CIL-LONYDD SOLAR FARM

Volume 1 - Environmental Statement

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1 INTRODUCTION

1.1 This Environmental Statement (ES) has been prepared by RPS Consulting Services Limited on behalf of Cenin Renewables Limited "Cenin" (the Applicant).

1.2 The ES reports on the findings of the Environmental Impact Assessment (EIA) process and accompanies the planning application for a solar photovoltaic electricity generating station (or 'solar farm') with an installed generation capacity of approximately 35MW and associated ancillary development, including Battery Energy Storage System (BESS).

Statutory Framework and Purpose of the Environmental Statement

Development of National Significance

1.3 Developments of National Significance (DNS) are infrastructure developments of national importance. For a DNS, an Inspector examines the planning application and makes a recommendation to the Welsh Ministers. The decision is made by the Welsh Ministers under the process and considered under policies in Future Wales.

1.4 Paragraph 5.7.5 of Planning Policy Wales (PPW) Edition 12 (February 2024) highlights that planning applications for onshore generating projects in Wales which have an installed generation capacity of between 10MW and 350MW (there is no upper limit for onshore wind generating stations) are considered as DNS applications. Therefore, with a generating capacity of approximately 35MW, Cil-Lonydd Solar Farm is considered a DNS application.

Statutory Consultation

1.5 The DNS (Wales) Regulations 2016 ("the DNS regulations") requires the Applicant to undertake statutory pre-application consultation (PAC) on the full draft planning application for a period of no less than 42 days. This is to provide technical and community stakeholders, and local people, a further opportunity to provide feedback on the project and the technical assessments produced for the Proposed Development.

1.6 The applicant will undergo this process in April 2024. The feedback received during this process will be reported in a PAC Report and considered during design of the final scheme for the planning application.

Purpose of EIA

1.7 EIA is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a project. The findings of the EIA process are reported in an ES in order to inform the relevant planning authority and interested parties as part of the decision-making process.

1.8 This EIA seeks to identify and assess the significance of effects likely to arise from the Proposed Development which requires consideration of the likely changes to the environment, where these arise as a consequence of the Proposed Development, through comparison with the existing and likely future baseline conditions in the absence of the Proposed Development.

The EIA Regulations

1.9 The legislative framework for EIA is set by European Directive 2011/92/EU, as amended by Directive 2014/52/EU (collectively referred to as the EIA Directive). Directive 2014/52/EU entered into force on 15 May 2014.

1.10 In Wales, the requirements of the EIA Directive have been transposed into legislation through the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. These regulations are referred to in this ES as 'the EIA Regulations'.

Need for EIA

1.11 Schedule 1 of the EIA Regulations identifies development types that always require EIA. Schedule 2 identifies development types that require EIA if they are likely to lead to significant effects on the environment by virtue of factors such as their nature, size or location. Schedule 2 development is defined within the EIA Regulations as development of a description mentioned in Column 1 of the table in Schedule 2 where:

'a) any part of that development is to be carried out in a sensitive area; or

b) any applicable threshold or criterion in the corresponding part of Column 2 of that table is respectively exceeded or met in relation to that development.'

1.12 The Proposed Development falls within the description at paragraph 3(a) 'Industrial installations for the production of electricity, steam and hot water (unless included in Schedule 1)' in column 1 of the table in Schedule 2. Such development requires screening against the criteria set out in Schedule 3 of the Regulations. The criteria include the characteristics of the development, location of development and types and characteristics of the potential impact.

1.13 The Proposed Development would exceed the relevant thresholds for development within Schedule 2. Schedule 2 developments require consideration against the criteria set out in Schedule 3 of the EIA Regulations to determine whether EIA is required. The criteria include the characteristics of the development, location of development, and characteristics of the potential impact.

1.14 An EIA screening direction was not submitted. It was the intention that the Applicant would provide an Environmental Statement (ES). Accordingly, an EIA Scoping Direction (Appendix 4.2) (by means of an EIA Scoping Request (Appendix 4.1)) was sought from Welsh Government. An EIA Scoping Direction was received from Planning and Environment Decisions Wales (PEDW) on the 23rd November 2023. Further details in relation to this are provided in Chapter 4 (Environmental Assessment Methodology).

1.15 A notification of intention to submit a DNS was sent to Welsh Ministers on 21st March 2024 and the acceptance was received on the 10th April 2024. The Acceptance of Notification from PEDW is included in the planning application. The notification of acceptance is included as a planning application document.

Content of the ES

1.16 This ES has been prepared in accordance with the EIA Regulations and informed by the EIA Scoping Decision issued by Welsh Ministers (Appendix 4.2). Although there is no statutory provision as to the form of an ES, it must contain the information specified in Regulation 17 and Schedule 4 of the EIA Regulations.

1.17 This ES provides all information required under Regulation 17 and Schedule 4. The information supplied within this ES is considered to provide a clear understanding of the main and likely significant effects of the Proposed Development upon the environment, and the likely residual effects

having regard to the mitigation proposed, taking account of the fact that effects will be both negative and positive.

Structure of the ES

1.18 The ES has been structured in order to allow relevant environmental information to be easily accessible. This volume of the ES (Volume 1) includes the main text 'written statement' of the ES. A description of the Proposed Development is provided in Chapter 2. Information relating to the main alternatives considered during the evolution of the project and the reasons for the choices made is found within Chapter 3. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains environmental assessment information by topic (Chapters 5-9), as shown in Table 1.1.

1.19 Figures and appendices to accompany the text of the ES are provided in Volumes 2 and 3. Volume 3 includes specialist reports providing background and technical information. A Non-Technical Summary (NTS) of the ES is provided as a separate summary document.

Table 1-1 Structure of ES

Structure of ES	
Non-Technical Summary	Summary of the ES using non-technical terminology
Volume 1: Written Statement	
	Glossary
Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Landscape and Visual Assessment
Chapter 6	Biodiversity
Chapter 7	Cultural Heritage
Chapter 8	Human Health
Chapter 9	Risk of Major Accidents
Volume 2: Figures	
Including all figures and drawings to accompany the text.	
Volume 3: Appendices	
Including specialist reports forming technical appendices to the main text.	

The Applicant

1.20 Cenin is a Welsh renewable energy developer. Cenin is an innovative market leader in the development of large-scale energy projects and smart energy solutions as demonstrated at its Parc Stormy renewable energy cluster, which incorporates anaerobic digestion, wind and solar photovoltaic generation, ultra-low carbon cement production, and Cardiff University's energy positive Solcer House.

The Assessment Team

1.21 The EIA has been managed by RPS, taking into account information provided by the Applicant and design team. The ES has been completed in accordance with the guidance of Institute of Environmental Management and Assessment (IEMA) Quality Mark. All authors of this ES are

qualified consultants and a statement setting out how the authors have sufficient expertise to ensure the completeness and quality of the ES is provided in Appendix 1.1.

Further Information

1.22 This ES is being submitted as part of a planning application for the proposed Cil-Lonydd Solar Farm and associated ancillary infrastructure, including a BESS. The application is being submitted to PEDW.

1.23 Copies of the ES and planning application documents can be viewed on the PEDW Developments of National Significance (DNS) website: https://gov.wales/developments-national-significance-dns-applications.

1.24 Further copies of the ES can be obtained from the following address:

RPS

2 Callaghan Square

Cardiff

CF10 5AZ

1.25 A paper copy of the full ES can be obtained for a cost of £250 plus VAT or an electronic copy (CD) or USB for a cost of £25. A hard copy of the Non-Technical Summary (NTS) can also be obtained, free of charge.

1.26 All comments on the ES (and planning application) should be issued to PEDW.

References

Department for Communities and Local Government (2006) Environmental Impact Assessment: A guide to good practice and procedures. A consultation paper. [Available online]

2 SITE AND PROJECT DESCRIPTION

Introduction

2.1 This chapter provides a brief description of the Site and its surrounding environs. Detailed descriptions of the Site baseline are provided in the relevant topic chapters within the ES. In addition to the Site description, this chapter also provides a description of the Proposed Development and approach to construction, the parameters of which form the basis for the assessment provided in this ES.

2.2 A number of measures to avoid, reduce or offset any adverse environmental effects have been included/ embedded as part of the project design. Details of these measures are provided in this chapter and are set out in each topic chapter where applicable. This chapter, together with the subsequent topic chapters, provide the detail to assess the effects of the project in accordance with Regulation 17 and Schedule 4 of the EIA Regulations.

The Site and Surrounding Environs

Site Location

2.3 The Site comprises land at Cil-Onnydd Farm between Newbridge to the west and Cwmbran to the east. It is located within the administrative boundary of Caerphilly County Borough Council (CCBC. The location of the Site is shown in Figure 2.1: Site Location Plan (included within Volume 2 – Figures) of the ES.

2.4 The Site itself extends to approximately 37.5 hectares (92.7 acres) and consists of several parcels of land. The parcels are irregular in shape and comprise a series of agricultural fields of varying sizes. They are currently primarily used for pasture grazing, bound by a mixture of mature woodland, trees and hedgerows. The Site adjoins registered common land to the east.

Surrounding Area

2.5 The Site is located within a Visually Important Local Landscape, allocated by Policy NH2.3 of the CCBC Local Development Plan (LDP).

2.6 The Site is adjacent to three Sites of Interest for Nature Conservation and also contains scattered parcels of ancient woodland.

2.7 Within a 5km radius of the Site, are 10 Scheduled Monuments, 163 listed buildings, and 5 Conservation Areas. No other designated asset types are present within 5km of the Site. The nearest designated heritage asset to the Site is 1.8km away.

2.8 The Site adjoins Mynydd Maen Common to the east and neighbours Hafod Quarry, an asphalt quarry, to the south.

2.9 The Public Rights of Way (PRoW) NWBG/RBW/172 (Restricted Byway) traverses the Site. Additionally, a number of PRoW are adjacent to the Site:

- NWBG/RBW/171
- ABEC/BR179
- NWBG/RBW316
- NWBG/RBW320

Geology and Topography

2.10 The Site is approximately 330m above ordnance datum (AOD).

2.11 The Site is partially within a Coal Mining Development Referral Area, a Sandstone Resource Area and a Mineral Site Buffer Zone for the Hafod Fach Quarry to the southwest.

Site History

2.12 The Site is currently made up of pasture fields, used for sheep grazing. Details of any historical planning uses on Site are set out in Table 2.1 below.

Site Planning History

2.13 The Site lies within the local planning authority of CCBC. The LPA online records outline the following historic planning applications of relevance:

Table 2-1 Site Planning History

Application Ref.	Address	Description of Development	Submission Date	Decision	Decision Date
2/09247	Cei-Lonydd Farm Former South Celynen Colliery	Pennant sandstone quarry including stone processing plant, conveyor route and railhead.	22 February 1992	Refused	10 April 1992
2/09826	Land At Cil-Lonydd The Pant Newbridge Gwent	Agricultural Workers Dwelling.	29 June 1991	Refused	16 August 1991
2/08102	A. Land at Cil Lonydd Farm and South Celynen Tip; 17 Ha (41.99 Acres) Working Area Grid Ref. 229 972 B. Part of Former South Celynen Colliery; 4.9 Ha (12.2 Acres) Grid Ref; 215 960.	Pennant sandstone quarry, conveyor route and railhead; stone processing plant, block making plant, concrete plant, tarmacadam coating plant, access road and bridge across the Ebbw river.	19 October 1988	Refused	6 December 1988
2/05488	The Double "D" Trekking Centre Cil Lonydd Farm Newbridge	10 No. Holiday Chalets.	2 October 1984	Granted	19 November 1984
2/03597	Hafod Fach Farm Abercarn	11 K.V. O.H. line extension.	19 August 1980	Granted	6 October 1980

Planning Context

2.14 The Development Plan for the purposes of Section 38(6) of the Planning and Compulsory Purchase Act 2004 comprises of:

- Future Wales: The National Plan 2040, published February 2021; and
- Caerphilly County Borough Council Local Development Plan up to 2021, adopted November 2010.

2.15 The LDP Proposals Map and Constraints Map indicate the Site is not allocated for any specific use. However, it is affected either in whole or in part by the following designations:

- Visually Important Local Landscape (Abercarn) (Policy NH2.3);
- Coal Mining Development Referral Area;
- Sandstone Resource Area; and
- Mineral Site Buffer Zone – Hafod Fach Quarry to the southwest (Policy MN1.3).

2.16 The Site is also close to the following designations:

- Ancient Woodland
- Three Sites of Interest for Nature Conservation

2.17 The ES provides an overview of relevant legislative and planning policy context within each topic chapter. The assessments have regard to national and local policy documents, where relevant.

2.18 The ES does not include a separate chapter on Planning Policy Context as this was agreed with PEDW that it can be scoped out of the assessment. The draft guidance on EIA from the Department for Communities and Local Government *'EIA: A Guide to Good Practice and Procedures'* (DCLG 2006) (paragraph 155) states that there is no requirement to provide chapters on planning and sustainability in Environmental Statements.

2.19 A separate Planning Statement is submitted with the planning application.

Project Description

2.20 The applicant proposes to develop a solar photovoltaic electricity generating station (or 'solar farm') with an installed generation capacity of approximately 35MW and associated ancillary development, including BESS. The power generated would be enough to power approximately 15,000 typical family homes.

2.21 The point of connection is proposed to be located at an existing 132kV substation to the southeast on Mynydd Maen Common, which would be connected to the site by a cable route of 3km.

Key Components

2.22 The main components of a solar farm are:

- Solar panels and frames;
- Inverters;
- Transformers;
- Cabling; and
- BESS.

2.23 Trenches of typically 1m deep and 50cm wide are required for the underground cabling. At this stage the technical requirements are being clarified and assessed but the proposal will include a

substation, which would comprise an open compound with support stanchions and cabling. BESS is also proposed within the Site.

Solar Arrays

2.24 The Solar PV panels are fixed panels which will be positioned at a 'fixed' tilt. There are no moving elements associated with the panels. They will be arranged in a series of rows known as arrays.

2.25 The proposal features south facing panels and east/west facing panels, in order to maximise sunlight in the configuration of the site.

2.26 The south facing panels are 2.729m at their highest point, including posts which elevate the panel 1m off the ground. The panel itself is 6.68m long and tilted southwards at an angle of 15 degrees.

2.27 The east / west facing panels will sit approximately 0.7m off the ground with an overall height of 1.4m at the highest point. The lower edges of the panels will sit at 1m above ground.

2.28 The metal support frames or mounting structures for the panels will be installed by pilled technique and there would be no significant ground works required with this installation method.

Inverters and Transformers

2.29 'String' inverters will be mounted onto the support frames and will not require any additional foundations. The transformers will be housed in Glass Reinforced Plastic (GRP) containers and will be in a suitable pantone colour that can be agreed with CCBC.

Grid Connection

2.30 To optimise utilisation of the grid network with the highest amount of clean electricity, the proposal will share a grid connection with the nearby Mynydd Maen Wind Farm that is being developed by RES (DNS/3276725).

2.31 The point of connection is proposed to be located at an existing 132kV substation to the southeast on Mynydd Maen Common.

Cable Route

2.32 The cable route will be approximately 3km in length and will traverse the Mynydd Maen Common land. This will share the substation with Mynydd Maen Wind Farm.

2.33 A secondary application under Section 38 of the Commons Act will be submitted to enable temporary works to be carried out during construction of the Solar Farm. The Section 38 application and supporting statement are included in this planning application.

2.34 Trenches of approximately 1 m deep and 0.5 m wide are required for the underground cabling.

BESS

2.35 The proposal will also include a 40 MWh BESS, which will store any surplus electricity generated by the solar panels during daylight hours and release it when needed. The proposed layout and location of the BESS facility is shown in Figures 2.2 and 2.3 in Volume 2 of this ES.

Access and Parking

2.36 The site access will route along the existing access track into the farm which links out onto the A472 at Hafodyrynys to the north or the A467 at Abercarn to the south. Construction traffic will exit the Site in the reverse order of the above route. A variety of vehicles will need to access the Site during construction. These will include rigid and articulated HGVs and a large mobile crane

associated with manoeuvring the requisite materials (including aggregate, mounting frames and the solar panels) and prefabricated buildings.

2.37 A detailed Construction Traffic Management Plan (CTMP) describing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic will be submitted with the planning application.

Transport Management

2.38 Applicant will appoint a Site Manager for the project and the details will be provided to CCBC once confirmed. The Site Manager for the project will undertake the transport co-ordination role for the Site. In this respect, their main responsibilities will include:

- Managing implementation of the CTMP;
- Vehicle scheduling;
- Checking for scheduled road works, events, or incidents in the local area which may cause HGVs to deviate from the designated vehicle route; Checking for scheduled refuse collections to avoid conflict with HGV deliveries within built up areas;
- Informing local residents and CCBC of the commencement of construction works;
- Informing local residents and CCBC of any major or noise intensive works associated with the construction phase to avoid / minimise disruption.
- Handling any complaints; and
- Acting as a point of contact for employees, CCBC, contractors, the general public, and any other interested parties.

2.39 The CTMP states the need to avoid routes where scheduled roadworks and construction vehicles could conflict. The Site Manager will keep up to date on scheduled roadworks, events and incidents in the nearby area which could impact construction vehicle routeing. Any major roadworks or events identified on the access route that result in the deviation of the route will be agreed with officers at CCBC in advance where feasible.

2.40 The Proposed Development also offers the opportunity for construction workers to car share or travel by bicycle to the Site. The CTMP deems it appropriate to promote the below measures to promote sustainable travel by staff.

- Providing changing areas and storage facilities for construction staff.
- Assist in matching car sharers through a car sharing database.
- Minimise where possible the number of contractors on site at any one time to reduce trips
- generated by the Site and promote car sharing.

Appearance and Design

2.41 The Proposed Development is low lying in nature, typically shorter in height than the many existing mature trees and hedgerows around the site.

2.42 The appearance will be a more modern and obvious human influence on the landscape compared to that currently formed by industrialised agriculture. Whilst construction would cover a wide area, the works would be temporary and the proposed development itself will be considerably less solid and durable in appearance than traditional buildings. This would mitigate against the likely change in the character of the landscape.

2.43 The Proposed Development would be removed within the 50 year lifetime enabling the site to return to its former agricultural character and appearance.

Landscape Strategy

2.44 The Landscape and Ecology Masterplan (See Figure 5.25 of the ES) shows the planting of a number of trees and lengths of hedgerows.

2.45 The mitigation measures are the planting of indigenous trees and hedgerows. The proposed tree planting and hedgerow planting would integrate the Proposed Development into the landscape as well as provide screening.

2.46 The objective of the mitigation planting would be to reinforce the existing and historical character of the Site as well as screening views.

2.47 Existing mature trees were former Beech hedgerows which have been left unmanaged. This is a typical feature in the local landscape. There are other types of boundary treatments in the same character area (stone walls, managed hedgerows, post and wire fences, coniferous trees).

2.48 Landscape and Biodiversity are considered in more detail in Chapters 5 and 6 of this ES respectively.

Drainage and Flood Risk

2.49 Based on the Natural Resources Wales (NRW) Development Advice Maps (DAM), the Site is not at risk of river and/or surface water flooding. It is located in Zone A described in Welsh Government's Technical Advice Note on Flooding (2004) as areas that are considered to be at little or no risk of fluvial or tidal/coastal flooding. This situation does not change with the Flood Map for Planning and a new TAN15, although there are some small watercourses running through the Site.

Lighting

2.50 There will be no use of artificial lighting during operation that could adversely affect field boundary habitats and/or adjoining woodland.

2.51 Some temporary task lighting may be required during construction and decommissioning depending on the time of year and sunlight levels.

2.52 The solar farm will cause a minimal amount of potential for redirection of light in terms of glint and glare via the surface of the panels. Any effects would be localised and unlikely to be of a magnitude that would be significant in environmental terms. Accordingly, a Glint and Glare Assessment has been undertaken and forms part of the DNS planning application (Appendix 5.1).

Sustainability

2.53 This section outlines the effects of the Proposed Development on sustainability factors such energy demand, waste, use of natural resources and residues and emissions.

Energy Demand

2.54 The Proposed Development will supply electrical energy to the distribution network rather than generate demand.

2.55 The Welsh Government formally committed Wales to legally binding targets to deliver the goal of net-zero emissions. The Climate Change Committee recommended the following targets that the Proposed Development will contribute to:

- Carbon Budget 2 (2021-25): 37% average reduction with credit ("offset") limit of 0%
- Carbon Budget 3 (2026-30): 58% average reduction

- 2030 target: 63% reduction
- 2040 target: 89% reduction
- 2050 target: 100% reduction (net zero)

2.56 The Proposed Development will also contribute to cost-effective local energy generation and energy security with limited governmental subsidy and will, therefore provide socio-economic and community benefits. Notably, the design of the Proposed Development will allow an efficient dual use of the land for renewable energy generation and agriculture.

Waste

2.57 Waste produced during construction will be kept to a minimum and will be managed and sorted accordingly. Only registered waste management companies will be utilised to dispose of construction waste (packaging, wood, metal) or waste from the construction team (general domestic or canteen/kitchen waste). The specialist EPC hired to construct the solar installation will ensure that all waste is disposed of responsibly using only licensed waste management companies. This will be subject to appropriate due diligence checks prior to contracting.

2.58 Following decommissioning there will be significant potential for recycling many of the materials used in the Proposed Development. There may be some equipment at the end of the project lifespan that would result in some solid waste. However, given the scale and nature of the Proposed Development significant effects are not likely in terms of waste generation. At decommissioning stage, the solar panels will be unscrewed from the mounting frames and packaged either to send to a solar recycling depot, or if they are still operational, they may be sold on second-hand.

Use of Natural Resources

2.59 The Site is entirely classified as Subgrade 4 agricultural land, which is poor quality agricultural land. An Agricultural Land Classification (ALC) survey is not required given the predictive map information for the site and the knowledge that the site does not contain Best and Most Versatile (BMV) Agricultural Land.

2.60 The Proposed Development is temporary in nature and fully reversable. Appropriate construction techniques will be implemented to reduce above and below ground works and to minimise any compaction of soil mitigating any potential impact on the soil structure and ability to infiltrate water. Most of the soil will not be physically impacted from the Proposed Development.

2.61 Following decommissioning, the applicant would ensure that the future quality of the agricultural land is maintained with no likely significant lasting adverse effects on the quality of the soil. Furthermore, the planning application is supported by a Soil Management Plan.

Residues and Emissions

2.62 Details of any potential effects in relation to residues and emissions having regard to water are set out in the Drainage Strategy and FCA which is submitted as part of this planning application.

Summary of Key Parameters

Table 2-2 Key Parameters of the Proposed Development

Element of Development	Key Parameter for EIA
Site area	Up to 37.5 hectares(ha) including the solar panels and cable route.
Maximum height of solar panels	The East/West facing solar is 1.2m high, South facing solar is 2.8m high.

Area covered by development	37.5 ha
Underground cabling	The cable across the common is 3043m long. 1200mm deep, 600mm wide.
Security fencing / CCTV	A 2m high security fence will be installed around the Site. column mounted infra red CCTV security cameras will be provided inside the Site.
Substation and BESS	132 kV substation to the southeast on Mynydd Maen Common, which would be connected to the site by a cable route of 3km. A40 MWh battery storage facility.

Construction Methodology

2.63 The details of construction methods, timing and phasing are necessarily broad at this stage of the Proposed Development. The limits of the assessment, however, have been set sufficiently wide to allow a robust assessment to be undertaken of a reasonable worst-case scenario.

2.64 The project is anticipated to utilise established standard construction methodologies (including piling) for solar farms. The posts will be driven into the ground (by either direct piling or screw piling) to a depth of around 1.5-2m, dependent on localised ground conditions.

Phasing of Construction Works

2.65 The timing of the project would be dependent on securing planning permission and the discharge of planning conditions. The construction of the solar farm is expected to take approximately 6-9 months (in the region of up to 39 weeks).

Construction Working Hours

2.66 All work will be conducted between 08:00 and 18:00, construction HGV deliveries and departures will not be to enter or exit the Site between 08:00 and 09:00 or between 17:00 and 18:00. All construction HGV deliveries and departures will therefore only be permitted to enter or exit the Site between 09:00 and 17:00.

2.67 These hours would be subject to agreement with the LPA. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the LPA prior to commencement of the activity, as necessary.

Environmental Management during Construction

2.68 Construction would be undertaken in accordance with good practice environmental management procedures that will be set out in more detailed plans and method statements contained within a Construction Environmental Management Plan (CEMP) to be developed by the contractor. The CEMP will set out the key management measures that contractors would be required to adopt and implement. These measures will be developed based upon those effects identified during the EIA process and set out in the topic chapters of this ES. They will include strategies and control measures for managing the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable.

2.69 The CEMP would be prepared during the pre-construction period once a contractor has been appointed. The final CEMP would be submitted to the LPA for approval.

Construction Working Areas

2.70 A number of temporary facilities would be required during construction including:

- Temporary offices and welfare facilities;
- Storage area for materials, fuels, plant and equipment;
- Waste management areas; and
- Car parking facilities.

2.71 As far as possible, storage areas would be located away from existing properties. Such storage areas would be bunded to mitigate any spillages of potential contaminants and would avoid being located in areas of vegetation or habitat to be retained.

2.72 All construction works will be carried out within the defined project area and no additional land would be required outside of the Proposed Development site boundary.

Construction Access

2.73 The construction access will route along the existing access track into the farm which links out onto the A472 at Hafodyrynys to the north or the A467 at Abercarn to the south. Construction HGVs will exit the Site in the reverse order of the above route. A variety of vehicles will need to access the Site during construction. These will include rigid and articulated HGVs and a large mobile crane associated with manoeuvring the requisite materials (including aggregate, mounting frames and the solar panels) and prefabricated buildings.

2.74 Every effort would be taken to minimise the effects of traffic associated with the construction phase of the project. Materials and resources would be sourced locally where possible and deliveries and construction traffic would endeavour to avoid travel during commuter peaks.

2.75 A CTMP detailing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic has been prepared. Transport has been scoped out of the ES.

2.76 Operational traffic movements will be minimal.

Construction Vehicles

2.77 The potential trip generation of the Site during the construction phase of the Proposed Development has been informed through discussions with the Applicant based upon the construction programme and experience of similar projects across the United Kingdom.

2.78 A variety of HGV and other construction vehicles will be used for the construction of all elements of the project, The details of the vehicles are provided in Table 3.1 of the CTMP (Appendix 2.2).

2.79 A range of vehicles will need to access the Site during the construction of the Proposed Development. These will include rigid and articulated HGVs, with the largest type of vehicle being a 16.5m long articulated HGV, as well as a large mobile crane associated with delivering the requisite and prefabricated buildings.

2.80 While the construction phase will take between 12 and 15 months to complete, the number of vehicle trips to and from the Site will fluctuate over this time. Some periods will see more trips when for example, deliveries are made to the Site, while other periods will see fewer trips when for example, only work at the Site is being undertaken.

2.81 The number of construction HGV movements per day will vary as the construction works progress and will be dependent upon the activities being undertaken at the Site. It is estimated however that

there will be an average of six movements (three inbound movements plus three outbound movements) per day during the construction phase of the Proposed Development.

2.82 The Proposed Development will give rise to a maximum of 20 HGV movements (10 inbound movements plus 10 outbound movements) per day at the peak of the construction phase, with fewer number of HGV movements per day outside of peak activities.

Drainage

2.83 The construction phase would incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable.

2.84 Such measures would be implemented through the CEMP, which will require the following:

- Installation of wheel washing facilities at the entrance to the construction compounds;
- Use of sediment fences along existing watercourses when working nearby to prevent sediment being washed into watercourses;
- Covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains;
- Bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice);
- Storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds;
- Concrete to be stored and handled appropriately to prevent release to drains;
- Preparation of a flood response plan in the event of flooding during construction works. This would include a procedure for securing or relocating materials stored in bulk;
- Treatment of any runoff water that gathers in the trenches would be pumped via settling tanks or ponds to remove any sediment;
- Obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk;
- Use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage;
- Storage of stockpiled materials on an impermeable surface to prevent leaching of contaminants and use of covers when not in use to prevent materials being dispersed and to protect from rain; and
- Stockpiles to be kept to minimum possible size with gaps to allow surface water runoff to pass through.

Construction Waste

2.85 The specialist EPC hired to construct the Proposed Development will ensure that any waste that is required to be taken off site will be disposed of responsibly to registered waste companies from the application sites during and immediately following construction.

2.86 The potential waste generated during the construction process will primarily be related to packaging, and will include:

- The pallets that the solar panels are packaged in. These will be either wood crates, or cardboard boxes. These will be removed from the application site on a regular basis. If they arrive on wooden pallets, which have a financial value, these will either be returned to the manufacturer/distributer, or collection by a local contractor will be arranged. If they arrive packaged in cardboard boxes, then these will be removed on a regular basis, either through a hired skip, or through trips to the closest appropriate recycling station.

Use of Natural Resources

2.87 The contractors CEMP will consider the main types and quantities of materials required for the project in order to assess potential for sourcing materials in an environmentally responsible way.

2.88 The Considerate Constructors Scheme (CCS) includes measures relating to the use of resources, including categories in relation to minimising the use of water.

2.89 The construction process would take into account the principles of good practice in soil handling and restoration set out in the following documents, wherever possible, to reduce the possibility of damage to soil:

- Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide; and
- Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (including the Toolbox Talks).

2.90 The EIA Directive also refers to the use of land and biodiversity resources. Further details are provided in Chapter 6 (Biodiversity) of this ES and the Soil Management Plan and Planning Statement that also accompany the planning application.

Residues and Emissions

2.91 The CEMP will consider ways of minimising construction activity residues and emissions, including spills, noise and vehicle emissions during the construction phase.

2.92 Details of residues and emissions in relation to water are set out in the attached Flood Consequences Assessment (FCA) and Drainage Strategy. Any impact associated with noise has been addressed by a Noise Impact Assessment, included as part of the planning application.

Operation and Maintenance

2.93 All equipment will be removed from Site at the end of the installation's operational life (approximately 40 years). Once operational, the solar farm will be operated remotely and only require between 10-20 visits per year for maintenance, monitoring and cleaning of the panels and site.

2.94 Assessment of accidents and emergencies for the operational development is limited at this stage with security fencing and CCTV minimising health and safety risks as far as possible.

2.95 Emissions from activities from the Proposed Development shall be free from odour, noise and vibration at levels likely to cause pollution outside the Site.

Decommissioning

2.96 The solar farm is designed to be fully reversible at the end of the lifetime of the project. Solar panels, cabling, inverters, sub-station and other paraphernalia are removed leaving only small holes, trenches and areas to be back filled. The land can then revert to its previous use.

2.97 The decommissioning of the Site will ensure the future quality of the agricultural land is maintained with no likely significant lasting adverse effects on the existing quality of the soil.

