarcating the boundary between the site and Margam Country Park. These were largely intact though other examples towards the centre of the site were decrepit and were interspersed with fences.

Coniferous plantation

- 6.5.16 The central portion of the site is bounded on the west and east by coniferous plantation. The plantation to the west comprises low-growth forestry and a good range of bird species were associated with this.

Species

Bats

- 6.5.17 The linear features on site (lines of trees, drystone walls) appeared suitable for foraging bat species. These were largely contiguous with the surrounding woodlands (eastern and western slopes and in the south) and thus provided good extension foraging habitat to these areas. There were several mature trees containing features suitable for roosting bats present within the line of trees (see 6.5.8). Data from the local biodiversity records centre returned records of Noctule, Common and Soprano Pipistrelle, Natterer's and Daubenton's bats. Additionally, Margam Country Park immediately adjacent to the site holds a populations of Lesser and Greater Horseshoe Bats and Barbastelle.

Badgers

- 6.5.18 An individual Badger was recorded foraging on site during Nightjar surveys in 2022, however, there was no sign of an active sett within the surveyed area. This field observation in conjunction with the proximity of the surrounding woodland and feeding opportunities in the open pasture on site did mean that the site appeared suitable for this species. Historical records were evident from the grassland south of Ton Mawr farm and from the plantation forestry to the immediate west of the site.

Otter

- 6.5.19 No Otter spraints or other Otter signs were recorded from the site. In addition, no records of Otter were evident from the desk study. It is possible that Otter may occasionally use the river Kenfig study area, though (based on the lack of field signs) this is likely to be on a very infrequent basis.

Water Vole

- 6.5.20 No signs of Water Vole were recorded, and it is considered unlikely that Water Vole use this site. The river Kenfig and the flush areas (with Soft Rush) were considered most likely and therefore these were targeted for survey. However, it was determined that these were too

dense and sub-optimal to support Water Vole. No records of Water Vole were returned from SEWBreC.

Hazel Dormice

- 6.5.21 There was no suitable habitat on site for Hazel Dormice. Additionally, no records of this species were returned within 2km of the site by the local biodiversity records centre.

Reptiles

- 6.5.22 The presence of small areas of suitable habitat (particularly unimproved acid grassland), coupled with potential refugia sites in drystone walls suggests that the site is of potential suitability for common species of reptile (within the habitat areas described). Records of Adder, Grass Snake, Slow Worm and Common Lizard were returned from SEWBreC.

Amphibians

- 6.5.23 The presence of marshy grassland and acid flush indicated suitability for common amphibian species such as Common frog, Smooth Newt and Common Toad. However Great Crested Newt is highly unlikely to be present due to the underlying acidity of the soil, and the location of the nearest pond, which was 1.2km south west of the site, 180m below the site altitude. SEWBreC returned records of Common Frog and Common Toad.

Invertebrates

- 6.5.24 The site was suitable for a small range of invertebrates, particularly associated with the acid flush and marshy grassland habitats on site. The data search returned records of Small Heath, Small Pearl-bordered Fritillary, Black Oil Beetle and Violet Oil Beetle from within the site.

White-clawed crayfish

- 6.5.25 There was no suitable habitat for White-clawed Crayfish. Additionally, no records of this species were returned within 2km of the site by the local biodiversity records centre.

Non-native invasive plants

- 6.5.26 Himalayan Balsam *Impatiens glandulifera* was found to be frequent, intermixed in several flush areas and alongside the river Kenfig. Additionally, a small stand of mature Japanese Knotweed was located north of the site at approximately SS 84474 88307.

Vascular plants

6.5.27 No vascular plants were recorded that are listed under Schedule 8 of the Wildlife and Countryside Act or under the Vascular Plant Red Data List for Wales (Dines, 2008).

Receptors Considered to be Important Ecological Features (IEFs)

6.5.28 The areas of marshy grassland, acid grassland and acid flush were considered to be of ecological value. Badger were recorded foraging within the acid grassland. Foraging Pipistrelle spp. were observed over the acid grassland during Nightjar surveys, indicating that this area may be of importance for foraging and roosting bats. The line of trees was considered to have some potential for roosting bats, with several mature trees containing potential roost features (such as holes, cracks, split limbs and other fissures). The areas of coniferous woodland (particularly clearfell) on the eastern and western boundaries of the site were also considered to be of ecological importance, particularly for reptiles.

Table 6.5.3: Notable or Protected species and habitats on site scoped in and/or out

Species/Group	Scoped in / out	Rationale
SINC (Margam CP)	In	Proximity to development area; impacts presently unknown and dependent on final design.
SINC (Gilfach Uchaf)	In	Proximity to development area; impacts presently unknown and dependent on final design.
Acid Grassland	In	Habitat will be lost as a result of the development; habitat is rare/localised in site context
Acid flush	In	Habitat will be lost as a result of the development; habitat is rare/localised in site context
Marshy grassland	In	Habitat will be lost as a result of the development; habitat is rare/localised in site context
River Kenfig	In	Proximity to development area; impacts presently unknown and dependent on final design. Potential for pollution to watercourse during construction phase.
Line of trees	Out	Habitat will be retained
Improved Grassland	Out	Limited ecological value; enhancements as part of development are likely to improve this habitat
Bracken	Out	Limited ecological value; enhancements as part of development are likely to improve this habitat
Semi-natural broadleaved woodland	Out	Habitat will be retained
Walls	Out	Habitat will be retained
Reptiles	In	Further surveys required; Population present on site, with foraging, basking and hibernating habitats impacted
Amphibians	Out	No suitable habitat on site itself
Badgers	In	Further surveys required; Population present on site, with foraging, commuting and breeding habitats impacted
Bats	In	Further surveys required; Population present on site, with foraging, commuting and breeding habitats impacted
Otter	Out	No suitable habitat on site itself
Invertebrates	In	Further surveys required; Population present on site, with foraging, commuting and breeding habitats impacted
Water Vole	Out	No suitable habitat on site itself
INNS	Out	Himalayan Baslam on site is restricted to areas immediately along watercourses which can be avoided

Further Surveys

- 6.5.29 Trees on site will be surveyed via a ground level tree assessment (GLTA) to ascertain their suitability for roosting bats, with either traditional emergence/re-entry surveys or aerial inspections to take place on trees with moderate or high suitability for roosting bats. Bat surveys will undertaken on site using industry standard guidelines set out by the Bat Conservation Trust (BCT, 2016). A ground level tree assessment (GLTA) will be undertaken by a suitably experienced ecologist, with any trees containing features considered to have “moderate” or “high” suitability for roosting bats recorded and flagged for further surveys. Additional surveys will be undertaken within the active period for bats (April – September) with a minimum of two visits for “moderate” features, and three visits for “high” features. Surveys will be either traditional emergence/re-entry surveys, aerial assessment, or a combination of both methodologies. Additional transect surveys may be required to ascertain which species are using the site for commuting and/or foraging. A minimum of one survey per month (April – October) will be carried out, with additional data being collected via static detectors deployed on site for five consecutive nights.
- 6.5.30 Reptile surveys of the site, focusing on the acid grassland and where the site borders forestry should also be undertaken to ascertain the presence/absence of reptiles and to identify the requirement or otherwise for a translocation effort. The surveys will follow industry standard guidelines as set out in ARC (2013). Reptile surveys will be undertaken April – October; the survey entails a set up day with refugia set out and left in situ for at least 10 days, with seven surveys undertaken (ideally consecutively) in suitable conditions (above 10°C and avoiding wet weather where possible) with refugia collected on the final (seventh) survey. A population estimate will be calculated on the basis of the data collected, using the calculations set out in Froglife Advice Sheet 10.
- 6.5.31 Invertebrate surveys targeting Small Pearl-bordered Fritillary and the two Oil-beetle species will also be undertaken. Invertebrate surveys will be undertaken for Small Pearl-bordered Fritillary using the annual timed count methodology outlined by the UK Butterfly Monitoring Scheme to ascertain population size on site, and to identify appropriate mitigation measures for the species.
- 6.5.32 Badger surveys of the site will undertaken on site using industry standard guidelines set out by the Mammal Society (1989). The survey will focus on establishing the location of any active

setts on site within the site boundary. The area will be mapped and described in the event that a full or partial closure is required in the future.

6.6 Potentially Significant Effects and Approach to Mitigation

6.6.1 Potentially significant effects are outlined in Table 6.6.1

Table 6.6.1: Potential significant effects resulting from the Proposed Development

Activity	Potential Effects
Construction Phase	
	Destruction of important ecological features (IEFs) including unimproved acid grassland and marshy grassland.
	Potential for pollution to IEFs including acid flushes.
	Reduction in foraging area for mammal species e.g. Bats and Badgers
	Potential death/injury to reptiles which are protected under the WCA.
	Loss of suitable foraging/basking/hibernation areas for reptiles which are protected under the WCA (1981).
	Potential death/injury to Badgers, or damage/destruction of their setts which are protected under the PBA (1992).
	Potential disturbance to foraging/commuting bats and their roosts which are protected under the WCA (1981) and the Habitat Regulations (2017).
Operational Phase	
	Reduction in foraging area for mammal species e.g. Badger, bats
	Potential disturbance to foraging/commuting bats and their roosts which are protected under the WCA (1981) and the Habitat Regulations (2017).

Decommissioning Effects

6.6.2 No decommissioning effects, aside from temporary disturbance, are envisaged at this time.

Approaches to Mitigation and Biodiversity Benefits

6.6.3 Mitigation will ensure that key habitats are avoided with infrastructure. The whole site would benefit from significantly lower grazing levels and therefore habitat enhancement could result from changes in the grazing regime. Additional measures (such as off site compensation) will be reviewed following the conclusion of surveys.

6.7 Residual Effects

6.7.1 This will be assessed after completion of the scoped in further surveys, and assessment of the likely impacts and mitigation.

6.8 References

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Froglife (1999) *Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. *Froglife Advice Sheet 10*. Froglife, Halesworth.

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Stace. C. (2019). *New British Flora of the British Isles*. 4th Edition. Cambridge University Press.

7 Ornithology

7.1 Introduction

7.1.1 The Ornithological Assessment of the Proposed Development will be conducted by RSK ADAS Ltd. ADAS has worked on the Ecological Impact Assessment (EclA) of more than 10 large solar farm proposals. All of these EclAs have encompassed the full range of relevant surveys including ornithology. All of the ADAS proposed surveyors for this project have extensive experience of standard and accepted survey methodologies.

7.2 Policy and Relevant Guidance

7.2.1 An analysis of the legislative and policy framework relevant to the EclA (ornithology) is presented in table 7.2.1.

Table 7.2.1: Relevant legislation and planning policy - Ornithology

Scale	Legislation / Policy	Description
International	EC Birds Directive (2009/147/EC)	Annex 1 of the EC Birds Directive lists rare and vulnerable species of wild birds that are subject to special conservation measures. The Directive also provides for the designation of SPAs, which form part of the Natura 2000 network of sites protected by European wildlife legislation.
	The Conservation of Habitats and Species Regulations 2017 (as amended) – The Habitats Regulations	This legislation transposed the Habitats Directive (European Directive 92/43/EEC) into Welsh and English law during the period where the UK was a member of the European Union. Following the implementation of Brexit, the legislation is enacted into UK law, ensuring continued protection of all habitats and species listed on the Annexes of the Habitats Directive. Certain habitats and species will remain protected as per the objectives of the Directive, and will be referred to as such in this Chapter for ease of reference. Species listed on these Annexes are identified as being threatened or of ‘community interest’. Annex I lists habitat types regarded as being of European/international importance, including ‘priority habitat types’; Annex II lists species of European/international importance; and Annex IV(a) lists animal species of community interest needing strict protection. Species listed on Annex II and Annex IV(a) are commonly referred to as European Protected Species (EPS), and will remain as such following the implementation of Brexit. Under this legislation it is an offence to: > Deliberately capture, injure or kill any wild animal of an EPS;

Scale	Legislation / Policy	Description
		> Deliberately disturb wild animals of any such species; > Deliberately take or destroy the eggs of such an animal; or > Damage or destroy a breeding site or resting place of such an animal. Disturbance of animals includes in particular disturbance which is likely: To impair their ability – > to survive, to breed or reproduce, or to rear or nurture their young, or > in the case of animals of a hibernating or migratory species, to hibernate or migrate; or > to affect significantly the local distribution or abundance of the species to which they belong.
National	The Wildlife and Countryside Act 1981 (as amended)	This legislation effectively prevents any kind of activity occurring that might have a detrimental effect on nesting birds. Schedule 1 of the Act also lists a number of species which are protected by special penalties at all times. Nesting periods vary between species, from year to year and in relation to latitude and altitude, however as a general rule, the breeding season for most species occurs between March and the end of July.
	The Countryside and Rights of Way (CROW) Act 2000	This legislation strengthens the provisions of the 1981 Wildlife and Countryside Act, both in respect to statutory sites such as Sites of Special Scientific Interest (SSSI's) and protected species. It also places a statutory obligation on Local Authorities and other public bodies to further the conservation of biodiversity in the exercise of their functions, thus providing a statutory basis to the Biodiversity Action Plan (BAP) process which began in 1994. Section 74 of the Act lists the habitat types and species of principal importance in England.
	RSPB Birds of Conservation Concern (BoCC)	'Red' and 'Amber' lists for Wales have been prepared by the RSPB of species populations and their known breeding population. Red List species are those whose breeding population or range is rapidly declining (50% or more in the last 25 years), recently or historically, and those of global conservation concern. Amber List species are those whose breeding population is in moderate decline (25 – 49% in the last 25 years), rare breeders, internationally important and localised species and those of unfavourable conservation status in Europe. Species included on a third, "Green" list are not considered threatened or to be in significant decline.

Scale	Legislation / Policy	Description
		These lists confer no legal status; however, they are useful when assessing the significance of predicted impacts and determining the level of mitigation that may be required when birds are affected by development or any other activity.
Regional	Environment (Wales) Act 2016	This act makes provision in respect of biodiversity, pesticides harmful to wildlife, protection of birds and invasive non-native species in Wales. Section 7 of this act includes a duty on public bodies to have regard to the purpose of conserving biodiversity in the exercise of their functions. The list of species included in Section 7 defines the birds that are of principal importance in Wales and should be considered when public bodies exercise their duty.
	Planning Policy Wales – Chapter 6: Distinctive and Natural Places (11 th ed., 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government’s objectives for Biodiversity and Ecological Networks among other environmental and cultural components of ‘Placemaking’. In particular, the Biodiversity and Ecological Networks section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by Natural Resources Wales (NRW). In this sense PPW now requires information of ecosystem resilience as well as protected and priority species as outlined by Section 6 and Section 7 of the Environment (Wales) Act 2016.
	Future Wales: The National Plan 2040	This development plan recognises the necessity for resilient ecosystems within Wales within Policy 9 of the document. Developments should deliver net biodiversity benefits whilst maximising the provision of green infrastructure, in alignment with Policies 17 and 18.
	Technical Advice Note 5	Technical Advice Note 5 (TAN5) outlines how the land use planning system in Wales should contribute to protecting and enhancing biodiversity and geological conservation. TAN5 details that when considering policies and proposals in planning applications at a local level the principles and material considerations are taken into account.
Local	Neath Port Talbot Council – Local Development Plan 2011 - 2026	The Neath Port Talbot Council Local Development Plan contains a set of policies which identify the need to conserve species and/or habitats as part of the planning consultation process, integrating nature conservation into all planning decisions and for any development to provide a net benefit for biodiversity conservation in Wales with no significant loss of habitat or populations of species, locally or nationally. Additionally, renewables projects must demonstrate that appropriate measures have been taken to minimise the impact on the natural environment.

Scale	Legislation / Policy	Description
	SP15 – Biodiversity and Geodiversity	Important habitats, species and sites of geological interest will be protected, conserved, enhanced and managed through the following measures: 1. The identification of the following Internationally and Nationally designated sites within the County Borough to enable their protection: (a) Special Areas of Conservation (SACs) and Ramsar Sites; (b) Sites of Special Scientific Interest (SSSIs); (c) National Nature Reserves (NNRs). 2. The identification and protection of sites of regional and local importance; 3. The protection of important natural heritage features.
	EN6 – Important Biodiversity and Geodiversity Sites	Development proposals that would affect Regionally Important Geodiversity Sites (RIGS), Local Nature Reserves (LNRs), Sites of Interest for Nature Conservation (SINCs), sites meeting SINC criteria or sites supporting Local Biodiversity Action Plan (LBAP) or S42 habitats or species [now Section 7 habitats and species] will only be permitted where: 1. They conserve and where possible enhance the natural heritage importance of the site; Or 2. The development could not reasonably be located elsewhere, and the benefits of the development outweigh the natural heritage importance of the site. Mitigation and/or compensation measures will need to be agreed where adverse effects are unavoidable.
	EN7 – Important Natural Features	Development proposals that would adversely affect ecologically or visually important natural features such as trees, woodlands, hedgerows/field boundaries, watercourses or ponds will only be permitted where: 1. Full account has been taken of the relevant features in the design of the development, with measures put in place to ensure that they are retained and protected wherever possible; or 2. The biodiversity value and role of the relevant feature has been taken into account and where removal is unavoidable, mitigation measures are agreed.
	SP16 – Environmental Protection	Air, water and ground quality and the environment generally will be protected and where feasible improved through the following measures:

Scale	Legislation / Policy	Description
		1. Ensuring that proposals have no significant adverse effects on water, ground or air quality and do not significantly increase pollution levels; 2. Giving preference to the development of brownfield sites over greenfield sites where appropriate and deliverable; 3. Ensuring that developments do not increase the number of people exposed to significant levels of pollution.

Study Area and Zones of Influence

- 7.2.2 The assessment conducted for this report has considered the area in which ornithological features could be subject to significant effects from the Proposed Development. The area of the potential effects is often wider than the actual perimeter of the development site and is known as the Zone of Influence (ZOI).
- 7.2.3 The ZOI varies for different ecological features and each designated site, habitat and species has been considered in relation to their sensitivity to the Proposed Development. In the case of bird species, the ZOI is wider than the site boundary and species could potentially use the site for foraging from a large surrounding area. Bird surveys have been conducted on the site itself but wider impacts will be considered during the assessment.

7.3 Assessment Methodology

Scope

- 7.3.1 The Ornithological Impact Assessment (OIA) will follow guidelines developed by The Chartered Institute of Ecology and Environmental Management (CIEEM, 2018). These guidelines aim to promote good practice in Ecological Impact Assessment (EcIA) relating to terrestrial, freshwater, coastal and marine environments in the UK and Ireland. The Biodiversity: Code of practice for planning and development published by the British Standards Institute (BS 42020:2013) cites the CIEEM EcIA Guidelines as the acknowledged reference on Ecological Impact Assessment (EIA). The Guidelines are consistent with the British Standard on Biodiversity, which provides recommendations on topics such as professional practice, proportionality, pre-application discussions, ecological surveys, adequacy of ecological information, reporting and monitoring.
- 7.3.2 The guidelines state that EcIA (and by extension, OIA) is a process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on

habitats, species and ecosystems. The findings of an assessment can help competent authorities understand ecological issues when determining applications for consent. EcIA can be used for the appraisal of projects of any scale including the ecological component of EIA. When undertaken as part of an EIA, EcIA is subject to the relevant EIA Regulations. Unlike EIA, EcIA on its own is not a statutory requirement. It is an evaluation process undertaken to support a range of assessments. EcIA is a process that is most effective if all contributing ecologists and other specialists work in collaboration. An EcIA report (or the ecological chapter of an EIA Environmental Statement (ES)) should clearly and simply describe the significant effects of any project so that all interested parties understand the implications of what is proposed. The Guidelines explain the key elements of the EcIA process. Key to this is a scientifically rigorous and transparent approach. EcIA should be undertaken by qualified professionals with an appropriate level of experience in ecological survey and impact assessment who are recognised by a relevant professional body such as CIEEM.

7.3.3 The CIEEM guidelines list the following principles that underpin EcIA (OIA):

- Avoidance. Seek options that avoid harm to ecological features (for example, by locating on an alternative site).
- Mitigation. Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed - for example, through a condition or planning obligation.
- Compensation. Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- Enhancement. Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.

Determining Importance

7.3.4 The frame of reference for the ornithological features in terms of their geographical importance is in line with guidance set out in CIEEM, 2018.

7.3.5 Bird species are assessed, where appropriate, against best practice guidelines and with reference to Table 7.3.1.

Table 7.3.1: Definition of nature conservation value for bird interest at Eirlys

Sensitivity	Definitions
Very High	Qualifying species of an internationally designated site (i.e. SPA or Ramsar) Species present in internationally important numbers (>1% of UK population).
High	Species that contribute to the integrity of a SPA or Site of Special Scientific Interest (SSSI) but which are not cited as species for which the site is designated (SPAs) or notified (SSSIs). Ecologically sensitive species such as rare birds (<300 breeding pairs in the UK). Species present in nationally important numbers (>1% Welsh population). Species listed on Annex I of the EC Birds Directive or breeding species listed on Schedule 1 of the Wildlife and Countryside Act. Regularly occurring relevant migratory species, which are either rare or vulnerable, or warrant special consideration (i.e. Schedule 1 of the Wildlife and Countryside Act and Section 7 of the Environment Act) on account of the proximity of migration routes, breeding, wintering and staging areas in relation to the Development.
Medium	Species present in regionally (i.e. south Wales) important numbers (>1% regional population) Species occurring within SPAs and SSSIs but not crucial to the integrity of the site. Species of Principal Importance as defined in Section 7 of the Environment Act. Regularly occurring relevant migratory species, which are either rare or vulnerable, or warrant special consideration (i.e. BoCC Wales Red List) on account of the proximity of migration routes, breeding, wintering and staging areas in relation to the Development.
Low	Regularly occurring relevant migratory species, which are either rare or vulnerable, or warrant special consideration (i.e. BoCC Wales Amber List) on account of the proximity of migration routes, breeding, wintering and staging areas in relation to the Development. Any other species of local conservation interest such as those listed in the LBAP.

Characterising Potential Impacts

- 7.3.6 The descriptions in Table 7.3.1 are used to categorise the geographical 'importance' of bird species and their habitats. In characterising potential impacts, the term 'ecological integrity' is used, as defined by the Office of the Deputy Prime Minister (ODPM) Circular 06/2005 on Biodiversity and Geological Conservation (ODPM, 2005) where the integrity of a designated site refers to "coherence of ecological structure and function...that enables it to sustain the habitat, complex of habitats and/or levels of populations of species for which it was classified".
- 7.3.7 For species and for non-designated habitats, the ODPM Circular (and CIEEM guidance) refers to 'conservation status'. The Circular states (in Part IV, Paragraph 96) that species and habitats are normally legally protected because of their vulnerable conservation status (i.e. the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations). Conservation status is thus a key concept in the assessment of effects on species and non-designated habitats. The judgement on the severity of effects was based on a combination of the following: knowledge of the requirements of the species or habitat in question, and an evaluation of the effect itself. In describing the effects, reference was made to the following factors:
- Confidence in predictions;
 - Spatial extent of effect;
 - Temporal extent of effect;
 - Reversibility of effect; and
 - Timing and frequency of effect.
- 7.3.8 In reality, evaluation of the severity of effects is frequently made on the basis of 'professional judgement' (which would include such factors as the fragility of the habitat receiving the effect) and this was used where required.

Magnitude of Potential Effects

- 7.3.9 Table 7.3.2 outlines the criteria used to determine the magnitude of an impact. Table 7.3.3 outlines the criteria used to determine the temporal magnitude of impacts.

Table 7.3.2: General criteria to describe the magnitude / character of potential effects

Magnitude of Impact		Typical criteria
Major	Adverse	Complete or near-complete loss of resource, population/productivity and/or quality and integrity of the receptor, through mortality, displacement or disturbance. Severe damage to key characteristic features or elements. Quantified as approximately >80% of resource lost.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality. Quantified as approximately a >80% net gain for the resource, in comparison with the baseline.
Intermediate	Adverse	Significant effect on the resource or status of the population/productivity due to mortality, displacement or disturbance, but not adversely affecting the integrity. Partial loss of/damage to key characteristics, features or elements. Quantified as 21-80% of resource lost.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. Quantified as approximately a 21-80% net gain for the resource, in comparison with the baseline.
Minor	Adverse	Some measurable change/partial reduction in the status of the population/productivity of its attributes, via mortality, displacement or disturbance. Minor loss of or alteration to, one (or maybe more) key characteristics, features or elements of the resource. Quantified as 1-20% of resource lost.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring. Quantified as an approximate 1-20% net gain for the resource in comparison with the baseline.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements. Quantified as <1% of the resource lost.
	Beneficial	Very minor improvement of the status of the population/productivity or quality of the resource. Quantified as a <1% net gain for the resource. No loss or alteration of characteristics, features or elements; no observable effect in either direction.
No change	Neutral	No loss or alteration of characteristics, features or elements; no observable effect either adversely or

Magnitude of Impact		Typical criteria
		beneficially. Can also be considered a continuation of the baseline.

Table 7.3.3: Temporal magnitude/timeframe of potential impacts

Temporal Magnitude	Definition
Permanent	Impact continues beyond the span of lifetime of the development (>30 years)
Long term	Between 15 and 30 years
Medium term	Between 5 and 15 years
Short term	6 months and up to 5 years
Negligible	Less than 6 months

Determining Significant Effects

7.3.10 In this assessment, the significance of an effect was determined through a combination of the ecological value of the bird species (Table 7.3.1) and the magnitude criteria from Table 7.3.2 and Table 7.3.3. As an example, a species present in regionally important numbers would be valued at 'Medium' level of value (Table 7.3.1). If a substantial part of this population were displaced by disturbance, this would constitute a major adverse effect. The magnitude of the impact is thus major – adverse (Tables 7.3.2). A high degree of confidence can be placed in this prediction. In cases such as this, where the significance falls within a range (e.g. between 'moderate' or 'large'), a decision is made as to which is the correct value. This decision is based on the factors listed in 7.3.7 and particularly on 'professional judgement'.

7.3.11 In this assessment, any effect that is of at least 'moderate' significance (with Ornithological Value of at least medium i.e. 'County' level) is considered as significant in the overall context of the development and in terms of the EIA Regulations. Where Ornithological Value is assessed as Low level or below, effects of 'moderate' significance are considered to be not significant in terms of the EIA Regulations. Professional judgement is an important factor in determining the level of ornithological value, the magnitude of the impact and the overall significance. An effect may be either negatively or positively significant.