2.98 There will be some long-term storage of soil for restoration uses at the decommissioning phase. Any soil removal at construction for future restoration (e.g of the tracks) will be stored on Site and labelled for subsequent return.

Environmental Management Measures adopted as part of the Project

2.99 In order to avoid or reduce the environmental effects, a number of measures have been designed (embedded) into the project. Details of these can be found within each topic chapter of the ES and are summarised in Tables 2-3 and 2-4 below.

Table 2-3 Measures adopted as part of the Project during construction

Topic	Proposed measures during construction
General / Design	Construction work will be kept away from root protection zones.
Landscape and Visual	All disturbed areas would be restricted as far as practicable to the specified areas and the temporary construction compound. Any effects on the visual amenity receptors and their views during the construction phase will be for a temporary duration.
Biodiversity	The temporary loss of land under temporary construction areas will be minimised, and reinstatement and enhancement of habitats will be undertaken in line with enhancement measures outlined at the end of the Biodiversity ES Chapter 6 (to be detailed within a LEMP). Vegetation removal will be limited to the removal of 14 scattered hawthorn trees within a defunct field boundary (over approximately 180 m in length) in centre of the Proposed Development. Measures to avoid impacts on SINCs, ancient woodland sites, priority habitats and trees during construction will need to be detailed in a Construction Environmental Management Plan (CEMP). Ways in which accidental physical damage, lighting, pollution, soil compaction and sediment mobilisation will be set out. There may be a requirement for the presence of an Ecological Clerk of Works (ECoW) to assist in effective implementation of the CEMP. Measures to avoid killing / injuring of great crested newt will be implemented during construction, to include staged removal of vegetation (if required), hand-searching where necessary and discussion of material storage, vehicle access or compound locations / positioned, as required, by a Suitably Qualified Ecologist. These measures should be included within a CEMP. Clearance of grassland vegetation (where required) will be conducted outside bird nesting season to avoid disturbing or destroying birds' nests. Should works commence during the nesting bird season (which is typically taken as March to August inclusive), any removal of vegetation or construction within marshy grassland fields should be preceded by a

walkover survey by a suitably experienced ecologist. The surveyor will identify any active nests, and in the event that nests are found, work in their immediate vicinity (that could result in the damage / destruction of the nest and / or killing / injury of adult birds or dependent young) will be suspended until the nest is no longer active. A 5 - 15 m buffer around the field boundary and woodland features will be in place during construction to minimise disturbance to breeding birds, as a matter of good practice. A practical method statement will be produced detailing measures to avoid impacts on nesting birds (as outlined above) and included in the CEMP. This will provide clear guidance to contractors working on the construction of the proposed development.

A pre-commencement check for new badger setts will be completed in advance of ground investigation and construction works. Appropriate further mitigation measures to protect badgers, and avoid contravention of the law, will be set out in the CEMP (as necessary).

Measures to avoid killing / injuring of amphibians and reptiles will be implemented during construction. These will include staged removal of vegetation and hand-searching by a Ecological Clerk of Works (ECoW) where necessary. These measures should be included within a CEMP.

Construction and pre-commencement ground investigations will be timed, to minimise night-time working to minimise disturbance to bats. Artificial light to aid construction will be minimised with that present designed to minimise light spillage outside active construction areas. Artificial light will be directed away from any field boundaries, trees or buildings within and / or adjacent to the Site. Ground investigations will be undertaken away from any potential bat roosts to minimise disturbance by noise / vibration. Control measures should be outlined in a CEMP.

The CEMP will identify best practice to be applied to minimise water pollution from spillages associated with construction works and air pollution from construction vehicle emissions and dust generation.

Night working will be avoided where possible during the construction phase, however where required, by using sensitive lighting strategies to direct light away from habitat features as outlined within the CEMP.

Sufficient gaps will be left under perimeter security fences to allow access for small mammals (it is noted that animals will also be able to dig under these fences in normal circumstances). Gaps of approximately 35 x 35 cm at ground level will allow for continued use by species such as hedgehog.

Sensitive working practices will be adopted during the construction phase to prevent entrapment or other causes of harm to mammals (i.e. providing means of escape for any uncovered excavations, appropriately store chemicals and capping exposed piping). These mitigation measures should be included in a method statement within a CEMP.

Cultural Heritage	Hedgerows are for the most part retained in the design and will be fenced off during the construction phase to prevent accidental damage.
Human Health	Standard good practice construction management would appropriately reduce disruption and disturbance to users of the public footpaths adjacent and crossing the Site.
Risk of Major Accidents	The Regulatory Reform (Fire Safety) Order 2005 (RRFSO) provides a framework for regulating fire safety in all non-domestic premises including workplaces and the parts of multi-occupied residential buildings used in common in England and Wales. It consolidated previous fire safety legislation into one Order. Essentially, it requires that any person who has some level of control in premises must take reasonable steps to reduce the risk from fire and make sure people can safely escape if there is a fire. It applies to virtually all premises and covers nearly every type of building, structure and open space including: offices and shops; care homes and hospitals; community halls and places of worship; shared areas of multi-household properties; pubs, clubs and restaurants; schools and sports centres; tents and marquees; hotels and hostels; and factories and warehouses. The RRFSO requires the employer, in relation to those parts of their premises where staff may be present to: • carry out a fire-risk assessment identifying any possible dangers and risks; • consider who may be especially at risk; • get rid of or reduce the risk from fire as far as is reasonably possible and provide general fire precautions to deal with any possible risk left; • take other measures to make sure there is protection if flammable or explosive materials are used or stored; • create a plan to deal with any emergency and, in most cases, keep a record of findings; and review them when necessary. Whilst the above mentioned list does not specifically include solar farms and there are no internal workspaces included in the Proposed Development, the Applicant is aware of the requirements of the RRFSO and will comply with them as necessary to ensure risk from fire is managed in accordance with the legislation. Considering the requirements of the RRFSO, the following specific mitigation measures will be adopted as part of the Proposed Development in order to minimise fire risk: • Procurement of components and use of construction techniques which comply with all relevant legislation; • Inclusion of automatic fire detection systems in the development design; • Inclusion of automatic fire suppression systems in the development design; • Inclusion of redundancy in the design to provide multiple layers of protection; • Designing the Proposed Development to contain and restrict the spread of fire though the use of fire-resistant materials, and

adequate separation between elements of the battery storage facility; and

- Ensuring that South Wales Fire and Rescue Service recommendations and requirements are addressed to enable an adequate emergency response to a fire.

Suitable mitigation measures have been adopted as part of the Proposed Development and would be implemented through the Battery Safety Management Plan. The assessment has demonstrated that the construction of the Proposed Development would not cause any exceedances of the risk of major accident objectives in relation to fire safety and that the overall effect would be not significant. It is therefore, not considered necessary to propose further mitigation measures for the Proposed Development.

Table 2-4 Measures adopted as part of the Project during operation

Topic	Proposed measures during construction
General / Design	The design of the Proposed Development is low lying-in nature, typically shorter in height than the many existing mature trees and hedgerows around the Site. Once in operation, this will mitigate against any likely change in the character of the landscape.
Landscape and Visual	The Landscape Masterplan (See Figure 5.25) shows the planting of a number of trees and lengths of hedgerows. This has been prepared in conjunction with the project's ecologist to ensure that habitat creation particular to this site has been included. The mitigation measures are the planting of indigenous trees and hedgerows. The proposed tree planting and hedgerow planting would integrate the Proposed Development into the landscape as well as provide screening. The objective of the mitigation planting would be to reinforce the existing and historical character of the Site as well as screening views. Existing mature trees were former Beech hedgerows which have been left unmanaged. This is a typical feature in the local landscape. There are other types of boundary treatments in the same character area (stone walls, managed hedgerows, post and wire fences, coniferous trees). The existing tree canopies provide screening benefits for the Proposed Development from some views to the Site, but the nature of the trees offers less screening at a lower level. Therefore, managed hedgerows (approx. 1.5 – 2.0m in height) are proposed to provide the screening where it is required. Along the eastern boundary, adjacent to the local road, replacing the existing post and wire fence with a stone wall would be preferrable, this would continue the existing character of the wall at

	the entrance to Cil Lonydd farm. Hedgerow planting here would also provide screening if stone wall is not feasible. If possible, the hedgerow planting could be managed to allow some Beech trees to grow as succession planting for the existing mature Beech trees across the site. This would help strengthen the existing character of the Site. The tree planting and hedgerow planting would provide the following benefits and follow landscape character guidelines: • Create habitats and extend wildlife links to existing habitats. • Increase biodiversity. • Provide additional screening effects to reduce visibility. • Enhance the landscape character. • Adhere to the landscape character guidelines.
Biodiversity	Sufficient gaps will be left under perimeter security / deer fences to allow access for small mammals (it is noted that animals will also be able to dig under these fences in normal circumstances). Gaps of approximately 35 x 35 cm at ground level will allow for continued use by species such as hedgehog.
Cultural Heritage	Depending on the results of the trial trenching, potential impacts upon buried archaeological remains will be mitigated where necessary through a programme of archaeological works allowing for the appropriate excavation and recording of the affected assets and/or preservation in situ through methods such as the use of 'feet' for the mounting of the solar arrays, which would minimise ground disturbance in areas of archaeological sensitivity. These measures will be agreed with GGAT. The Modern, possible military square structure (GGAT05036g) within the northern part of the Site is assumed to be retained within the development design.
Human Health	Any PRoWs through the development will likely be extinguished (after permission if granted) with alternative routes proposed to replace the original route which will be fully accessible and managed. This is due to safety reasons with the public unable to walk through a solar farm. Some routes are inaccessible so creating new managed, well-kept routes would be beneficial for all. Any PRoW outside of the proposal will not be affected.
Risk of Major Accidents	Suitable mitigation measures have been adopted as part of the Proposed Development and would be implemented through the Battery Safety Management Plan. The assessment has demonstrated that the construction of the Proposed Development would not cause any exceedances of the risk of major accident objectives in relation to fire safety and that the overall effect would be not significant. It is therefore, not considered necessary to propose further mitigation measures for the Proposed Development.

References

Caerphilly County Borough Council (2010) Caerphilly County Borough Local Development Plan up to 2021.

Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (including the Toolbox Talks).

Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide

3 NEED AND ALTERNATIVES CONSIDERED

Introduction

3.1 This chapter of the ES provides a summary of the need for the Proposed Development and a description of the reasonable alternatives considered by the Applicant. It includes a summary of the reasons for the selection of the Site, together with a description of the alternative design and layout options that have been considered. Further information on the design evolution is provided in the Design and Access Statement that accompanies the planning application and not repeated here.

Need for the Development

3.2 The need for the Proposed Development stems from:

1. Increasing demand for electricity;
2. The need to decarbonise energy systems and combat the potentially devastating effects of climate change on current and future generations; and
3. Energy security for Wales.

3.3 Consideration of need, having regard to the relevant national and local policy context, is provided below.

National Grid Future Energy Scenarios (July 2023)

3.4 'Future Energy Scenarios' (FES) (National Grid, 2023) sets out credible ways that the UK can achieve Net Zero by 2050, as well as the UK Government's commitment to a decarbonised electricity system by 2035. The document considers how much energy is needed and where the energy could come from. In all scenarios, the demand for electricity increases; this is brought about by shifting away from high carbon fuels to hit the Government's net-zero emissions target by 2050 and the predicted increase in electric vehicles ahead of the 2040 ban on petrol/diesel driven vehicles.

3.5 For electricity supply, in all scenarios, there are significant increases in renewable energy generation. The 'key messages' of the FES report, with regards to the Proposed Development, include:

- Significant investment in low carbon electricity generation will be required across all net zero pathways; and
- At least 89 GW of wind and solar is connected in 2030, with 119 GW in Leading the Way.

3.6 Between 2021 and 2022 there was a 9.5 TWh drop in weather corrected electricity demand, partly in response to the spike in electricity prices. This added to pre-existing trends of decreasing annual electricity demand, driven by increasing efficiency of lighting and appliances. Generation capacity is expected to increase rapidly through the 2020s, with a between 42% and 85% increase by 2030 when compared to 2022.

3.7 Growth in total installed generation capacity is seen across all scenarios through the 2020s, the primary driver of this short-term capacity growth is new renewable generation. This is most rapid in Leading the Way, which sees up to an additional 27 GW of solar installed by 2030.

Welsh Government Declaration of Climate Emergency

3.8 On 29 April 2019, the then Environment Minister Lesley Griffiths declared a climate emergency in Wales on behalf of the Welsh Government.

Welsh Government Declaration of Commitment to Net Zero by 2050

3.9 On 9 February 2021, the Welsh Government set out its legal commitment to achieve net zero emissions by 2050.

UK Government Net Zero 2050

3.10 On 27 June 2019, the UK became the first major economy in the world to pass laws to end its contribution to global warming by 2050. The target will require the UK to bring all greenhouse gas emissions to 'net zero' by 2050, compared with the previous target set within the Climate Change Act (2008) of at least an 80% reduction of emissions by 2050 (against the 1990 baseline). In support of this target, the Energy white paper: Powering out net zero future (DBEIS, 2020a) was published, setting out the pathway to achieving net zero through the greater reliance on solar and wind energy.

3.11 Net Zero 2050 – A Roadmap for the Global Energy Sector (International Energy Agency, 2021) outlines the essential conditions for the global energy sector to reach net-zero carbon dioxide (CO2) emissions by 2050. The Roadmap calls for scaling up solar and wind technologies during the 2020s, reaching up to 630GW of solar and 390GW of wind by 2030, four times the set record levels in 2020. The Roadmap stresses that for solar, this equates to installing the world's current largest solar farm roughly every day.

National Planning Policy Context

3.12 PPW Edition 12 published February 2024, Future Wales - the National Plan 2040, published February 2021 (Future Wales), and the Technical Advice Notes (TANs) set out the national planning policies of the Welsh Government. Following the publication of Future Wales, TAN 8: Planning for Renewable Energy has been revoked and there is no longer an energy-specific TAN.

3.13 PPW paragraph 5.7.14 confirms that the Welsh Government targets for the generation of renewable energy are:

- Wales to generate 70% of its electricity consumption from renewable energy by 2030;
- One Gigawatt of renewable electricity capacity in Wales to be locally owned by 2030; and
- New renewable energy projects to have at least an element of local ownership.

3.14 It is noted that it is vital that we reduce our emissions to protect our own wellbeing and to demonstrate our global responsibility. Future Wales together with PPW seeks to ensure the planning system focuses on delivering a decarbonised and resilient Wales through the places we create, the energy we generate, the natural resources and materials we use, and how we live and travel.

3.15 Regarding energy generation, Future Wales identifies that Wales can become a world leader in renewable energy technologies. Wales' wind and tidal resources, potential for solar generation, its support for both large and community scaled projects, and commitment to ensuring the planning system provides a strong lead for renewable energy development, means it is well placed to support the renewable sector, attract new investment and reduce carbon emissions.

Local Policy Context

3.16 The development plan for the site for the purposes of Section 38(6) of the Planning and Compulsory Purchase Act 2004 is the Caerphilly County Borough Local Development Plan (LDP) up to 202, adopted November 2010.

3.17 A key objective (5) of the CCBC LDP is to *'Improve energy, waste and water efficiency while promoting environmentally acceptable renewable energy to maintain a cleaner environment and help reduce our impact on climate change.'*

3.18 In 2019, CCBC declared a climate emergency, with a pledge to become net zero by 2030 in line with the Welsh Government's declaration.

Overall Need

3.19 Overall, there is a significant need to increase electricity supply based on predictions of future consumption due to electrification of transportation and heating in particular.

3.20 Given the climate emergency, there is a need for the electricity to be produced from zero or near zero carbon and greenhouse gas emission sources.

3.21 Solar power has an important role to play as part of the mix of energy sources required to meet increasing electricity demand in the future and national carbon and greenhouse gas reduction targets, in particular the Welsh and UK Government's legally binding targets of net zero carbon emissions by 2050.

3.22 The Development would contribute to the delivery of these National and Local policy objectives, diversify the energy mix, and facilitate the transition to low carbon energy, whilst decreasing the dependency on fossil fuels. Due to rapid advances in technology, solar PV is one of the most cost-effective sources of energy, leading to more affordable and secure energy supply to consumers.

'Do nothing scenario'

3.23 Under the 'do nothing' scenario, the Site would continue to be used for pasture.

Alternatives Considered

Site Location

3.24 Large scale ground mounted solar farms are generally located in the open countryside. Sites large enough to accommodate a financially viable scheme, with sufficient megawatt (MW) output, are difficult to find in or close to settlements, particularly the towns and villages that are found in the area local to the Proposed Development, in particular there are:

3.25 Not enough rooftop areas or existing brownfield land available and competition from other high value sectors such as residential and mixed use for such sites;

- Unsuitable roof structures and standards (including roof orientation, shading, presence of plant and other equipment);
- Complex multiple landlords/tenant agreements; and
- Sites within settlements are likely to be considerably more visible to more people.

3.26 It is rare to find a site which meets all the other requirements for a large-scale solar farm, such as close to a point of connection with capacity, with no significant environmental designations or features, and minimal impact on the environment.

Site Selection

3.27 The Site selection process involved looking at and identifying locations with grid capacity – i.e. points on the distribution network that have the ability to accommodate additional generated electricity. These locations are fixed and unique and not readily available. Once grid capacity has been identified, the next step is identifying land parcels large enough to accommodate a viable project in close proximity to the available grid connection, whilst factoring in the following requirements:

- Need for a relatively flat topography,
- Supportive planning policy (lack of constraints),

- Suitable access (including access to the Site itself, and ability to provide unconstrainted access around the Site e.g. pre-existing gaps in hedgerows and established field access points etc),
- Biodiversity opportunities,
- Appropriate grade ALC land (i.e. land not classified as Best and Most Versatile (BMV));
- Low risk of flooding;
- Established and pre-existing screening in the form of existing woodland and hedgerows;
- Land that is not subject to local, national or international ecological designations;
- Proximity to residential and amenity areas;
- Proximity to Heritage constraints – including designated and non-designated assets; and
- Willing Landowner.

Table 3-1 Summary of main factors considered in Site Selection

Assessment Category	Specific Factor	Site Performance
Technical Suitability of the Site	Topography and ground conditions	The site has a relatively flat and gently sloping topography.
	Size	The site is a large usable area, making it worthwhile for a large number of panels.
	Orientation	The fields generally face south or east/west, allowing for the optimum orientation for solar. North facing fields are avoided.
	Accessibility	The site has clear road access for construction, maintenance and decommissioning from the A472 at Hafodyrynys.
Electrical Infrastructure	Proximity of nearest point of connection	The site is strategically located in close proximity to the Mynydd Maen Wind Farm Proposal (DNS/3276725) allowing the sites to share a grid connection.
	Availability of grid capacity at the substation	
	Accessibility substation to connect to via cables	
Planning Constraints	Planning designations, both national and local level	The site is not allocated for any uses under the CCBC LDP.
	Existing land use	The aim of the proposal is to provide a collaboration of energy generation and agriculture, allowing for sheep grazing beneath panels. The site was

		chosen for this due to its current land use for pasture grazing.
	Landscape designations	The site is not within any national landscape designations such as Areas of Outstanding Natural Beauty (AONB) or National Park or Special Landscape Area. At a local level, according to the CCBC LDP, the site falls within a Visually Important Local Landscape. However, the site was chosen due to being naturally well screened from nearby farms and properties.
	Ecological designation	There are no national designations near the site.
	Heritage designations	There are no designated heritage assets on site, the nearest being 1.8km distant from the site.
	Flood risk	The location of the site at a higher elevation means there is a low vulnerability to major accidents and disasters arising from flooding.
	Neighbouring land uses	The site is strategically located in close proximity to the Mynydd Maen Wind Farm Proposal (DNS/3276725) allowing the sites to share a grid connection.
	Potential visual receptors	The site is extremally well screened from nearby farms and properties.
	Presence of Best and Most Versatile (BMV) Agricultural Land.	The land onsite is subgrade 4 agricultural land, which is poor quality agricultural land.
Site Availability	Willing landowner	The client has an agreement with a single landowner in place prior to planning submission.

3.28 The Preliminary Ecological Appraisal (PEA) concluded that the proposed development could have an impact on nearby locally designated site, Mynydd Maen, East of Newbridge Site of Important Nature Conservation (SINC). Following consideration of this issue, the Proposed Development boundary was amended to remove the area of SINC, and the cable route was relocated to follow an existing road along the common land to reduce its impact on the SINC.

References

Caerphilly County Borough Council (2010) Caerphilly County Borough Local Development Plan up to 2021.

International Energy Agency (2021) Net Zero by 2050 A Roadmap for the Global Energy Sector

National Grid (NG) (2023) Future Energy Scenarios (FES). [Available online at: Future Energy Scenarios 2023 | National Grid ESO)

The Town and Country Planning (Environmental Impact Assessment) Regulations 2017

Welsh Government (2021) Future Wales: The National Plan 2040.

Welsh Government (2024) Planning Policy Wales: 12th Edition.

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

Introduction

4.1 This chapter explains the methodology used to prepare the technical chapters of this ES and details its structure and content (the Scope). In particular, it sets out the process of identifying and assessing the likely significant environmental effects of the Proposed Development. Further details of topic specific methodologies, such as survey methods, are provided in each technical chapter as applicable.

Scope of the Environmental Impact Assessment

4.2 The Scope of the EIA is defined through a scoping exercise where the content and extent of matters to be covered by the EIA process are considered. The scope is defined by the information and assessment considered necessary to provide a clear understanding of the potential significant effects of the Proposed Development upon its environment. Scoping is an important preliminary procedure, which sets the parameters for the EIA process.

4.3 Regulation 15 of the EIA Regulations allows an Applicant to request that the LPA/PEDW sets out its opinion (known as a Scoping Direction) as to the issues to be addressed in the ES. Whilst there is no formal requirement in the EIA Regulations to seek a Scoping Direction prior to submission of an ES, it is recognised as best practice to do so.

4.4 A Scoping Request was submitted to PEDW in August 2023. The Scoping Report that comprised this request is included as Appendix 4.1.

4.5 PEDW issued a DNS EIA Scoping Direction on the 23 November 2023 and a copy of this is included as Appendix 4.2.

4.6 The ES topic chapters provide a summary of the key points raised during consultation with both statutory and non-statutory consultees.

4.7 The Scoping exercise also highlighted a number of areas that consultees wished to see addressed within the ES. Taking into account the nature, size and location of the project, the information provided within the Scoping Direction and other consultation responses provided throughout the EIA process, the following topics have been scoped in as requiring assessment within this ES:

- Landscape and Visual (Chapter 5)
- Biodiversity (Chapter 6)
- Cultural Heritage (Chapter 7)
- Human Health (Chapter 8)
- Risk of Major Accidents (Chapter 9)

Topics Scoped Out of the EIA Process

4.8 Effects on other aspects of the environment are not likely to be significant. The topics scoped out of the EIA are summarised below.

Planning Policy

4.9 The ES provides an overview of relevant legislative and planning policy context within each topic chapter and the assessments have had regard to national and local policy documents, where relevant. A separate chapter on planning policy has not been included within the ES, however, a Planning Statement has been prepared to accompany the planning application.

Water

4.10 A FCA has been supported by a drainage strategy in accordance with PPW, Technical Advice Note 15 and latest climate change data to ensure flood risk and hydrological impacts are managed appropriately.

Transport

4.11 Transport matters are addressed through the submission of separate standalone technical reports, such as a Transport Assessment and a Construction Traffic Management Plan (CTMP).

Air Quality

4.12 A CEMP and Outline Construction and Decommissioning Method Statement will be prepared to outline measures to limit any effects during these phases. We propose that these documents are conditioned to any planning consent. PEDW welcomes this approach and as also referred to under Transport above, these documents should be included as technical appendices to the ES.

Land (for example land take)

4.13 PEDW and CCBC agreed that land can be scoped out. However, a separate Coal Mining Risk Assessment was required due to parts of the site being at high risk due to past coal mining activities. A Coal Mining Risk Assessment screening report (Ground Conditions Review) has been provided as part of the planning application.

Soil

4.14 The Proposed Development is unlikely to have significant effects on soils and is fully reversible at the end of its lifetime. Furthermore, the site does not contain BM agricultural land. Whilst this topic has been scoped out, a Soil Management Plan has been produced to accompany the application.

Material Assets

4.15 Material assets is considered across a range of topic areas within an ES, in particular the Cultural Heritage ES Chapter 7. Therefore, no separate consideration of material assets is considered necessary.

Environmental Assessment Methodology

Relevant EIA Guidance

4.16 The EIA process has taken into account relevant government or institute guidance, including:

- Welsh Office Circular 11/99: Environmental Impact Assessment;
- Ministry for Housing, Communities and Local Government (2019a) Planning Practice Guidance at http://planningguidance.planningportal.gov.uk;
- Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;
- Highways Agency et al. (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;

- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;
- Institute of Environmental Management and Assessment (2015) Environmental Impact Assessment Guide to Shaping Quality Development;
- Institute of Environmental Management and Assessment (2016) Guide to Delivering Quality Development;
- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach;
- Institute of Environmental Management and Assessment (2020) Climate Change Resilience and Adaptation;
- Institute of Environmental Management and Assessment (2022) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance; and
- Institute of Environmental Management and Assessment (2023) Environmental Assessment of Traffic and Movement.

4.17 Other topic specific legislation and good practice guidance will be drawn upon as necessary.

Key Elements of the General Approach

4.18 The assessment of each environmental topic forms a separate chapter of the ES. For each environmental topic, the following have been addressed:

- Methodology and assessment criteria;
- Description of the environmental baseline conditions;
- Measures adopted as part of the project, including mitigation and design measures that form part of the project;
- Identification of likely effects, evaluation and assessment of the significance of identified effects, taking into account any measures designed to reduce or avoid environmental effects which form part of the project;
- Identification of any further mitigation or monitoring measures envisaged to avoid, reduce and, if possible, remedy adverse effects (in addition to those measures that form part of the project); and
- Assessment of any cumulative effects with other developments planned in the area.

Methodology and Assessment Criteria

4.19 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. Each environmental topic has been considered by a specialist in that area.

4.20 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, desk study and survey work undertaken and the approach to the assessment of effects. The identification and evaluation of effects have been based on the information set out in Chapter 2 (Project Description) of this ES, EIA good practice guidance documents, and relevant topic-specific guidance where available.

Description of the environmental baseline conditions (including future baseline conditions)

4.21 The existing and likely future environmental conditions in the absence of the Proposed Development are known as 'baseline conditions'. Each topic-based chapter includes a description of the current (baseline) environmental conditions. The baseline conditions at the site and within the study area form the basis of the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

4.22 The baseline for the assessment of environmental effects is primarily drawn from existing conditions during the main period of the EIA work in the period 2022 to 2024.

4.23 The baseline for the assessment should represent the conditions that will exist in the absence of the project at the time that the project is likely to be implemented. The anticipated start date for construction is 2027/2028, with enabling works likely to occur in 2027. The programme would be of approximately 6-9 months duration (including enabling works). Full operation of the site has been assumed to take place in 2028/2029. Further information about the construction programme assessed as part of the EIA process can be found in Chapter 2 (Project Description) of this ES.

4.24 Consideration has been given to any likely changes between the time of survey and the future baseline for the construction of the project from 2027/2028 and for operation of the project from 2028. In some cases, these changes may include the construction or operation of other planned developments in the area. Where such developments are built and operational at the time of writing and data collection, these have been considered to form part of the baseline environment. Where sufficient and robust information is available, such as expected traffic growth figures, other future developments have been considered as part of the future baseline conditions. In all other cases, planned future developments are considered within the assessment of cumulative effects.

4.25 The consideration of future baseline conditions has also taken into account the likely effects of climate change, as far as these are known at the time of writing. This has been based on information available from the UK Climate Projections project (UKCP18), which provides information on plausible changes in climate for the UK (Environment Agency and Met Office, 2018) and on published documents such as the UK Climate Change Risk Assessment 2017 (Committee on Climate Change, 2016).

4.26 Climate data from the UKCP18 database has been compiled for a 25km2 grid square containing the site, based on a high emissions scenario (RCP8.5). Future cloud cover change data for the period 2040-2069 has been used to inform the consideration of how environmental conditions may change at the site and within the study area in future.

Limitations of the assessment

4.27 Each topic chapter identifies any limitations identified in the available baseline data and whether there were any difficulties encountered in compiling the information required.

Mitigation measures adopted as part of the project

4.28 During the EIA process, environmental issues have been taken into account as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design.

4.29 The project assessed within this ES therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. In some cases, these measures may result in enhancement of environmental conditions. The assessment of effects has taken into account measures that form part of the project.

4.30 The topic chapters set out the measures that form part of the project and that have been taken into account in the assessment of effects for that topic. These include:

- Measures included as part of the project design (sometimes referred to as primary mitigation);
- Measures to be adopted during construction to avoid and minimise environmental effects, such as pollution control measures. These measures would be implemented through the CEMP; and
- Measures required as a result of legislative requirements.

Assessment of Effects

4.31 The EIA Regulations require the identification of the likely significant environmental effects of the project. This includes consideration of the likely effects during the construction and operational phases. The assessment is based on consideration of the likely magnitude of the predicted impact and the sensitivity of the affected receptor. The process by which effects have been identified and their significance evaluated is set out within each individual topic chapter. The overarching principles are set out below.

Sensitivity or Importance of Receptors

4.32 Receptors are defined as the physical or biological resource or user group that would be affected by a project. For each topic, baseline studies have informed the identification of potential environmental receptors. Some receptors will be more sensitive to certain environmental effects than others. The sensitivity or value of a receptor may depend, for example, on its frequency, extent of occurrence or conservation status at an international, national, regional or local level.

4.33 Sensitivity is defined within each ES topic chapter and takes into account factors including:

- Vulnerability of the receptor
- Recoverability of the receptor
- Value/importance of the receptor.

4.34 Sensitivity is generally described using the following scale:

- High
- Medium
- Low
- Negligible.

4.35 In some cases, a further category of very high has been used.

Magnitude of Impact

4.36 Impacts are defined as the physical changes to the environment attributable to the project. For each topic, the likely environmental change arising from the project has been identified and compared with the baseline (the situation without the project). Impacts are divided into those occurring during the construction and operational phases and where necessary decommissioning.

4.37 The categorisation of the magnitude of impact is topic-specific but generally takes into account factors such as:

- Extent

- Duration
- Frequency
- Reversibility

4.38 With respect to the duration of impacts, the following has been used as a guide within this assessment, unless defined separately within the topic assessments:

- Short term: A period of months, up to one year
- Medium term: A period of more than one year, up to five years
- Long term: A period of greater than five years.

4.39 The magnitude of an impact has generally been defined used the following scale:

- High
- Medium
- Low
- Negligible.

4.40 In some cases, a further category of 'no change' has been used.

Significance of Effects

4.41 Effect is the term used to express the consequence of an impact (expressed as the 'significance of effect'). This is identified by considering the magnitude of the impact and the sensitivity or value of the receptor.