Cumulative Effects

7.3.12 An assessment of the potential cumulative effects cannot be undertaken until the initial assessment of impacts is undertaken. The lack of nearby development means that significant cumulative impacts are unlikely, however the additional impacts of all developments within the zone of influence will be reviewed in relation to this proposal.

Avoidance and Mitigation

- 7.3.13 It is anticipated that the key mitigation in terms of the proposal will be in relation to the design of the Proposed Development. In particular, the location of solar panels and tracks, as well as other associated infrastructure, will be critical in avoiding any significant impacts. Thus, areas of better quality habitat should wherever possible, be avoided. These areas are also likely to support bird species of more ornithological value at the site.

Residual Effects

- 7.3.14 Residual effects on bird species will be assessed following completion of initial assessment and identification of appropriate avoidance and mitigation measures.

Compensation

- 7.3.15 Based on the results of baseline surveys (see section 6.5: Baseline Conditions), the need for compensation will be fully assessed, with recommendations provided for any subsequent on or off-site compensation.

Enhancement

- 7.3.16 Ornithological enhancement of the site will be discussed with Neath Port Talbot Council and NRW, as appropriate.

7.4 Baseline Conditions

- 7.4.1 This section describes the baseline ornithology conditions at the site, based on desk study and original field surveys. It outlines existing nature conservation designations. It also describes the bird species present in terms of current knowledge.

Desk Study

- 7.4.2 Sites designated for their ornithological interest within a 30km radius are detailed in Table 7.4.1.

Sites holding International statutory designations for nature conservation

Table 7.4.1: Sites holding International statutory designations within 30km. Bolded text within the table indicates the feature has been scoped in

Site	Distance from Study Area	Qualifying features	Scoped in/out	Rationale
Burry Inlet SPA & Ramsar	16km	Waterfowl and wader species	Scoped out	Site is not suitable for these species, including on migration

Sites holding National statutory designations for nature conservation

7.4.3 Four statutory sites were located within 5km of the site and 141 non-statutory sites within 2km of the site. These are outlined in table 7.4.2 though it should be noted that none of these have been designated on account of their ornithological interest. However, the fact that all are likely to support habitat of value means that they are likely to support at least some ornithological interest.

Table 7.4.2: Statutory and non-statutory designated sites within 5km and 2km of the survey site

Site Name	Description	Designations	Distance from site
Statutory Designated Sites			
Kenfig Pool and Dunes	Consists of a large expanse of sand dunes which lead to the coast and Sker Point. Glamorgan's largest lake, Kenfig Pool, is situated on the edge of the reserve. Home to several wild orchid species, including the rare <i>Epipactis neerlandica</i> and Fen Orchid (<i>Liparis loeselii</i>). Kenfig NNR holds more than 90% of the total number of Fen Orchids found in the UK. The NNR also supports diverse birds and invertebrates.	National Nature Reserve (NNR)	4.7km SW
Eglwys Nunydd Reservoir	The largest body of fresh water in the county. On the site of Margam Moors which, before being reclaimed for the Abbey Steel Works, were a notable site for wildfowl. The reservoir attracts large numbers of wintering waterfowl and passage migrants.	SSSI	3.8km SW
Non-statutory Designated Sites			

Site Name	Description	Designations	Distance from site
Margam Country Park	Woodlands and wood pasture, neutral grassland, bats including Lesser and Greater Horseshoe and Barbastelle bats	Site of Importance for Nature Conservation (SINC) (Neath Port Talbot (NPT))	Adjacent to western boundary of site
Cwm Cerdin	Broad-leaved semi-natural woodland, unimproved neutral grassland	SINC (NPT)	700m north-east of eastern boundary of site
Gilfach Uchaf	Marshy grassland, semi-improved acid grassland, acid dry dwarf shrub heath and rock exposure	SINC (NPT)	Adjacent to eastern boundary of site
Nant y Castell grasslands	Unimproved neutral grassland.	SINC (NPT)	1km east of eastern boundary of site

7.4.4 Table 7.4.3 presents the results of the biological records search. Only data from the last ten years is presented. A large number of records were received from South East Wales Biodiversity Records Centre (SEWBReC) that related to historical records (majority pre-2000).

Table 7.4.3: Records of selected protected or notable bird species within 2km of the site

Species	Designation	Approx. location
Nightjar <i>Caprimulgus europaeus</i>	Annex 1, EAW S. 7	Forestry to west of site (several records)
Kestrel <i>Falco tinnunculus</i>	BoCC Wales (red)	Forestry west of site, open grassland on site, forestry east of site
Goshawk <i>Accipiter gentilis</i>	WCA 1	Forestry west of site, forestry east of site
Golden Plover <i>Pluvialis apricaria</i>	Annex 1, BoCC Wales (red)	Flying over forestry west of site

Species	Designation	Approx. location
Crossbill <i>Loxia loxia</i>	WCA 1	Forestry west of site, forestry east of site
Lesser Redpoll <i>Acanthis cabaret</i>	EAW S. 7, BoCC Wales (amber)	Forestry west of site
Red Kite <i>Milvus milvus</i>	Annex1, WCA 1	Forestry east of site, open grassland on site
Skylark <i>Alauda arvensis</i>	EAW S. 7, BoCC Wales (amber)	Open grassland on site
Linnet <i>Linaria cannabina</i>	EAW S. 7, BoCC Wales (red)	Forestry east of site
Wood Warbler <i>Phylloscopus sibilatrix</i>	EAW S. 7, BoCC Wales (red)	Forestry east of site

Annex 1=Annex 1 species of the Birds Directive

EAW=Environment Act Wales 2016

WCA1 = Wildlife and Countryside Act 1981 Schedule 1

S7 = Environment (Wales) Act 2016 species

BOCC red/amber = Birds of Conservation Concern Red/Amber Wales

Field Surveys

7.4.5 The upland nature of the site meant that the Brown and Shepherd (1993) methodology was the most suitable technique for breeding birds survey. This is principally aimed at breeding waders but is applicable for recording most species of open habitats and woodland edge. The survey requires a minimum of two visits to a site, though NRW recommend that three visits are carried out. Three visits took place, one on 30th April, one on 20th May and one on 10th June 2021. These covered the eastern half of the site. Further surveys took place in 2022, covering the western half of the site. The surveyors (Chris Forster Brown MSc MCIEEM and Daniel Watson BSc (Hons)) have extensive experience of the Brown and Shepherd methodology (and of bird survey more generally) and are highly familiar with breeding bird species and species assemblages.

7.4.6 The survey area encompassed the whole area within the boundary of the Site and the immediate surrounds. Following the Brown and Shepherd methodology, the observers covered the survey area so that they passed within 100 m of all points of the Site. All birds

were recorded, using standard British Trust for Ornithology (BTO) symbols on a relevant scale map. The behaviour of individual birds was also recorded, where appropriate. Birds are said to be breeding if they are observed displaying or singing, adults are repeatedly alarm calling, nests, eggs or young are located, distraction displays are seen and/or territorial disputes are seen. Species particularly targeted by the survey were breeding waders (Curlew *Numenius arquata* and Lapwing *Vanellus vanellus*) and raptors associated with open moorland (e.g. Hen Harrier *Circus cyaneus* and Merlin *Falco columbarius*). All species were noted on field maps. Those species that are listed on S.7 of the Environment (Wales) Act and/or are red-listed by RSPB (Wales) as of conservation concern, were also targeted.

7.4.7 Additional surveys targeting Nightjar and other crepuscular/nocturnal species were undertaken and on 30 June, 12 July and 25 July 2022. The methodology followed that proposed in Gilbert *et al.* (1998), with modifications by Conway *et al.* (2007) for a breeding season survey to establish population size. Surveys began 30 minutes prior to sunset, and continued until approximately 1am. Surveyors followed a pre-determined transect, stopping every 250m to listen for churring males, or other behaviours (such as wing-clapping, calls, feeding or territorial flights), marking locations on a map, annotated with behaviour notes or observations as appropriate. The direction of the churring males was marked in relation to the transect to avoid duplication of data, and individuals were only registered where there was either a distance of greater than 200m between individuals during the survey, or registered over 200m from a “known” territory on a subsequent visit. This methodology differs from Conway *et al.* (2007) which suggests a minimum distance of 350m, however multiple churring males were recorded in close proximity, and observed engaging in territorial behaviours during surveys, therefore a lower threshold was considered more appropriate.

7.4.8 The site supported a good range of common bird species. Skylark (BoCC Wales Amber) was recorded in particularly good numbers, with more than 20 individuals present. The majority of these were in the northern half of the site, associated with the open grassland. Meadow Pipit *Anthus pratensis* (BoCC Wales Amber) was also present in good numbers (10+ individuals). Stonechat *Saxicola torquata* pairs were present at two locations on site along the western boundary. Linnet (BoCC Wales Red) were also present in the area around Tonmawr farm 1, with further individuals (usually in pairs) widely scattered around the site, but particularly associated with boundaries in the north. Approximately 20 individuals of Linnet were recorded overall.

- 7.4.9 Several species of bird were associated with the re-growth conifer plantation immediately adjacent to the western edge of the site. These included breeding Nightjar, Lesser Redpoll *Carduelis cabaret* (BoCC Wales Amber) in small numbers, though clearly breeding close by (song flights were evident). Other species recorded here included a single reeling Grasshopper Warbler *Locustella naevia* (BoCC Wales Red) on two occasions, single Common Whitethroat *Sylvia communis* (BoCC Wales Red) and at least one Eurasian Cuckoo *Cuculus canorus* (BoCC Wales Red). The forestry immediately to the east of the site also contained breeding Nightjar, though supported fewer species; a single Common Crossbill *Loxia curvirostra* was recorded flying in this direction and Tree Pipit *Anthus trivialis* (BoCC Wales Amber) was singing in a felled area at Moel Ton-nawr. This species was also recorded associated with one of the lines of tall trees in the south-east of the site. One of these lines of trees also supported a singing Common Redstart *Phoenicurus phoenicurus* and further individuals of this species were recorded from a hedge line along the southern boundary and from a woodland edge to the south of Ton Mawr Farm.
- 7.4.10 Green woodpecker (BoCC Wales Amber) was recorded from the south eastern corner of the site, particularly associated with the ant hills in the neutral grassland. Willow Warbler *Phylloscopus trochilus* (BoCC Wales Red) were recorded widely around the site, singing in the far north-west, from the woodland along the southern boundary and particularly in the low growth forestry immediately adjacent to the western boundary. Single Red Kite *Milvus milvus* (BoCC Wales Amber, WCA1) were also recorded widely. It is not clear whether any of the individuals seen were breeding in the adjacent woodlands. A single Eurasian Curlew *Numenius arquata* (BoCC Wales Red) was heard distantly on the first survey, in the north-west of the site. This was clearly an individual moving through and not breeding on the site as there was no particularly suitable habitat and no other birds were recorded on subsequent visits.

Table 7.4.4: Notable bird species on site scoped in and/or out

Species	Scoped in / out	Rationale
Nightjar	In	High breeding population, foraging habitat impacted
Skylark	In	High breeding population, habitat impacted
Meadow pipit	In	High breeding population, habitat impacted
Lesser Redpoll	Out	Moderate breeding population, habitat easily avoided
Linnet	In	Moderate breeding population, habitat easily avoided but disturbance likely
Cuckoo	In	Small breeding population, habitat impacted

Species	Scoped in / out	Rationale
Grasshopper Warbler	In	Very small breeding population, habitat impacted
Common Whitethroat	In	Small breeding population, habitat impacted
Tree Pipit	In	Very small breeding population, habitat may be avoided
Willow Warbler	In	Small breeding population, habitat impacted
Common Redstart	Out	Limited suitable habitat on site itself, easily avoided
Red Kite	Out	No suitable breeding habitat on site itself
Eurasian Curlew	Out	Single record relating to passage individual, not recorded subsequently

7.5 Potentially Significant Effects and Approach to Mitigation

Table 7.5.1: Potentially significant effects

Activity	Potential Effects
Construction Phase	
Installation of solar panels (and tracks)	Removal of potential breeding habitat for Skylark, Linnet, Cuckoo, Grasshopper Warbler, Common Whitethroat, Willow Warbler and Meadow Pipit. Removal of foraging habitat for breeding Nightjar, Skylark, Meadow Pipit, Linnet, Cuckoo, Grasshopper Warbler, Common Whitethroat, Tree Pipit and Willow Warbler.
Operational Phase	
Presence of solar panels (and tracks)	Continued non-availability of breeding habitat for Skylark, Linnet, Cuckoo, Grasshopper Warbler, Common Whitethroat, Willow Warbler and Meadow Pipit Continued non-availability of foraging habitat for breeding Nightjar, Skylark, Meadow Pipit, Linnet, Cuckoo, Grasshopper Warbler, Common Whitethroat, Tree Pipit and Willow Warbler.

Decommissioning Effects

- 7.5.1 No decommissioning effects, aside from temporary disturbance, are envisaged at this time.

Approaches to Mitigation and Biodiversity Benefits

- 7.5.2 It is possible that mitigation will ensure that key habitats for Skylark, Linnet, Cuckoo, Grasshopper Warbler, Common Whitethroat, Willow Warbler and Meadow Pipit are avoided with infrastructure. The retention of the area of acid grassland would ensure sufficient foraging areas and habitat used in courtship and for commuting by Nightjar.

Additional mitigation could take the form of leaving larger rows between panels and/or encouraging Skylark to move to other parts of the site through reducing grazing levels and thereby increasing the quality of alternative habitats.

7.6 Residual Effects

- 7.6.1 All surveys will follow best practice. Avoidance of key areas of habitat and species will lessen any residual significant effect.

7.7 References

Brown A. F. and Shepherd K. B. (1993). *A method for censusing upland breeding waders* Bird Study, 40:3, 189-195

Chartered Institute of Ecology and Environmental Management (2017). *Guidelines for Ecological Preliminary Ecological Appraisal. Technical Guidance Series.* www.cieem.net

Chartered Institute of Ecology and Environmental Management (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Technical Guidance Series www.cieem.net

Conway, G., Wotton, S., Henderson, I., Langston, R., Drewitt, A., and Currie, F. (2007). *Status and distribution of European Nightjars *Caprimulgus europaeus* in the UK in 2004*, Bird Study, 54:1, 98-111

Gilbert, G., Gibbons, D. W., Evans, J. (1998) *Bird Monitoring Methods: A Manual of Techniques for Key UK Species.* RSPB.

8 Archaeology and Cultural Heritage

8.1 Introduction

- 8.1.1 An Archaeological and Cultural Heritage Assessment of the Eirlys Solar Farm will be conducted by Archaeological Management Services (AMS) Ltd t/a Foundations Heritage. AMS is a Registered Archaeological Organisation of the Chartered Institute for Archaeologists (CIfA).
- 8.1.2 A Heritage Appraisal of the site area (Headland Archaeology 2022) has been undertaken to date, but only examines designated heritage assets in a 2km radius, rather than the 3km requested by Cadw; this scoping report is consequently based upon the HA as well as readily available information and professional experience in regard to archaeological and cultural heritage assessment of solar farms. It is anticipated that full archaeological and heritage impact desk-based assessment and ASIDOHL reports will be completed prior to the compilation of the relevant ES Chapter.
- 8.1.3 No consultation has currently taken place with Glamorgan Gwent Archaeological Trust (GGAT) as archaeological advisors to Neath Port Talbot CBC. Cadw have been consulted in regard to an EIA screening option and have asserted that the proposed development has the potential to result in harm to the significance of numerous designated heritage assets.

8.2 Policy and Relevant Guidance

- 8.2.1 Legislation protecting the historic environment is contained in the Historic Environment (Wales) Act (2016). The Act provides effective protection to listed buildings and scheduled monuments, improves the management of the historic environment; and introduces greater transparency and accountability into decisions taken on the historic environment. It also amends the Ancient Monuments and Archaeological Areas Act (1979) and the Planning (Listed Buildings and Conservation Areas) Act (1990) that provide the main UK framework legislation for the management and protection of the historic environment. PPW is supported by various Technical Advice Notes, of which TAN 24: Historic Environment (2017) is the most relevant.
- 8.2.2 The Ancient Monuments and Archaeological Areas Act (1979 as amended 2016) allows for the protection of Scheduled Monuments. Under the provisions of the Act, it is an offence to damage, disturb or alter a Scheduled Monument either above or below ground without first obtaining permission from the Welsh Ministers. This Act does not allow for the protection of the setting of Scheduled Monuments.
- 8.2.3 The Planning (Listed Buildings and Conservation Areas) Regulations (2012) outline the provisions for designation, control of works and enforcement measures relating to Listed Buildings and Conservation Areas.

8.2.4 In considering any planning application for development, the local planning authority is bound by the policy framework set by this legislation, government guidance (in this case Planning Policy Wales, Edition 11, Chapter 6) and current Development Plan policies (in this case the Neath Port Talbot CBC Local Plan (2011-2026) (2016) and any other material considerations.

8.2.5 Relevant Guidance comprises the Standard and Guidance for Desk-based Assessment (CIfA 2014/2021), Guidance on Heritage Impact Assessment (ICOMOS 2011), Principles of Heritage Assessment in the UK (IEMA, IHBC, CIfA 2021) and various Cadw documents comprising Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process (2007), Conservation Principles for the Sustainable Management of the Historic Environment in Wales (2011), The Setting of Heritage Assets (2017), Heritage Impact Assessment in Wales (2017), Managing Change to Listed Buildings in Wales (2017) and Managing Change to registered Parks and Gardens in Wales (2017).

8.2.6 Assessment Methodology and Significance Criteria

Data Sources

8.2.7 The main data source used to support the ES Chapter will be the detailed desk-based assessment and ASIDOHL report. These will be based on data acquired from the Glamorgan Gwent Archaeological Trust Historic Environment Record (HER), the Aerial Photography Unit of the Welsh Government, the RCHAMW inventory and aerial photographic archives, LiDAR data held by National Resources Wales, designated asset information held by Cadw, the West Glamorgan Archives Service, historic maps and borehole and geological data.

8.3 Assessment of Likely Effect Significance

8.3.1 Guidance for establishing the significance or value of heritage assets is predominantly based on four criteria set out in Conservation Principles for the Sustainable Management of the Historic Environment in Wales (Cadw 2017); these criteria are evidential, historical, aesthetic and communal. As a finite and irreplaceable resource, heritage assets (in particular archaeological deposits) have a limited capacity to absorb change and direct physical effects will always be permanent in relation to archaeology.

Table 8.3.1: Criteria for Establishing Importance of Heritage Assets

Importance	Receptors
Very High	World Heritage Sites and other heritage assets and landscapes of international importance

Importance	Receptors
High	Designated assets including Scheduled Monuments, Listed Buildings, Registered historic landscapes, battlefields and parks and gardens
Medium	Non-designated heritage assets of regional importance, Conservation Areas; unregistered landscapes with moderate preservation and time depth
Low	Non-designated assets of local importance, sites, landscapes and assets with low coherence and poor preservation; historic buildings on local list
Negligible	Non-designated assets and landscapes with very little coherence and very poor preservation; historic buildings that retain some heritage significance but do not qualify for local list
Unknown	Assets, landscapes and buildings with heritage interest that have not been adequately assessed.

8.3.2 The criteria for establishing relative sensitivity of a heritage asset to change is normally folded into the criteria for establishing importance; but in this case sensitivity has been assessed separately given the potential for an impact on a registered landscape.

Table 8.3.2: Criteria for Establishing Relative Sensitivity of a Heritage Asset to Changes to its Setting

Relative Sensitivity	Criteria
High	Key characteristics or values of the heritage asset have little tolerance and/or are vulnerable to change. Development would significantly conflict with and affect the way that setting conveys heritage significance through an effect on physical surroundings and the way in which the asset can be experienced.
Medium	Some key characteristics or values of the heritage asset are sensitive to change but there is some tolerance to accommodating development without widespread or severe changes to physical surroundings and the way in which the asset can be experienced.
Low	Few key characteristics or values of the heritage asset are sensitive to change and there are opportunities to accommodate development

Relative Sensitivity	Criteria
	without widespread or severe changes to physical surrounding and the way in which the asset can be appreciated.
Negligible	Key characteristics and values of the heritage asset are robust and not appreciably sensitive to change; development can be accommodated without widespread or severe changes to physical surrounding and the way in which the asset can be appreciated.
Neutral	Key characteristics and values of the heritage asset are not susceptible to change. No harm is anticipated from development proposals.

8.3.4 Sensitivity to change depends on the nature and significance of the heritage asset and its capability to absorb change.

Criteria for Assessing Magnitude of Impact

8.3.5 Magnitude of impact is defined by the nature, scale and type of change, whether beneficial or adverse, that might affect a heritage asset.

Table 8.3.3: Criteria for Classifying Magnitude of Impact

Impact Magnitude	Criteria
Major	Beneficial: Cessation or reversal of physical damage to a heritage asset or its setting that would otherwise result in complete or near complete loss of the asset or historic landscape and/or considerably enhance heritage values.
	Adverse: Harm caused to very high/high value heritage assets or their setting in breach of relevant planning policies, or where the level of impact would result in total destruction or substantial loss of the ability to appreciate heritage values; change to most or all key landscape elements and/or extreme visual effects so as to result in complete change to historic landscape character.
Medium	Beneficial: Cessation or reversal of physical damage to a heritage asset of regional value or its setting that would otherwise result in significant harm and/or clear enhancement of heritage values

Impact Magnitude	Criteria
	Adverse: Harm caused to regionally important heritage assets that would significantly modify the resource but leave some deposits or key elements <i>in situ</i> ; change to some key historic landscape elements and/or clear visual changes to historic landscape character
Low	Beneficial: Change in landuse or management to enhance preservation of the heritage resource and/or its setting Adverse: Harm to heritage assets of low/local value and/or their settings and/or limited harm to regionally important heritage assets that would leave the majority of the resource in situ and would not affect future investigation; change to historic buildings and change to few key historic landscape elements and/or slight visual changes so that the asset is slightly different
Negligible	Beneficial: Very slight changes to landuse to enhance and conserve the value of any heritage asset and/or its setting. Adverse: Very minor changes to heritage assets and/or their settings so that mitigation is sufficient to offset harm; slight change to historic building elements that hardly affect it; very minor changes to key historic landscape features and/or virtually unchanged visual effects.
Neutral	No change to any heritage asset.

Criteria for Assessing Level of Effect

- 8.3.6 The significance of effects has been derived by cross-referencing the value/significance of the heritage asset as defined in Table 8.3.1 with the Magnitude of Impact as set out in Table 8.3.3. Effects can vary from major to neutral.

Table 8.3.4: Level of Effect based on Inter-Relationship between the Importance and/or Sensitivity of a Heritage Asset and/or its setting and the Magnitude of Impact

Magnitude of Impact	Importance and/or Sensitivity				
	Negligible	Low	Medium	High	Very High
High	Minor	Moderate	Moderate	Major	Major

Magnitude of Impact	Importance and/or Sensitivity				
	Negligible	Low	Medium	High	Very High
Medium	Negligible/ Neutral	Minor	Moderate	Moderate	Major
Low	Negligible/ Neutral	Negligible/ Neutral	Minor	Minor	Moderate
Negligible	Negligible/ Neutral	Negligible/ Neutral	Negligible/ Neutral	Minor	Minor

8.3.7 For the purposes of this scoping report ‘major’ and ‘moderate’ effects are considered significant in EIA terms, whilst ‘low’ and ‘negligible’ are considered to be not significant.

8.4 Cumulative Effect Assessment

8.4.1 Cumulative effect assessment is required by the EU Directive on EIA to identify impacts that are the result of combining the proposed development with existing or other proposed developments with which it may interact. Cumulative impacts may be more, or more rarely, less, than the sum of the impacts of individual developments.

8.4.2 Cumulative change is predominantly linked to setting, but can also apply to direct physical impacts that can change the heritage significance of an asset; a particular example is a change to the hydrological regime that may result in the loss of waterlogged organic archaeological remains or palaeoenvironmental evidence.

8.5 Potentially Significant Effects and Approach to Mitigation

Baseline

8.5.1 There are 80 designated assets in the form of scheduled monuments (21) and listed buildings (59) within the 3km study area for settings, as well as the Margam Park Registered Park and Garden. Additionally, the site falls within the Margam Mountain Registered Historic Landscape. One of the Scheduled Monuments; Roman Camp (GM058) extends into the northernmost part of the site area, while three others, Camp North of Tonmawr (GM507), Camp 530m East of Tonmawr (GM090) and Danish Camp (GM056) are immediately outwith the redline.

8.5.2 The ZTV (Tir Collective 2022) indicates that seven scheduled monuments will have no intervisibility, although the Ergyd Uchaf round barrow (GM159) lies on the very edge of an area of visibility. Thirteen of the Listed buildings appear to have no intervisibility under the same criteria. All of the above will require ground-truthing.

- 8.5.3 There are 88 entries on the GGAT Historic Environment Record within a study area based on 1.5km from the site centre, additionally, the Margam Park Conservation Area lies 1.35km from the western edge of the site redline. Some of the HER entries are not likely to be considered significant in EIA terms, other than where they contribute to the character and value of the Registered Park and Garden and Registered Historic Landscape. In particular previous archaeological assessment and investigation has noted the presence of several archaeological features within the site area in the form of holloways, enclosures and other features (08214w), unknown linears (08213w), a quarry (06693w) and the Moel Ton Tramway (04539w). Two other features in the form of a hollow or drain (08215w) and a trench (03883w) may potentially extend partly into the site area.