4.42 The magnitude of an impact does not directly translate into significance of effect. For example, a significant effect may arise as a result of a relatively modest impact on a resource of national value, or a large impact on a resource of local value. In broad terms, therefore, the significance of the effect can depend on both the impact magnitude and the sensitivity or importance of the receptor.

4.43 Significance levels are defined separately for each topic. Unless stated otherwise, the assessments take into account topic specific guidance, based on the following:

- **Substantial**: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity
- **Major:** These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process
- **Moderate**: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor
- **Minor**: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project
- **Negligible**: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

4.44 The terms minor, moderate, major and substantial apply to either beneficial or adverse effects. Effects may also be categorised as direct or indirect; short, medium or long term; permanent or temporary, as appropriate.

4.45 Each chapter defines the approach taken to the assessment of significance. Unless set out otherwise within the chapter, topic chapters use the general approach set out in Table 4-1. For some topics, a simplified or quantitative approach is considered appropriate.

Table 4-1 Typical Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate Major	Major or Substantial	Substantial

4.46 Unless set out otherwise in each topic chapter, effects assessed as moderate or above are considered to be significant in terms of the EIA Regulations within this assessment.

Further Mitigation and Future Monitoring

4.47 Where required, further mitigation measures have been identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment.

4.48 Where relevant and necessary, future monitoring measures have been set out within the topic chapters.

Assessment of Cumulative Effects

4.49 The EIA Regulations require consideration of cumulative effects, which are effects on a receptor that may arise when the project is considered together with other proposed developments in the area.

4.50 The cumulative effects of the project in conjunction with other proposed schemes have been considered within each topic chapter of the ES. Other developments considered within the cumulative assessment include those that are:

- Under construction;
- Permitted, but not yet implemented;
- Submitted, but not yet determined; and

- Identified in the Development Plan (and emerging Development Plans - with appropriate weight being given as they move closer to adoption) recognising that information on any relevant proposals will be limited.

4.51 It is noted that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.

4.52 More detail on the assessment of the cumulative schemes is included in ES Chapter 5: Landscape and Visual.

Interrelationships

4.53 Inter-related effects arise where effects from one environmental topic bring about changes in another environmental topic for example ecology and landscape. Each topic chapter therefore considers whether or not there are any inter-related effects with other topics included within the EIA that have not already been considered in order to identify any secondary, cumulative or synergistic effects.

Summary Tables

4.54 Summary tables have been used to summarise the effects of the project for each environmental topic.

References

Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;

Highways Agency et al. (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08;

Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;

Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;

Institute of Environmental Management and Assessment (2015) Environmental Impact Assessment Guide to Shaping Quality Development;

Institute of Environmental Management and Assessment (2016) Guide to Delivering Quality Development;

Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach;

Institute of Environmental Management and Assessment (2020) Climate Change Resilience and Adaptation;

Institute of Environmental Management and Assessment (2022) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance; and

Institute of Environmental Management and Assessment (2023) Environmental Assessment of Traffic and Movement.

Ministry for Housing, Communities and Local Government (2019a) Planning Practice Guidance at http://planningguidance.planningportal.gov.uk;

Welsh Office Circular 11/99: Environmental Impact Assessment;

5 CHAPTER 5 LANDSCAPE AND VISUAL ASSESSMENT

5.1 Introduction

5.1.1 This Landscape and Visual Impact Assessment (LVIA) will consider the potential effects of the proposed Cil-Lonydd Solar Farm (Proposed Development) upon the physical landscape elements, features, landscape character, views and visual amenity within a 5 km radius study area (as measured in all directions from the outer edges of the Site).

5.1.2 A study area of 6km for the cumulative assessment was agreed with the LPA, the cumulative assessment is to consider other solar developments and also wind energy developments within the study area.

Landscape and Visual Methodology

5.1.3 This assessment has been prepared with reference to current recommended guidelines notably the Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA) published by the Landscape Institute and the Institute of Environmental Assessment in 2013. The GLVIA relies on an appreciation of the existing landscape, a thorough understanding of the development proposals, evaluation of the magnitude of impact predicted to result from the proposed development, the sensitivity of the existing landscape to change and the potential to mitigate effects.

5.1.4 The assessment has involved five key stages:

- Defining the scope of the assessment, site reconnaissance and desktop background research.
- Establishment of the baseline conditions relating to landscape character, quality and value and sensitivity to change of the existing landscape.
- Evaluation of the potential effects anticipated to result from the introduction of the development into the baseline context.
- Assessment of the anticipated effects based on magnitude of impact and sensitivity of the receptor.
- Description of the anticipated effects and the degree of significance.

5.1.5 The following specific desk-based tasks have been undertaken:

- A review of the landscape character assessment within the 2km study area.
- A review of landscape designations from the English Heritage database and local authority sources.
- Identification of landscape character and its key landscape elements.
- A site appraisal of the landscape character and its key landscape elements was carried out. Site recording involved the completion of standardised recording forms and annotation of survey plans, supported by a photographic record of landscape character areas.

Landscape Character Methodology

5.1.6 The aim of the landscape character assessment is to identify, predict and evaluate potential key effects arising from the development. The assessment of predicted effects involves:

- An appreciation of the nature, form and features of the development in the context of the baseline landscape character. Landscape character is a composite of physical, biological and cultural elements. Landform, hydrology, vegetation, land use pattern and associations combine to create a common 'sense of place' and identity which can be used to categorise the landscape into definable units (character areas). The level of detail and size of unit can be varied to reflect the scale of definition required. It can be applied at national, regional and local levels;
- A review of the sensitivity to change of designated sites and landscape character in relation to changes proposed. This is arrived at by a review of landscape value and scenic quality;
- An evaluation of the predicted magnitude of impact experienced by designated sites and landscape character, assuming implementation of the development. This is in the form of quantification and description of the loss of, or indirect impact on, specific landscape components that make up the character of the various local landscape areas within the study area. Further, it includes explanation of the predicted change in the composite quality of the various areas related to such loss and influence in combination with the compatibility of the proposed forms within or neighbouring the various areas; and
- Assessment of the degree of significance of the effects of the development on the designated site or landscape character under consideration by relating the magnitude of impact to the sensitivity to change.

Landscape Sensitivity to Change

5.1.7 The sensitivity of the landscape receptors is a combined judgement of the value of the landscape receptor and the susceptibility of the landscape receptor. See Table 5.3 for the Landscape Sensitivity matrix.

5.1.8 Landscape Value is with reference to landscape designations. The criteria for assessing landscape value is shown in Table 5.1.

Table 5.1: Landscape Value

HIGH	Designated areas at an International, National or Local scale (including but not limited to World Heritage Sites, National Parks, AONBs, SLAs, etc.) considered to be an important component of the country's character experienced by a high number of people. Landscape condition is good and components are generally maintained to a high standard. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has an elevated level of tranquillity. Rare or distinctive landscape elements and features are key components that contribute to the landscape character of the area.
MEDIUM	No formal designation but (typically) rural landscapes, important to the setting of towns and villages and considered to be a distinctive component of the national or local landscape character experienced by a large proportion of its population. Landscape condition is fair and components are generally well maintained. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has a moderate level of tranquillity. Rare or distinctive landscape elements and features are notable components that contribute to the character of the area.

LOW	No formal designations but a landscape of local relevance (including but not limited to public or semi-public open spaces, village greens of allotments) and green infrastructure and open spaces within residential areas likely to be visited and valued by the local community. Landscape condition may be poor and components poorly maintained or damaged. In terms of seclusion, enclosure by land use, traffic and movement, light pollution and presence/absence of major infrastructure, the landscape has limited levels of tranquillity. Rare or distinctive elements and features are not notable components that contribute to the landscape character of the area.

5.1.9 Susceptibility is the ability of the landscape receptor to accommodate the change. The criteria for assessing landscape susceptibility is shown in Table 5.2.

Table 5.2: Landscape Susceptibility

HIGH	**Scale of enclosure** – landscapes with a low capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc. **Nature of land use** – landscapes with no or little existing reference or context to the type of development being proposed. **Nature of existing elements** – landscapes with components that are not easily replaced or substituted (e.g. ancient woodland, mature trees, historic parkland, etc.). Nature of existing features – landscapes where detracting features, major infrastructure or industry is not present or where present has a limited influence on landscape character.
MEDIUM	**Scale of enclosure** – landscapes with a medium capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc. **Nature of land use** – landscapes with some existing reference or context to the type of development being proposed. **Nature of existing elements** – landscapes with components that are easily replaced or substituted. Nature of existing features – landscapes where detracting features, major infrastructure or industry is present and has a noticeable influence on landscape character.
LOW	**Scale of enclosure** – landscapes with a high capacity to accommodate the type of development being proposed owing to the interactions of topography, vegetation cover, built form, etc. **Nature of land use** – landscapes with extensive existing reference or context to the type of development being proposed. **Nature of existing features** – landscapes where detracting features or major infrastructure is present and has a dominating influence on the landscape.

Table 5.3: Landscape Sensitivity

Value	***Landscape Sensitivity***		
High	Medium	High	High

Value	***Landscape Sensitivity***		
Medium	Medium	Medium	High
Low	Low	Medium	Medium
	Low	***Medium***	***High***
	Susceptibility to Change		

Magnitude of Impact

5.1.10 Magnitude of impact has been assessed on a four-point scale of high, medium, low or negligible. These criteria are described as follows:

- **High**: very noticeable indirect change in landscape characteristics over an extensive area, or direct change to landscape components/character over a less extensive area;
- **Medium**: noticeable indirect change in landscape characteristics over less extensive area, or direct change to landscape components/character over a localised area;
- **Low**: perceptible indirect change in landscape characteristics over a localised area, or direct change to landscape components/character over a very localised area; and
- **Negligible**: virtually imperceptible or no indirect change in landscape characteristics over a very localised area, or virtually imperceptible, or no, direct change to landscape components/character.

5.1.11 Wireline (or wireframe) diagrams and photomontages from viewpoint receptors have also been used as a tool to aid assessment.

5.1.12 The visibility of the development in the landscape would vary according to the weather conditions. The assessment has been carried out, as is best practice, by assuming the 'worst case' scenario, i.e. on a clear, bright day.

Degree of Significance Assessment

5.1.13 Using professional judgement and assisted by tools such as ZTVs, photomontages and wireline diagrams, the assessment of effects compares the magnitude of impact experienced by a designated site or landscape character area to its sensitivity to change of the type proposed. It also takes into account direct impacts upon existing landscape elements, features and key characteristics and assesses whether these would be lost or their relationships modified, in the context of their importance in determining the existing sensitivity of the character area in question.

5.1.14 Anticipated magnitude of impact is reported in terms of a descriptive scale ranging from Major – Moderate – Minor adverse through Negligible to an ascending scale of Minor – Moderate – Major beneficial.

5.1.15 The criteria adopted for the assessment of landscape effects are as follows:

- **Major** adverse (or beneficial) degree of significance: very noticeable deterioration/improvement in the existing landscape.
- **Moderate** adverse (or beneficial) degree of significance: noticeable deterioration/improvement in the existing landscape.

- **Minor** adverse (or beneficial) degree of significance: perceptible deterioration/improvement in the existing landscape.
- **Negligible** degree of significance: virtually imperceptible deterioration/improvement in the existing landscape.

5.1.16 For the purposes of this appraisal, degree of significance of Moderate and above are considered to be significant.

5.1.17 See Table 5.4 – Degree of Significance as a visual guide to understanding how the magnitude of impact relates to the degree of significance over different sensitivities of landscape character.

5.1.18 The predicted effects have been considered in the light of primary mitigation measures associated with site planning, culminating in a statement of the predicted effects and their overall degree of significance to the landscape resource of the study area.

Table 5.4: Degree of Significance for Landscape Assessment

Magnitude of Impact	Degree of Significance		
High	Minor or moderate	Moderate or major	Major
Medium	Minor	Moderate	Moderate or major
Low	Negligible or minor	Minor	Minor or moderate
Negligible	Negligible or minor	Negligible or minor	Minor
	Low	***Medium***	***High***
	Landscape Receptor Sensitivity		

Visual Assessment Methodology

5.1.19 The assessment of visual impact has been based on the Guidelines for Landscape and Visual Impact Assessment (GLVIA) Third Edition 2013. The guidelines suggest that visual effects are assessed from a clear understanding of the development proposed and any related landscape mitigation measures. It calls for an understanding of the visual form of the existing landscape, its quality and sensitivity to change taking into account the nature of the development.

5.1.20 The assessment has involved three key stages:

- Determination of the main areas where effects would occur as a result of the location and orientation of the development, and establishment of the baseline conditions relating to the visual context of the study area and the location and sensitivity of potential visual receptors.
- Evaluation of the potential effects anticipated to result from the introduction of the development into the baseline context. The susceptibility of visual receptors to change in views and how they contribute to the sensitivity. Next the scale, extent and duration and how they contribute to the magnitude of impacts are assessed.
- Finally, the effects of the anticipated development are assessed by an evaluation of the magnitude of impact on the sensitivity to change. The resulting judgments about sensitivity and magnitude inform the judgement of the overall degree of degree of significance.

Baseline Assessment

5.1.21 The following specific desk-based tasks have been undertaken:

- Within the detailed study area consider methodology, key views and viewpoint locations.
- Identification of the Zone of Theoretical Visibility (visual envelope) for the proposed development.
- Identification and field assessment of potential receptors within the visual envelope.
- Appreciation of the nature and importance of existing views experienced by the identified receptors.
- A site appraisal of potential impacts upon visual amenity was carried out. Site recording involved the completion of standardised recording forms and annotation of survey plans, supported by a photographic record of views from key receptor locations and using wireline projections.

Identification of Visual Receptors

5.1.22 For there to be a visual effect there is the need of a viewer (or visual receptor). Visual receptors include users of residential properties, recreational facilities and other outdoor sites used by the public such as roads, railways and footpaths, which would be likely to experience a change in existing views as a result of the construction and operation of the proposed development.

5.1.23 Views from nearby key viewpoints are illustrated by photomontage and wireline diagrams and views from those potential viewpoints with limited visibility of the proposed development proposals are assessed but not illustrated with either wirelines or photomontages.

Appreciation of Existing Views

5.1.24 The visual assessment involved an initial desk-based review of OS mapping to establish the wider context, followed by site surveys to establish the form and nature of specific views and the role of the proposed development area in such views.

5.1.25 Site survey notes were recorded using a standardised spreadsheet that included receptor type and number, the nature of the existing view, the distance, angle and extent of the view of the proposed development, etc.

5.1.26 The evaluation involved the following tasks:

- Analysis of the sensitivity of the viewpoint receptors to the anticipated change in their view; and
- Identification of the anticipated magnitude of impact in existing views at these locations.

Visual Receptor Sensitivity

5.1.27 The sensitivity of a receptor to the proposed development has been considered in relation to the susceptibility of the receptor, for example, the inhabitants of a residential dwelling are generally considered more sensitive to change than occupiers of a factory unit.

5.1.28 The susceptibility of visual receptors to change in views and visual amenity depends on the activity or occupation of people. The people are the visual receptors who may be residents, recreational users, visitors and commuters. The judgement of susceptibility to change and value are assessed and how they contribute to the sensitivity of the visual receptor. The importance of the changed view to the receptor also contributes to an understanding of sensitivity to change. Therefore, orientation, nature of use, scenic quality and receptors' expectations of the changed view in respect of existing context are all considered as a part of this evaluation. For example, a front-on

changed view from the main habitable rooms of a dwelling would result in higher sensitivity to change than a side-on or rear changed view from the same receptor.

5.1.29 The sensitivity of visual receptors is therefore a combined judgement of the value of the view and the susceptibility of the visual receptor. See Table 5.7 for the Visual Sensitivity matrix.

5.1.30 The criteria for assessing the Value of Views is shown in Table 5.5.

Table 5.5: Value of Views

HIGH	Views with high scenic value within designated landscapes (including but not limited to World Heritage Sites, National Parks, AONBs, SLAs, etc.) Likely to include key viewpoints on OS maps or reference within guidebooks, provision of facilities, presence of interpretation boards, etc.
MEDIUM	Views with moderate scenic value within mostly undesignated landscape including urban fringe and rural countryside.
LOW	Views with unremarkable scenic value within undesignated landscape with partly degraded visual quality and detractors.

5.1.31 The criteria for assessing the Susceptibility of Visual Receptors is shown in Table 5.6.

Table 5.6: Susceptibility of Visual Receptors

HIGH	Includes occupiers of residential properties and people engaged in recreational activities in the countryside using public rights of way (PROW).
MEDIUM	Includes people engaged in outdoor sporting activities and people travelling through the landscape on minor roads and trains.
LOW	Includes people at places of work e.g. industrial and commercial premises and people travelling through the landscape on major roads and motorways.

5.1.32 The criteria for judging the combined value of views and the susceptibility of Visual Receptors to ascertain the sensitivity is shown in Table 5.7.

Table 5.7: Visual Receptor Sensitivity

Value	Visual Receptor Sensitivity		
High	Medium	High	High
Medium	Medium	Medium	High
Low	Low	Medium	Medium
	Low	***Medium***	***High***
		Susceptibility to Change	

Magnitude of Impact

5.1.33 The magnitude of impact considers the extent of the proposed development visible, the extent of the existing view that would be occupied by the proposed development, the influence of the proposed development within the view and the viewing distance from the receptor to the proposed development. This has involved a combination of site, and desk-based analysis. On site, the elements of the proposed development potentially visible were recorded on the survey sheets. The analysis also involved the use of wireline projections and draft photomontages to assist the assessors with the evaluation.

5.1.34 In the assessment of visual effects, the magnitude of impact is considered in terms of the type of effect taking place in a view from a receptor and the degree of change which would take place in that view.

5.1.35 Magnitude of impact is measured on the following scale, which has been adapted from GLVIA methodology:

- **High** magnitude: where the proposed development would cause a very noticeable change in the existing view.
- **Medium** magnitude: where the proposed development would cause a noticeable change in the existing view.
- **Low** magnitude: where the proposed development would cause a perceptible change in the existing view.
- **Negligible**: where the proposed development would cause a largely imperceptible change in the existing view.

Assessment of Effects

5.1.36 The main criteria used to evaluate the visual impact are centred on the extent to which the proposed development would modify established views. The assessment of effects is based on consideration of both sensitivity to change and magnitude of impact.

5.1.37 The determination of the effects is derived from the assessment of sensitivity to change and the magnitude of impact combined with professional judgement.

- The final assessment adopts the following categories to illustrate the level of visual effects:
- **Major** adverse (or beneficial) degree of significance: very noticeable deterioration/ improvement in the existing view.

- **Moderate** adverse (or beneficial) degree of significance: noticeable deterioration/improvement in the existing view.
- **Minor** adverse (or beneficial) degree of significance: perceptible deterioration/ improvement in the existing view.
- **Negligible** degree of significance: largely imperceptible deterioration or improvement in the existing view.

5.1.38 For the purposes of this appraisal, degree of significance of Moderate and above are considered to be significant and are applicable for landscape and visual assessments that require an EIA.

5.1.39 See Table 5.8 – Degree of Significance as a visual guide to understanding how the magnitude of impact relates to the degree of significance over different sensitivities of visual receptors.

5.1.40 An assessment has been made of the visual effects upon receptors which would occur as a result of the proposed development at the viewpoint locations. However, the visual prominence of the development would vary according to weather conditions. The assessment has therefore been carried out in accordance with best practice, by assuming the "worst case" scenario; that is, on a clear, bright day in winter. The assessment also takes into account changes in vehicle movement patterns and other proposal-related operations.

Table 5.8: Degree of Significance for Visual Assessment

Magnitude of Impact	**Degree of Significance**		
High	Minor or moderate	Moderate or major	Major
Medium	Minor	Moderate	Moderate or major
Low	Negligible or minor	Minor	Minor or moderate
Negligible	Negligible or minor	Negligible or minor	Minor
	Low	***Medium***	***High***
	Visual Receptor Sensitivity		

Visual Baseline Conditions

Viewpoints

5.1.41 The following specific desk-based tasks have been undertaken:

- Consider correct methodology, key views and viewpoint locations.
- Identification and field assessment of potential receptors within the visual envelope and an appraisal of their sensitivity.
- Appreciation of the nature and importance of existing views experienced by the identified receptors.
- The visual assessment involved an initial desk-based review of OS mapping to establish the wider context within which views initially appear to be set, followed by site surveys to establish the form and nature of specific views and the role of the proposed development area in such views.

Methodology for Preparation of Photographs

5.1.42 The site survey includes a photographic record of the viewpoints. At each of the viewpoints the following details are recorded:

- the grid reference (of the viewpoint)
- the angle of view (of the photo viewpoint)
- the ground height level or elevation
- the viewer height (measured to the lens of the camera)
- the date (of survey)
- the direction of view (to the development)
- the distance to the development (from the viewpoint)
- the grid reference of the development
- the height of the development
- The photographs have been taken using a digital SLR camera with a full frame sensor using a 28mm fixed focal length lens.

Methodology for the Preparation of Wirelines

5.1.43 Wirelines (or wire frame drawings) are the visual representation of landform shown as contours laid over the bare ground. These are essential in order to prepare the photomontages.

5.1.44 The wirelines have been prepared using digital terrain software which produces a bare ground model as represented by the Digital Terrain Model (DTM). The DTM uses the Ordnance Survey's 5m DTM. The curvature of the earth and refraction through the atmosphere are taken into account but not the effects of screening due to woodland, buildings and other surface features.

5.1.45 The wirelines were checked against the photographs and site survey notes and directions of views. The wirelines are then lined up with the photographs at a suitable scale.

Methodology for Preparation of Photomontages

5.1.46 The photomontages are prepared by overlaying the wirelines as a transparency over the photographs to accurately position the development. This is achieved by lining up landform features in the photograph and the wirelines as well as inserting 'markers' in the DTM which are shown in draft wirelines indicating the location of corners of buildings, pylons or other key landscape elements that can be allocated a grid reference position and can be seen in the photograph.

5.1.47 The representation of the type of development proposed is replicated from other photos and positioned in the location of the wireline development.

5.1.48 The final preparation of the wirelines and photomontages are positioned below the existing photograph and presented as a figure and intended to be printed at a scale of A3. The details outlined in paragraph 5.1.42 are included as a spreadsheet and the images are annotated as appropriate.

Consultation

5.1.49 A request for scoping opinion was submitted by RPS on behalf of Cenin to the Planning and Environment Decisions Wales (PEDW) reference: DNS CAS-02446-R8X8W2 for the proposed solar farm at Cil-Lonydd. The Caerphilly County Borough Council (CCBC) EIA Scoping Opinion Report reference: EIASCO/23/001 was provided as part of a Scoping Direction received from PEDW, and this report follows closely those elements identified within the Landscape and Visual points identified.

Site Context

The Proposal

5.2.1 Cenin Renewables Ltd (the applicant) proposes to develop a solar photovoltaic electricity generating station (or 'solar farm') with an installed generation capacity of approximately 40 MW and associated ancillary development, including a substation. The point of connection is proposed to be located at an existing 132 kV substation to the southeast on Mynydd Maen Common, which would be connected to the Site by a cable route of 3km.

The Study Area

5.2.2 The potential effects of likely landscape receptors and visual receptors were initially appraised within a study area of 5km radius which was outlined in the CCBC Scoping Opinion. This report focuses on the main issues of potential landscape and visual effects within the defined study area.

Landscape Assessment

5.2.3 A study area of 5km from the Site boundary was used for the appraisal of the effects on landscape features and landscape character.

Visual Amenity Assessment

5.2.4 The visual assessment covered a radius of 5km from the Site boundary. The appraisal focussed on key viewpoints, illustrated with photomontages, although it also included assessment of notable views.

Cumulative Landscape and Visual Assessment

5.2.5 The cumulative landscape and visual assessment study area was defined at 6km from the Site boundary, as outlined in the CCBC Scoping Opinion.

Limitations of the Assessment

5.2.6 The limitations of the assessment included site photography.

5.2.7 The winter photographs were required as part of this assessment and the weather conditions were carefully observed to obtain the best results. However, the limitations were the periods of time available to carry out photography in clear periods of weather.

5.2.8 This limitation was managed by regular observations of weather forecasts and being available at short notice to get to site when a clear period was available. The resultant photographs are clear for the assessment, but some light conditions are effected. This however does not effect the outcome of the assessment and the robustness of the assessment for EIA purposes.

5.3 Baseline Conditions

Landscape Character Baseline

Landscape Character of the Site

5.3.1 The Site is located to the east of Newbridge, the nearest settlement to the Proposed Development in the valley below.

5.3.2 The Site is on a westward-sloping plateau in an elevated, uplands area on Mynydd Maen.

5.3.3 The Site is large, covering an area of approximately 37.5 hectares.

5.3.4 The majority of the Site consists of an area of improved pasture fields, grazed by both sheep and cattle, which are bounded by mature deciduous trees of varying density. These are mostly Beech and are former hedgerows – a typical feature in the local landscape.

5.3.5 The field pattern is mostly regular although the sizes of the fields vary from small along the western edge of the site, medium in the south portion of the site and large in the north and east part of the site.

5.3.6 The eastern-most field of the Site is unimproved pasture and is bounded on its eastern edge by coniferous trees. This boundary separates the site from a large area of unimproved open moorland which extends eastwards to the peak of Mynydd Maen.

5.3.7 The rolling nature of the landform, together with the large mature trees, mean that the overall experience of the site feels compartmentalised into roughly three parts:

- The medium-sized, regular fields south of the PRoW and east of the farm.
- The large, more open fields to the north of the ProW and east of the farm.
- The smaller, regular fields to the west of the farm with dense, mature tree boundaries.

5.3.8 Cil Lonydd farm sits in the southwestern portion of the Site, situated close to the head of the Nant Hafod-fach stream with its steep, wooded valley sides.

5.3.9 Views outwards vary across the Site, with many views filtered through the large, mature trees throughout. There are wide, far-reaching views to the west and northwest from some northwestern parts of the site. Views to the east are mostly screened by vegetation and the rising landform. The exposure of the site therefore varies between open and enclosed.

5.3.10 A number of Public Rights of Way cross the Site.

5.3.11 Access to the site is from the unnamed local road which links Llanfach to north of Pantside via Mynydd Maen.

5.3.12 There are electricity pylons crossing the proposed from the farm northwards which are the only existing vertical incongruous elements.

5.3.13 Adjacent to the site to the south is the Hafod Asphalt Plant which is a working quarry with associated heavy machinery and equipment.

5.3.14 To the southwest of the Site, on the same landform, lies a former spoil heap which has been regraded. This large-scale, treeless landform can be seen from within the site and from views to the site from the local area and is a detracting feature in the landscape.

5.3.15 The wider local landscape is typical of the landscape character in the area with the developed lower valleys contrasting with the rural, agricultural character of the uplands. These are often separated by steep valley sides which in the study area are mostly wooded.

5.3.16 Table 5.9 provides details of the baseline site photographs (see Figure 5.21 and Figures 5.17-5.19).

Table 5.9: Viewpoints

Viewpoint	Grid Reference
A	323004, 196815
B	323057, 197061
C	322794, 197147
D	322740, 197147
E	322795, 197352
F	322798, 197528

Viewpoint	Grid Reference
G	323142, 197610
H	323161, 197467
I	323423, 197441
J	323409, 197206
K	323287, 197153
L	323226, 196853

5.3.17 These baseline viewpoints were taken on the 11th of February 2024. The series of photographs were taken from the corners of and within the Site to give an impression of the overall landscape character and also how the landscape character varies across the Site. The photographs trace the Site boundary in a clockwise direction.

5.3.18 Photograph L was taken on the boundary of the original proposed Site boundary. Although the Site boundary now no longer includes this particular field, it remains useful to see the view from a southeastern location and the landscape character of that edge of the Site.

Landscape Character Type

5.3.19 The Site is within the Wales National Landscape Character Area 37 - South Wales Valleys.

5.3.20 Key Characteristics:

- Extensive Upland plateaux – typically wild and windswept, often with unenclosed tracts, running roughly north-south as ‘fingers’ parallel between intervening deep valleys.
- Numerous steep-sided valleys - typically aligned in parallel, flowing in southerly directions, shaped by southward flowing glaciers, leaving behind distinctive corrie ('cwm') and crag features. Major rivers include the Tawe, Taff and Rhymney.
- Ribbon urban and industrial areas in valleys – in places extending up valley sides and to valley heads. The area is sometimes regarded as being part of a ‘city region’. Middle and eastern valleys tend to be the most heavily and continuously developed, e.g Rhondda Valley. The uplands by comparison have little or no settlement.
- Extensive remains of heavy industry – with a mix of derelict, preserved and largely redeveloped areas, notably for coal mining. Preserved as heritage (World heritage Site) at Blaenafon this typically includes old railway alignments, buildings and former tips.
- Contrast of urban valley activity next to quiet uplands – e.g. busy roads, new developments, traffic noise, night lighting, verses the adjacent wilder, remoter, quieter uplands.
- Large blocks of coniferous plantation and deciduous woodland fringes – covering many steep hillsides and hilltops, most notably in the middle to western portion of the area, providing a softer contemporary landscape where there was once industry.
- Heather, rough grassland and steep bracken slopes – dominate many plateaux and are grazed mainly by sheep. Much is common land.
- Improved pastures on some lower valley sides - grazed by sheep and some dairy cattle.
- Field boundaries - dry stone walls mark the boundary of common land while fields on lower slopes are bounded by dense hawthorn hedges, interspersed with swathes of broadleaved woodland.

- Transport routes restricted to valleys – the intervening topography makes valley to valley travel difficult, except at heads and bottoms of valleys. Occasionally there are roads that climb steeply over passes with dramatic views and 'hair pin' bends.
- Iconic cultural identify – many popular images of a tough, rugby-playing, religious, radically-minded society still remain associated with the South Wales Valleys, however today's post-industrial, internet-connected reality is somewhat different.

Adjacent Landscape Character Types

5.3.21 Within the 5km study area is the adjacent Wales National Landscape Character **Area 35 – Cardiff, Barry and Newport**.

5.3.22 Key Characteristics:

- Edge to the coalfield - lowland margins to the south-east of the South Wales coalfield. A varied geology of mudstones, sandstones and a few outcrops of limestone. Many glacial moraine features.
- Busy, heavily urbanised areas - containing Cardiff, and other large settlements including Penarth and Barry to the south to the west and the city of Newport and new town of Cwmbran to the east.
- The M4 motorway - forms a noisy, busy corridor between and bypassing the two cities, together with the main railway.

Landscape Designations

5.3.23 The landscape designations are all shown in the vicinity of the Proposed Development on Figure 5.21.

5.3.24 The Site is located within the Mynydd Llwyd and Mynydd Maen **LANDMAP Visual and Sensory Aspect Area (VSAA)** (CYNONVS214). The area has an overall LANDMAP evaluation of moderate for scenic quality. There are numerous LANDMAP VSAAs within the study area.