8.6 Potentially Significant Effects / Mitigation

Direct Impacts

- 8.6.1 For the purposes of this report 'Direct Impact' is taken to relate to the direct physical impact of the development, rather than setting. In general usage (following ICOMOS guidance as recommended in TAN24), direct impact is taken to include those impacts that arise as a primary consequence of the proposed development, which specifically includes 'setting'. Indirect impacts are normally defined as a 'secondary consequence' and relate, for example, to associated infrastructure such as access roads and grid connections.
- 8.6.2 The identified direct impacts in this case will result from the installation of mini-piles to support the solar array panels. These will be inserted in large numbers to an approximate depth of 1.5m, but the overall effect is very small, typically less than 0.5% of the site area, including for deformation of surrounding deposits. Excavation will also be required for service runs and footings for inverters and the substation building. Some further limited ground disturbance will also be required for perimeter security fencing. Access roads may also require excavation to base course but in some cases can be inserted without any requirement for excavation. In the absence of any detailed assessment, it is not currently possible to provide any detailed assessment of direct physical impacts. The archaeological resource known from within the site is currently relatively poorly understood being based predominantly on the results of geophysical survey. Some features, such as larger ditches and quarries are generally robust and unlikely to suffer significant harm from the insertion of piling, while other features including some enclosures and holloways and the majority of discrete features may suffer appreciable harm in the absence of mitigation. Although archaeological mitigation may be required as a planning condition, the majority of this harm is unlikely to be considered significant in EIA terms. The proposed access route from the north has the potential to impact

on the southern end of the scheduled Roman Camp and the non-designated Moel Ton Mawr Tramway; the level of potential impact on these assets, if any, will depend on construction techniques, but the Roman Camp is already crossed by an existing track at this point which may be utilised for the new access.

8.7 Settings Impact

- 8.7.1 Settings impact will result predominantly from visual impact to designated heritage assets including scheduled monuments, listed buildings, registered parks and gardens, registered landscapes and the Margam Conservation Area. No other relevant settings impacts have currently been identified beyond the potential for noise during the construction and decommissioning phases. In the majority of cases the site area does not form part of the setting of these designated assets and changes, for the most part are likely to result only in amenity changes, rather than harm to heritage significance and are therefore not significant in EIA terms. In the absence of any detailed assessment, it is difficult to provide any detailed assessment of settings impact, although the Heritage Appraisal (2022) has touched upon the setting of the closest relevant assets in the form of the four scheduled monuments around or partially within the site.

8.8 Mitigation

- 8.8.1 In the absence of detailed assessment and any form of ground-truthing it is currently anticipated that a standard suite of mitigation measures may be applied to the proposed development. For direct physical impacts, such mitigation may comprise the full range of archaeological investigation through preservation by record and *in situ*. For settings impacts consideration may be given to techniques such as screening through additional planting and exclusion zones to minimise visual impact. In the case of the two scheduled camps (GM090 and GM057), in particular, it may not be possible to provide any appropriate mitigation; the existing plantation woodland represents a recent intrusion into the landscape and additional planting may, particularly in the case of GM090, GM057 and GM058, be not much less harmful in regard to setting as the introduction of the proposed solar panels. The Danish Camp (GM056) is already located within plantation woodland and there is unlikely to be any appreciable effect on its setting resulting from the proposed development.
- 8.8.2 The Heritage Appraisal has given some consideration to GM090, 057 and 058 and has concluded that the pastoral landscape only provides a minor contribution to setting. However, in the absence of more detailed assessment it is not possible to confirm this level of assessment and it is possible that in the case of GM090 and GM057 the level of harm would

be at least moderate and therefore significant in EIA terms. On the basis of the ZTV, which was not available at the time of the Heritage Appraisal GM058 is likely, however, to be affected only by the new access, with topography acting to screen the actual solar arrays; the potential effects on this asset are consequently unlikely to be significant.

8.9 Residual Effects

- 8.9.1 In the absence of detailed assessment or clearly identified mitigation proposals it is difficult to assess residual effects with any great accuracy. However, residual effects on buried archaeology are assessed as being either neutral given the implementation of no-impact design solutions (e.g. concrete shoes and exclusion areas), or negligible where archaeological mitigation takes the form of preservation by record on deposits of lower importance. No significant residual effects have therefore been identified in regard to buried archaeology.
- 8.9.2 There are potential residual effects in regard to the settings of relevant assets (in this case the potential for significant effects (at least moderate adverse) is likely to be restricted to potential harm to scheduled monuments GM090 and GM057. These effects will continue through the operational phase of the scheme but are not permanent and are fully reversible, ceasing after decommissioning

8.10 Cumulative Effects

- 8.10.1 At present only a single possible development has been considered in relation to the scheme. This comprises the adjacent DNS scheme of the Y Bryn Wind Farm. It is not currently certain that this scheme will be progressed. No details of the scheme are currently to hand with regard to number and height of the proposed turbines, making an accurate assessment difficult, but the introduction of these features to the north/northeast of the site is likely to have no more than a minor cumulative effect and to not be significant in EIA terms.

9 Transport and Traffic

9.1 Introduction

- 9.1.1 The section covers the predicted transport and access issues that may arise from the construction of the Proposed Development, the significance of these effects and what suitable mitigation can be put in place to avoid, minimise or offset any adverse impacts.
- 9.1.2 The Transport & Access EIA Report Chapter will be supported by a combined Transport Statement / Construction Traffic Management Plan report and technical figures.
- 9.1.3 The key issues for consideration as part of the assessment will be:
- The temporary change in traffic flows and the resultant, temporary effects on the study network during the construction phase;
 - The design of new access infrastructure; and
 - The consideration of appropriate and practical mitigation measures to avoid, minimise or offset any temporary effects.
- 9.1.4 The potential effects of these will be examined in detail.

9.2 Published Guidance and Approach

- 9.2.1 The following policy and guidance documents will be used to inform the Transport and Access Chapter:
- The Guidelines for the Environmental Assessment of Road Traffic (Institute of Environmental Assessment (IEA), 1993);
 - Future Wales – The National Plan 2040 (2021);
 - Planning Policy Wales (PPW);
 - Technical Advice Note (TAN) 18 Transport; and
 - Welsh Transport Appraisal Guidance (WelTAG) (2017).

9.3 Assessment Methodology

- 9.3.1 The Guidelines for the Environmental Assessment of Road Traffic (IEMA 1993) sets out a methodology for assessing potentially significant environmental effects. In accordance with this guidance, the scope of assessment will focus on:
- Potential impacts (of changes in traffic flows) on local roads and the users of those roads; and

- Potential impacts (of changes in traffic flows) on land uses and environmental resources fronting these roads, including the relevant occupiers and users.

9.3.2 The following rules taken from the guidance will be used as a screening process to define the scale and extent of the assessment:

- Rule 1: Include highway links where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%); and
- Rule 2: Include any other specifically sensitive areas where traffic flows are predicted to increase by 10% or more.

9.3.3 Increases below these thresholds are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flow below this level predicted as a consequence of the Proposed Development will therefore be assumed to result in no discernible environmental impact and as such no further consideration will be given to the associated environment effects.

9.3.4 The estimated traffic generation of the Proposed Development will be compared with baseline traffic flows, obtained from existing traffic survey data, in order to determine the percentage increase in traffic.

9.3.5 Potentially significant environmental effects will then be assessed where the thresholds as defined above are exceeded. Suitable mitigation measures will be proposed, where appropriate.

9.3.6 It is not anticipated that a formal Transport Assessment will be required as these are not generally considered necessary for temporary construction works. A reduced scope Transport Assessment combined with a Construction Traffic Management Plan is therefore proposed.

9.4 Baseline

9.4.1 Access to the Proposed Development will be taken from the Graig Coch access road, a publicly adopted road located to the east of Margam Country Park.

9.4.2 Construction traffic associated with the development will generally approach from the M4 corridor via Junction 38. Construction vehicles would then access the site via the A48, Margam Park Access Lane and the Graig Coch access road.

9.4.3 The study area for the transport will reflect the access routes for the delivery of construction materials and will include the following:

- The M4 to the northwest of Junction 38;
- The A48 between its junction with the M4 and Pyle;
- Margam Park Access Lane; and
- Graig Coch access road.

- 9.4.4 Existing traffic count data will be used from the Department for Transport (DfT) database for the M4. New ATC surveys for the A48, Margam Park Access Lane and Graig Coch road will be commissioned and deployed for one week to record classified traffic data for a neutral month. The survey information will be factored using Low National Road Traffic Forecast (NRTF) Low growth assumptions to develop a future year baseline traffic flow for use in the assessment.
- 9.4.5 Three years of traffic accident data will be collected using the online resource crashmap.co.uk for the study area to inform the baseline review.
- 9.4.6 Online sources such as the National Cycle Route map and Ordnance Survey maps will be used to obtain details of the sustainable travel network.
- 9.4.7 Once operational, it is envisaged that the level of traffic associated with the Proposed Development will be minimal. Regular monthly visits would be made to the solar farm for maintenance checks. The vehicles used for these visits are likely to be 4x4 vehicles and there may also be the occasional need for an HGV to access the site for specific maintenance and/or repairs. It is considered that the effects of operational traffic would be negligible and therefore no detailed assessment of the operational phase of the development is proposed.
- 9.4.8 The traffic generation levels associated with the decommissioning phase will be less than those associated with the development phase as some elements such as access roads will be left in place on the site. As such, the construction phase is considered the worst case assessment to review the impact on the study area. An assessment of the decommissioning phase will therefore not be undertaken, although a commitment to reviewing the impact of this phase will be made immediately prior to decommissioning works proceeding.

9.5 Impact Prediction and Mitigation

- 9.5.1 Potential impacts that may arise during the assessment may include the following for users of the road and those resident along the delivery routes:
- Severance;

- Driver delay;
- Pedestrian delay;
- Pedestrian amenity;
- Fear and intimidation; and
- Accidents and safety.

9.5.2 The impacts on receptors within the study area will be reviewed during the construction phase, with a peak construction period assessment undertaken. This will review the maximum impact and presents a robust assessment of the effects of construction traffic on the local and trunk road networks.

9.5.3 The effects that will be considered will be based upon percentage increases in traffic flow and reviewed against the impacts noted above.

9.5.4 Standard mitigation measures that are likely to be included in the assessment are:

- Production of a Construction Traffic Management Plan;
- The design of suitable access arrangements with full consideration given to the road safety of all road users; and
- A Staff Sustainable Access Plan.

9.6 Residual Effects

9.6.1 There are no predicted residual effects as a result of the construction phase.

9.7 Cumulative Assessment

9.7.1 Committed development traffic, i.e. those from proposals with planning consent, will be included in baseline traffic flows, where traffic data for these schemes is considered significant and is publicly available. Developments that are proposed or at Scoping would not be included.

10 Socio-economic Impacts Assessment

10.1 Introduction

- 10.1.1 This chapter sets out the proposed scope of the socio-economic assessment for Eirlys Solar Farm. It outlines the approach to assessing socio-economic impacts, the information sources to be used, the study area and the potential significant effects. The anticipated extent to which these effects are significant will be explored below and where they are, will suggest that such socio-economic elements are considered in more detail as part of the full Environmental Impact Assessment (EIA).
- 10.1.2 This chapter has been prepared by Wavehill, a social and economic research consultancy who have delivered a range of scoping reports for renewable energy schemes across Wales, as well as EIA chapters, and post build impact assessments. The conclusions draw on Wavehill's experience and insight into the potential effects of the Eirlys Solar Farm development on local social and economic factors.

10.2 Published Guidance and Approach

- 10.2.1 This section presents a summary of the latest policy and guidance that will inform the approach to a socio-economic assessment of the Eirlys Solar Farm.

Latest Policy

- 10.2.2 The UK government has made a commitment to reach net zero by 2050, and renewable energy is fundamental to achieving this. Welsh Government is also committed to sustainable development and net zero with a pledge campaign across the country to reduce carbon emissions.¹⁰
- 10.2.3 Further, the Welsh Government seeks to reach 70% of energy consumption from renewable sources and 1GW of local ownership by 2030; both targets that the proposed Development will contribute to. This supports the broad direction of policy and strategy in the UK which either aligns to, or will be supported by, renewable energy development and decarbonisation.
- 10.2.4 Future Wales: The National Plan 2040¹¹ sets out the national goals for the next 20 years and includes sustainability themes aligned to developing a greener economy and factoring the response to the climate and nature emergency as a golden thread through all activity. Future Wales also helps to align local and regional planning to ensure consistency with the national

¹⁰ Working together to reach net zero: All Wales Plan 2021-25, Welsh Government, October 2021

¹¹ Future Wales: the national plan 2040, Programme for Government, Welsh Government, 2021

goals, including an emphasis on supporting planning that helps to decarbonise, clearly putting more renewable energy developments at the heart of this transition while supporting jobs and the economy. The benefits arising from job creation should help to tackle socio-economic inequality and regeneration, particularly in rural areas, while supporting good natural resource utilisation.

- 10.2.5 Planning Policy Wales (PPW)¹² provides further guidance to support the transition to a lower carbon economy. It places a priority on the objectives of the Well-being of Future Generation Act in the decision-making process to consider the importance of planning to create the environment for future generations to thrive.
- 10.2.6 Prosperity for All: a low carbon Wales¹³ builds on the Environment (Wales) Act¹⁴ and reinforces the importance of reducing greenhouse emission by 2050 and working towards net zero goals. Within this is the ambition to create a low carbon economy for Wales, how this can be achieved and the benefits it will bring, including clean growth, quality jobs and improved health. The development of new solar farm sites, including the proposed Eirlys Solar Farm, directly align and contribute to this ambition, by creating high value jobs, improving sustainability and reducing emissions, diversifying the economy and increasing wellbeing.
- 10.2.7 The intention to create jobs in the low carbon sector in Wales has been set out since Capturing the Potential: a green jobs strategy for Wales¹⁵ which highlights the transition required for Wales to become a low carbon economy. Several themes are important here, including fostering innovation and technological progression, supporting sustainability in businesses and investing in a more sustainable economy, with renewable energy offering a clear market that can be enhanced by each of these themes, all of which will support job creation.
- 10.2.8 Other social policies and strategies, such as the Well-being of Future Generations Act,¹⁶ also place emphasis on the importance of decarbonisation for the future and it is a consistent theme for much of the social as well as economic policy agenda.
- 10.2.9 The £1.3bn Swansea Bay City Deal¹⁷ funding for the City Region constitutes 9 programmes and projects which will grow the area and develop high value sectors and employment to improve GVA and productivity. The investments across Swansea, Carmarthenshire, Neath Port Talbot and Pembrokeshire includes a £58.7million programme to support innovation and low carbon growth. Further, investment in Pembroke Dock Marine including the Marine Energy Test Area (META) and the Marine Energy Engineering Centre of Excellence (jointly with the Offshore

¹² PPW (2021), Welsh Government, (Edition 11)

¹³ Prosperity for All: a low carbon Wales a Welsh Government plan, 2019

¹⁴ Environment (Wales) Act, Welsh Government, 2016

¹⁵ Capturing the Potential. A green jobs strategy for Wales, Welsh Government, 2009

¹⁶ Well-being of Future Generations Act, Welsh Government, 2015

¹⁷ Swansea Bay City Deal, HM Government, 2017

Renewable Energy Catapult) demonstrates the commitment of the City Region to renewable energy development and the transition to a low carbon economy.

10.2.10 Neath Port Talbot puts climate change at the centre of its Local Development Plan (LDP) 2011-2026. The LDP highlights objectives for economic development which include objectives to encourage employment opportunities and growth within the county which will be supported by the development of the low and zero carbon sectors. The alignment through from the local authority level, to the regional context and national policy direction is clear in the emphasis on utilising renewable energy developments such as Eirlys Solar Farm, to respond to the climate crisis but also transition the economy to sustainable jobs.

Guidance

10.2.11 There is no specific guidance available for conducting an EIA of the socio-economic effects of a proposed renewable energy project development. Therefore, the approach used in the assessment for the Eirlys Solar Farm is based on best practice. Adherence will be made to the best practice and guidance highlighted in the latest PPW (Edition 11), Future Wales and other relevant policy, as appropriate, from Government and industry groups. This includes guidance on impact appraisals from HM Treasury (Green and Aqua Book),¹⁸ the methodologies adopted by Renewable UK, and industry practice from the Market Research Society and Institute of Economic Development. In addition, the latest published information from other solar farm sites, especially post-build impact assessments, will be considered when estimating the potential socio-economic impact of the Eirlys Solar Farm.

10.2.12 The EIA regulations used in the National Policy Framework request that the EIA assess the direct and indirect impacts of a project on human populations and their interaction with the environment. This inherently recognises that social and economic effects are likely to occur which may produce both positive and negative impacts for people both locally to the site, but also in other communities and parts of the country.

10.3 Assessment Methodology

10.3.1 To determine the extent to which the Eirlys Solar Farm will produce socio-economic effects, the following methodology will be employed.

Study Area

10.3.2 Four study areas will be considered in the socio-economic assessment. A local study area established as the wards that fall within 10 km of the Site (see map below) will be used when

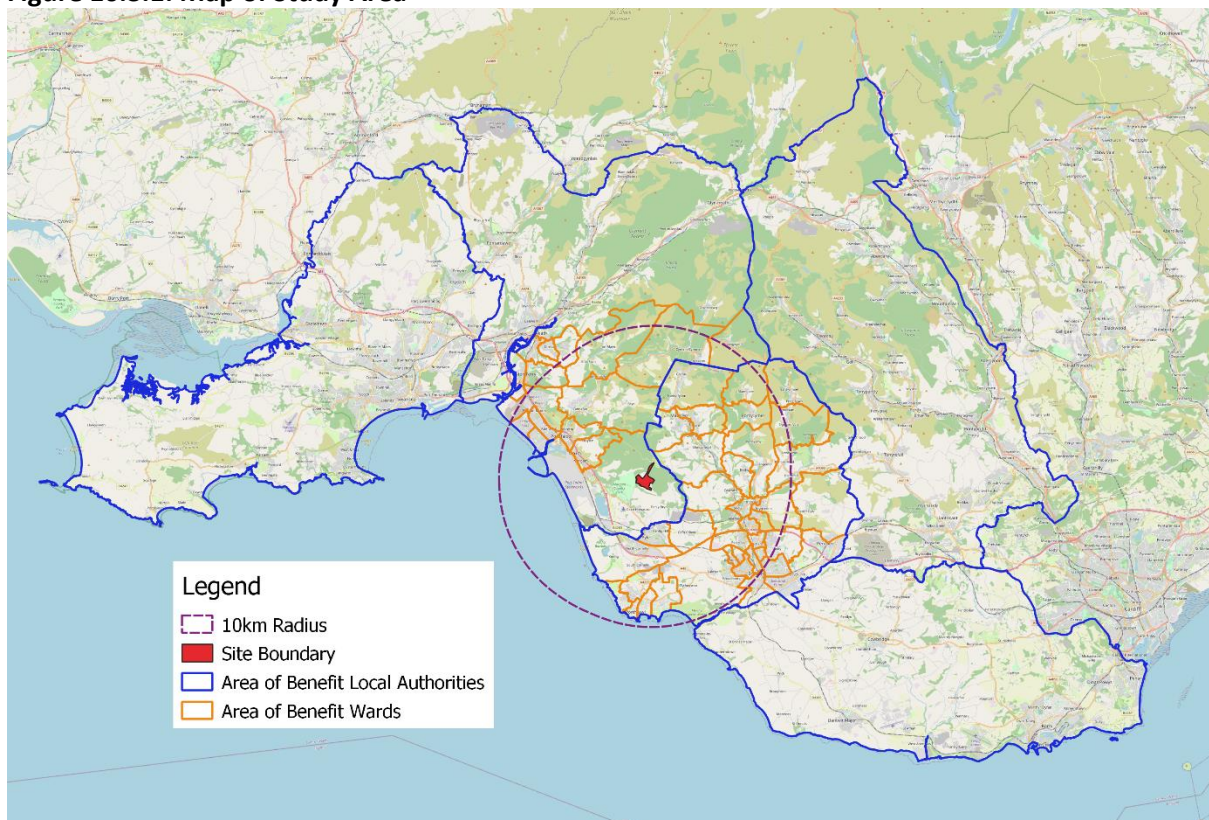
¹⁸ Green Book, HM Treasury, March 2022 & Aqua Book, HM Treasury, March 2015

assessing any social impacts. This includes the smaller communities of Coed Hirwaun and Pen y Bryn 1.5km to the South, and Margam, Pyle and Maesteg ~4km West, South and North respectively.

10.3.3 Given the location of the Site in Southern Neath Port Talbot is fairly central in the South Wales M4 corridor, and economic data is more readily available for local authority areas, a 30 minute Travel to Work Area (TTWA) consisting of Swansea, Neath Port Talbot, Bridgend, Rhondda Cynon Taf and Vale of Glamorgan is considered for local economic impacts. A wider study area covering Wales and then the UK will also be used.

10.3.4 This will allow for the fact that much of the economic benefits such as jobs created and GVA will be to businesses based outside of the local area, and potentially even Wales. Sensitivity to the location of contractors and supply chains will be made to allow for the fact that some economic impacts may be accrued outside of the UK (for instance solar panel manufacture and supply is likely to be from a European based company).

Figure 10.3.1: Map of Study Area



Economic Impact Assessment Approach

10.3.5 Initially a desk-based review of the socio-economic context will be conducted, updating indicator figures presented in the baseline in this chapter (section 12.4). This review will consider the site and study area, as well as the latest local policy activities that might have future effects on the socio-economic conditions being assessed. As part of the review, the

assessor will work with the Developer to understand the potential supply chain locally and what services may be required to complete the design and construction of the solar farm. This information will inform the modelling and contextualise the assessment of impacts estimated from the Development.

10.3.6 All relevant documentation to the Development and its potential socio-economic impact will be reviewed in preparation for the socio-economic impact assessment. This will include a literature review of evidence of impact from other solar farms to identify suitable benchmarks and ready reckoner figures which can be appropriately applied to the Eirlys Solar Farm. Updated figures will also be produced from the latest UK data sets from the ONS and other sources for calculating Gross Value Added and jobs created for the relevant supply chain sectors. For instance, identifying the latest input-output tables¹⁹ and GVA²⁰ by sector.

10.3.7 The socio-economic impact assessment will require no field surveys, however a consultation exercise will be undertaken with local and industry stakeholders. This will help support the evidence of potential impacts (both social and economic) and provide insight on local context, while industry experts will provide additional supply chain information to inform robust impact modelling.

10.3.8 Potential stakeholders could include:

- Industry groups and experts
- Community interest groups and local residents
- Local council officers and members
- Swansea Bay City Region representatives
- Welsh Government representatives

10.3.9 The data captured from the stakeholders, the evidence reviewed and previous experience will feed into an economic model as key assumptions. This model will estimate the potential economic impact given the investment into the Development. The model will consider several scenarios to provide a range of impacts against different supply chain considerations and local retention. These outputs can then be compared to the economic baseline conducted to assess impacts for the area.

10.3.10 Modelling will consider how the scope and scale of the Proposed Development will bring economic opportunities and potential challenges to the area, the effects this will have on job creation or safeguarding and the overall GVA that will be created.

¹⁹ Input Output Tables, ONS, 2020

²⁰ Annual Business Survey, ONS, 2021

10.3.11 Accounting for location of expenditure, multipliers, displacement, substitution and leakage will all be carried out to provide the final attributable impact of the Proposed Development on the economy in the area of study, Wales and the United Kingdom (UK). This will also consider the effects of any shared ownership or community benefit fund established as part of the development.

Social Impact Assessment Approach

10.3.12 The key social impacts considered in an assessment of the Development will be recreation use of the site. Several footpaths run through the proposed site boundary as well as the Ogwr Ridgeway Walk bridlepath. Desk research into the impacts from other solar farms on local recreation use will be used to help assess the potential implications (though recognising there is limited evidence that recreation is adversely affected).

10.3.13 The insight from community interest groups, councillors and local residents from the consultation (see above) will support the assessment and inform the extent to which the Development may disrupt recreational use of the site.

10.3.14 Further, an assessment of any shared ownership and community benefit fund will also be made modelling information on likely investment and potential impacts, drawing on evidence from other community benefit funds.

Significance Testing

10.3.15 There is no published standard for assessing significance of impacts of a solar farm development on different receptor groups, though generally, the proximity of the receptor to the site, the level of usage of the site itself and the ease of mitigation all determine sensitivity. As the socio-economic receptors considered have the same level of sensitivity (i.e. one job is considered the same as another) then only magnitude will be considered when determining the significance of an impact. These will be based on the criteria set out in the table below.

Scale of Impact and Associated Criteria

Table 10.3.1: Table showing Scale of Impact and Associated Criteria

Magnitude of Impact (positive or negative)	Definition/Criteria
Major	A substantial change to socio-economic loss or gain in the area of impact affecting a large number of people (100+) and/or businesses (30+) to the extent of changing the baseline business and employment structure sufficient to constitute a major long term alteration of socio-economic

Magnitude of Impact (positive or negative)	Definition/Criteria
	conditions or a major change to recreation assets or tourism spend.
Moderate	A partial change to socio-economic loss or gain in the area of impact affecting a sizeable number of people (20-100) and/or businesses (10-30) to the extent of adjusting baseline business operations and employment sufficient to constitute a moderate alteration of socio-economic conditions or a moderate change to recreation assets or tourism spend.
Minor	A small change to socio-economic loss or gain in the area of impact affecting a group of people (<20) and/or businesses (<10) to the extent of influencing baseline business activities and employment opportunities sufficient to constitute a minor alteration of socio-economic conditions or a minor change to recreation assets or tourism spend.
Negligible	Barely distinguishable change to socio-economic loss or gain to baseline in the area of impact affecting no people and/or businesses permanently and very few people (<10) and/or businesses (<5) temporarily (for less than 1 year).
Neutral	Where there is no positive or negative socio-economic impact.

10.3.16 Where the Development will lead to Major or Moderate magnitude impacts, they will be considered within the EIA in accordance with the methodology above.

10.4 Baseline

10.4.1 A summary of the socio-economic characteristics of NPT are given through a number of indicators against which the area can be assessed, providing comparison figures to Wales and the UK where appropriate. This data is drawn from mainly Office for National Statistics (ONS) sources.²¹

10.4.2 Across the five local authorities in the study area (Neath Port Talbot, Swansea, Bridgend, Vale of Glamorgan, and Rhondda Cynon Taf) the total resident population is 914,300. As of 2020, of the total resident population, 62% are of working age (16-64 years old) in Bridgend, RCT and NPT. Swansea has a higher working age population at 63% and Vale of Glamorgan lower at 60%. These figures are consistent with the averages for Wales as a whole and the UK.