Table 5.10: Mynydd Llwyd and Mynydd Maen LANDMAP Visual and Sensory Aspect Area (VSAA)

Aspect Layer	Description	Overall Evaluation
Mynydd Llwyd and Mynydd Maen (CYNONVS214)	Areas of upland comprising both heath and grassland on the western slopes of both Mynydd Maen and Mynydd Llwyd. These areas are largely flanked by coniferous plantation woodland with more open areas to the east. More westerly areas in valleys have smaller field patterns. Some views to adjacent upland areas and to urban area of Newbridge in the valley to the west.	Value: Moderate Condition: Unassessed Trend: Constant Scenic quality: Moderate Integrity: Moderate Character: Moderate Rarity: Moderate Overall Evaluation: **Moderate** "Some nice views but forestry obscures views and area is not remarkable in terms of uniqueness."

5.3.25 There are three **Special Landscape Areas (SLA)** within the study area, the nearest of these to the Proposed Development is 'St Illtyd Plateau & Ebbw Eastern Sides' which lies approximately 1.3km to the north. The other SLAs in the study area are, 'Mynyddislwyn' approximately 1.7km southwest of the proposal and 'South West Uplands' to the east of the Proposed Development (approx. 2.6km).

5.3.26 The whole of the site is within the **Visually Important Local Landscape (VILL)** – 2.3 Abercarn. These areas have been designated by the Caerphilly County Council.

5.3.27 The VILL areas were designated in the Local Plan adopted in 2010. These areas cover former SLAs which were excluded as SLAs. "*The concept of the VILL designation has been to identify those areas of the Borough that contribute to the visual qualities of the landscape but do not meet the criteria for designation as SLAs*." "*These areas were generally those of some Visual and Sensory importance but that did not rate sufficiently in conjunction with other aspects to justify inclusion within the new SLA system. However, it is felt that these areas require some form of protective designation.*" (source: Designation of Visually Important Local Landscapes (April 2008)).

5.3.28 The closest **National Park** to the Site is the Bannau Brycheiniog (Brecon Beacons) National Park which lies approximately 7km to the northeast at its nearest point.

5.3.29 The closest **Area of Outstanding Natural Beauty (AONB)** to the Site is Wye Valley and is over 20km to the east.

5.3.30 The Blaenavon Industrial Landscape **World Heritage Site** is approximately 9km to the north of the proposal at its nearest point.

5.3.31 The nearest **Conservation Area** to the Site is the Newbridge Conservation Area 1.8km west. There are 4 other Conservation Areas within 5km of the site.

5.3.32 There are ten **Scheduled Ancient Monuments (SAM)** within 5km of the Proposed Development. The nearest of these to the proposal is '250 – Charcoal Blast Furnace at Abercarn'.

5.3.33 Within 2km of the Proposed Development there are 17 **Listed Buildings** with the nearest over 1.5km from the Site.

5.3.34 There are no **Historic Parks and Gardens** within the 5km study area.

5.3.35 The Pen-Y-Fan pond **Country Park** is the only such designation in the study area, it is approximately 4km to the northwest of the proposal.

5.3.36 The northeastern corner of the Site shares a boundary with the Mynydd Maen, East of Newbridge **Site of Importance for Nature Conservation (SINC)**. Within 1km of the site boundary there are 5 SINCs.

5.3.37 Other landscape designations in the 5km study area which are more related to biological or geological reasons include three **Sites of Special Scientific Interest (SSSI)**; no **Special Protection Areas (SPA)**; no **Special Areas of Conservation (SAC)**; no **National Nature Reserves (NNR)**; and 3 **Local Nature Reserves (LNR)**. For the purposes of this landscape assessment, it is the landscape value and fabric of the landscape which is most important to understand and assess. Therefore, these designations are not directly pertinent to this landscape assessment.

5.3.38 There are many **Ancient Woodlands** within the study area. Many of these have little to no association with the Proposed Development. There are 4 ancient woodlands which lie immediately adjacent to the Site and only these are assessed in this report.

Baseline Views

5.3.39 A series of sixteen representative viewpoints were identified within the study area. These visual receptors are to be found within 5km of the Proposed Development and within the ZTV which is shown in Figure 5.22.

Visual Amenity Baseline Conditions

5.3.40 The area was examined on site from different viewpoints to establish the potential effects of the Proposed Development on visual amenity to different visual receptors (recreational users, residents, road users).

5.3.41 The following sixteen viewpoints have been chosen as key representative viewpoints in the close vicinity of the Proposed Development. See Figure 5.23 and Table 5.11.

5.3.42 Viewpoint Susceptibility, Value and a justification of the value are shown in Table 5.12.

Viewpoints

Table 5.11: Viewpoints

No.	View Location Description	Visual Receptors	Sensitivity
VP1	Local road south of Site, just north of Glan Shôn Farm (PRoW ABEC/FP333/1)	Road Users	Medium
		Recreational	High
VP2	Public Right of Way immediately south of Site (PRoW ABEC/BR179/3)	Recreational	High
VP3	Public Right of Way (Restricted Byway) at the junction with unnamed local road (PRoW NWBG/RBW172/1)	Recreational	High
VP4	Public Right of Way adjacent to Cil Lonydd Farm (PRoW NWBG/RBW172/2)	Recreational	High
VP5	Junction of Public Right of Way and local road to the north of the Site (PRoW NWBG/RBW160/1)	Recreational	High
VP6	Public Right of Way northeast of the Site (PRoW NWBG/FP365/1)	Recreational	High
VP7	Public Right of Way route to peak of Mynydd Maen, northeast of the Site (PRoW CRUM/FP163/1)	Recreational	High
VP8	Public Right of Way near to Hafod-arthen (PRoW FP 337 36/1)	Recreational	High
VP9	Public Right of Way just southeast of Llanerch-uchaf (PRoW CRUM/BR44/1)	Recreational	Medium
VP10	Public Route east of Pen-Y-Fan Industrial Estate (PRoW CRUM/FP92/1)	Recreational	Medium
VP11	Layby off Pentwyn Road near junction with Load of Hay Road	Road Users	Medium
VP12	Park just off Royal Crescent in Treowen	Residential	High
		Recreational	High
VP13	Local road between Croespenmaen and Pentwyn-mawr	Road Users	Medium
VP14	Public Right of Way south of Pennar-ganol Farm (PRoW NWBG/FP262/2)	Recreational	High
VP15	Raven Walk long-distance walking route (PRoW ABEC/FP89/1)	Recreational	High
VP16	Junction of Linden Court and Old Pant Road, Pantside	Residential	Medium

Table 5.12: Viewpoints Sensitivity

No.	Receptors	Susceptibility	Value	Justification of Value	Sensitivity
VP1	Road Users	Medium	Medium		Medium

No.	Receptors	Susceptibility	Value	Justification of Value	Sensitivity
	Recreational	High		Within VILL – Within pasture farmland, not on open moorland/heathland which is the primary reason for the designation.	High
VP2	Recreational	High	Medium	Within VILL - Within pasture farmland, not on open moorland/heathland which is the primary reason for the designation.	High
VP3	Recreational	High	High	Within VILL – High Scenic Quality – from open moorland/heathland with expansive views	High
VP4	Recreational	High	Medium	Within VILL – Within pasture farmland, not on open moorland/heathland which is the primary reason for the designation.	High
VP5	Recreational	High	Medium	Within VILL - Within pasture farmland, not on open moorland/heathland which is the primary reason for the designation.	High
VP6	Recreational	High	High	Within VILL – High Scenic Quality – from open moorland/heathland with expansive views	High
VP7	Recreational	High	High	Within VILL – High Scenic Quality – from open moorland/heathland with expansive views	High
VP8	Recreational	High	Medium	Within SLA – view of low importance	High
VP9	Recreational	High	Low	Long distance walking route. No designation – view of low importance	Medium
VP10	Recreational	High	Low	No designation – view of low importance	Medium
VP11	Road Users	Medium	Low	No designation – view of low importance	Medium
VP12	Residential	High	Medium	No designation – a view from a public open space where receptors may go for views	High
	Recreational	High			High
VP13	Road Users	Medium	Low	No designation – view of low importance	Medium
VP14	Recreational	High	High	Within SLA – Open views over the valley.	High
VP15	Recreational	High	High	Within SLA – Open views over the valley. On a long distance walking route.	High
VP16	Residential	High	Low	No designation – view of low importance	Medium

Other Visual Receptors

Recreational Visual Receptors

5.3.43 Recreational users are people who use recreational routes, these may be in the form of Public Rights of Way, Cycle Ways and Open Access Land.

5.3.44 Within 2km of the Proposed Development there are 5 areas of **Countryside Rights of Way (CRoW),** the nearest ones share a boundary with the application site to the north, an area of woodland (Coed Cil-Lonydd) and to the east an area of upland moorland (Mynydd Maen). There are numerous other CRoW areas within the wider 5km study area.

5.3.45 There is an extensive network of **Public Rights of Way (PRoW)** within the study area. There are 6 PRoWs which pass through or along the boundary of the Proposed Development which are to be assessed particularly closely. The remaining PRoWs will be assessed proportionately and are represented in several of the proposed viewpoints.

5.3.46 Eight **Long Distance Footpaths** pass through the 5km study area surrounding the Proposed Development. Of these, only three are within the Zone of Theoretical Visibility (ZTV); the Ebbw Valley Walk (represented by VP 9) to the west, Taith Torafaen Anytime Challenge (represented by VP 3) which passes directly adjacent to the site and the Raven Walk (represented by VP 15) to the south.

5.3.47 There are five **National Cycle Network (NCN)** routes within the study area. All of these are outside the ZTV and therefore there would be no intervisibility between the Proposed Development and the cycle routes.

Residential Visual Receptors

5.3.48 The context of the visual amenity (within the ZTV) – where residents may be able to see the Proposed Development - includes the following villages; Pantside; Newbridge; Treowen; Trinant/ Pen-twyn; the eastern end of Croespenmaen; Abercarn; and Pontllanfraith.

5.3.49 There are several other hamlets, scattered dwellings and farmsteads within the study area.

Road User Visual Receptors

5.3.50 There may be some dynamic views may be seen from the A472 when travelling west to east from Pontllanfraith to Newbridge. The majority of main roads lie in the valley bottoms and are therefore out of the ZTV, with no views to the Proposed Development.

5.3.51 The B4251 (Kendon Road) between Croespenmaen and Crumlin lies partially within the ZTV. There are a number of local roads in the study area within the ZTV, these are mainly to the west of the Proposed Development on the western side of the Ebbw Valley.

Sequential Views

5.3.52 As requested by Caerphilly Borough Council, the sequential assessment will consider the effects on sequential views, within the ZTV, experienced by users of the PRoW network in an close to the Site.

Sequential View – Route Name

5.3.53 PRoW running east to west through site (NWBG/RBW172/1). PRoW merges into NWBG/RBW172/2.

5.3.54 NWBG/RBW172/3 - moves north along the western edge of the Site. Not marked on OS maps.

5.3.55 PRoW entering site from the south (ABEC/BR179/3) – VP2

5.3.56 PRoW along Nant Hafod-fach, just south of site.

5.3.57 PRoW passing north of the Site, on the southern edge of the plantation (NWBG/RBW/316/1).

5.3.58 PRoW which shares the local road (not marked on OS as a PRoW) – Passes the site along its eastern edge (NWBG/RBW171/1).

Cumulative Baseline

5.3.59 The assessment of cumulative effects within the study area on the landscape character and from the same Representative Viewpoints where there would be potential intervisibility between the cumulative site and the Proposed Development. Cumulative projects would include those with planning permission and pre-applications within the planning system.

5.3.60 The cumulative assessment study area is defined as within a 6km radius from the Proposed Development. This was determined following a ZTV analysis which showed very limited visibility between 7 to 15km of the Proposed Development.

5.3.61 Further to this, areas with a visibility of less than 0.25 degrees of vertical angle have been scoped out of the cumulative assessment. While the Proposed Development may be technically visible (discounting views blocked by vegetation and built form) from these areas, the Proposed Development would take up a very small portion of the vertical field of view and as such would be barely perceptible to a visual receptor.

5.3.62 The cumulative assessment includes all energy developments including both solar and wind farms.

Other Solar Farm Sites

5.3.63 The following Solar Farms, within 6km of the Proposed Development, are to be considered in the cumulative assessment:

- Treowen Solar Farm (W)
- Pen-y-Fan Solar Farm (NW)
- Pen-y-Fan Caravan Park Solar Farm (NW)
- Mynyddislwyn (SW)

5.3.64 Other Solar Farms within 6km of the Proposed Development which have been scoped out of the cumulative assessment because there would be no or limited intervisibility:

- Pen-rhiw-arwydd (SW)
- Near Pant-yr-eos Reservoir (SE)

Other Renewable Energy Sites

5.3.65 Wind Farms within 6km of the Proposed Development to be considered in the cumulative assessment:

- Mynydd Maen Wind Farm – Pre-Application
- Trecelyn Wind Farm – Pre-Application
- Llanhilleth Wind Farm – In Planning
- Mynydd Carn-y-cefn Wind Farm – In Planning
- Coed y Gilfach Wind Turbines – Operational
- Oakdale Business Park wind Turbines – Operational
- Pen-y-Fan Industrial Estate Wind Turbine – Operational
- Pen-y-Fan Leisure Park – Operational
- Pen-y-Fan Ganol Farm – Operational

5.3.66 Other Wind Farms within 10km which have been scoped out of the cumulative assessment include:

- Abertilly Wind Farm – Pre-Application
- Tyle Crwth Wind Turbine - Operational
- Bryn Ysgawen Farm Wind Turbine - Operational
- Tir-y-Ferch-Gryno Farm Wind Turbine - Consented

- Gelli-wen Farm Wind Turbine - Operational
- Cruglwyn Wind Turbines - Operational
- Manmoel Wind Farm (outside 10km) – Pre-Application

5.3.67 As some of the wind farms listed above are in the early stages of planning, the details of the number and locations of the turbines are subject to change.

5.4 Landscape and Visual Assessment

Landscape Character Baseline

Landscape Character of the Site

5.4.2 The Site is located to the east of Newbridge, the nearest settlement to the Proposed Development in the valley below. Landscape and Visual Assessment

Landscape Character Assessment

5.4.3 The following section provides an assessment on the effects that the Proposed Development would have on the landscape character areas and designated sites, within the 5km detailed study area. The assessment evaluates the likely effects during construction and in the longer term.

5.4.4 The judgement of the sensitivity of the landscape receptor and the Magnitude of Impact informs the assessment of the degree of significance.

The Effect on the Landscape During Construction

5.4.5 Construction activities which have the potential to affect the landscape character include:

- Deliveries to site and vehicle movements on and off site
- Presence of machinery and plant for construction.
- Erection of the solar panels and fencing
- Digging for underground cabling
- Reinstatement works to areas disturbed by construction activities/compound.

5.4.6 From the description of the construction activities as outlined above, any effects on the landscape character during the construction phase would be temporary for a short duration.

5.4.7 Therefore, the short-term and temporary nature of the construction activities on the landscape character would be **Low**.

The Effect on the Landscape Character of the Site

5.4.8 As requested by the LPA, 12nr Baseline photographs were taken to demonstrate the character of the Site. (see Figures 5.17, 5.18 and 5.19 and 5.21).

5.4.9 The Proposed Development will introduce a landscape element of a similar height to the existing adjacent stone walls.

5.4.10 The site would be contained by a boundary fence around the entire site.

5.4.11 There would be minimal removal of existing vegetation across the Site. The only proposed removal would be of the gappy, poor quality hedgerow between the two large fields in the northern part of the site. There would be additional hedgerow/tree planting as part of the proposals which may strengthen the existing character of the site.

5.4.12 The land cover will remain as grazing and retain productivity of the site for farming sheep. Additionally, there would be beneficial biodiversity gains in improvements in management of existing boundary trees and of possible additional hedgerows and providing further shelter and shade for plant and animal habitats.

5.4.13 The scale of the Proposed Development and other infrastructure including the inverters and battery storage would be suitable for the varying scale of the fields across the Site. The proposed battery stores are located close to the existing farm buildings and are of a height and scale which is in keeping with the existing built form.

5.4.14 The majority of the site is to be covered by east-west facing solar panels which would be at a maximum height of 1.4m.

5.4.15 Larger 2.8m high south facing solar panels are proposed on the more south-sloping parts of the site, these are in the vicinity of the existing farm buildings.

5.4.16 The underlying landform would be unaffected by the proposal.

5.4.17 The manmade structures of the electricity pylons are an existing vertical element on the site.

5.4.18 This landscape is essentially a working landscape with a variety of farming uses employed at present. The proposal is another way of farming the landscape whilst still benefitting from sheep grazing, managed hedgerows and creating and improving wildlife habitats for increased biodiversity.

5.4.19 The Proposed Development has a finite lifespan and is removable with minimal reinstatement required therefore there is no permanent change to the landscape of the site or its landscape character.

5.4.20 Overall, the Magnitude of Impact on the landscape character of the immediate Site would be **High**.

The Effect on the Landscape Character Type

5.4.21 The Site is within the Wales National Landscape Character **Area 37 - South Wales Valleys**.

5.4.22 ***Key Characteristics:***

- *Ribbon urban and industrial areas in valleys – in places extending up valley sides and to valley heads. The area is sometimes regarded as being part of a 'city region'. Middle and eastern valleys tend to be the most heavily and continuously developed, e.g Rhondda Valley. The uplands by comparison have little or no settlement.*
- *Extensive remains of heavy industry – with a mix of derelict, preserved and largely redeveloped areas, notably for coal mining. Preserved as heritage (World heritage Site) at Blaenafon this typically includes old railway alignments, buildings and former tips.*
- *Contrast of urban valley activity next to quiet uplands – e.g. busy roads, new developments, traffic noise, night lighting, verses the adjacent wilder, remoter, quieter uplands.*
- *Large blocks of coniferous plantation and deciduous woodland fringes – covering many steep hillsides and hilltops, most notably in the middle to western portion of the area, providing a softer contemporary landscape where there was once industry.*
- *Heather, rough grassland and steep bracken slopes – dominate many plateaux and are grazed mainly by sheep. Much is common land.*
- *Field boundaries - dry stone walls mark the boundary of common land while fields on lower slopes are bounded by dense hawthorn hedges, interspersed with swathes of broadleaved woodland.*
- *Transport routes restricted to valleys – the intervening topography makes valley to valley travel difficult, except at heads and bottoms of valleys. Occasionally there are roads that climb steeply over passes with dramatic views and 'hair pin' bends.*

5.4.23 This Landscape Character Area is of a very large scale. The Proposed Site is relatively small in comparison to this large scale and therefore the change in the characteristics of the landscape is minor.

5.4.24 LCT 37 has a large number of existing renewable energy developments, from large wind farms and solar farms to individual wind turbines. The southeastern corner of the character area, where the Site is located, has fewer large scale wind developments but several existing small-medium scale solar farms.

5.4.25 The nature of the Proposed Development as a solar farm makes it suitable for an uplands siting as it is of a low height and therefore is by design less visible within the landscape.

5.4.26 The Proposed Site is situated within existing enclosed pasture farmland. The Proposed Development would continue to be grazed whilst benefitting from the addition of energy production. The farmland of the Site is set within an area of considerable coniferous plantations. The open, upland landscape of Mynydd Maen is separated from the Site by a row of coniferous trees and also by the land use.

5.4.27 The Proposed Development would have a very localised impact on the existing characteristics of this large-scale landscape character type which already contains numerous, large-scale existing renewable energy developments. The Magnitude of Impact to this landscape character type would therefore be **Negligible**.

The Effect on Adjacent Landscape Character Types

5.4.28 The effect of the Proposed Development on the adjacent Wales National Landscape Character **Area 35 – Cardiff, Barry and Newport** would be None.

5.4.29 There would be **no effect** on this Landscape Character Type as a result of the Proposed Development. This is due to the intervening landform of Mynydd Maen which severs all association between the Site and the Landscape Character Type.

The Effect on Landscape Designations

5.4.30 The following assessments examine the effect of the Proposed Development on the landscape settings of each of the landscape designations as introduced in section x – Baseline Conditions.

Mynydd Llwyd and Mynydd Maen LANDMAP Visual and Sensory Aspect Area

5.4.31 The effect of the Proposed Development on Mynydd Llwyd and Mynydd Maen LANDMAP Visual and Sensory Aspect Area (VSAA) (CYNONVS214):

5.4.32 The site is completely within this VSAA which covers the uplands of Mynydd Maen and the two plateaus which extend westwards from the main landform. These upland areas are typically gently sloping with steep valley sides which form another VSAA (372). The Site occupies the northern of the two ‘arms’ of the area, covering a part of the site which is predominantly improved pasture in character with mature tree field boundaries. The large spoil heap from the former Celynen colliery is a large man-made feature at the end of this ‘arm’.

5.4.33 The area is assessed as having Moderate Scenic Quality and Overall is evaluated as Moderate, with the justification being, “Some nice views but forestry obscures views and area is not remarkable in terms of uniqueness.”

5.4.34 The sensitivity of the VSAA is determined by combining the Value (Medium) and the Susceptibility to change (Medium), resulting in a **Medium** Sensitivity.

5.4.35 The Proposed Development would add a new element into the VSAA which would not be in keeping with the existing character of the area. There would be a **High** Magnitude of Impact on the Site itself and the immediate surroundings. In the wider area due to a lack of visibility across the whole area and the fact that the Proposed Development does not affect a large area of the more sensitive moorland/heathland areas of the VSAA, the overall Magnitude of Impact of the Proposal on the VSAA would be **Medium**.

5.4.36 The resulting Degree of Significance would be **Moderate**.

Special Landscape Areas

5.4.37 The effect of the Proposed Development on **Special Landscape Areas** (SLA):

5.4.38 **St Illtyd Plateau & Ebbw Eastern Sides** - which lies approximately 1.3km to the north – Represented by VP8. Very limited intervisibility from within the SLA and the Proposed Development. The Proposed Development does not affect the appreciation of the underlying landscape of the SLA here, which is in place to protect the enclosed farmland character which is relatively untouched by Industrialisation. **No effect** on the SLA as a result of the Proposed Development.

5.4.39 **Mynyddislwyn** - approximately 1.7km southwest of the proposal – This SLA is represented in the visual amenity assessment by VP14 and VP15. There are two large existing solar farms within this SLA towards the south of the area. The Proposed Development would have some intervisibility with the Mynyddislywn SLA, in the northeastern part. The Proposed Development is at a separation distance of over 2km from the nearest point. While it is acknowledged that there would be some visual effects on northeasterly views to the uplands on the far side of the valley, the understanding and appreciation of the underlying landscape of the SLA would not be affected – there would be a **No effect**.

5.4.40 **South-West Uplands** - to the southeast of the Proposed Development – **No effect** due to no intervisibility and no association.

Visually Important Local Landscape

5.4.41 The effect of the Proposed Development on the **Visually Important Local Landscape** (VILL) - 2.3 Abercarn would be a localised effect on the Site and its immediate surroundings due to the change in character within the Site from improved pasture farmland to solar panels with pasture. There would be minimal removal of existing vegetation – the character of the existing mature tree boundaries would remain.

5.4.42 This would be the first solar development within the VILL.

5.4.43 Intervisibility is kept within a small area in the north of the VILL and from other upland areas. Dense vegetation around the site further reduces the visual impact of the Proposed Development.

5.4.44 From the open moorland in the vicinity of the Site to the east, the character would change from open moorland with improved pasture to include the presence of the solar farm.

5.4.45 Mitigating factors include the presence of the large electricity pylons which detract from the open qualities of the moorland. The Proposed Development would not affect the sense of openness.

5.4.46 There would be a High Magnitude of Impact on the Site and a Medium Magnitude of Impact within a radius up to 500m east of the Site.

5.4.47 Overall, there would be a Medium Magnitude of Impact on the VILL as there would be a direct change to the landscape character over a localised area.

5.4.48 The Sensitivity of the VILL is assessed to be Medium (Value: Medium; Susceptibility: Medium). The resultant Degree of Significance is **Moderate**.

Bannau Brycheiniog (Brecon Beacons) National Park National Park

5.4.49 The effect of the Proposed Development on **Bannau Brycheiniog (Brecon Beacons) National Park National Park** – **None** – Scoped out of the assessment due to separation distance.

Wye Valley of Area of Outstanding Natural Beauty

5.4.50 The effect of the Proposed Development on **Wye Valley of Area of Outstanding Natural Beauty** (AONB) - None – **No effect** due to separation distance.

Blaenavon Industrial Landscape World Heritage Site

5.4.51 The effect of the Proposed Development on the **Blaenavon Industrial Landscape World Heritage Site** would be **No effect** due to the separation distance.

Conservation Areas

5.4.52 The effect of the Proposed Development on the **Newbridge Conservation Area** – The conservation area covers a small part of the historical core of Newbridge. It is situated in the bottom of the valley and due to the steep sided nature of the valley sides, there is no intervisibility between the Proposed Development and the designation - therefore **no effect**.

5.4.53 Note: **Oakdale Conservation Area** is partially within the ZTV, but there is limited visibility to the Site, further to this there is a large separation distance and there would be **no effect**.

Scheduled Ancient Monuments

5.4.54 The effect of the Proposed Development on the **Scheduled Ancient Monuments (SAM)**:

5.4.55 250 – Charcoal Blast Furnace at Abercarn' – Out of ZTV. **No effect**.

5.4.56 269 – Pen Y Fan Canal Reservoir to northwest is within the ZTV but due to the distance between the designation and the Site and limited intervisibility, there is **no effect** on the reasons for designation.

Listed Buildings

5.4.57 The effect of the Proposed Development on **Listed Buildings**:

5.4.58 The Swffryd-ganol farm and barn range are 1.8km north of the Site and the only Listed Buildings within 2km of the Proposed Development which would have intervisibility with the Site. Views to the Site are filtered through trees both near to the farm and around the Site. There would be little to no effect on the setting of the Listed Buildings as a result of the introduction of the Proposed Development. The effect would be **Negligible**.

Pen-Y-Fan Pond Country Park

5.4.59 The effect of the Proposed Development on **Pen-Y-Fan Pond Country Park**. Views to the site are very limited from the park due to the trees and vegetation surrounding the park. There is a solar farm neighbouring the park. The Proposed Development is over 4km away. **No effect**.

Site of Importance for Nature Conservation

5.4.60 The effect of the Proposed Development on **Site of Importance for Nature Conservation (SINC)** would be minimal effect for reasons of the designation. In terms of the setting of the sites, there would be some change and the likely impacts would be during construction when there would be increased activity in the area which may affect habitats. There is minimal removal of vegetation on the site. In the long term, with the additional mitigation planting, there may be additional benefits to the SINC.

Ancient Woodlands

5.4.61 The setting of the Ancient Woodlands to the north of the site would not be affected – these are on the slopes of the valley and there is separation between the woodland and the Proposed Development. The woodland which lies immediately south of the farm and the Site may have some intervisibility with the site. However, the woodland is on a steep sided, south-facing slope with the Site at the top of the slope to the north. There would be a **Negligible** effect on the setting of the woodland.

Landscape Character Assessment Summary

5.4.62 The effect on the landscape character during construction activities would be short-term and Magnitude of Impact on the landscape character would be **Low**.

5.4.63 The Magnitude of Impact to the Landscape Character Area 37 – South Wales Valleys would be **Negligible** due to the large-scale landscape character type which already contains numerous, large-scale existing renewable energy developments.

5.4.64 The effect of the Proposed Development on Mynydd Llwyd and Mynydd Maen LANDMAP Visual and Sensory Aspect Area (VSAA) (CYNONVS214) - The site is completely within this VSAA which covers the uplands of Mynydd Maen. There would be limited visibility of the Proposed Development across the VSAA and there would be a limited effect on the most sensitive moorland/heathland areas with the VSAA. Therefore, the overall Degree of Significance of the Proposal on the VSAA would be **Moderate**.

5.4.65 There would be a **High** Magnitude of Impact on the Site and the immediate surroundings.

5.4.66 The effect of the Proposed Development on Special Landscape Areas (SLA): Mynyddislwyn - The Proposed Development is at a separation distance of over 2km from the nearest point and while there may be some visual effects, the understanding and appreciation of the underlying landscape of the SLA would not be affected and there would be a **No effect**. There would be No effect on the other two SLAs within the Study Area.

5.4.67 The site is completely within the Visually Important Local Landscape (VILL) - 2.3 Abercarn and there would be a localised effect on this designated landscape as a result of the introduction of the Proposed Development. Any effects would diminish with increasing distance from the Proposed Site. The overall Magnitude of Impact on the VILL would be Medium, resulting in a **Moderate** Effect.

5.4.68 There would be a **Negligible** effect on the Swyffryd-ganol farm and barn range Listed Buildings which are approximately 1.8km north of the Proposed Development.

5.4.69 There would be some change on the setting of the Sites of Importance for Nature Conservation (SINC) within the study area, however, there would be little to no effect on the ecological reasons for these designations.

5.4.70 There are a number of Ancient Woodlands bordering the Proposed Site. There would be a very limited effect on the setting of the woodlands, with a maximum of a **Negligible** effect on the woodland immediately to the south of the Proposed Development.

5.4.71 There would be **no effect** on any of the following designations:

- National Parks
- AONBs
- World Heritage Sites
- Conservation Areas
- Scheduled Ancient Monuments
- Country Parks

Visual Amenity Assessment

Basis of Assessment

5.4.72 The key elements and characteristics of the proposed development which may give rise to visual effects are as follows:

- The Solar Panels (2.8 & 1.4m height)

- The Inverters (1.5m height)
- The Battery Compound (2.3m height)
- The Perimeter Fencing
- Temporary Compound

5.4.73 All disturbed areas would be restricted as far as practicable to the specified areas and the temporary construction compound.

5.4.74 The wireline and photomontage visualisations and records from the site assessments have usefully demonstrated the typical views around the area.

The Effect on the Visual Amenity during construction

5.4.75 Construction activities which have the potential to affect the views from visual amenity receptors include;

- Deliveries to site and vehicle movements on and off site;
- Construction of new access track;
- Presence of machinery and plant;
- Erection of Solar Panels, Battery Compound & Inverters;
- Construction of access road;
- Reinstatement works to areas disturbed by construction activities.

5.4.76 From the description of the construction activities as outlined above, any effects on the visual amenity receptors and their views during the construction phase will be for a temporary duration.

5.4.77 Therefore, the short-term temporary nature of the construction activities on the visual amenity receptors and their views will ensure that the overall effects will be **Low**.

Visual appearance of Proposal

5.4.78 The visual appearance of the proposed solar panels would be rows of ground mounted solar panels. The orientation of the panels would face the sun to maximise the benefit. On the areas within the site which have a southern aspect, these would be south-facing panels, and on areas which generally have a more westward facing aspect, these would be east-west facing panels.

5.4.79 There would be ground mounted solar panels of two different heights:

- 2.8m south-facing panels;.
- 1.4m east-west facing panels.

5.4.80 The solar arrays would be mounted on a supporting metal frame mounting system which would be hammered or bored directly into the ground with some connecting underground cables between the rows, the inverters and the battery compound. Consequently, the panels are ephemeral in nature and could be removed with little long-term effect.

5.4.81 The east-west facing panels would be in rows oriented in a north-south direction while the south facing panels would be in east-west oriented rows.

5.4.82 To ensure that the panels can generate electricity even during the winter months, the rows of south-facing panels would be approximately 4m apart from panel edge to panel edge. The east-west facing panels would have a smaller separation of approximately 2.1m. These distances would also allow for maintenance.

5.4.83 The panels are generally set at a separation distance of at least 9m (but often more) from the site boundary or internal boundaries featuring trees or vegetation in order to maximise the benefit from the sun and to minimise shadowing effects.

5.4.84 The panels are composed of photovoltaic cells and are designed to maximise the absorbency of the sun's rays and minimise solar glare, which would represent a loss of potential solar energy. The panels therefore have a relatively matte finish.

5.4.85 There would be Inverters which would be 1.5m in height and would be located in 15 positions across the Site.

5.4.86 The Battery Compound would be approximately 2.3m in height and would consist of shipping container-sized units oriented roughly north-south and located north of Cil-Lonydd farm.

5.4.87 Access to the Site would be gained from the existing access track to Cil-Lonydd Farm from the local road to the east of the Site.

Assessment of Effects

5.4.88 As described in the baseline, 16 representative viewpoints were identified and agreed in consultation with Caerphilly County Borough Council (CCBC) within the 5km study area.

5.4.89 The ZTV (Figure 5.22) shows an area of 5km where the Proposed Development may be seen. A 10km ZTV was initially prepared and submitted with the scoping request (DNS CAS-02446-R8X8W2) which demonstrated very limited visibility beyond 7km from the Proposed Site. It was agreed in the Scoping Opinion that a 5km ZTV area was required which would show potential visibility in greater detail.

5.4.90 The ZTV has been calculated using a composite Digital Model. A 2m LiDAR Digital Surface Model (DSM) in the vicinity of the proposed site (with additional local screening effects of woodland applied to a height of 10m) and a bare-earth Terrain 5 and Terrain 50 Digital Terrain Model (DTM) for the wider area.

5.4.91 The ZTV shows coloured height bands to visualise the impact of distance in the potential visibility of the Proposed Development. The height bands show where the Proposed Development would take up a greater or lesser proportion of the visible vertical field of view. These height bands range from 'Greater than 3 degrees visible vertical angle', where the Proposal would be likely to highly visible, to 'less than 0.25 degrees visible vertical angle', where the Proposal would be theoretically visible, but practically would have very little visual presence.

5.4.92 The extent of the visibility of the Proposed Development shown in the ZTV, the highest concentration of visibility would be within 1km of the Site. There would also be some potential visibility to the Site from the area on the opposite valley side to the northwest. There are large areas of woodland plantations around the site which screen views and to the east, the large landform of Mynydd Maen rises up and screens all views to the Site from the east.

5.4.93 Within the ZTV the following viewpoints have been chosen as key viewpoints representative of different visual receptors in the study area – residents, road users and recreational users.

5.4.94 The following assessment of effects at each viewpoint assumes a baseline as per the baseline photograph, which is the current view on the date it was taken. The change in view has then been assessed assuming the addition of the Proposed Development only, i.e. not including other solar or wind farms which are approved but not yet built, in-planning or in scoping. See the cumulative visual amenity assessment for assessment including these other cumulative developments.

Representative Viewpoint Assessment

5.4.95 The following viewpoints have been chosen in consultation with Caerphilly County Borough Council. These are representative viewpoints of typical views within the study area. The visual receptors are representative of recreational users, residents and road users.

Table 5.13: Viewpoints

Viewpoint	Grid Reference
1	322603, 196208
2	322995, 196733
3	323426, 197181
4	322952, 197184
5	323279, 198200
6	323617, 197775
7	324355, 197895
8	322088, 201873
9	321506, 200094
10	320143, 199479
11	320699, 199060
12	320851, 197972
13	319364, 197803
14	320195, 195823
15	320092, 193807
16	322137, 197971

5.4.96 **Viewpoint 1** – See Figure 5.1:

Viewpoint 1 – Local road south of Site, just north of Glan Shôn

Existing View

This viewpoint is taken from the local road between Llanfach and Mynydd Maen, just north of Glan Shôn farm. The view looks north towards the Site, over an intervening valley and the Hafod Asphalt Plant Quarry. The view is representative of road users and recreational users travelling along the road.

NOTE: The location of this viewpoint was intended to be along the PRoW (ABEC/FP333/1) between the local road and through Glan Shôn farm. However, this footpath was inaccessible, and an alternative representative viewpoint was found. This viewpoint is at the approximate midpoint between the two ends of the PRoW and although it is taken from a lower elevation, it remains representative of what a visual receptor might see along the line of the footpath.

Views northwards along this stretch of road are filtered and of a glimpsed nature between the trees on the northern side of the road. This representative view has been taken at a gap in the trees to allow a clear view to the Site. The layered, bare rock face of the quarry is a dominant, incongruous feature in the view. In the centre of the view, the improved pasture field surrounded by mature trees is the only part of the site visible. The farm building in the centre of the view is part of Cil Lonydd farm. The wooded slopes of Nant Hafod-fach are also visible and the flat-topped hill on the left of the image is the spoil heap from the former Celynen colliery.

As the view is not in the principal direction of travel, the sensitivity of road users is **Medium**. Recreational receptors travelling along this route are considered **High** sensitivity to change in view.

Change in View

A portion of the Proposed Development is theoretically visible in the centre of the view in the improved pasture field surrounded by trees.

The Proposed Development would be on the south facing slope and would be visible from this viewpoint. At this angle, the solar panels would be facing the viewer who would likely perceive them as a single mass covering the ground level. The trees on the southern boundary of the site would partially screen views of the panels. There may be some views to other Proposed Development in the field beyond and in the fields behind the existing farm building, although these would be heavily filtered through the intervening trees.

Viewpoint 1 – Local road south of Site, just north of Glan Shôn

From the road there would be a perceptible change in view as the view is not in the primary direction of travel and views are filtered and glimpsed through roadside trees. However, the view of the Site is framed by the landform which increases the notability of the change.

Views from the PRoW, which are at a slightly higher elevation and with less vegetation screening would experience a higher degree of change in the view.

It is considered that there would be a **Low** Magnitude of Impact for Road Users and a **Medium** Magnitude of Impact for visual receptors using the PRoW.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Road Users	Medium	Low	Minor
Recreational	High	Medium	Moderate

5.4.97 **Viewpoint 2** – See Figure 5.2:

Viewpoint 2 – Public Right of Way immediately south of Site

Existing View

This viewpoint faces northeast and is taken from the public bridleway immediately south of the Site. The view is representative of recreational users on the PRoW.

Views to the Site increase as the receptor moves north along this route due to the crowned landform of the field. The view is of the pastoral field landscape with mature tree field boundaries. To the west of the PRoW, views are blocked by a bund between the PRoW and the quarry, and views to the east end at the dense coniferous plantation. The Site is located on the far side of the post and wire fence in the middle-ground of the image and also beyond the line of evenly spaced mature trees to the right of centre. The mature boundary trees within the site and the rolling landform visually compartmentalise the site.

As this viewpoint is representative of recreational users on a public bridleway, the sensitivity of receptors to change in view is considered to be **High**.

Change in View

The southern edge of the Proposed Development would be a prominent new feature in the view. A small portion of the overall solar farm would be visible.

The Proposed Development would be visible across the width of the photograph and those panels visible would be east-west facing, meaning the viewer would look down the line of panels. There would also be views to some of the more distant panels on the fields in the background although these would be filtered through existing trees within the site.

Overall, the change in view would be very noticeable. The view would change from a pastoral view of fields and trees to one of fields of solar panels bounded by large trees.

It is therefore considered that there would be a **High** Magnitude of Impact.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	High	Major

5.4.98 **Viewpoint 3** – See Figure 5.3.1 and 5.3.2:

Viewpoint 3 – Public Right of Way (Restricted Byway) at the junction with unnamed local road

Existing View

This view is representative of recreational users travelling along the Public Right of Way. The nature of the view is wide as one emerges from the dense coniferous plantation and across the local road. The principal view faces along the line of the PRoW which crosses the road in a westerly direction. The view is representative of part of a sequential view when travelling along the PRoW

The view looks over the local road in the foreground to the track which leads to Cil Lonydd Farm and is also a PRoW. In the mid-ground is an area of open access moorland which is partially bounded by stone walls. Over the wall, the mature trees which bound the fields of the site are visible and beyond these, in gaps between the trees are long distance views over the valley beyond.

Due to use of this route by recreational users, the sensitivity of receptors to change at this viewpoint is **High**.

Change in View

Viewpoint 3 – Public Right of Way (Restricted Byway) at the junction with unnamed local road

The Proposed Development is theoretically visible in a large horizontal field of view around the viewpoint. The site would stretch from the line of the road facing southwest around to the corner of the wall north of the viewpoint.

In reality the existing stone wall would be of a similar height as the Proposed Development and would therefore screen a large proportion of the potentially visible panels. To the south of the view (left of the photographs) there would be some views to the Site through the boundary fence.

This viewpoint marks a change in the Magnitude of Impact for sequential receptors travelling east to west along the PRoW. Within the woods to the east, there would be no views to the Site and therefore no change, however at this point, the receptor emerges from the woodland and into the open access area between the woods and the Site. In this intermediate area, there would be noticeable change in the view which would result in a **Medium** Magnitude of Impact due to the Proposed Development.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	Medium	Moderate

5.4.99 **Viewpoint 4** – See Figure 5.4.1 and 5.4.2:

Viewpoint 4 – Public Right of Way adjacent to Cil Lonydd Farm

Existing View

This viewpoint is taken from the Public Right of Way which passes through the Site. It is taken from the side of the route just east of Cil Lonydd Farm and is representative of recreational users. There would be views to the Site in all directions, but the principal views are likely to be in an east/southeasterly direction. Views to the west would be partially screened by the farm buildings, and views north face into a slope which screens views of a large portion of the site.

The principal views eastwards face the direction of the PRoW which can be seen as the track heading away from the viewer. The landform of the site somewhat encloses this viewpoint to the north, east and west, with only longer distance views possible to the southwest. The view looks over the head of the Nant Hafod-fach stream to the pastoral fields of the Site which are separated by the large trees which were once hedgerows. Along the horizon is the coniferous plantation to the east of the site.

As this viewpoint is representative of recreational users on a public Right of Way, the sensitivity of receptors to change in view is **High**.

Change in View

The Proposed Development would be visible from this location, and would be a prominent new feature in the views from this PRoW. The views would be mainly possible when travelling eastwards along the route and the solar units would be visible on either side of the footpath. Travelling in the opposite direction, there would also be views to the Proposed Development from the west side of the farm buildings.

From this PRoW, a receptor would see a large change in the view with solar panels covering the fields either side of the route. There would be a **High** Magnitude of Impact on receptors using this PRoW.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	High	Major

5.4.100 **Viewpoint 5** – See Figure 5.5:

Viewpoint 5 – Junction of Public Right of Way and local road to the north of the Site

Existing View

This viewpoint is taken from a double gateway just off the local road and is also the end of a Public Right of Way. The view faces south and is representative of views of recreational users of the PRoW.

Views are over improved pasture fields which slope gently away from the viewer. A small portion of the Site may be visible between the dense tree cover in the middle ground, the majority of the site is screened behind the trees. There are views over the trees to the hills on the far side of the valley and also to the top of the spoil heap at Twyn-y-ganol which sits in the mid-ground at the right of the view. The view forms a portion of wider views over the valley which are possible to the west of the view.

As it is representative of recreational receptors, the susceptibility of receptors to changes in the view is High. However the value of this view is Medium and therefore the sensitivity is **Medium**.

Change in View

Views to the Site are theoretically visible in a wide portion of this view, however, in reality the dense tree cover between the Site and the viewpoint mean that only a small portion of the site would be visible.

Viewpoint 5 – Junction of Public Right of Way and local road to the north of the Site

Views to the eastern-most part of the Site may be possible on the left of the photograph. These views to the Proposed Development would be heavily filtered by intervening tree branches and would likely not be possible in the summer months when there are leaves on the trees. Even in the winter, views to the panels would be difficult, albeit perceptible.

A receptor travelling south along this PRoW would find views of the Site generally diminish despite moving closer to the Site. This is due to the landform falling to the south and the trees to the north of the Site becoming closer. These combine to provide further screening by the trees which already screen much of the site. There may be glimpsed, heavily filtered views in the winter through the trees, but in summer, the Proposed Development would almost be entirely screened from view.

Due to the dense tree-cover between the viewpoint and the proposal, the overall change in view is considered to be minor, resulting in a **Low** Magnitude of Impact.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	Low	Minor

5.4.101 **Viewpoint 6** – See Figure 5.6:

Viewpoint 6 – Public Right of Way northeast of the Proposed Site

Existing View

This view is representative of recreational users using the PRoW and within the CRoW access land. This view faces southwest and is at the junction of the local road and the PRoW.

The view looks over the western edge of the Mynydd Maen moorland open access land in the foreground to the line of coniferous trees which form the boundary to the Site. Beyond this line of conifers there is an area of semi-improved pasture before the improved pasture of the Site which is bounded by mature beech trees along the former hedge line. In the background, there are long distance views over the Ebbw Valley.

The view is representative of recreational users and so is **Highly** sensitive to any changes in the view.

Change in View

The Proposed Development is theoretically visible in a large portion of the view, however, in reality, the trees on the edge of the site and within the site largely screen views to the Proposed Development.

The primary view of the Proposed Development would be of the northern portion of the site, lying in the improved pasture field beyond the line of regular mature trees in the mid-ground of the picture. Some of this part of the site is further screened by the conifers on the nearest boundary to the viewpoint. The landform slopes away from the viewpoint and so the views of the site are at an oblique angle. To the left of the view, the dense screening by the conifers blocks most views to the proposal. There may be some glimpsed views to the panels in gaps between trees in this part of the view.

Although there is some dense screening between the Site and the viewpoint and only portions of the site would be visible at any one position, there would be an overall sense of a large new element in the view from the road, the PRoW and the CRoW access land in general. There would therefore be a major change in the view.

It is considered that there would be a **High** Magnitude of Impact in the view.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	High	Major

5.4.102 **Viewpoint 7** – See Figure 5.7:

Viewpoint 7 – Public Right of Way route to peak of Mynydd Maen, northeast of the Site

Existing View

This viewpoint is taken from the route of the PRoW as is crosses the expansive area of the CRoW access land which covers much of the upland area of Mynydd Maen. The view faces west and is representative of recreational users of the PRoW and also on the open access land.

NOTE: Representative of views from the CRoW access land and the PRoW which constitutes a wide track up to the peak of Mynydd Maen. Views to the Site vary across the open access land, the chosen viewpoint represents typical views from the route of the PRoW, where the rolling landform and the plantations screen much of the Site. It is possible to view a larger portion of the Site within the CRoW access land off the track, particularly in the west (close to the location of VP6).

Views are of the expansive area of upland moorland which covers Mynydd Maen with wide, panoramic views to the west. The landform is gently undulating, sloping generally westwards towards the Site, but the rolling nature of the landform partially screens views to the Site. There is a large area of plantation to the

Viewpoint 7 – Public Right of Way route to peak of Mynydd Maen, northeast of the Site

south of the viewpoint, and this can be seen on the left side of the photograph. In the centre mid-ground of the view is the flat-topped spoil heap of the former Celynen colliery.

The sensitivity of recreational receptors in this location is **High**.

Change in View

Theoretically, there are views to a wide portion of the Site, however, due to screening by trees and landform, views of the Site are limited from this viewpoint. Only a very small portion of the overall Proposed Development is visible between a gap in the trees on the eastern edge of the Site.

The change in view would be the addition of the solar panels in the gap between the trees in the mid-ground of the view.

The change in view would vary depending on a receptor's location within the CRoW access land. The views from along the path, which are the principal views, would be less affected than views from further west (closer to the Site) and off the track where there are more open views to Site (see VP6). The Magnitude of Impact would be **Low** along the PRoW (at this VP location). (There would be a High Magnitude of Impact in the western most areas of the CRoW land (within approx. 200m east of the road) – this is represented in VP6.)

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	Low	Moderate

5.4.103 **Viewpoint 8** – See Figure 5.8:

Viewpoint 8 – Public Right of Way near Hafod-arthen

Existing View

This view represents views from the PRoW to the east of St.Illtyd. It is at a distance of approximately 4.3km from the Proposed Site and is representative of recreational receptors using this route.

The view faces south and shows a wide, panoramic view showing part of the Ebbw Valley. The rural, upland character can be seen in the midground with its dense tree boundaries around the pasture fields. Also notable are the wooded, steep-sided valley sides which are characteristic of the area. The Proposed Site is just visible in the far reaches of the view.

As the view is representative of recreational users the sensitivity of receptors is **High**.

Although views to the Proposed Development are theoretically possible, in reality views would be at a significant separation distance and would be screened by trees and landform.

There is a possibility that a small portion of the Proposed Development might be seen from this viewpoint, however, at this distance from the Site, a receptor along this route would be unlikely to perceive any change in the view.

There would be a **Negligible** Magnitude of Impact.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	Negligible	Minor

5.4.104 **Viewpoint 9** – See Figure 5.9:

Viewpoint 9 – Public Right of Way just southeast of Llanerch-uchaf

Existing View

This viewpoint is taken from a PRoW which forms part of the Ebbw Valley Walk long-distance route. The footpath is just to the southeast of the farmstead of Llanerch-uchaf, a working farm, and traverses through typical upland pasture fields. The view looks south-eastwards towards the Site which is approximately 2.8km away.

The view looks over the pasture field in the foreground, over the wooded, narrow, steep-sided Ebbw valley to more pasture fields on the uplands on the opposite side of the valley. Some of the dwellings of the upper part of Swffryd can be seen on the slopes on the right of the view. The Proposed Site is further in the background of the view and is partially screened by trees.

The sensitivity of the recreational receptors on this route in this location would be **Medium**.

Change in View

A portion of the north-west part of the Proposed Development may be visible from this viewpoint. There would be screening provided by the trees on the boundary of the Site as well as from other trees between the viewpoint location and the Development. A large part of the Site would be hidden from view by the landform.

Viewpoint 9 – Public Right of Way just southeast of Llanerch-uchaf

The elevation of the viewpoint is lower than the Site, and so the view effectively looks up to towards the Proposed Development. This means that views of the Proposed Development would be at an acute viewing angle and so less of the vertical angle of the field of view would be occupied by the Site, and there is a greater effect of screening by the intervening trees. This, coupled with the separation distance from the Site would mean that there would be a minor change in the view from this location.

A receptor travelling along this route would barely perceive a change in the view and as a result, the Magnitude of Impact would be **Negligible**.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	Medium	Negligible	Minor

5.4.105 **Viewpoint 10** – See Figure 5.10:

Viewpoint 10 – Public Route east of Pen-Y-Fan Industrial Estate

Existing View

This viewpoint is taken from a PRoW to the east of the Pen-y-Fan industrial estate. There are a number of public routes in the vicinity of this viewpoint, however, there are many trees lining the footpaths and so views to the Site are not always possible. The view is representative of recreational users and faces southeast towards the Proposed Site.

This footpath appears to be well-used and has views towards the Proposed Site. Due to the numerous mature trees near to the route, the wider views are often glimpsed between gaps in the trees, as in the viewpoint shown. Where views to the Site are possible, it is seen at a distance and appears to be set within a densely treed area of upland pasture fields.

This viewpoint has a **Medium** sensitivity as it is representative of recreational receptors with low value views.

Change in View

Views to the Proposed Development are theoretically possible from this viewpoint as the Site is on a slope which faces towards the viewer. However, only a small portion of the Site is visible due to the tree cover on the edge and within the Proposed Site.

The view to the Site is also looking up from a lower elevation, which creates an acute viewing angle to the Proposed Development. Due to the gaps between the trees on the edges of the Site, there would be clear views to some of the proposed solar panels. Mitigation hedgerow planting would help to reduce these views. There are other existing built form elements within the view, these are Pantside (centre of view) and Treowen (right of view).

At the separation distance between the Site and the receptor, and the glimpsed, short-duration nature of the views from the PRoW, there would be a **Low** Magnitude of Impact from this viewpoint.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	Medium	Low	Minor

5.4.106 **Viewpoint 11** – See Figure 5.11:

Viewpoint 11 – Layby off Pentwyn Road near junction with Load of Hay Road

Existing View

This view is representative of road users and is taken from a layby just east of Load of Hay Road on the busy Pentwyn Road. The viewpoint looks southeast (not in the direction of travel) towards the Site and is a wide, panoramic view looking over the Ebbw Valley.

The viewpoint location was chosen as it offered views to the Site from the road, however, there are very limited views from other routes near this viewpoint. Roadside trees screen views from Load of Hay Road and the PRoW which links up to Kendon Farm (camper van/caravan storage).

The view to the Site on the upland fields in the centre-midground of the photo are just possible over the roadside hedge in the foreground. The trees of Load of Hay Road can be seen on the right of the view, with the dwellings of Swffryd on the left of the view. It is possible to see some of the dwellings on the northern edge of Pantside in the centre of the view – the Site is beyond those.

The sensitivity of road user receptors from this viewpoint is **Medium**.

Change in View

Views to a portion of the Proposed Development are theoretically possible from this viewpoint location. The views would be from a lower elevation than the Site and so the viewer is looking up to the Proposal. As well as this, there would be partial screening by the trees on the edge of the Proposed Site.

Viewpoint 11 – Layby off Pentwyn Road near junction with Load of Hay Road

This viewpoint is taken from a similar viewing direction as VP10, but is lower down the hillside, and so the viewing angle to the Site is even more acute. This reduces the proportion of the view that Proposed Development that is visible.

The Proposed Development would be seen between gaps in the existing mature trees on the western boundary of the Site. However, receptors are unlikely to notice a change in the view due to the short duration of this view from the road, and because it is not in the direction of travel of the road.

The Magnitude of Impact is **Low**.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Road Users	Medium	Low	Minor

5.4.107 **Viewpoint 12** – See Figure 5.12:

Viewpoint 12 – Public Park just off Royal Crescent in Treowen

Existing View

This viewpoint is taken from the well-used public park in Treowen and is representative of recreational users using the park as well as residential views from properties with views across the valley to the Site. The view faces east.

The view was taken from the southern side of the park area and shows the proximity of the houses, seen in the foreground to the right of the view, to the park. Most of the dwellings face in the direction of the Site which is on the far side of the valley. There are also occasional large trees, as seen on the left of the view, which provide some localised screening near to the viewpoint.

The view is characteristic of views along this side of the valley. There is a sense of enclosure due to the steep-sided nature of the valley. Many of the trees on these steep valley sides are part of plantations as can be seen in the photograph as many of the trees have been recently felled. This lends an industrial sense to the view. Views to the Site, which sit above the viewer, on the pasture fields of the uplands of the far valley side are partially screened by intervening trees. There are more open views up the valley to the north.

The sensitivity of both residential and recreational receptors from this viewpoint is **High**.

Change in View

Views to a portion of the northwest corner of the Proposed Site are possible from this viewpoint. There would be filtered views to the Proposed Development between the gaps in the trees which line the western edge of the Site.

The view to the Site would be at an acute angle and so the Proposed solar panels would take up a small portion of the vertical field of view. Mitigation hedgerow planting on this western edge would reduce the visibility of the Proposed Development.

Receptors from dwellings and from the public park would notice a change in the view as some solar panels would be visible, however, due to the nature of the view looking up to the panels on the far side of the valley with significant screening provided by the existing trees, the Magnitude of Impact would be **Low**.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	Low	Minor
Residential	High	Low	Minor

5.4.108 **Viewpoint 13** – See Figure 5.13:

Viewpoint 13 – Local road between Croespenmaen and Pentwyn-mawr

Existing View

The view looks east from the narrow local road between Croespenmaen and Pentwyn-mawr and is representative of road users. The view towards the Site is perpendicular to the direction of travel along the road. At the time of taking the photograph, the hedgerow on the eastern side of the lane had not been cut, so the viewpoint is located in a small gap in the hedgerow. Views from the rest of the route are currently screened by the hedge, however, there may be views to the Site in the future as and when the hedge is cut. Due to this limitation in the viewpoint location, the branches of a large tree in the midground partially screens the Proposed Site.

The viewpoint is at the highest point on this local road, offering the best views to the Site. The view is a wide view over the Ebbw valley. In the foreground are dense hedgerow and tree bounded pasture fields. There is an electricity substation in the view on the left of the photograph in the midground – the Treowen solar farm can also be made out on the ridge of this hill. Beyond this is the far-side of the valley, Pantside is visible on the slopes of the hill and further up the hillside is the uplands landscape containing the Site

Viewpoint 13 – Local road between Croespenmaen and Pentwyn-mawr

and the open moorland of Mynydd Maen. A line of large electricity pylons can be made out on the horizon of Mynydd Maen.

The sensitivity of road users from this viewpoint is **Medium**.

Change in View

From this viewpoint, views to a portion of the Proposed Development would be possible. The aspect of the Proposed Site is angled towards the viewpoint, with the north-western part of the Site being the most visible. The acute viewing angle to the Site as well as the screening effects of the trees on the boundary of and within the Site would filter views to the Proposed Development.

The change in view would be the introduction of solar panels into the background of the view. Within the wide angle of the view, the visible portion of the Proposed Development would appear to take up a small part of the view.

The duration of the view is very short due to the roadside hedgerow along the local road and also because the view is not in the direction of travel along the road. These factors, together with the filtered views of the site at the acute viewing angle would result in a **Negligible** Magnitude of Impact on receptors views from this route.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Road Users	Medium	Negligible	Negligible

5.4.109 **Viewpoint 14** – See Figure 5.14:

Viewpoint 14 – Public Right of Way south of Pennar-ganol Farm

Existing View

This viewpoint was taken from a PRoW on the northern edge of the Mynyddislwyn SLA. The route is also the access track to Pennar-ganol farm. It is representative of recreational users. Despite the proximity of the viewpoint to Newbridge, there is a sense of tranquillity in these upland areas.

The view looks northeast across the valley towards the Site. In the foreground of the view is a large pasture field and views beyond that are to the opposite sides of the valley and the steep slopes of the Ebbw Valley. The Proposed Site is partially screened by the large man-made landform of Twyn-y-ganol, the spoil heap of the former Celynen colliery, which is in the centre of the view. Beyond it on the horizon is the line of electricity pylons which traverse the moorland of Mynydd Maen.

As the recreational receptors are on the edge of a highly valued landscape, their sensitivity would be **High**.

Change in View

It would be theoretically possible to gain views to the Proposed Development, however, the large landform of the spoil heap blocks views of a large portion of the Site. There may be some views to the southern part of the Proposed Site, although there would be screening by the trees on the edge of the Site which would filter views. Trees would entirely screen views to the Site on the northern side of the spoil heap.

There would be a minor change in the view from this viewpoint. Receptors may perceive the addition of the Proposed Development but it would not form a noticeable new feature within the view.

The Magnitude of Impact would be **Low**.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	Low	Moderate

5.4.110 **Viewpoint 15** – See Figure 5.15:

Viewpoint 15 – Raven Walk long-distance walking route

Existing View

This viewpoint was taken from the PRoW which forms part of the Raven Walk long-distance route. It was taken at the highest point of the route as it passes over Mynydd y Lan and faces northeast towards the Site. It is representative of recreational users along this section of the route. The viewpoint is also within the Mynyddislwyn SLA.

The open views gained from this section of the route are for a short section of the overall route as it passes over this open section of ground on the hill top. Further to the west the footpath is contained by walls and vegetation, and further east, the elevation lowers quickly and moves into woodland. The Mynyddislwyn Solar Farm is just over the boundary wall to the south of the viewpoint. Other solar farms are visible in the view to the north, one of which can be seen at the far-left edge of the photograph.

Beyond the foreground of the view which looks over the gently undulating, open pasture fields there are panoramic, open views to the west, north and east from this vantage point. The view itself covers only a

Viewpoint 15 – Raven Walk long-distance walking route
portion of the overall views. The Proposed Site is located on the far side of the valley in the right-centre of the view (the Twyn-y-ganol spoil heap of the former Celynen colliery is in shadow in the direction of the Site). Some of the farm buildings of Cil Lonydd farm can be made out, albeit it at a significant distance from the viewpoint. Recreational receptors in this location would be of **High** sensitivity to changes in view.
Change in View There are possible views to a large part of the Proposed Development from this viewpoint. The Proposed Site is sloped slightly towards the viewpoint, which slightly increases the amount of the Site which may be visible. While some of the fields with proposed solar panels are visible, a large portion of the Proposed Development would be screened by the trees within and on the edges of the Site. There would be views to the Proposed Development to either side of the existing built form at Cil Lonydd farm, and these would change from green fields to fields with rows of solar panels. The changes in the view are at a large separation distance from this viewpoint and form a small part of the wider panoramic views. Due to these factors and the short duration for which this view is possible, the Magnitude of Impact would be **Low**.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Recreational	High	Low	Moderate

5.4.111 **Viewpoint 16** – See Figure 5.16:

Viewpoint 16 – Junction of Linden Court and Old Pant Road, Pantside
Existing View This viewpoint represents views from the Pantside housing estate and is therefore representative of residential receptors. The view faces southeast and looks over the steep-sided, upper valley to the upland pasture fields of the Site. Plantations of the valley side have recently been felled as seen in the photograph although the deciduous trees on the top of the hill have been left and form part of a dense patchwork of trees around the fields. Many of these large mature trees line the boundaries of the fields. The view is typical of views along this section of Old Pant Road and the dwellings along the south-east side of Pantside. The view to the Proposed Site is from a lower elevation and so the viewer looks up to the Site. The sensitivity of residential receptors here is **Medium**.
Change in View The northwestern portion of the Proposed Site would be visible from this viewpoint. The Proposed Development would be partially screened by the mature trees, although the solar panels would be visible between the gaps in the trees. Mitigation hedgerow planting along the existing lines of mature trees would help screen views of the panels from this viewpoint and would reduce the visibility of them significantly. There would be a noticeable change in the view, so the Magnitude of Impact would be **Medium**.

Visual Receptors	Sensitivity of Receptors	Magnitude of Impact	Degree of Significance
Residential	Medium	Medium	Moderate

Other Visual Receptors

Recreational Visual Receptors

5.4.112 Countryside Rights of Way (CRoW) – only really affects the CRoW land of Mynydd Maen immediately east of the Site. Represented by VP3, 5 & 7. Main track through CRoW land rising up Mynydd Maen is **Low** Magnitude of Impact, rising to **High** within approx. 500m east of the Site.