²¹ NOMIS, ONS, 2021/22

- 10.4.3 In 2021, just under 29% of residents of NPT and 34% of residents of RCT had a qualification of NVQ Level 4 or above. These are below the overall average for Wales (39%) and the UK as a whole (44%). The proportion of Swansea and Bridgend residents qualified to Level 4 and above is at the Wales average of 39%. A higher proportion of Vale of Glamorgan residents have this level of qualification at 49%. This is significantly higher than the Welsh average and suggests that the skill level in the Vale is above that of both Wales and the UK.
- 10.4.4 The average salary for full-time employees in Wales is £28,861, lower than the UK average at £31,368. Earnings in NPT in 2021 were £31,456, while Swansea (£28,827), Vale of Glamorgan (£29,564) and Bridgend (£29,667) were also above the Wales average. In RCT average annual earnings are below the Welsh.
- 10.4.5 Data from ONS Labour Force survey illustrates that in 2021 unemployment in NPT was 3.4%, lower than both the Wales and UK (both 3.8%), and lower than neighbouring Swansea (6.1%). Rates in Bridgend, Vale of Glamorgan and RCT are also lower than the Welsh average at 3.1%, 3.2% and 3.3% respectively.
- 10.4.6 ONS data illustrates that 75% of the population in NPT are economically active which is lower than the UK (78%) and Wales (76%). Rates in Swansea (77.2%), Bridgend (79.6%) and RCT (77%) are above the Welsh average. The economically active population in Vale of Glamorgan is above both the Welsh and UK average at 81.7%.
- 10.4.7 There are 3,200 enterprises in NPT, with 88% of these being micro in size (0-9 employees). This is slightly below the Welsh average of 90% but mirrors the rates in Swansea (88%), Bridgend (88%) and RCT (89%). The percentage of micro-enterprises in Vale of Glamorgan is 91%.
- 10.4.8 Job density is used to provide an understanding of how urban economies are structured in terms of how jobs are concentrated or dispersed across a given area. The data generated from ONS figures illustrate a consistently lower job density in NPT (0.63 jobs per head of population aged 16-64) than both Wales and the UK (0.76 and 0.84 respectively). Rates of job density in Bridgend, RCT and Vale of Glamorgan also run lower than the Welsh and UK average at 0.67, 0.56 and 0.57 respectively. The rate in Swansea is higher than Welsh average but lower than the UK average at 0.78.
- 10.4.9 The top industry by employment in NPT is manufacturing (18% of all employment). Manufacturing is also the biggest employing industry in Bridgend where the retail, public administration and manufacturing sectors each individually make up 14%. The largest industry in RCT is retail (17%), while Swansea, Vale of Glamorgan and Wales nationally have higher proportions of health and social work activities (16%, 20% and 16% respectively).

10.4.10 Data from the ONS estimated the economy of NPT and Bridgend to be £5.6bn, with Swansea also valued at £5.6bn and .²² The figures for RCT and Vale of Glamorgan are not disaggregable from the wider valleys local authorities or Cardiff.

10.4.11 The productivity of the area, as measured by GVA per hour for NPT is £30.20, slightly below the Wales average, while in Swansea it is £32.40, Bridgend £36.60, Vale of Glamorgan £29.20 and RCT £36.40.

10.5 Impact Prediction and Mitigation

10.5.1 This section outlined the expected socio-economic effects as a result of the Development.

Predicted Economic Impacts

10.5.2 The indicative scale of the Development proposal at 79MW, and associated grid connection and battery storage, would represent a sizeable investment in renewable energy in Neath Port Talbot and Wales and is likely to generate a moderate economic impact. Businesses in the supply chain in Wales will be positively affected by the revenue opportunities the development creates, while there will be the potential for jobs created or safeguarded among South Wales residents.²³

10.5.3 Some impacts will be created during the design and development phase with the consultants and developer visiting the site as well as undertaking planning work. Greater benefits are then expected to come as part of the preparation and installation of the solar farm, with manufacturing elements likely to be from overseas locations. Local impacts during construction include supply of minerals and aggregates, agricultural specialists and landscaping/fencing contractors, alongside the electrical works. During operation surveillance, security and monitoring, and maintenance will be required.

10.5.4 The construction phase of the solar farm development is anticipated to create a number of temporary roles for specialist installation contractors. The UK Energy Research Centre estimates that across the solar value-chain, 400-500 jobs could be created during installation and construction combined, 200-300 in operations and maintenance, and 100 in advanced manufacturing and R&D per GW of additional solar capacity.²⁴

10.5.5 Multiplier effects through the supply chain will provide further benefits from the original investment and deliver additional job and GVA impacts in each of the study areas.

²² Local GVA Estimates, ONS, 2021

²³ Renewable Energy and Jobs Annual Review 2021, IRENA, 2021

²⁴ Low Carbon Jobs, UK Energy Research Centre, 2014

- 10.5.6 Skills benefits are also expected and needed if the solar and renewable industry in Wales is able to meet the policy targets set. Specialist training and development opportunities may therefore be created by Eirlys Solar Farm.

Predicted Social Impacts

- 10.5.7 There may be some social impacts as a consequence of the Development and potentially to a moderate significance (depending on the use of the public rights of way and extent of the community benefit fund and any shared ownership). The effects of any community benefit fund or shared ownership may bring may generate a moderate impact magnitude with initiatives that will benefit local residents.

Tourism & Recreation

- 10.5.8 It is proposed that the effects on tourism are scoped out of the socio-economic impact assessment. There is no evidence that renewable energy developments have any substantial impact on tourism with few visitors reporting disbenefits.²⁵ The location of other renewable energy sites nearby, including onshore wind farms, is likely to mean the Development brings no additional impact on the local tourism economy or recreation use, and tourism data for Neath Port Talbot shows increases in the visitor numbers over recent years despite large wind farm developments in the borough.²⁶ Recreation impacts are likely to only be temporary during the construction of the solar farm.
- 10.5.9 As part of the mitigation measures taken there will be gaps between the solar installations and public rights of way that cross the site to ensure the open nature of any views are preserved and reduce any potential negative recreation impacts. Other impacts of the Development on socio-economic factors are likely to be positive and therefore will be enhanced as far as possible, such as using local suppliers where possible.

10.6 Cumulative Assessment

- 10.6.1 The Eirlys Solar Farm will contribute to the growing number of solar farms and renewable energy projects in Neath Port Talbot and South Wales. Given the proximity to several other solar farm sites, cumulative effects from these developments need to be considered. Given the intensity of local labour and material requirements for one solar farm is unlikely to

²⁵ Study into the Potential Economic Impact of Wind Farms and Associated Grid Infrastructure on the Welsh Tourism Sector, Welsh Government, 2014 & The economic impacts of wind farms on Scottish tourism, A report for the Scottish Government, 2008 & Wind Farms & Tourism Trends in Scotland: Evidence from 44 wind farms, BiGGAR Economics, 2021

²⁶ Regeneration and Sustainable Development Cabinet Board, Tourism Update Report, Neath Port Talbot County Borough Council, March 2019

substantially alter the socio-economic baseline when operational and any effects are positive, cumulative effects beyond the economies of scale are unlikely.

11 Hydrology, Hydrogeology and Geology

11.1 Introduction

11.1.1 This Scoping Report describes the baseline environment in relation to hydrology, hydrogeology and geology and sets out the potential effects which could occur as a result of the Proposed Development. A description of mitigation measures that will be included as part of the design of the Proposed Development have also been included.

11.2 Policy and Relevant Guidance

11.2.1 The ES chapter on hydrology, hydrogeology and geology will take into consideration relevant legislation, planning policy, and guidance. This includes (but is not limited to):

- Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;
- Environmental Permitting (England and Wales) Regulations 2016;
- Land Drainage Act 1991;
- The Water Supply (Water Quality) Regulations (Wales) 2018;
- River Basin Management Plans (RBMP);
- Flood and Water Management Act 2010;
- Planning Policy Wales 11 (PPW 11);
- Future Wales: The National Plan 2040;
- Technical Advice Note 15 (TAN);
- GPP1: Understanding your environmental responsibilities – good environmental practices ;
- GPP5: Works and maintenance in or near water;
- PPG06: Working at construction and demolition sites ; and
- GPP21: Pollution incident response planning.

11.3 Assessment Methodology and Significance Criteria

11.3.1 This chapter of the scoping report has been developed based on information obtained from a preliminary desk-based study. The information used to determine the likely impacts have been listed below in Table 11.3.1.

Table 11.3.1 Sources of Information used to assess Baseline Environment

Topic	Source of Information
LiDAR data	http://lle.gov.wales/GridProducts#data=LidarCompositeDataset
Catchments and watercourses	https://waterwatchwales.naturalresourceswales.gov.uk/en/index.html
TAN15	https://datamap.gov.wales/layers/inspire-nrw:NRW_TAN15_DEFENDED_ZONES
SSSI and RAMSAC site	https://datamap.gov.wales/layers/inspire-nrw:NRW_LIDAR_ARCHIVE_TILE_CATALOGUE
Flood Zone 2 and 3	https://datamap.gov.wales/capabilities/layergroup/2070/?ows_service=wms
Geology	https://geologyviewer.bgs.ac.uk https://datamap.gov.wales/layers/inspire-wg:wg_unified_peat_2019

11.3.2 Assessments of impacts will be based on initial desk-based studies in respect of early stage designs of the Proposed Development. An iterative design process will be utilised where potential impacts to hydrology, hydrogeology, geology are identified. These early design changes will help reduce the residual effects on the water environment.

11.3.3 Further site visits, consultation, data processing and analysis will then take place using later stage designs of the Proposed Development, and where impacts cannot be avoided, mitigation measures will be provided to reduce effects.

11.3.4 The assessment will follow these key stages:

- identification of the study area;
- baseline determination;
- review of the Proposed Development to identify potential impacts and effects;

- evaluation of significance of effects and vulnerability of receptors to determine significance of effects;
- identification of mitigation; and
- assessment of significance of residual effects.

11.3.5 The cumulative effects of developments within the local area will be assessed on a catchment basis. The size of the draining catchments and the proximity to current or other proposed developments will be assessed to determine the likely cumulative impacts on the local environment.

Study Area

11.3.6 Impacts upon water quality will be considered on a catchment basis. The catchments draining the Site are presented in Figure 11.1.

11.3.7 Flood risk will be considered within the site and to third parties outside of the site as far as any flood modelling suggests any impacts may occur. It is assumed that information provided by National Resources Wales (NRW) models and online mapping is sufficient for this assessment.

11.4 Baseline

Surface Hydrology, Site Drainage and Flooding

11.4.1 The Proposed Development Site is located in South Wales on land to the south-east of Port Talbot on the south-western slopes of Moel Ton-mawr. The Site is located on the boundary of two main river catchments; the Nant Cwm Phillip and Afon Cynffig (Kenfig). A minor watercourse (unnamed) runs through the south of the Site, which is tributary of the Nant Cwm Phillip. This watercourse is indicated by OS mapping as being fed by a number of springs within the Site boundary. The Natural Resources Wales (NRW) fluvial flood map indicates the Site is not at risk of fluvial flooding, however this does not mean flood risk is not present from rivers, only that fact that NRW mapping does not model fluvial risk for catchments less than 5km². Instead, the NRW pluvial map may be used as a proxy for fluvial risk from smaller catchments (of which the Site is comprised). This pluvial mapping indicates there is a small south-western section of the Site at risk. The extent of flooding is minimal and is constrained to the channel of the unnamed watercourse emanating from the centre of the Site and draining south before confluencing with the Nant Cwm Phillip. The extent of flooding is shown in Figure 11.2.

- 11.4.2 A review of the TAN 15 NRW maps indicate that the Site is wholly situated within Development Advice Zone A, which means the site is considered to be at little or no risk of flooding. Review of the NRW flood risk maps, show the Site is not at risk of reservoir or tidal flooding (being located 5km from the coast and significantly elevated above sea level).

Geology, Hydrogeology and Soils

- 11.4.3 Bedrock geology mapping of the Site indicates it is underlain almost entirely by Rhondda Member sandstone. Investigation into the superficial geology shows that the Site is not overlain by any significant superficial deposits. No peat is identified within the Site boundary according to the Unified Peat Map for Wales and BGS mapping. The Site is entirely underlain by the (undifferentiated) Swansea Carboniferous Coal Measure groundwater waterbody, which is a moderately productive aquifer. The soil is freely draining and loamy²⁷.

Land Use and Designated Sites

- 11.4.4 The Proposed Development is located within an area of open farmland, which slopes steeply from the north east to the southern and western extents. Located approximately 2.5km south-west (downstream) of the Site is the Eglwys Nunydd Reservoir, a Site of Special Scientific Interest (SSSI). Margam Moors SSSI is located 3.5km downstream in the same direction. The Kenfig Special Area of Conservation (SAC) is located 4km to the south-west and Cefn Cribwr SAC is located 3.4km to the south-east of the Site. The location of these designated sites are shown on Figure 2-3. The Site lies upstream and drains into both the Elgwys Nunydd Reservoir SSSI and Kenfig SSSI, with a potential hydraulic connection also to the Margam Moors SSSI. To the west of the Site is Margam Country Park, through which the Nant Cwm Philip drains.
- 11.4.5 NRW identified a historic landfill at the northern end of the proposed development Site (approximate grid reference: SS 83293 87804) (see Figure 11.3). The landfill is an old municipal site run by the Local Authority which accepted household and industrial waste between 1960 and 1974. The landfill records show a mine shaft is also situated within the location of landfill site. The landfill is recorded as Llety Brongu and listed as reference 6915/0017 and EAHLD14062; however no further information is readily available.