5.4.113 CRoW land at Cil Lonydd is **not affected** due to the severe slope facing north.

5.4.114 CRoW land to the north of the Site would mostly be screened by landform and trees, resulting in **no effect**.

5.4.115 The effect on CRoW land at Mynydd y Lan (represented in VP15) would be **Low** due to the separation distance.

5.4.116 Public Rights of Way (PRoW) - The 6 PRoWs which pass through or along the boundary of the Proposed Development are assessed in the Sequential Views section below and a represented by Viewpoints 2, 3 & 4. The remaining PRoWs within the Study Area are represented by several viewpoints including Viewpoints 1, 5, 6, 7, 8, 9, 10, 14 & 15.

5.4.117 There are three Long Distance Footpaths which are within the ZTV:

5.4.118 Ebbw Valley Walk, represented by VP 9, runs north to south to the west of the Site roughly along the line of the Ebbw River. In the southern part of the Study Area the route is within woodland and lower down the valley sides and there are no views to the Site. To the west of Treowen, where the route passes the Treowen solar farm, there are possible views to the Site, but these are not in the direction of travel and there are many trees which would mean that views would often be glimpsed between gaps in the trees. Further north, near Llanerch-uchaf (where the route is represented by VP9) there are views to a small portion of the Site but at an acute angle, looking up to the Site and with partial screening by trees which filter the view. The overall impact on the route is **Low**.

5.4.119 Taith Torafaen Anytime Challenge, represented by VP 3 & 6, passes directly past the Site. Views to the Proposed Development would generally be at a small separation distance and with intervening stone wall and vegetation partially screening from some parts of the route. The most open views to the Site would be near to VP3 where there would be a Medium Magnitude of Impact on the views of receptors. As the Magnitude of Impact along the rest of the route would be Low to Negligible, overall, there would be a **Low** Magnitude of Impact on the route as a whole.

5.4.120 Raven Walk, represented by VP 15, passes through the study are to the south of the Proposed Development. Only a short section of the route is within the ZTV and the worst-case views to the Site are represented in VP15. The impact on receptors is **Low**.

5.4.121 There would be no views of the Proposed Development from the National Cycle Network (NCN) as this is out of the ZTV and therefore there would be **no effect**.

Residential Visual Receptors

5.4.122 **Pantside** – Theoretically, there are views to the Site from the northern area of Pantside, north of Claremont Road. On the ground, the views are only possible from the eastern side of the estate along the northern most stretch of Old Pant Road (north of Willow Court) and even then, views are often screened by roadside trees to the east of Old Pant Road. There would be views to the Site from the windows of dwellings on Willow Court, Linden Court and possibly Glanshon Court. These views to the Site are represented by VP16. The view of the Site would be at an acute angle, looking up to the Proposed Development with partial tree screening. The Magnitude of Impact of the worst-case scenario views at Linden Court (VP16) would be **Medium**.

5.4.123 **Newbridge** – In the valley bottom and with the steep sided slopes of the valley there is little visibility to the Site on the top of the hill. From some of the western parts of Newbridge there may be some views to a small portion of the Proposed Development. These views may be from dwellings on roads which run in the direction of the Site, e.g. New Bryngwyn Road. The majority of residents' views would be screened by other buildings, trees, or by the aspect of the dwelling (the majority of houses in Newbridge have a southerly aspect). Any views to the Site would be at a very acute angle, and the trees on the western boundary of the Site would screen much of the view to the Proposed Development. The Magnitude of Impact would be **Negligible**.

5.4.124 **Treowen** (Represented by VP12) – Much of the dwellings of Treowen face eastwards towards the Site and are on a slope on the opposite side of the Ebbw Valley and so there would be views to the Proposed Development from many of the residences. Viewpoint 12 is representative of a typical view from Treowen and has a Low Magnitude of Impact due to the acute viewing angle to the Site, intervening screening from trees, and the fact that the settlement is at a lower elevation than the Proposed Development and so receptors would be looking up to the Site, which would mean it would take up a smaller portion of the vertical field of view. The Magnitude of Impact would be **Low**.

5.4.125 **Trinant / Pen-twyn** – Although this is within the ZTV, in reality views to the Site are limited due to the orientation of roads and the effects of screening by other dwellings and further to that the tree cover around the settlement which screens views to Site. The settlement is also at a separation distance of over 2.5km. The Magnitude of Impact would be **Negligible**.

5.4.126 **Croespenmaen** – **No effect** – there is a large separation distance to Site and views from the dwellings would mostly be screened by other built form.

5.4.127 Abercarn – **No effect** – This town is set in the bottom of the valley and is mostly out of the ZTV. Any views to the Site would be screened by the dense tree cover in the valley bottom.

5.4.128 Pontllanfraith – **No effect** – there is a large separation distance and views to the Proposed Development would be imperceptible, if even possible.

Road User Visual Receptors

5.4.129 A472 – between Crumlin and Pontypool – no effect. Between Newbridge and Pontllanfraith (when travelling east) there may be heavily filtered, glimpsed views of a very short duration. The Site is on the top of the hill, so receptors would be looking up at a small portion of the Site. There would be a **Negligible** change in the view.

5.4.130 B4251 – Travelling on Kendon Road eastwards from Croespenmaen, the ZTV shows that it is theoretically possible to see the Proposed Development. In reality, the road is either lined by buildings or trees and views along the route would **not be affected** by the Proposed Development.

Sequential Views

5.4.131 The following section assesses the sequential views of PRoWs within and around the Proposed Development as requested by the LPA.

Sequential View

Sequential View on PRoW (NWBG/RBW172/1)

5.4.132 The sequential view along **PRoW (NWBG/RBW172/1)** when walking from east to west, emerging from plantation there would be views as represented by VP3 with the Proposed Development on the other side of the stone wall and would result in a **Medium** Magnitude of Impact. Crossing the cattle grid and entering the Site, there would be a **High** Magnitude of Impact as the receptor would be travelling through a solar farm. There would be solar panels on either side of the receptor. The path slopes down towards the farm buildings of Cil Lonydd farm where the path becomes route NWBG/RBW172/2 and there is the representative VP4 which shows views looking back towards the east. On the west side of the farm the path is very poorly marked and difficult to find, however, there would be solar panels and therefore a **High** Magnitude of Impact within the field up to the next field boundary where the path changes to RBW 380/1. On the OS maps, the route continues to the west over the spoil heap, however, there are no marked paths here and access was not possible.

Sequential View on RBW173/1

5.4.133 This footpath connects eastwards from RBW172/1 (as assessed above). This route is within the dense plantation and therefore there would be a minor change in views, and only from the very western most parts of the route. **Low** Magnitude of Impact.

Sequential View on NWBG/RBW172/3

5.4.134 This route runs north to south along the western boundary of the Site. This route is not marked on OS maps. There would be views looking uphill to the Site on the receptors right-hand side when travelling north. There are wider views through the large mature trees to the northwest, on the viewers left, which are the principal views from this route. There would still be a **High** Magnitude of Impact on receptors travelling on this route.

Sequential View on ABEC/BR179/3

5.4.135 This bridleway enters the Site at the southern boundary and heads northwards towards Cil Lonydd Farm. Views of the Proposed Development would increase when travelling north along the path across the field to the south of the Site until the receptor was at the boundary of the Site and would therefore have uninterrupted views of the solar panels. The route then moves around the outside of the field which would have solar panels all along its eastern side to the junction with the east-west footpath (NWBG/RBW/172/1). There would be a **High** Magnitude of Impact for users of this route.

Sequential View on ABEC/BR179/4

5.4.136 The PRoW along Nant Hafod-fach within the woodland and the steep-sided gorge of the stream. Views of the site would be unlikely due to the dense tree cover. The quarry would also be on the receptors eastern side when on this route. There would be a **Negligible** Magnitude of Impact for much of the route, only along the final northern part of the route would there be a **Low** Magnitude of Impact where the Proposed Development would be visible.

Sequential View on NWBG/RBW/316/1

5.4.137 This route passes along the northern boundary of the Site. Along much of the route from the northeast corner of the site there are limited to no views of the Site due to a steep banking between the path and the Proposed Development. There may be views of any boundary fence which is part of the Development, even so, the Magnitude of Impact would be **Low**. Only in the western-most section, the path emerges from the plantation and there would be open views of the solar panels on the southern side. There are long-distance views to the west and north which draw the eye, however, there would still be a **High** Magnitude of Impact on this short final section of the route.

Sequential View on NWBG/RBW171/1

5.4.138 This route passes along the local unnamed road to the east of the Site. At approximately its closest point to the Site, the route is represented by VP3. The road is further represented to the north by VP6 and to the south by VP1. Views from the road to the Proposed Development would be possible, however, the intervening coniferous trees (to the north), the stone walls (in the central section – near VP3) and the separation between the route and the Proposed Development to the south reduce the visibility of the Proposed Development. Whilst a receptor along this route would notice a change in views, the views of the Proposed Development would be partially screened along some sections, furthermore, the Site falls away to the west, away from the receptor, therefore there would be a **Medium** Magnitude of Impact for approximately 1km of this route.

Visual Amenity Assessment Summary

5.4.139 The Proposed Development would consist of rows of solar panels on metal frames. The rows would vary in height with the south-facing panels at 2.8m height in east-west oriented rows and the east-west-facing panels at 1.4m height in north-south oriented rows. There would also be inverters at 1.5m height spread evenly across the Site and the battery compound would appear as rows of shipping-container sized (2.3m height) units in the centre-west of the Site.

5.4.140 The short-term temporary nature of the construction activities on the views of visual receptors would ensure that the overall visual effects would be **Low**.

5.4.141 The visual assessment identified key viewpoints within the study area, in consultation with the LPA. The Magnitudes of Impact range between **Negligible** to **High** and Degrees of Significance range between **Negligible** to **Major**.

5.4.142 Viewpoints with a Degree of Significance assessed as Major are Viewpoints 2, 4 and 6.

5.4.143 Visual receptors who may see the Proposed Development include residents, recreational users and road users.

5.4.144 There would be sequential views of the Proposed Development from the Public Rights of Way within and around the Proposed Site. There would be varying views of the Proposed Development from these routes which would further vary along each route. The Magnitudes of Impact on these various routes ranges from **Low** to **High**.

5.4.145 The overall visual effects of the Proposed Development would be very noticeable from some viewpoints and routes in close proximity to the Site. The visual effects of the Proposed Development would diminish with distance from the Site as well as with intervening screening effects of landform and vegetation which limit views to the Site depending on the viewing angle.

5.5 Cumulative Landscape and Visual Assessment

Cumulative Landscape and Visual Assessment Methodology

5.5.1 Cumulative impacts are those which occur as a result of the construction of more than one solar farms in an area. The nature of these effects relates to the number of solar farms, scale, the landscape context and the inter-relationship between the visual envelopes of the developments.

5.5.2 The assessment of cumulative impacts is an evaluation of the additional change and effect that the proposed development would have on a theoretical baseline position which assumes that all other existing, consented and application solar farms have been constructed.

5.5.3 The Caerphilly County Borough Council EIA Scoping Opinion for DNS report (Ref: EIASCO/23/0001) outlines a cumulative study area of 6km from the Proposed Development.

5.5.4 Further to this, it was requested that the cumulative assessment should include all existing identified solar and wind energy infrastructure schemes, as well as those for which planning applications have been submitted.

5.5.5 This cumulative assessment considers two scenarios to reflect the different nature of various cumulative schemes:

5.5.6 Scenario 1 - assumes a baseline including all operational, approved (as yet unbuilt) and in-planning solar energy schemes within the study area; and

5.5.7 Scenario 2 - assumes a baseline including all operational, approved (as yet unbuilt) and in-planning solar and wind energy schemes within the study area.

5.5.8 The 'Pre-Application' schemes Mynydd Maen Wind Farm and Trecelyn Wind Farm have been included in the Scenario 2 assessments in the following sections. It should be noted that as these developments are in the early stages and there is a large scope for the locations and layouts of these projects to change. Therefore, while the assessment has been undertaken with the latest information available, if the layout of these developments changes, or if they do not go ahead, the judgements of cumulative effects for Scenario 2 would need to be reassessed.

5.5.9 The cumulative plan – Figure 5.24 shows the locations of other development in the vicinity of the Proposed Development.

Other Solar Farms/Wind Energy Infrastructure

Other Solar Farm Sites

- Treowen Solar Farm (W) – on the opposite side of the valley to the Site.
- Pen-y-Fan Solar Farm (NW) – distant and only visible in views south and east of the Site.
- Pen-y-Fan Caravan Park Solar Farm (NW) – distant and only visible in views south and east of the Site.

- Mynyddislwyn (SW) – not seen with this in views, but this solar farm is perceived from VP15 as the VP is taken from the corner of the solar farm.

Other Renewable Energy Sites

Pre-Application

- Mynydd Maen Wind Farm – Large wind farm on the top of Mynydd Maen east of the Proposed Development. Approximately 2km away from the Site at its nearest point. This separation distance helps to keep the elements separate perceptually despite sharing the larger landform of the Mynydd Maen uplands.
- Trecelyn Wind Farm – immediately adjacent to the Site.

In Planning

- Llanhilleth Wind Farm
- Mynydd Carn-y-cefn Wind Farm

Operational

- Coed y Gilfach Wind Turbines
- Oakdale Business Park wind Turbines
- Pen-y-Fan Industrial Estate Wind Turbine
- Pen-y-Fan Leisure Park
- Pen-y-Fan Ganol Farm

Cumulative Effects on Landscape Character

5.5.10 **Scenario 1** - In this scenario, it is assumed that in the cumulative baseline includes operational, approved (as yet unbuilt) and in-planning solar energy schemes within the study area.

5.5.11 Within the 6km study area there are six solar farms, two of which have been scoped out due to no inter-visibility or association with the Proposed Site. The remaining four solar farms are located to the west of the Proposed Site and lie on the uplands of the western side of the Ebbw valley. The Pen-y-Fan Caravan Park and Pen-y-Fan solar farms are situated very close to each other.

5.5.12 The cumulative effect of the addition of the Proposed Development within the landscape character type 37 throughout the study area would be the combined effects of the Proposal together with this assumed cumulative baseline.

5.5.13 The Proposed Site would be the first solar energy development on the uplands of the eastern Ebbw valley.

5.5.14 The extremely undulating nature of the landform in the study area together with the extensive tree coverage across most of the area means that there is often very limited intervisibility between the existing solar farms. It is only from clear vantage points on the uplands where there are views of one or more. The result is that there is a sense that this landscape is utilised for its suitability to solar energy developments, however, there is no perception of this being an area dominated by solar energy developments.

5.5.15 The addition of the Proposed Development would add another solar energy element into the landscape but due to its separation (over 2km) from the nearest solar farm which lies on the opposite side of the valley and due to the limited intervisibility between the solar farms, there would be **Negligible** cumulative effect on the Landscape Character.

5.5.16 **Scenario 2** - In this scenario, the addition of wind energy developments which are operational, approved (as yet unbuilt) and in-planning are included within the cumulative baseline.

5.5.17 At the time of writing, there are 8 wind turbines within the 6km study area, of a relatively low height and are situated in the north and western parts of the study area. Their presence is noticed from some upland vantage points within the area, however, they do not form a noticeable feature. The introduction of the proposed turbines at Llanhilleth wind farm in the north, and the Trecelyn and Mynydd Maen pre-application wind farms would more dramatically effect the existing cumulative baseline.

5.5.18 The introduction of those turbines would bring the wind energy developments which are more common in the western part of the Landscape Character Area 37 – South Wales Valleys to this part of the character area. The proposed siting of these wind farms would be on the uplands, mirroring the existing character in the west.

5.5.19 Therefore, the cumulative baseline including the solar farms, would be the noticeable presence, from upland areas, of renewable energy developments within the study area. The developments would be set far apart and so they would not dominate.

5.5.20 The addition of the Proposed Development into this cumulative baseline would have some additional effects in the vicinity of the Site due to the presence of the Trecelyn wind farm, which would be in close proximity to the Proposed Site. However, within the study area, there would be a **Negligible** cumulative effect due to the Proposed Development.

Cumulative Visual Amenity Assessment

5.5.21 This section addresses issues relating to potential cumulative effect upon the visual amenity of the study area likely to result from the Proposed Development. It describes and evaluates the potential change in views of the existing landscape once in operation, and the extent to which these affect residents, visitors and users of the landscape.

5.5.22 For this Cumulative Visual Amenity Assessment, the viewpoints have been grouped based on their similarity of location, angle of views to the site and the cumulative baseline visible from the Viewpoint. Within these groupings of viewpoints, the cumulative effects are taken to be the same.

5.5.23 The viewpoint groupings are as follows:

- VPs 1-4 – In close proximity to the Site and facing north to northwest;
- VPs 6&7 – Within the CRoW access land close to the Site and facing southwest;
- VPs 8&9 – Distant views from the north looking south to the Site;
- VPs 10-13 – All at a similar distance from the Site facing generally eastwards;
- VPs 14&15 – From the Mynyddislwyn SLA, both looking northeast;
- VPs 5&16 – Generally similar views from within 1km of the Site and looking southwards.

Assessment of Effects

5.5.24 **VPs 1-4** – Views generally relatively enclosed with no views to other cumulative solar sites. Some views through trees on site to turbines at Pen-y-fan and in that direction. The presence of the proposed wind farms of Trecelyn and Mynydd Maen would be dominant new features from these viewpoints and the addition of the Proposed Development would account for a noticeable further increase in renewable energy development. Scenario 1 - **Low** Cumulative Magnitude of Impact. Scenario 2 - **Medium** Cumulative Magnitude of Impact.

5.5.25 **VPs 6-7** – Views overlooking the site with wider views beyond. There would be views to Treowen solar farm and some turbines in distance. Not an existing sense of too much solar, or renewables. Proposed Development would noticeably increase the number of solar developments in the view

and a receptor may begin to notice a pattern of solar farms within the landscape. Scenario 1 - **Medium** Cumulative Magnitude of Impact. Scenario 2 - **Medium** Cumulative Magnitude of Impact.

5.5.26 **VPs 8-9** – No noticeable solar farms within the wider views of VP8, and no other solar visible from VP9. Proposed turbines behind the proposal would potentially give a context for the solar farm. The addition of the proposed wind farms near to the Proposed Site would be a new feature within the views, however, these views are not affected by the Proposed Development. Scenario 1 - **Negligible** Cumulative Magnitude of Impact. Scenario 2 – **Negligible** Cumulative Magnitude of Impact.

5.5.27 **VPs 10-13** – Views generally facing to the east from elevated ground on the far side of the Ebbw Valley. The views of the Proposed Development are at an acute angle due to the Site being at a higher elevation. Views don't include other solar farms, despite Treowen solar farm being on the viewpoint side of the valley. The Trecelyn and Mynydd Maen wind farms would be a prominent new element in the view on the top of the landform, however, due to the difference in the visual nature of the developments, the wind farms and the Proposed Development would appear as separate elements in the view. Scenario 1 - **Negligible** Cumulative Magnitude of Impact. Scenario 2 - **Negligible** Cumulative Magnitude of Impact.

5.5.28 **VPs 14-15** – Looking northeast from southwest of the Site. Again, the views are from lower elevations and there is a large separation distance and so views of the Proposed Development are at an acute angle, diminishing the vertical field of view taken up by the Proposed Development in the view. VP14 has no views of other solar farms. VP15 is open and has panoramic views with some distant views to Treowen and Pen-Y-Fan solar farms. The Proposed Development would be on the far side of the valley to the viewpoint and the existing solar farms. While there would be a perceived increase in the number of solar farms, it would be noticeable but not overwhelming. Mynyddislwyn solar farm is directly behind VP15. The proposed Wind Farms at Mynydd Maen and Trecelyn would be a prominent new feature on the top of Mynydd Maen, seen behind the Site. The Llanhilleth wind farm further to the north would extend the spread of turbines in the view but there would be a visual separation between the wind farm and the Proposed Development. Scenario 1 - **Low** Cumulative Magnitude of Impact. Scenario 2 - **Low** Cumulative Magnitude of Impact.

5.5.29 **VPs 5 & 16** – VP5 looks south and has some wider views over the valley to the west, while there are views to the Treowen solar farm, the views to the Site are limited due to tree cover and are in a different direction to the Treowen solar farm. VP16 looks southeast to the Site and there are no other solar farms visible from here. The proposed wind farms may be visible behind the Site. Scenario 1 - **Low** Cumulative Magnitude of Impact. Scenario 2 - **Low** Cumulative Magnitude of Impact.

Cumulative Sequential Views

5.5.30 An assessment of the sequential cumulative views of the Proposed Development with existing solar farms and other renewable energy infrastructure within the study area has been requested by the LPA.

5.5.31 There are three Long Distance Footpaths within the ZTV:

Ebbw Valley Walk

5.5.32 Ebbw Valley Walk, represented by VP 9, runs north to south to the west of the Site roughly along the line of the Ebbw River. In the southern part of the Study Area the route is within woodland and lower down the valley sides and there are no views to the Site. To the west of Treowen, where the route passes the Treowen solar farm, there are possible views to the Site, but these are not in the direction of travel and there are many trees which would mean that views would often be glimpsed between gaps in the trees. Further north, near Llanerch-uchaf (where the route is represented by VP9) there are views to a small portion of the Site but at an acute angle, looking up to the Site and with partial screening by trees which filter the view.

5.5.33 **Scenario 1** - The aspect of the views from this route are generally to the east. Views of the Site are seldom possible. There would be some views of another solar farm as the route passes the Treowen Solar Farm, however, there would be no association with the Proposed Development from this solar farm as they would be in opposite directions. Otherwise, along the route while there may be a sense of the area hosting solar farms, there would not be a noticeable increase as a result of the Proposed Development. **Low** Cumulative Magnitude of Impact.

5.5.34 **Scenario 2** - Considering other renewable infrastructure, most notably wind turbines, the route passes through woodland and the landform shields many of the views to wind turbines. There may be an increasing sense of turbines in the landscape as the route moves further north (mostly out of the study area) where there are increasing numbers of wind turbines. The construction of the Mynydd Maen and Trecelyn wind farms on the landform above the Proposed Development would increase the renewable energy presence in the landscape, but views of many these would likely be screened by landform. There would be a **Low** Cumulative Magnitude of Impact on overall renewable energy sources along this route within the study area.

Taith Torafaen Anytime Challenge

5.5.35 Taith Torafaen Anytime Challenge, represented by VP 3 & 6, passes directly past the Site. This route passes over Mynyddislwyn and Mynydd Maen, passing the Site at close proximity along the local road to the east of the Site.

5.5.36 **Scenario 1** - Focussing on the impact on this route close to the Site, while there may be views to the Treowen solar farm, and possibly the more distant Pen-y-Fan solar farms, there is no real sense of solar farms as a feature within views of the wider landscape. The Proposed Development would slightly increase this sense, however, the proximity to the Site would mean that a receptor travelling along this route would mostly notice this solar farm in isolation rather than as part of the wider landscape. Therefore, there would be a **Low** cumulative Magnitude of Impact on the route.

5.5.37 **Scenario 2** - Considering other renewable energy developments, primarily wind turbines, it would be the proposed developments of the Trecelyn and Mynydd Maen wind farms which would have the most noticeable impact on views from this route. There are existing views to other wind turbines in the wider landscape from the uplands of Mynydd Maen, however, there is not a sense that this is a wind turbine/renewable energy landscape. The addition of the Trecelyn and Mynydd Maen wind farms might begin to lend a stronger sense of renewable energy in the area as they would be dominant features on Mynydd Maen. The Proposed Development would be seen within this slightly increased renewable energy baseline and with some views to other solar farms in the wider landscape, the Proposed Development would have a **Medium** Cumulative Magnitude of Impact.

Raven Walk

5.5.38 Raven Walk, represented by VP 15, passes through the study are to the south of the Proposed Development. Only a short section of the route is within the ZTV and the worst-case views to the Site are represented in VP15.

5.5.39 **Scenario 1** - Views to the Proposed Site would be limited, and so the only potential cumulative impact would be along the section of the route by VP15. From this vantage point, there is a sense of solar farms in the landscape (views of Treowen, Pen-y-fan and Pen-y-Fan Caravan Park Solar Farms), however, these do not have a strong presence within views. The addition of the Proposed Development would not noticeably increase the cumulative effect of solar farms within views. These views are for a short section of the overall route, and although other cumulative solar farms may be visible along other sections of the route, the separation distance along the route between the Proposed Development and the other solar farms would not increase any sense of solar farms in the landscape. **Low** Cumulative Magnitude of Impact.

5.5.40 **Scenario 2** - When considering all renewable energy schemes, the proposed developments of the Trecelyn and Mynydd Maen wind farms would have the greatest potential impact on views from

the Raven Walk route. Particularly from the upland stretch of the route near Mynyddislwyn. These proposed wind farms would somewhat increase the overall sense of renewable energy within the landscape, as additional wind turbines in an angle of the view which is currently without turbines. The Proposed Development at Cil Lonydd would be seen with these two wind farms as the backdrop. The attention of a receptor would likely be to notice an increase in wind energy within the landscape and the additional solar farm would not increase the overall sense of renewable energy further. **Low** Cumulative Magnitude of Impact.

The National Cycling Network

5.5.41 The National Cycling Network (NCN) cycling routes within the study area are all outside of the ZTV of the Proposed Development, meaning there would be no cumulative views of the Proposed Development with other renewable energy infrastructure in the study area. There is therefore no effect on the NCN routes.

Cumulative Assessment Summary

5.5.42 The cumulative effects on landscape character of the Proposed Development in combination with existing, approved and proposed solar and wind energy developments within the 6km study area has been assessed.

5.5.43 Two scenarios of cumulative effects were assessed where Scenario 1 assumed a baseline including all operational, approved (as yet unbuilt) and in-planning solar energy schemes and Scenario 2, further to scenario 1 includes all operational, approved (as yet unbuilt) and in-planning wind energy schemes within the study area.

5.5.44 For Scenario 1, the Proposed Development would be located in an uplands location, similar to the existing solar schemes. The Proposed Development would not noticeably increase the presence of solar energy within the study area. Therefore, there would be a **Negligible** cumulative effect on the landscape character.

5.5.45 For Scenario 2, the addition of the Proposed Development would have some additional effects in the vicinity of the Site due to the presence of the Trecelyn wind farm, which would be in close proximity to the Proposed Site. However, within the study area there would be a **Negligible** cumulative effect due to the Proposed Development.

5.5.46 For the cumulative visual amenity, the key viewpoints were assessed in relation to other renewable energy schemes in the area (as per Scenarios 1 and 2), with the Cumulative Magnitude of Impact ranging between **Negligible** to **Medium**.

5.5.47 There would not be any significant cumulative visual effect on visual amenity.

Mitigation Measures Adopted as Part of the Project

5.6.48 The landscape masterplan (See Figure 5.25) shows the planting of a number of trees and lengths of hedgerows. This has been prepared in conjunction with the project's ecologist to ensure that habitat creation particular to this site has been included.

5.6.49 The mitigation measures are the planting of indigenous trees and hedgerows. The proposed tree planting and hedgerow planting would integrate the Proposed Development into the landscape as well as provide screening.

5.6.50 The objective of the mitigation planting would be to reinforce the existing and historical character of the Site as well as screening views.

5.6.51 Existing mature trees were former Beech hedgerows which have been left unmanaged. This is a typical feature in the local landscape. There are other types of boundary treatments in the same character area (stone walls, managed hedgerows, post and wire fences, coniferous trees).

5.6.52 The existing tree canopies provide screening benefits for the Proposed Development from some views to the Site, but the nature of the trees offers less screening at a lower level. Therefore, managed hedgerows (approx. 1.5 – 2.0m in height) are proposed to provide the screening where it is required.

5.6.53 Along the eastern boundary, adjacent to the local road, replacing the existing post and wire fence with a stone wall would be preferrable, this would continue the existing character of the wall at the entrance to Cil Lonydd farm.

5.6.54 Hedgerow planting here would also provide screening if stone wall is not feasible.

5.6.55 If possible, the hedgerow planting could be managed to allow some Beech trees to grow as succession planting for the existing mature Beech trees across the site. This would help strengthen the existing character of the Site.

5.6.56 The tree planting and hedgerow planting would provide the following benefits and follow landscape character guidelines:

- Create habitats and extend wildlife links to existing habitats.
- Increase biodiversity.
- Provide additional screening effects to reduce visibility/
- Enhance the landscape character.
- Adhere to the landscape character guidelines.

Table 5.5.1: Summary of Likely Environmental Effects on Landscape and Visual Resources

Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Effect	Significant / Not significant	Notes
NLCA 37: South Wales Valleys	Medium	Negligible	**Negligible**	Not Significant	
NLCA 35: Cardiff, Barry and Newport	Medium	None	**No Effect**	Not Significant	
Site	Medium	High	**Moderate**	Significant	
Mynydd Llwyd and Mynydd Maen (CYNONVS214)	Medium	Medium to High	**Moderate**	Significant	
St Illtyd Plateau & Ebbw Eastern Sides	High	None	**No Effect**	Not Significant	
Mynyddislwyn	High	None	**No Effect**	Not Significant	
South-West Uplands	High	None	**No Effect**	Not Significant	
2.3 Abercarn	Medium	Medium	**Moderate**	Significant	
Bannau Brycheiniog (Brecon Beacons)	High	None	**No Effect**	Not Significant	
Wye Valley	High	None	**No Effect**	Not Significant	
Blaenavon Industrial Landscape	High	None	**No Effect**	Not Significant	
Newbridge	High	None	**No Effect**	Not Significant	

Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Effect	Significant / Not significant	Notes
Oakdale	High	None	**No Effect**	Not Significant	
250 – Charcoal Blast Furnace at Abercarn	High	None	**No Effect**	Not Significant	
269 – Pen Y Fan Canal Reservoir	High	None	**No Effect**	Not Significant	
Swffryd-ganol farm and barn range	High	Negligible	**Negligible**	Not Significant	
Pen-Y-Fan Pond	High	None	**No Effect**	Not Significant	
Mynydd Maen, East of Newbridge	High	Negligible	**Negligible**	Not Significant	
Gwydon Valley Woodlands, Abercarn	High	Negligible	**Negligible**	Not Significant	
Coed Cil-Lonydd, East of Newbridge	High	Negligible	**Negligible**	Not Significant	
Cwm Hafod-Fach Woodlands, North of Abercarn	High	Negligible	**Negligible**	Not Significant	
Coed Prysg - Ancient Semi Natural Woodland	High	Negligible	**Negligible**	Not Significant	
Coed Cil-lonydd - Ancient Semi Natural Woodland	High	None	**No Effect**	Not Significant	
Coed Cil-lonydd - Plantation on Ancient Woodland Site	High	None	**No Effect**	Not Significant	
Coed Cil-lonydd - Restored Ancient Woodland Site	High	None	**No Effect**	Not Significant	
VP1: Local road south of Site, just north of Glan	Medium	Low	**Minor**	Not Significant	Road Users

Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Effect	Significant / Not significant	Notes
Shôn Farm (PRoW ABEC/FP333/1)	High	Medium	**Moderate**	Significant	Recreational
VP2: Public Right of Way immediately south of Site (PRoW ABEC/BR179/3)	High	High	**Major**	Significant	Recreational
VP3: Public Right of Way (Restricted Byway) at the junction with unnamed local road (PRoW NWBG/RBW172/1)	High	Medium	**Moderate**	Significant	Recreational
VP4: Public Right of Way adjacent to Cil Lonydd Farm (PRoW NWBG/RBW172/2)	High	High	**Major**	Significant	Recreational
VP5: Junction of Public Right of Way and local road to the north of the Site (PRoW NWBG/RBW160/1)	High	Low	**Minor**	Not Significant	Recreational
VP6: Public Right of Way northeast of the Site (PRoW NWBG/FP365/1)	High	High	**Major**	Significant	Recreational
VP7: Public Right of Way route to peak of Mynydd Maen, northeast of the Site (PRoW CRUM/FP163/1)	High	Low	**Moderate**	Significant	Recreational
VP8: Public Right of Way near to Hafod-arthen (PRoW FP 337 36/1)	High	Negligible	**Minor**	Not signific Significant	Recreational
VP9: Public Right of Way just southeast of Llanerch-uchaf (PRoW CRUM/BR44/1)	Medium	Negligible	**Minor**	Not Significant	Recreational

Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Effect	Significant / Not significant	Notes
VP10: Public Route east of Pen-Y-Fan Industrial Estate (PRoW CRUM/FP92/1)	Medium	Low	**Minor**	Not Significant	Recreational
VP11: Layby off Pentwyn Road near junction with Load of Hay Road	Medium	Low	**Minor**	Not Significant	Road Users
VP12: Park just off Royal Crescent in Treowen	High	Low	**Minor**	Not Significant	Residential
	High	Low	**Minor**	Not Significant	Recreational
VP13: Local road between Croespenmaen and Pentwyn-mawr	Medium	Negligible	**Negligible**	Not Significant	Road Users
VP14: Public Right of Way south of Pennar-ganol Farm (PRoW NWBG/FP262/2)	High	Low	**Moderate**	Significant	Recreational
VP15: Raven Walk long-distance walking route (PRoW ABEC/FP89/1)	High	Low	**Moderate**	Significant	Recreational
VP16: Junction of Linden Court and Old Pant Road, Pantside	Medium	Medium	**Moderate**	Significant	Residential
Mynydd Maen	High	Low to High (close to site)	**Minor to Major**	Not Significant to Significant	Recreational
Cil Lonydd	High	None	**No Effect**	Not Significant	Recreational
North of Site	High	None	**No Effect**	Not Significant	Recreational
Ebbw Valley Walk	High	Low	**Minor**	Not Significant	Recreational

Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Effect	Significant / Not significant	Notes
Taith Torafaen Anytime Challenge	High	Low	**Minor**	Not Significant	Recreational
Raven Walk	High	Low	**Minor**	Not Significant	Recreational
NCN 466	High	None	**No Effect**	Not Significant	Recreational
Pantside	Medium	Medium	**Moderate**	Significant	Residential
Newbridge	Medium	Negligible	**Negligible**	Not Significant	Residential
Treowen	High	Low	**Minor**	Not Significant	Residential
Trinant/Pen-twyn	Medium	Negligible	**Negligible**	Not Significant	Residential
Croespenmaen	Medium	None	**No Effect**	Not Significant	Residential
Abercarn	Medium	None	**No Effect**	Not Significant	Residential
Pontllanfraith	Medium	None	**No Effect**	Not Significant	Residential
A472	Low	Negligible	**Negligible**	Not Significant	Road Users
B4251	Low	None	**No Effect**	Not Significant	Road Users
NWBG/RBW172/1	High	Medium to High	**Moderate to Major**	Significant	Recreational
NWBG/RBW173/1	High	Low	**Minor**	Not Significant	Recreational
NWBG/RBW172/3	High	High	**Major**	Significant	Recreational
ABEC/BR179/3	High	Low to High	**Minor to Major**	Significant	Recreational

Receptor	Sensitivity of Receptor	Magnitude of Impact	Significance of Effect	Significant / Not significant	Notes
ABEC/BR179/4	High	Negligible to Low	**Minor**	Not Significant	Recreational
NWBG/RBW/316/1	High	Low to High	**Minor to Major**	Significant	Recreational
NWBG/RBW171/1	High	Low to Medium	**Minor to Moderate**	Significant	Recreational

References

Caerphilly County Borough Council – 'Designation of Visually Important Local Landscapes' (April 2008)

DataMapWales - New map | DataMapWales (gov.wales)

Caerphilly Visually Important Local Landscape LDP Appendices: APPENDIX 2: VISUALLY IMPORTANT LOCAL LANDSCAPES (opus3.co.uk) Map: Map: LDP Proposals Map (opus3.co.uk)

Wind Turbine Development Landscape Sensitivity and Capacity Study, Caerphilly County Borough (2015).

Landmap Portal (naturalresources.wales) LANDMAP – Visual and Sensory Aspect Area.

Planning guidance for the development of large-scale ground mounted solar PV systems. – BRE

Landscape Sensitivity and Capacity Assessment in relation to on-shore wind and solar photo-voltaic developments – Natural Resources Wales (2018)

Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA) (Landscape Institute and Institute of Environmental Management & Assessment, 2013);

An Approach to Landscape Character Assessment, Natural England (2014);

Planning Policy Wales LANDMAP Guidance Note 1: LANDMAP and Special Landscape Areas (2016);

Planning Policy Wales LANDMAP Guidance Note 3: (2013): and

Technical Guidance Note 06/19, Visual Representation of Development Proposals (Landscape Institute, September 2019).

6 BIODIVERSITY

6.1 Introduction

6.1.1 This chapter considers the likely significant effects on ecology associated with the construction, operation and decommissioning of the Proposed Development. The specific objectives of the chapter are to:

- describe the ecological baseline,
- describe the assessment methodology and significant criteria used in completing the impact assessment,
- describe the potential effects, including direct, indirect, and cumulative effects, and
- assess the residual effects remaining following the implementation of mitigation.

6.1.2 The assessment has been undertaken by BSG Ecology

6.1.3 The chapter is supported by:

- Appendix 6.1: Cil-lonydd Solar Farm - Baseline Report,
- Appendix 6.2: Summaries of Relevant Policy, Legislation and Other Instruments,
- Appendix 6.3: Breeding Bird Survey Results,
- Appendix 6.4: Habitat Suitability Index Results,
- Appendix 6.5: eDNA Survey Results,
- Appendix 6.6: Supplementary Great Crested Newt Survey Results, and
- Appendix 6.7: Biodiversity Enhancement Measures to be applied as part of the Proposed Development.

6.1.4 Figures 6.1 to 6.4 are referenced in the text where relevant.

Legislation and Planning Policy Framework

Legislation and Policy

6.1.5 There are a number of national, regional and local policies and guidance documents that relate to nature conservation and ecology within the planning process that are relevant to the Proposed Development. Reference to these provides an indication of the likely requirements and expectations of statutory authorities and others in relation to planning applications and nature conservation and ecology within a given area. There are also legislative requirements of new development. The relevant national, regional, and local planning policies for the proposed development are listed below (see Appendix 6.1 for further detail).

- Planning Policy Wales (Edition 12, February 2024),
- Technical Advice Note (TAN) 5 Nature Conservation and Planning (2009).
- The Environment (Wales) Act (2016).
- The Conservation of Habitats and Species Regulations (2017) as amended.
- The Wildlife and Countryside Act (1981) as amended.
- Relevant policies (including CW4-6) of the Caerphilly County Borough Local Development Plan (2010).

- The Greater Gwent Nature Recovery Plan (2022).
- The Caerphilly Biodiversity Action Plan (2002)

Guidance

6.1.6 This chapter has been based principally on relevant parts of the 2018 (partially updated 2022) Guidelines for Ecological Impact Assessment in the United Kingdom developed by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

Assessment Methodology

6.1.7 The evaluation and assessment within this report has been undertaken with reference to relevant parts of the Guidelines for Ecological Impact Assessment published by CIEEM (2019). Although this is recognised as current best practice for ecological assessment, the guidance itself acknowledges that it is not a prescription about exactly how to undertake an ecological impact assessment; rather, it aims to “provide guidance to practitioners for refining their own methodologies”.

Important Ecological Features

6.1.8 A first step in EcIA is determination of which ecological features (habitats, species, ecosystems, and their functions / processes) are important. Important features should then be subject to detailed assessment if they are likely to be affected by the Proposed Development. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened, and resilient to project effects, such that there is no risk to their viability.

6.1.9 Ecological features can be important for a variety of reasons and the rationale used to identify these is explained below. Importance may relate, for example, to the quality or extent of designated sites or habitats, to habitat / species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline.

Evaluation: Determining Importance

6.1.10 The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this report:

- International (European),
- National (United Kingdom).
- Country (Wales),
- Regional (South Wales),
- County (Caerphilly),
- Local (Ward – Newbridge),
- Site (the redline boundary).

6.1.11 Taking into account the CIEEM guidance, features of less than Local importance are generally considered unlikely to trigger a mitigation or policy response in EcIA terms. However, where it is helpful to characterise and evaluate features within the Site, this assessment approach also uses the term “Site importance”. This includes features which are assessed to be of value only in the context of the location of the Proposed Development. Features of Site importance is typically unlikely to require further assessment for the reasons set out above.

Significance Criteria

6.1.12 The assessment of significance process involves:

- Identifying and characterising significant effects.
- Incorporating measures to avoid and mitigate (reduce) these significant effects.
- Assessing the significance of any residual effects after mitigation.
- Identifying appropriate compensation measures to offset significant residual effects.
- Identifying opportunities for ecological enhancement.

6.1.13 It is only necessary to assess and report significant residual effects (those that remain after mitigation measures have been taken into account). However, it is good practice for the EcIA to make clear both the potential significant effects without mitigation and the residual significant effects following mitigation. This process of assessment without mitigation helps to identify necessary and relevant mitigation measures that are proportionate to the size, nature, and scale of anticipated effects.

6.1.14 The assessment only needs to describe those characteristics of effects that are relevant to understanding the ecological effect and determining its significance. It should consider, as appropriate: direct, indirect, secondary, and cumulative effects and whether these are short, medium, long-term, permanent, temporary, reversible and / or irreversible. In this report, positive effects are referred to as beneficial, negative effects as adverse. The assessment of significant effects then considers the baseline conditions to describe how the baseline conditions will change as a result of the project and associated activities.

Significant effects

6.1.15 The CIEEM guidance sets out information about the concept of ecological significance and how it relates to the ability to deliver biodiversity conservation objectives for a given feature.

6.1.16 Significant effects are qualified with reference to an appropriate geographic scale, and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

6.1.17 The nature of the identified significant effects on each assessed feature is characterised. This is considered, along with available research, professional judgement about the sensitivity of the feature affected, and professional judgement about how the significant effect is likely to affect the site, habitat, or population's structure and continued function. Where it is concluded that an effect would be likely to reduce the importance of an assessed feature, it is described as significant. The degree of significance of the effect takes into account the geographic context of the feature's importance and the degree to which its interest is judged to be affected.

Mitigation

6.1.18 Where significant effects have been identified, the mitigation hierarchy has been taken into account, as suggested in the CIEEM EcIA Guidelines, which sets out a sequential approach of avoiding significant effects where possible; applying mitigation measures to minimise unavoidable significant effects and then compensating for any remaining significant effects. Once avoidance and mitigation measures, and any necessary compensation measures, have been applied, and opportunities for enhancement incorporated, residual significant effects have then been identified. This approach is reflected across UK planning policy at a country level.

6.1.19 Where mitigation and compensation has been proposed, this is proportionate with the geographical scale at which an effect is significant. “For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved” (CIEEM, 2018, Paragraph 5.28).

Consultation

6.1.20 An application to the Planning and Environment Decisions Wales (PEDW) for an EIA scoping direction was made on 10 August 2023. Error! Reference source not found. Table 6.1 summarises the consultation responses received in relation to biodiversity.

Table 6.1: Consultation

Consultee	Summary of comments	Response
Erica Dixon Caerphilly County Borough Ecologist	Welcome the survey information to date and support recommendations for further reptiles and hedgehog survey and avoidance / mitigation. We suggest the final application also includes consideration of reptiles and hedgehog.	Comments noted and consideration is given to reptiles and hedgehogs in this assessment.
Natural Resources Wales	Agree with the conclusion of the Scoping Report (RPS Group, 2023) that there are unlikely to be significant effects on designated sites. Noted there are ancient semi-natural woodland close to the development Site and that the applicant should consider how any adverse impact to these habitats will be avoided.	Consideration is given to Ancient Woodland Sites in this assessment.
Natural Resources Wales	Noted the presence of great crested newt *Triturus cristatus* within ponds 3 and 4 as referenced within the Scoping Report (BSG Ecology, 2023). Where impacts to great crested newt are anticipated we advise the application include a great crested newt Conservation Plan setting out anticipated impacts and all mitigation /	A recommendation to include a great crested newt Conservation Plan as part of a conditioned Construction Environmental Management Plan (CEMP) has been made.

Consultee	Summary of comments	Response
	compensations measures that will be put in place.	
Natural Resources Wales	Noted the potential for bats in trees on Site as referenced within the Ecology section of the Scoping Report (RPS Group, 2023). Should trees require felling or management works, a preliminary bat roost inspection should be undertaken, with climbing inspections of moderate to high potential trees. Should roosts be confirmed and assessment of impacts and proposals to mitigate / compensate should be provided. Where impacts to bats are anticipated we advised the application include a Bat Conservation Plan setting out anticipated impacts and all mitigation / compensations measures that will be put in place.	The Proposed Development will retain mature trees which may offer potential roosting features for bats, with mitigation recommendations to avoid any residual impact to bat roosts on, or adjacent to Site (if present), to be included within a conditioned CEMP.
Natural Resources Wales	Note the comments regarding dormouse referenced within the Scoping Report (RPS Group, 2023). We welcome the intention to retain trees and boundary hedgerows and vegetation removal limited to widening of existing access points. We advise that a method statement is prepared for any minor works that will impact suitable dormouse habitat.	Suitable habitat to support hazel dormouse is limited to woodland bordering the Proposed Development. The Proposed Development will retain such features, with appropriate buffers to further reduce potential impacts. Residual impacts will be mitigated for with measures described within a conditioned CEMP.
Natural Resources Wales	Evaluation of the scheme should include direct and indirect; cumulative, short, medium, and long-term; permanent and temporary; positive and negative; construction, operational and decommissioning / post operational and impacts on long term security of the nature conservation resource.	The evaluation and assessment within this report is based on current best practice guidance for ecological assessment (CIEEM, 2019) guidance which addressed these elements. The Proposed Development will deliver Biodiversity Net Benefit in accordance with current policy requirements, through securing immediate and long-term, measurable, and demonstrable benefit on Site.

Consultee	Summary of comments	Response

6.2 Baseline Conditions

Site Description

6.2.1 The Proposed Development is located in upland enclosed farmland / grazing pasture (sheep, cattle and horse grazed), with stock proof fencing and mature trees demarcating field boundaries. The cable route extends, following the edge of a conifer plantation across upland heathland within Mynydd Maen common, before terminating at a substation associated with the proposed wind farm development (Mynydd Maen windfarm – ref. DNS/3276725, PEDW 2022). The approximate central point of the Site is at Ordnance Survey Grid Reference (OSGR) ST 22856 97352. The Site boundary is shown on Figure 2a - c. Areas of woodland border the northern and part of the southern Site boundaries, and acid grassland associated with Mynydd Maen Common extends off-Site to the east.

6.2.2 The surrounding landscape comprises the acid grassland / dry heathland expanse of common land to the east, and enclosed pastureland to the west. Areas of mature conifer plantation woodland are present to the north and south, and Hafod Quarry (asphalt and aggregates) is immediately south of the Site. There are several ponds within the wider surrounding area, the majority of which are located within Mynydd Maen Common. The closest urban / sub-urban area is Newbridge town, located approximately 850 m from the Site.

Method

6.2.3 The approach to understanding the baseline scenario had two parts, a desk study, and a series of field surveys.

Desk Study

6.2.4 To inform the baseline, a desk study was completed. This involved accessing data from a number of sources as detailed in Table 6.2. The search areas used have been adopted with reference to desk study data search area guidance published by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2017). These distances define the extent of a precautionary zone of influence based on the likely scope and nature of the Proposed Development.

Table 6.2: Desk Study Data Sources

Data source	Date most recently accessed /Notes received	
MAGIC (www.magic.defra.gov.uk)	Accessed March 2024.	European and national statutory designated sites of nature conservation interest (within 2 km of the Site). Ponds within 250 m of the Site. Priority habitats (on the Site).

Data source	Date most recently accessed / received	Notes
Google Earth Pro (7.3.4.8248 (64-bit))	Accessed March 2024	A search was made for ponds within 250 m of the Site and for other habitats / features within the surrounding landscape.
Ordance Survey maps (https://explore.osmaps.com)	Accessed March 2024	A search was made for ponds within 250 m of the Site and for other features within the surrounding landscape.
South East Wales Biodiversity Records Centre (SEWBReC)	Updated on 27 March 2024.	Records on non-statutory designated sites and existing protected / notable and non-native invasive species records.
Mynydd Maen Windfarm - DNS application (https://www.mynyddmaen-windfarm.co.uk/dns-application/)	Accessed March 2024.	The desk study also included a review of ecological survey information used to inform a neighbouring Mynydd Maen Windfarm application (an eighteen-turbine development located within Mynydd Maen common). Mynydd Maen Wind Farm is a Development of National Significance (DNS) application which is currently in Pre-application Consultation with PEDW. Documentation to support his application is available via their website and has been referenced where applicable.

Field Survey

6.2.5 The field surveys comprised of those aimed at habitats; those identifying conditions or features suitable for, or signs of the presence of, protected species; and specific protected species surveys.

6.2.6 The field surveys extended to the Site, and a 25 m buffer either side of the cable route (collectively referred to as the 'Survey Area'), with the exception of great crested newt survey which extended to ponds within 250 m of the Site boundary.

6.2.7 A brief description of the methods adopted is described below and further details on the method of these surveys are provided in Appendix 6.1.

Extended Phase 1 habitat survey

6.2.8 A Phase 1 survey of the Site (not including the cable route) was completed on 26 July 2023, and the cable route (including the buffer) on 27 March 2024. The survey method was based on industry standard guidance (JNCC, 2010). Habitats present within the Survey Area were identified and mapped, with any features of ecological interest recorded as 'target notes'. The survey was 'extended' to include an assessment of the potential of the Survey Area to support protected or otherwise notable species (IEA, 1995) e.g., badger Meles meles and hazel dormouse Muscardinus avellanarius.

National Vegetation Classification (NVC)

6.2.9 To provide more detailed habitat information and determine the quality of marshy grassland habitats within the Site (adjacent locally designated sites – this area is on the Western Fringe of Mynydd Maen Common and is similar to that area in terms of general character) surveyors assigned the habitat to plant communities within the National Vegetation Classification (NVC) (Rodwell 1991) with refence to the Domin scale of cover / abundance (Rodwell, 2006). Plant communities were assigned based on the experience of the surveyors, and with reference to the community descriptions and keys provided. Where habitat differed from or fell between such communities, the vegetation was described with reference to the plant communities of the NVC.

Limitations to habitat survey

6.2.10 The Phase 1 survey of the cable route was completed outside the optimal window for habitat surveys (April to October, inclusive) and may have missed some later flowering species. However, the information gathered is considered sufficient to determine the broad habitat types and for the purposes of this assessment and is consistent with the detailed habitat survey(s) of the adjacent Mynydd Maen common (PEDW, 2022).

Great Crested Newt Survey

6.2.11 The Survey Area and a buffer 250 m around it were initially assessed using aerial photographs and Ordnance Survey maps for the presence of small, non-flowing waterbodies that were considered to have potential suitability to support breeding great crested newt. This was supplemented by local knowledge as several of these ponds were known to surveyors from surveys completed by BSG Ecology to inform the planning application for the neighbouring windfarm development (Mynydd Maen wind farm - DNS/3276725). Permission has been granted to use the data by the applicant, Renewable Energy Systems (RES) Ltd. This was followed by field survey, undertaken as ahead of further survey in April 2023, of those waterbodies within 250 m of the Proposed Development where land was under the control of the Applicant or publicly accessible.

6.2.12 Two ponds were identified as having suitability for great crested newt, these are shown on Figure 6.4. Both ponds were surveyed for great crested newt presence / absence using the environmental DNA (eDNA) technique on 17 April 2023. Laboratory analysis of the collected water samples was undertaken by SureScreen Scientifics Ltd, Morley, Derbyshire.

6.2.13 Supplementary presence / absence survey (bottle trapping, torching and egg searching) was completed of the pond 17 April and 11 May 2023 to provide further confidence in the result of the eDNA surveys. Breeding Bird Survey

Breeding Bird Survey

6.2.14 A programme of surveys was conducted in April, May, and June of 2023, with the aim of identifying the species and numbers of birds breeding, or potentially breeding, within the Site. Four visits were made, spaced at regular intervals over the period. Three visits were made in the morning and one in the evening to determine whether there is evidence of use of the Site by barn owl Tyto alba, or other crepuscular or nocturnal species.

6.2.15 During each visit all land within the Site and habitats bordering it were surveyed. All habitat features were approached to within approximately 50 m. This area was walked at a slow pace to enable all birds detected to be located, identified, and recorded on to a large-scale map. Regular stops were made to listen and scan for bird activity indicative of territory establishment or breeding such as singing, alarm calling, displaying, and carrying food. The direction of the walked circuit was

alternated between survey visits to avoid the same parts of the survey area being recorded either at the start or end of the visit.

Badger

6.2.16 A badger survey was completed to search for evidence of badger (including setts, feeding remains, dung pits, hairs, and tracks), within the Site and suitable areas within 30 m (where access permitted). In the event badger field signs were noted, they were to be mapped and recorded using a GPS device. Any setts recorded were also to be classified in accordance with industry criteria (as necessary).

Limitations to species survey method

6.2.17 Due to the potential for low overnight temperatures in April, bottle traps were not deployed during the supplementary survey for great crested newt. However, surveyors were still able to complete other survey methods and deploy the traps during the second visit in May. This, combined with the eDNA sampling methods, is considered sufficient to provide confidence in survey result, and is not considered to be a significant limitation to this survey or subsequent assessment.

6.2.18 The badger survey was undertaken from within the clients' land ownership or publicly accessible areas surrounding it. Third-party land was not accessed. Whilst visibility into third-party land / adjacent habitats was largely good, assisted by binoculars, some areas of woodland along the northern boundary were limited by vegetation coverage. This is taken into consideration within the assessment.

6.2.19 The protected species surveys were undertaken ahead of the final design freeze and before the cable route had been fixed. As such, the cable route was not included within the breeding bird or badger survey areas. Information regarding the presence of these species within habitats on the cable route is as a result of local knowledge of surveyors and survey information available for Mynydd Maen wind farm (DNS/3276725). Given the extent of up-to-date data available, this is to considered to be a significant limitation to this assessment.

Results

Designated Sites

Statutory Designated Sites

6.2.20 One statutory designated site of national importance is located approximately 2 km north of the Site. Ty'r Hen Forwyn Site of Special Scientific Interest (SSSI) is notified for species-rich neutral grassland and the large population of wood bitter-vetch Vicia orobus, a nationally scarce and declining species, that it supports.

Non-statutory Designated Sites

6.2.21 SEWBReC returned 39 records of non-statutory designated sites within a 2 km radius of the Survey Area; these are all Sites of Interest for Nature Conservation (SINC). They are shown on Figure 6.1.

6.2.22 Of these one, Mynydd Maen SINC, falls within the Survey Area, specifically the cable route, which passes through the SINC. This SINC is a large upland common, designated for extensive areas of acid grassland, bracken, and heath, and for locally significant bryophyte species (the latter located in woodland outside the Survey Area).

6.2.23 A further four SINCs are located immediately adjacent to the Survey Area:

- Gwydon Valley Woodlands - situated to the south of the cable route. The SINC is a large conifer plantation on former ancient woodland and contains semi-natural ground flora indicator species which qualify it as a SINC. Red wood ants Formica rufa are locally common.
- Cwm Hafod-Fach Woodlands - immediately to the south of the western spur of the Site, comprises semi-natural ancient woodland of the valley-sides surrounding a working quarry. Acid grassland and heath is also present locally in the open areas of the upper valley.
- Coed Cil-Lonydd - is adjacent to the northern boundary of the Site, following the line of the Nant Gawni stream through a steep-sided valley, containing blocks of former ancient woodland. Red wood ants occur locally throughout the woodland, which supports an assemblage of semi-natural indicator species.
- Edlogan Common – is located to the east of the furthest edge of the cable route and is designated for common land.

6.2.24 Magna Porta Common SINC and Mynydd Maen and Mynydd Llwyd Common SINC are located 5 m south and 238 m northeast of the of the cable route, respectively. Both are designated for common land.

Ancient Woodland Sites

6.2.25 SEWBReC returned records of 56 Ancient Semi-Natural Woodland (ASNW), 23 Restored Ancient Woodland Sites (RAWS) and 40 Plantation on Ancient Woodland Sites (PAWS) within the search area. The closer of these are Coed Prysg immediately south of the Site, and an area of Coed Cil-lonydd immediately to the north. All ancient woodland sites are shown on Figure 6.1.

Habitats

6.2.26 Set out below for each habitat present across the Survey Area is a brief description of its vegetation, its spatial distribution and whether it qualifies as a priority habitat (Habitat of Principal Importance (HPI)) under Section 7 of the Environment (Wales) Act 2016.

6.2.27 Further detail of the results of this survey is provided in Appendix 6.1 ‘Cil-lonydd Solar Farm Baseline Report’ including referenced photographs (within Section 8). A Phase 1 habitat map is provided on Figure 6.2a – c.

Broadleaved woodland - semi-natural

6.2.28 Broadleaved woodland is present on-Site along the southern edge of the Site (and extends off-Site to the south along the valley of the Nant Hafod-fach, identified as ASNW, above), and in an isolated patch within coniferous plantation south of the cable route. The canopy comprises abundant beech Fagus sylvatica, with occasional hazel Corylus avellana, hawthorn Crataegus monogyna, ash Fraxinus excelsior, and sessile oak Quercus petraea. The understory is generally open, with a band of dense bracken Pteridium aquilinum bordering the woodland edge (photo 1).

6.2.29 The woodland to the south of the cable route comprises mature to over-mature beech trees which precede the surrounding coniferous planting.

6.2.30 Broadleaved woodland corresponds to the Section 7 Habitat of Principal Importance (HPI) for lowland mixed deciduous woodland (Maddock, 2011) (as ‘altitude is not a defining feature’), and local designation criteria for semi-natural upland woodlands (Gwent Wildlife Trust, 2004).

Coniferous woodland – plantation

6.2.31 Mature conifer plantation is present adjacent to the southern edge of the cable route. The plantation is predominantly Sitka spruce Picea sitchensis with occasional larch Larix spp. present above Nant

Gwyddon-fach. The woodland is heavily shaded with no understorey layer other than occasional bilberry and bramble Rubus fruticosus agg. at the edges (photo 2). Ground flora is sparse, including occasional wood sorrel Oxalis acetosella and wood sage Teucrium scorodonia or absent, suppressed by a thick layer of litter.

6.2.32 This habitat does not correspond to any HPI or local designation definitions.

Broadleaved scattered trees and coniferous scattered trees

6.2.33 Broadleaved scattered trees are frequent across the Site, being present along the majority of field margins. The trees are situated on low raised banks and are likely remnant of historic hedgerows (as evidenced by the presence of vegetated field margins shown on OS maps dated 1881) with the shrubby understory having been lost over time.

6.2.34 Scattered trees largely comprise mature beech stands (photo 11) with occasional scrubby hawthorn also present. The understory is primarily vegetated with semi-improved grassland species (see below) including occasional harebell Campanula rotundiflora, eyebright Euphorbia sp. and fox glove Digitalis purpurea.

6.2.35 Coniferous scattered trees are present as a wind break along the western edge of the Site, comprising dominant larch with occasional Sitka spruce.

6.2.36 This habitat does not correspond to any HPI or local designation definition.

Acid grassland – unimproved

6.2.37 Unimproved acid grassland is present along the cable route though Mynydd Maen Common (photo 3). The sward is grazed (sheep and cattle) with sheltered and flatter patches tightly so, in areas preferred by livestock and a longer denser structure elsewhere (further east). The sward is typically dominated by mat grass Nardus stricta with abundant common bent Agrostis capillaris and heath bedstraw Galium saxatile. Sheep's fescue Festuca ovina, and the mosses Rhytidiadelphus squarrosus and Pleurozium schreberi are frequent, and heath rush Juncus squarrosus, sweet vernal grass Anthoxanthum odoratum, wavy hair-grass Deschampsia flexuosa, and the mosses Pseudoscleropodium purum and Polytrichum commune occasional. Small patches of soft rush Juncus effusus indicate impeded drainage in places.

6.2.38 The acid grassland on Site does not conform to any priority habitat descriptions, however, does contain several indicator species for acid grassland which are listed within local designation guidelines (Gwent Wildlife Trust, 2004) and a feature of Mynydd Maen SINC.

Neutral grassland - semi-improved

6.2.39 Semi-improved neutral grassland is present across most of the enclosed fields within the Site. The sward was fairly long across all fields on Site, with an homogeneous structure consistent with cattle / sheep grazing (photo 4).

6.2.40 The grassland sward is reasonably diverse and comprises frequent common bent Agrostis capillaris, Yorkshire fog Holcus lanatus, perennial rye-grass Lolium perenne, creeping buttercup Ranunculus repens and white clover Trifolium repens with occasional crested dog's-tail Cynosurus cristatus, sweet vernal grass Anthroxanthum odoratum, red fescue Festuca rubra, rough meadow grass Poa trivialis, red clover Trifolium pratense, yellow rattle Rhinanthus minor, bird's-foot trefoil Lotus corniculatus, autumn hawkbit Leontodon autumnalis, and yarrow Achillea millefolium.

6.2.41 Small areas with impeded drainage contain occasional soft rush and compact rush Juncus conglomeratus. Patches of common nettle Urtica dioica and creeping thistle Cirsium arvense are present in areas used for shelter by livestock and indicate enriched soils.