Water Quality and Water Use

- 11.4.6 The Site lies within the Tawe to Cadoxton Water Framework Directive (WFD) Management Catchment. The springs located to the west of the Site boundary drain into the Nant Cwm

²⁷ <https://www.landis.org.uk/soilscapes/>

Philip, which is located approximately 450m west from the boundary. The Nant Cwm is designated as a WFD water body (ID: GB110058026190) and has an overall waterbody status of Poor and chemical status of High²⁸. The Afon Cynffig, (ID: GB110058026170), draining the east of the Site, has a overall waterbody status of Moderate and chemical status of High.

- 11.4.7 Private water supplies may be present in the vicinity of the Site, satellite mapping was used to assess if any properties nearby were unlikely to have a mains water supply, and thus are more likely to be served by a private water supply (Figure 11.3). The properties Ton-Mawr (NGR: SS 824862) and Graig Goch (NGR: SS 819860), are located to the south of the Site and may be served by a private water supply. Further downstream within the catchment feeding the Afon Cynffig are Hirwuan Farm (NGR: SS 818851) and East Lodge (NGR: SS 814851), which might also have Private Water supplies. Private water supply properties will be assessed further following consultation with the local planning authority (LPA) and local residents.

11.5 Potentially Significant Effects and Approach to Mitigation

Potential Effects

- 11.5.1 During construction there is a risk of soil compaction across the whole of the Site through operation of machinery and plant to install the panel arrays. This is most likely to occur along the access tracks which would be the most heavily trafficked area onsite. This could lead to a minor increase in run-off as the soil compaction could reduce the soil's permeability. This, combined with the increase in impermeable areas due to on-site buildings and the other infrastructure, could lead to short term and long term increased surface water runoff. This has the potential to increase the flashiness of the catchment during high rainfall events and to temporarily reduce groundwater recharge. This could subsequently increase downstream flood risk.
- 11.5.2 There is a risk of surface water flooding of construction working areas. This is most likely to occur during heavy rainfall events which exceed the capacity of any installed drainage system or due to ground conditions resulting in standing water. Impacts associated with flood risk can also occur due to construction activities such as ground reprofiling which have the potential to alter drainage pathways.
- 11.5.3 Due to the increased impermeable area of the Site caused by its change of use, increased overland flow may occur. This has the potential to increase scour in the watercourse and increase flood risk downstream.

²⁸ <https://waterwatchwales.naturalresourceswales.gov.uk/en/index.html>

- 11.5.4 Water quality can be impacted by the excavation of the topsoil that would likely be required to lay the proposed access tracks and buried cables. If not appropriately mitigated, this can have a direct impact on the exposed subsoil or rock due to increased risk of erosion. This poses a risk during high rainfall events due to increased siltation of runoff which has the potential to pollute surrounding watercourses. The construction work across the Site that could expose surface soils, such as soil stockpiles, could occur adjacent to the natural land drainage ditches or watercourses that are located within various parts of the Site. Therefore, there is the potential for sediment laden run-off to enter these watercourses directly.
- 11.5.5 There is also a risk of pollutants leaching from the solar panels themselves as they have the potential to act as sources of leachable quantities of PFAS (per-and polyfluoroalkyl substances). This risk is however considered to be very small and these materials may not be present in the panels, depending upon product used.
- 11.5.6 Alongside siltation pollution, there is a low risk of chemical spillages/leakages from construction activities or vehicles harming the water quality. If this were to occur, it would have the potential to soak through the subsoil and into the groundwater leading to changes in the in-stream hydrochemistry. Or alternatively be entrained with surface water runoff into the watercourses surrounding the Site. These risks are considered low, providing that refuelling occurs off Site and appropriate emergency plans are put in place to deal with potential spill events.
- 11.5.7 The Site lies upstream of (draining through) both the Elgwys Nundd Reservoir and Cynffig SSSI, with a potential hydraulic connection also to the Margam Moors SSSI. These sites are particularly sensitive to hydrological changes due to the presence of habitats including dune grassland, shallow reservoir designated SSSI for birdlife, and moorland. Any flood risk increase or water quality decrease carries the risk of harming protected areas of rare biodiversity at these sites.
- 11.5.8 Towards the south and east of the Site are several small farmhouses which may have private water supplies. If private water supplies are encountered and construction is taking place within the catchment, if appropriate mitigation is not provided there is the potential for any construction pollution to impact the water quality of these supplies.
- 11.5.9 There is a historic landfill site located in the north of the Proposed Development (location shown in Figure 11.3), NRW will consider this site in respect of land contamination. Historic landfill sites produce leachate which can become toxic and resultingly contaminate nearby waterbodies. Construction within the Site boundary may disturb and mobilise contaminants from this source.

11.5.10 During operation the potential impacts on the water environment are likely to be low. Due to the static nature of a solar farm and the limited ongoing work that would take place during operation, pollution incidents would be restricted to maintenance vehicles and activities. The limited increase in impermeable areas are not likely to result in significant effects in relation to long term flood risk.

Approach to Mitigation

11.5.11 To reduce operational soil compaction, vegetation in the form of a wildflower and/or grasses mix will be maintained around the panels, helping to de-compact the ground. The use of heavy machinery during this stage will also be minimal. These measures would mitigate the impacts in relation to soil compaction such that they would not likely to be significant. Therefore, it is proposed to scope out effects in relation to soil compaction from the ES for the operational phase.

11.5.12 A Flood Consequence Assessment (FCA) and Outline Surface Water Drainage Strategy will be included to manage any increase in surface water runoff which will likely consist of landscaping and planting of native vegetation to intercept runoff and perimeter swales to store any excess runoff predicted. These methods, combined with the minimal increase in impermeable area caused by solar farms, mean the effects of increased surface water runoff during construction and operation would be low and not significant.

11.5.13 To reduce siltation impacting water quality during the construction phase, the lengths of open excavations required to build access tracks would be controlled and replaced with gravel material as soon as possible to reduce the risk of erosion.

11.5.14 To reduce the potential impacts on water quality caused by chemical pollution from construction activities and vehicles, best practice mitigation measures would be implemented. With these measures included as part of the Proposed Development the impacts would be reduced. However, due to the nearby presence of the Site to a SSSI, the impacts in relation to water quality during construction are proposed to be scoped into the ES.

11.5.15 During the operational stage the impact of the Site on levels of siltation and pollution in the waterways will be minimal and consequently it is proposed that these impacts would be scoped out of the ES. Best practice measures in relation to pollution incidents from maintenance vehicles would be implemented and as such construction water quality effects would not be considered significant.

11.5.16 Due to the proximity of WFD waterbodies a WFD assessment is required and will be provided as part of the ES.

11.5.17 Liaison with the local council and further investigation into the farmhouses surrounding the proposed Site would be required before the impacts of the Proposed Development on private water supplies can be scoped out. Details of any private water supplies will be provided within the ES and an impact assessment undertaken as necessary.

11.5.18 A Phase 1 contaminated Land Preliminary Risk Assessment report will be carried out to satisfy NRW's expectations in assessing the impact of the historic landfill site located north of the proposed development. An assessment of these effects will be included within the ES hydrology, hydrogeology and geology chapter.

11.5.19 As the Site is not located within any significant fluvial flood plains, no mitigation methods in terms of fluvial flooding is required. The FCA and Outline Surface Water Management Plan submitted as part of the ES will identify the risks of flooding during the operational period from all sources and will summarise the drainage features that form part of the Proposed Development design.

Table 11.5.1 : Scoping summary table

Aspect	Construction	Operation	Rationale for scoping in or out
Soil compaction resulting in increased runoff and reduced groundwater recharge	Out	Out	By implementing a construction traffic management plan, compaction during the construction phase should be minimal. During the operational phase the use of machinery onsite will be minimal. Grasses would be used to promote healthy top soil and stabilise any movement. Solar panels, once installed, would have a negligible impact on soil compaction. Wildflower and/or grasses would be planted beneath panels to ensure no erosion occurs on the drip lines. Impacts of soil compaction during operation can be scoped out.
Water Quality from siltation of runoff and pollution events (spillages)	In	Out	Best practice mitigation measures would be implemented during the construction phase. Due to the Site being potentially hydraulically connected though to at least two SSSI's downstream (particularly the Eglwys Nunydd Reservoir), this is scoped in during the construction phase.
Designated Sites	In	Out	Once in operation, impacts on water quality are however expected to be minimal due to the implementation of best practice measures.

Aspect	Construction	Operation	Rationale for scoping in or out
Pluvial/fluvial Flooding	In	In	Fluvial flooding (using pluvial flood maps as a proxy) occur within a very small area within the south-west of the Site, contained to the river channel. No evidence of surface water ponding is present through the Site. The impacts of this on the PV infrastructure is considered to be minimal, however the impact of infrastructure on flood risk downstream (in terms of increased runoff rates) needs to be investigated further and consequently both construction and operational effects have been scoped in. An FCA and Outline Surface Water Management Plan will be submitted with the ES. Tidal and reservoir flooding is to be scoped out of the ES.
Private Water Supplies	In	In	Not enough data has been obtained to determine if any households in the area rely on a private water supply at this time. Therefore, these effects are scoped in and an impact assessment will be undertaken as required.

12 Topics to be Scoped out of EIA

12.1 Glint and Glare

- 12.1.1 Having undertaken a desk-based review into the potential glint and glare effects of the proposed development, Pager Power have recommended that it be scoped out of the Environmental Assessment.
- 12.1.2 The effects on ground-based receptors are likely to be screened by existing vegetation and intervening terrain. No railway operations and infrastructure have been identified within 200m of the proposed development, therefore no significant impact can be predicated concerning railway operations and infrastructure
- 12.1.3 Considering the relative location of the Proposed Development with respect to the surrounding aviation infrastructure, layout modifications may be required. If required, it is expected that layout modifications would be sufficient to remove any significant effects upon aviation activity.

12.2 Ecology and Ornithology Surveys

- 12.2.1 Notable or Protected species and habitats on site which have been scoped out include, Line of trees, Improved Grassland, Bracken, Semi-natural broadleaved woodland, Amphibians, Otter, Water Vole and INNS.
- 12.2.2 In respect of Ornithology, following site investigation, a number of Bird Species surveys have been Scoped out of future assessment, including Lesser Redpoll, Common Redstart, Red Kite and Eurasian Curlew.
- 12.2.3 The burry Inlet SPA and Ramsar site sits 16Km away and holds interest with regard to Waterfowl and wader species, these have also been scoped out as the site is not suitable for these species.

12.3 Land and Soil

- 12.3.1 An initial check using the Predictive Agricultural Land Classification (ALC) Map 2²⁹ identified the site as being a mix of grades 4 (poor quality agricultural land) and 5 (very poor quality agricultural land).
- 12.3.2 The land comprising the site will be used to produce renewable energy. It is also the case that the land will be utilised as far as possible for agricultural purposes with the design of the site taking into account the potential for grazing by sheep on the land. Once the project has come

²⁹ https://datamap.gov.wales/layers/inspire-wg:wg_predictive_lac2

to an end, the land will be able to return to an agricultural use without any lasting impacts on the quality of the soil.

- 12.3.3 We conclude that there is little prospect of best and versatile land on this site so propose that ALC be scoped out.

12.4 Risk of Major Accidents

- 12.4.1 Solar PV technology is a form of electricity generation with a very low risk of accident or disaster and the project is not expected to have a significant environmental effect in this regard. The site will be closed off to the public by a security fence and monitored using CCTV, and the design of the site will meet all required health and safety standards. Risk of major accidents should therefore be scoped out of the EIA.
- 12.4.2 Glint and glare effects to road users and aircraft are considered in a separate section of the report.

12.5 Air Quality and Climate Change

- 12.5.1 It is not anticipated that there will be any significant effects on local receptors, with any potential effects being limited to during the construction and decommissioning phases of the solar farm. A Construction Traffic Management Plan will set out proposed management measures during the construction phase.
- 12.5.2 The site does sit in proximity to the Neath Port Talbot Air Quality Management Area, defined as “An area covering the majority of land and properties between the Corus Steel Works and the M4 motorway”, which is declared for PM₁₀. There is not anticipated to be a significant added effect with regards to this AQMA as a result of the proposed development.
- 12.5.3 Consideration of climate change will be provided in chapters of the ES, summarising and cross-referencing other ES chapters and reports submitted in support of the application. Due to the Nature of the development, once operational there would be no emissions generated. More generally, electricity generated from the development will replace fossil fuel derived electricity which can release Greenhouse gases and other harmful pollutants, and therefore the proposal will be of net benefit in terms of air quality. As a result of this, it is proposed Air Quality and Climate change be scoped out.

12.6 Population and Human Health

- 12.6.1 The potential for direct human health effects arising from the proposed development are limited, though impacts will be considered within the ES where appropriate. During the construction phase, jobs related to the construction of the site and supply chain impacts will

be of economic benefit to the local area. As mentioned above in Air, the project will displace fossil fuel derived electricity and the consequent greenhouse gas emissions and other pollutants released during fossil fuel combustion, and therefore would result in a beneficial effect on human health.