6.2.42 The western fields contained a longer sward a higher proportion of herbaceous species. Further west acid indicators are increasingly present (although in small numbers) including tormentil Potentilla erecta and sheep's sorrel Rumex acetosella.

6.2.43 This habitat does not correspond to any priority habitat description.

Marsh/marshy grassland

6.2.44 Marshy grassland is infrequent across the Site, located within the easternmost field on Site and as localised stands associated with areas of disturbance or wetter soils along the cable route, such as the edges of trackways and ditches along plantation woodland (photo 6).

6.2.45 The vegetation within the enclosed pasture on Site, is heavily cattle and sheep poached, periodically grazed, and has ground disturbance from large vehicles leaving bands of unvegetated soil throughout (photo 5). The species composition is indicative of damp and acid soils with increased herb diversity than elsewhere within the Survey Area. Soft rush dominates the sward with occasional compact and sharp-flowered rush Juncus acutiflorus and Yorkshire fog and creeping bent Agrostis stolonifera frequently present. Sheep's sorrel, tormentil, marsh bedstraw Galium palustre, cuckoo flower Cardamine pratensis, greater bird's-foot trefoil Lotus pedunculatus and fox-glove occur occasionally. Ivy-leaved bell flower Wahlenbergia hederacea, oval sedge Carex leporina, heath woodrush Luzula multiflora and lesser spearwort Ranunculus flammula are present in wetter areas to the south of the enclosure.

6.2.46 Areas of disturbed / bare ground are frequent and where sparsely vegetated contain species commonly found in disturbed or periodically inundated areas including marsh cudweed Gnaphalium uliginosum, knotgrass Polygonum aviculare, toad rush Juncus bufonius, floating sweet-grass Glyceria fluitans and water-purslane Lythrium portula.

6.2.47 This habitat corresponds to the definition for M23 Juncus effusus / acutiflorus – Galium palustre rush-pasture, Juncus effusus sub-community, with soft rush dominating the sward and sharp-flowered rush less frequent. Yorkshire fog, greater bird's-foot trefoil and marsh bedstraw are other constant species present within this community.

6.2.48 The marshy grassland vegetation along the cable route is dominated by rank growth of soft rush and is species-poor with occasional marsh bedstraw Galium palustre, willowherbs Epilobium spp., marsh thistle Cirsium palustre and infrequent broad buckler fern Dryopteris dilatata.

6.2.49 This habitat does not correspond to any priority habitat description.

Poor semi-improved grassland

6.2.50 This habitat type occurs in the enclosed cattle grazed pastures in the western part of the Site (photo 7). The grassland has been subject to some level of agricultural improvement and is characterised by species poor vegetation dominated by a mixture of Yorkshire fog, common bent and a higher frequency of perennial rye-grass than elsewhere on Site. Herb diversity is low but includes frequent white clover, creeping thistle, locally frequent soft rush, and small amounts of chickweed Stellaria media. Areas where stock have congregated are heavily poached and support occasional broad-leaved dock Rumex obtusifolius, common nettle and small amounts of sheep's sorrel.

6.2.51 This habitat does not correspond to any priority habitat description.

Bracken – continuous / scattered

6.2.52 Bracken occurs as extensive stands with a thick layer of litter on sloping ground at the edges of the cable route. Bracken also occurs in isolated patches along field margins within the Site, or as scattered stands encroaching along field edges.

Acidic dry dwarf shrub heath

6.2.53 This habitat is frequent along the cable route, occurring on much of the high ground and is characterised by dense cover of ericoid shrubs (25 % or more) (photo 8). The vegetation composition and condition vary along the route, due to a combination of previous management and current grazing levels.

6.2.54 The vegetation is low growing, and heather is rare, indicating high grazing pressure and potentially previous burning. Bilberry is the dominant species with frequent heath bedstraw and occasional tormentil and heath rush Juncus squarrosus. Low growing patches of Western gorse Ulex gallii are frequent throughout. Grasses are an important component of the vegetation, in similar composition to unimproved acid grassland (above). Bryophytes are also prominent, again similar to acid grassland (above) but with frequent Hypnum jutlandicum and occasional Dicranum scoparium.

6.2.55 Dry heath on Site meets the definition of upland heathland HPI (Maddock 2011) and Annex 1 priority habitat 4030 European dry heaths. Additionally, heath meets the definition within the guidance for local designation (Gwent Wildlife Trust, 2004) and is a feature of Mynydd Maen SINC.

Dry heath/acidic grassland mosaic

6.2.56 This habitat is frequent across the cable route. The vegetation is a complex mosaic of the two habitat types described above, characterised by patchy cover of heather and / or bilberry shrubs growing amongst acid grassland (photo 9).

Flush and spring - acid flush

6.2.57 A small acid flush was noted to the east of the cable route (TN 5). The vegetation is similar to that described above for marshy grassland, being typically species poor and dominated by soft rush but includes some Sphagnum fallax which allows referral to acid flush (photo 10).

6.2.58 This habitat corresponds to the Section 7 HPI ‘Upland Flushes, Fens, and Swamps’.

Standing water

6.2.59 Two areas of ephemeral pools / standing water are present on the eastern edge of the cable route (TN 6 and 7). Whilst likely to be holding more water than normal (following an extremely wet winter period), several contained species indicative of water-logged soils, suggesting they are persistently damp. Most of the pools were unvegetated, with bare substrate bases, however where vegetation was present, species included floating sweet-grass, soft and hard rush Juncus inflexus.

Running water

6.2.60 A narrow gully along the cable route (close to the mast) contains a small section of fast flowing rocky stream, which passes underneath the existing access track and flows away to the south.

Walls

6.2.61 Drystone walls demarcate the boundaries of the enclosed fields in the western part of the Site, and the plantation woodland along the cable route. The walls are generally intact and unvegetated (photo 6).

Dry ditches

6.2.62 Several dry ditches are present across the Survey Area (including TN 2). These are largely unvegetated, with bare substrate at their base and bordered by terrestrial plant species typical of surrounding habitat types, including, most frequently, soft rush.

Bare ground

6.2.63 Bare ground is infrequent across the Site and is mainly associated with tracks and disturbed ground at the base of field gates. Vegetation is sparse but where it is present is indicative of this habitat type, and includes broad-leaved plantain Plantago major, annual meadow grass Poa annua, pineapple-weed Matricaria discoidea and knotgrass.

Species

Badger

6.2.64 SEWBReC returned five records of badger within the search radius, the closest of which is 38 m from the northern boundary of the Site (dated 2013). The remaining records are more than 1 km from the Survey Area.

6.2.65 No setts or evidence of badger was recorded during the badger survey (or any other field survey visits). However, the Site and adjacent woodland provide suitable habitat for sett building, together with the on-Site fields offering foraging / commuting resources for badger.

Bats

6.2.66 SEWBReC returned at least twelve species of bat including brown long-eared Plecotus auritus, common pipistrelle Pipistrellus pipistrellus, Daubenton's bat Myotis daubentonii, greater horseshoe bat Rhinolophus ferrumequinum, lesser horseshoe bat Rhinolophus hipposideros, Leisler's bat Nyctalus leisleri, Natterer's bat Myotis nattereri, noctule Nyctalus noctula, serotine Eptesicus serotinus and soprano pipistrelle Pipistrellus pygamaeus from within the search radius.

6.2.67 No records were returned from within the Survey Area boundary. The closest records are of small roosts (less than 10 individuals) of brown long-eared, Natterer's and pipistrelle species at Blaengawney Farm, dated 2003, 157 m north of the Site. The remaining records are largely associated with the residential areas of Newbridge and Crumlin more than 1 km away.

6.2.68 There is one small building / structure within the Site (see TN 4 of Appendix 6.1; a small, simple red brick structure with a flat concrete roof. The structure is low, with a large opening on the north-western aspect but with no obvious cracks or crevices to offer potential roosting features for bats.

6.2.69 The field boundaries are bordered by mature beech trees which are a suitable size and age to offer potential roosting features (PRFs) for bats. Smaller scattered hawthorn trees are occasionally present throughout but have no obvious areas of damage or decay which would offer PRF for bats.

6.2.70 The exposed higher ground within the cable route is likely to be of limited value for bats. On-Site, mature trees and nearby woodlands bordering are of high-quality and are well-connected to the wider landscape, whilst interior fields are of lower suitability due to the even sward and lack of species diversity. The Survey Area overall is assessed as of moderate suitability for foraging and commuting bats.

Breeding Birds

6.2.71 SEWBReC returned more than eight hundred records of seventy-eight bird species within the search radius. Of these, records of four species including brambling Fringilla montifringilla and fieldfare

Turdus pilaris (listed under Section 1 of the Wildlife and Countryside Act 1981, as amended) and skylark Alauda arvensis, starling Turdus vulgaris and song thrush T. philomelos (listed as priority species under Section 7) were returned from within the Survey Area.

6.2.72 The remaining records included eighteen species of bird listed on Schedule 1 of the Wildlife & Countryside Act 1981 (as amended), including brambling, fieldfare, crossbill Loxia curvirostra, goshawk Accipiter gentilis, hobby Falco subbuteo, merlin Falco columbarius, osprey Pandion haliaetus, peregrine Falco peregrinus, red kite Milvus milvus and redwing Turdus iliacus all recorded within 500 m of the Survey Area.

6.2.73 Other records include twenty-seven species of principal importance (SPI) for the conservation of biodiversity in Wales listed in response to Section 7 of the Environment Wales Act (2016). The majority of these registrations were from woodland and open moorland surrounding the cable route.

6.2.74 Breeding bird surveys completed on Site in 2023 recorded forty-eight bird species, thirty-two of which were considered to be breeding on or within close proximity to the Site. Of those recorded breeding, one is listed on Schedule 1; goshawk which was recorded holding territory in woodland off-Site. A further three SPI species, dunnock Prunella modularis, bullfinch Pyrrhula pyrrhula and song thrush Turdus philomelos, were recorded holding territory within field boundary trees or woodland bordering the Site.

6.2.75 Additionally, three red-listed Birds of Conservation Concern (BOCC) in Wales (cuckoo Cuculus canorus, meadow pipit Anthus pratensis and willow warbler Phylloscopus trochilus) and four amber listed species (goldcrest Regulus regulus, green woodpecker Picus viridis, mistle thrush Turdus viscivorus and skylark Alauda arvensis) were also recorded.

6.2.76 The highest density of territorial birds was located along field boundary features and in the adjacent woodland, with a smaller number of ground nesting birds present within the tussocky marshy grassland pasture within the eastern part of the Site including skylark and meadow pipit. Detailed results of the breeding bird surveys are presented in Appendix 6.3 and territory locations are shown on Figure 6.3a – c.

Great crested newt (and other amphibians)

6.2.77 SEWBREC returned fifty-three amphibians records within the search radius; none of these were from within the Survey Area.

6.2.78 Of the records returned, ten were of great crested newt, these include records for known populations within ponds surveyed to inform the Mynydd Maen windfarm development (see below). Other records were grouped approximately 400 m south of the Site and one record approximately 780 m to the north.

6.2.79 Common newt species such as palmate newt Lissotriton helveticus and smooth newt Lissotriton vulgaris were also recorded in the same locations. One record of common toad Bufo bufo was also returned approximately 250 m north of the cable route.

6.2.80 There are 8 ponds within 250 m of the Survey Area, their location and position in relation to the Site is shown on Figure 6.4, including ponds associated with the proposed Mynydd Maen Wind Farm development (DNS/3276725) referenced ‘MM’. Mynydd Mean Wind Farm adjacent to the Site has undergone extensive survey for great crested newt, with ponds MM 2 and MM 3 identified as supporting a small population of great crested newt.

6.2.81 The two ponds associated with the proposed Solar Farm development (SF 1 and SF) both scored a great crested newt HSI score of ‘average’, 0.68 and 0.6 respectively. The ponds were sampled for great crested newt eDNA in April 2023, and returned a negative result. Supplementary surveys were completed in April and May and great crested newt were absent. However, a small population of smooth newts were found in SF1, and palmate newts in SF2.

6.2.82 Rougher areas of grassland (i.e., marshy grassland and acid grassland), woodland and bracken provide the most suitable terrestrial habitat for great crested newt within the Survey Area (open grassland fields within the Site provide less cover and are less suitable to support great crested newt during their terrestrial life phase).

Hazel dormouse

6.2.83 SEWBReC returned two records for hazel dormouse within the search radius, both were located more than 1 km from the Survey Area to the north and south of the Site respectively.

6.2.84 The hedgerows on Site have grown out into lines of trees with no functional understories / shrub layers and provide low value habitat for dormice. Woodland habitat at the fringes of the Survey Area is suitable habitat for this species and has connectivity to similar habitat in the wider landscape.

Invertebrates

6.2.85 SEWBReC returned two-hundred and seventy-nine records of sixty-seven invertebrate species within the search radius. One record was returned from within the Survey Area, small heath Coenonympha pamphilus recorded in heathland from the cable route corridor. Records include four species listed on Schedule 5 of the W&CA, high brown fritillary Fabriciana adippe, marsh fritillary Euphydryas aurinia, pearl-bordered fritillary Boloria euphrosyne, wood white Leptidea sinapis all recorded more than 1 km from the Survey Area. The remaining records include twenty-six species of butterfly and moth that are listed as priority species (Section 7), including grayling Hipparchia semele, located 26 m west of the Site.

6.2.86 Dry heathland habitat (and their associated grass species) and woodland are present within the Survey Area, which may offer suitable habitat for small heath. There is no suitable habitat on Site to support grayling.

6.2.87 Habitats present on the Site are common throughout the wider landscape and are unlikely to support a diverse assemblage or significant number of notable invertebrate species. Upland heathland habitats associated with the cable route however, offer potential habitat for a range of invertebrate species.

Otter and water vole

6.2.88 SEWBReC returned fourteen records of otter Lutra lutra within the search radius, the closest of these is more than 1.3 km from the Survey Area. No records for water vole Arvicola amphibius were returned.

6.2.89 A small stream originates close to the cable route, this is steep, rocky, and fast flowing, therefore unlikely to offer prey species or onward connectivity to attract otter and is unsuitable to support water vole. There are no other watercourses or habitat capable of supporting otter or water vole within the Survey Area, and both species are considered likely absent and are not considered further.

Reptile

6.2.90 SEWBReC returned twenty-one records of slow worm Anguis fragilis and common lizard Zootoca vivipara, the closest of which is 782 m from the Survey Area. The records are largely associated with residential areas in the wider landscape.

6.2.91 Vegetation on Site is heavily managed and uniform and is largely unsuitable for supporting reptiles. Reptiles may be present in low numbers in the western half of the Site towards the common land where the sward is locally longer. The mosaic of habitats along the cable route however, are likely to support common species of reptile including slow worm, common lizard, and potentially adder

Vipera berus, particularly where vegetation or ground is less homogeneous in structure, for example along track edges and the interfaces between habitats e.g., rough grassland or heath and bracken.

Other notable mammal species

6.2.92 SEWBReC returned records of stoat Mustela erminea, polecat Mustela putoris and hedgehog Erinaceus europaeus from within in the search radius. The closest record is of a hedgehog 850 m from the Survey Area. A stoat was seen close to the farm a buildings within immediately off-Site during the Phase 1 survey. The Site contains suitable habitats to support all three species.

6.2.93 Invasive non-native species

6.2.94 SEWBReC returned records for nine invasive plant species within the search radius including Japanese knotweed Fallopia japonica, Himalayan cotoneaster Cotoneaster simonsii, and wall cotoneaster Cotoneaster horizontalis, recorded 154 m west of the Survey Area.

6.2.95 No invasive non-native plant species were recorded during the survey work. Invasive plants are not considered further in this assessment.

Protected / notable plants

6.2.96 SEWBReC returned records for six protected / notable plant species, including English sticky or glandular eyebright Euphrasia officinalis subsp. anglica recorded 537 m from the Survey Area.

6.2.97 Euphrasia sp. was recorded on within the field margins in the Solar Area. Six species of eyebright are listed on the Section 7, and it was not possible to identify specimens to species level.

6.3 Evaluation of the Proposed Development

6.3.1 Based on the findings of the desk study and the surveys conducted of the Proposed Development, an evaluation has been carried out in terms of the importance of any site or habitat, or the importance of the Site to a species population present. The evaluation also considers if the receptor should be taken forward to the impact assessment section that follows. This evaluation is presented in Table 6.3.

Table 6.3: Evaluation of Sites, Habitats, and Species

Receptor	Importance	Further Consideration Required
Designated sites		
Ty'r Hen Forwyn Site of Special Scientific Interest (SSSI)	National	Direct impacts (e.g., removal or modification of habitats) and indirect impacts (e.g., noise or visual disturbance or pollution effects) to Ty'r Hen Forwyn SSSI are not anticipated as a result of the proposed development, due to the distance from the Site (over 1 km). **Scoped out from assessment.**
Mynydd Maen SINC, Gwydon Valley Woodlands SINC, Cwm hafod-fach woodlands SINC, Coed Cil-lonydd SINC and Edlogan Common	County	There are five SINCs on, or adjacent to, the Survey Area, including Mynydd Maen SINC which is present on-Site. Habitats associated with the SINC (a range of upland habitats including heath and acid grassland) are of biodiversity value in their own right and provide suitable conditions for several protected and priority species / groups. However, the cable route follows footpaths across the common; these areas are frequently disturbed, compacted from use, and as a result, the

Receptor	Importance	Further Consideration Required
SINC (other SINCs are scoped out).		vegetation present is generally of poor quality. Examples of these habitats can be seen in Section 8 of **Appendix 6.1** (see photos 12 and 13). In the absence of mitigation, SINCs on-Site, and adjacent to, may be subject to direct / indirect impact(s) as a result of the Proposed Development. The SINCs are of county borough value for biodiversity; it follows that impacts on them could therefore be significant at the same geographical level in the absence of appropriate mitigation. **Taken forward to assessment for construction phase impacts.** **Scoped out of assessment for operational phase impacts.**
Ancient woodland sites	County	ASNW habitat is present bordering the northern and southern edges of the Site (off-Site). All boundary features are being retained (with root protection areas) within the proposed development. However, there is potential for indirect impacts to retained habitat in the absence of mitigation. Ancient Woodland Sites are of county borough value for biodiversity; it follows that impacts on them could therefore be significant at the same geographical level in the absence of appropriate mitigation. **Taken forward to assessment for construction phase impacts.** **Scoped out of assessment for operational phase impacts.**
Habitats		
Broadleaved semi-natural woodland	Local	Broadleaved woodland priority habitat borders the northern and southern edges of the Site. All boundary features are being retained within the proposed development (with root protection areas). However, there is potential for indirect impact to retained habitat in the absence of mitigation. Given the small area of woodland present on Site and its prevalence in the wider surrounding locale, broadleaved semi-natural woodland is assessed as of local value for biodiversity. It follows that impacts to this habitat would be significant at the same geographical level in the absence of appropriate mitigation. **Taken forward to assessment for construction phase impacts.** **Scoped out of assessment for operational phase impacts.**
Coniferous woodland – plantation	Site	Not HPI. No impacts anticipated. **Scoped out from assessment.**
Scattered trees	Local	Not HPI.

Receptor	Importance	Further Consideration Required
		The mature trees form the internal field boundaries (these do not meet the definition for a priority habitat currently to but do have potential value to protected species) and are therefore assessed as of importance at the local level. The Proposed Development design largely retains boundary features, with the construction area contained within the fields, however, approximately 180 m of field boundary (14 individual hawthorn trees) will be lost as a result of the Proposed Development. Avoidance measures for retained habitat include incorporating appropriate buffers and root protection areas, to largely avoid direct impacts (e.g., loss and modification). Additionally, there is potential for indirect impacts to retained habitat in the absence of mitigation. Scattered trees are assessed as of local value to biodiversity, it follows that impacts to this habitat would be significant at the same geographical level in the absence of appropriate mitigation. **Taken forward to assessment for construction phase impacts.** **Scoped out of assessment for operational phase impacts**
Acid grassland unimproved	–Site	A feature of Mynydd Maen SINC, however acid grassland adjacent to the Site and along the cable route is heavily grazed, frequently disturbed and is of low intrinsic ecological value. The cable installation will require trenching and backfilling as the cable is laid. The proposals will invariably result in temporary loss of habitats within the SINCs (including 0.45 ha of acid grassland) which will be allowed to reestablish once works are completed. Unimproved acid grassland within the cable route is assessed as of Site value, as it is intensively managed and similar habitat is widespread in the surrounding area. **Scoped out from assessment.**
Neutral grassland semi-improved	–Site	Not HPI. Semi-improved neutral grassland is the dominant habitat type across the Site. Approximately 26 ha of grassland will be temporarily lost / modified during the construction phase. This habitat is common within the wider surrounding area, and its loss is not considered to have a significant effect beyond the Site level. **Scoped out from assessment.**
Marshy grassland	Site	Marshy grassland is present within the eastern edge of the Site, and whilst not within the SINC associated with similar habitats within. The NVC survey found the vegetative community resembles M23 grassland (‘rhos pasture’), which is common within upland enclosed landscapes in South Wales. This habitat whilst characteristic of its type, is not a particularly species-rich example of and has

Receptor	Importance	Further Consideration Required
		undergone recent and significant disturbance, its therefore assessed as of value at the Site level. The proposed development will result in the temporarily loss / modification approximately 4.4 ha of M23 marshy grassland, this is not considered to be a significant effect beyond the Site level. **Scoped out from assessment.**
Poor semi-improved grassland	Site	Not HPI. Poor semi-improved grassland is present in the west of the Site. The Proposed Development will result in the temporary loss / modification of 6.6 ha of grassland. This habitat is common within the wider surrounding area, and its loss is not considered to have a significant effect beyond the Site level. **Scoped out from assessment.**
Bracken	Site	Not HPI. **Scoped out from assessment.**
Dry heath	County	Dry heath is a priority habitat at the European and regional (Wales) level and a reason for designation for Mynydd Maen SINC. The cable installation will require trenching and backfilling as the cable is laid. The proposals will invariably result in temporary loss of habitats within the SINCs (including 0.42 ha of dry heath). Additionally in the absence of mitigation, indirect impacts of habitats associated with SINCs on and adjacent to Site may occur during the construction / decommission phase. No impacts are anticipated during the operational phase of the Proposed Development. Dry heath is assessed as of county value to biodiversity, it follows that impacts to this habitat would be significant at the same geographical level in the absence of appropriate mitigation. **Taken forward to assessment for construction phase impacts.** **Scoped out from assessment for operational phase impacts.**
Dry heath / acid grassland mosaic	County	Dry heath / acid grassland is a priority habitat at the European and regional (Wales) level (due to the dry heath component) and a reason for designation for Mynydd Maen SINC. The cable installation will require trenching and backfilling as the cable is laid. The proposals will invariably result in temporary loss of habitats within the SINCs (including 0.26 ha of dry heath / acid grassland mosaic).

Receptor	Importance	Further Consideration Required
		Additionally in the absence of mitigation, indirect impacts of habitats associated with SINCs on and adjacent to Site may occur during the construction / decommission phase. No impacts are anticipated during the operational phase of the Proposed Development Dry heath / acid grassland is assessed as of county value to biodiversity, it follows that impacts to this habitat would be significant at the same geographical level in the absence of appropriate mitigation. **Taken forward to assessment for construction phase impacts.** **Scoped out from assessment for operational phase impacts.**
Acid flush	Local	A small area of acid flush habitat is present at the eastern end of the Site. It is limited in size and not of particular botanical quality but do correspond to the Section 7 HPI 'Upland Flushes, Fens and Swamps'. Acid flush will be retained during the cable works, though micro-sighting the cable route. There is potential for indirect impacts to this priority habitat through pollution and / or changes to hydrology. In the absence of mitigation, indirect impacts (i.e., modification, degradation / pollution) of acid flush may occur during the construction / decommission phase. The acid flush habitat is of local value to biodiversity due to its limited extent; it follows that impacts to this habitat would be significant at the same geographical level in the absence of appropriate mitigation. **Taken forward to assessment for construction phase impacts.** **Scoped out from assessment for operational phase impacts.**
Dry stone walls	Site	Not HPI. No impact(s) anticipated. **Scoped out from assessment.**
Bare ground	Site	Not HPI. No impact(s) anticipated. **Scoped out from assessment.**
Protected species		
Badger	N/A	Not SPI. Protected species (in regard to species welfare, no for biodiversity conservation purposes).

Receptor	Importance	Further Consideration Required
		No evidence of badger was recorded during the survey. However, badger has been previously recorded in the surrounding area and there is habitat suitable for sett building e.g., woodland at the outer edges of the Site. Badgers are a highly mobile species and readily occupy new territories and build setts. **Taken forward to ensure legal compliance during construction phase.** Mitigation / protection measures within Construction Environment Management Plan (CEMP). **Scoped out of assessment for the operational phase.**
Bats	Local	SPI. European Protected species. In the absence of mitigation, direct impacts are limited to incidental tree works required for ongoing maintenance of the Site which may result in killing / injury and damage / destruction of a potential roost within mature trees on Site. Indirect impacts may include disturbance of retained habitats / off- Site roosts. **Taken forward to assessment for construction phase impacts.** Mitigation / protection measures within CEMP. **Scoped out from assessment for operational phase impacts.**
Breeding birds	Local	SPI. Protected species. In the absence of mitigation, there is a limited loss of nesting habitat for ground nesting birds. Indirect impacts include disturbance of nesting birds (including those listed on Schedule 1) using retained habitats during the construction phase. **Breeding birds in general taken forward to assessment for all phases.** Mitigation / protection measures within CEMP.
Great crested newt (and other amphibians)	County	Great crested newt and common toad are SPI. Other amphibians likely to use the Site of the Proposed Development are not SPI. Great crested newt are European Protected species. Other amphibians (common toad) likely to use the Site of the proposed Development are of Site importance only. Great crested newt has been previously recorded from two ponds within the wider landscape (> 250 m from the cable route footprint). There is sub-optimal terrestrial habitat for this species throughout the Site and whilst there is better quality habitat surrounding the cable route, the route itself is confined to footpaths across the Site. These areas are frequently disturbed, and compacted from use, with short sparse vegetation and therefore are less suitable to support great crested newt

Receptor	Importance	Further Consideration Required
		in their terrestrial life phase. The development has potential to result in both temporary terrestrial habitat loss and physical harm to individual animals, if present, and in the absence of mitigation. **Great crested newt and amphibians in general are taken forward to assessment for construction phase impacts**. **Scoped out from assessment for operational phase impacts.**
Hazel dormouse	N/A	Dormice have been recorded in the wider landscape, but suitable habitat for this species within the Site is limited to the woodland around the periphery of it. The proposed scheme intends on retaining the trees and boundary hedgerows, and vegetation removal will be limited isolated and scattered trees within the centre of the Site, therefore impacts on dormice (if present) are limited to a risk of disturbance in the absence of mitigation. **Taken forward to assessment for construction phase impacts.** Mitigation / protection measures within CEMP. **Scoped out from assessment for operational phase impacts.**
Invertebrates	Site	SPI. Dry heathland habitat (and associated grass species) is present within the or adjacent to Survey Area, which may offer suitable habitat for small heath. Temporary loss of dry heath habitat associated with the cable route cannot be avoided. The vegetation will be allowed to re-establish following works and, habitat enhancement across the Site will benefit the invertebrate community throughout the wider locale. **Scoped out from assessment.** Enhancement measures outlined at the end of this Chapter, to be detailed within a LEMP
Otter and water vole	N/A	SPI. European Protected species. **Scoped out from assessment**
Reptile	Local	SPI. Protected species. Reptiles have been recorded within the wider surrounding area. Suitable habitats are limited to boundary features on Site which will be retained and buffered as part of the development, and along the cable route. In the absence of mitigation, the proposed development may result in killing / injury of common reptile species.

Receptor	Importance	Further Consideration Required
		Taken forward to assessment for construction / phase impacts. Mitigation / protection measures within CEMP. **Scoped out from assessment for operational phase impacts.**
Other notable mammal species	Site	SPI. Protected species. A stoat was observed within the Site during the Phase 1 survey and the wider Survey Area has suitable habitat to support other notable mammal species. Direct impacts to protected / notable spices in the absence of mitigation include killing / injury and fragmentation / entrapment. **Taken forward to assessment for construction phase impacts.** Mitigation / protection measures within CEMP. **Scoped out from assessment for operational phase impacts.**
Invasive non-native plants	N/A	Not SPI. **Scoped out from assessment.**
Protected / notable plant species	Local	Potentially SPI. Eyebright sp. was recorded in a small area of sparse grassland in the north-eastern neutral grassland field on Site. **Scoped out from assessment.**

6.4 Assessment of Potential Effects

Construction Phase

6.4.1 In the absence of mitigation there is potential for the following environmental effects to occur during the construction phase of the Proposed Development:

- SINC habitat loss – direct impacts include the temporary loss of habitats within Mynydd Maen SINC (acid grassland and heath) during construction / installation of the cable route. Indirect impacts such as degradation of retained habitats associated with Mynydd Maen, Gwydon Valley Woodlands, Cwm Hafod-fach, Coed Cil-lonydd and Edlogan Common SINCs (e.g. through works or storage of materials within root zones / sensitive habitats, accidental damage and / or poor management of retained habitats, i.e., acid grassland, ASNW, heath and common land) and temporary disturbance (e.g. noise and visual impacts).
- Habitat damage – indirect damage to retained Section 7 habitats including acid flush and dry heath (and acid grassland / heath mosaic) adjacent to works and retained features including woodland / ancient woodland sites and mature trees, may include accidental damage (i.e., by

poor placement of temporary construction areas or vehicle movements), damage to root zones, soil compaction and / or pollution.

- Temporary loss of poor-quality terrestrial habitat for great crested newt and killing and injury of individual animals during the construction phase / cable route installation.
- Loss of breeding and foraging habitat for farmland birds and destruction and / or disturbance (resulting in abandonment) of nests.
- Disturbance to species within the boundary of the Proposed Development and in retained habitats adjacent to it - from noise, light and the presence of vehicles and people. This includes pre-commencement ground investigations which could cause disturbance through noise and an increase of human activity on Site.
- Killing and injury of amphibians and reptiles foraging, migrating, or sheltering through removal of vegetation within dry heath, field margins or woodland edges and / or compaction of soil by heavy plant or material laydown.
- Contamination / pollution – potential ground and air pollution from spillages and vehicles. This could lead to a local loss of condition of any ecologically valuable habitat affected.
- Exclusion of animals from the Site by security / stock-proof fencing.
- Entrapment of mammals such as hedgehog, stoat, and badger within open excavations.

Primary Mitigation Measures

6.4.2 The Proposed Development design has been informed by series of team meetings in which ecological constraints and opportunities have been discussed. The aim of this is to minimise the ecological impact of the scheme, as far as is possible given other constraints and viability considerations, through the design process, and demonstrates that the mitigation hierarchy has been followed. This includes:

- The design of the Proposed Development has sought to avoid any direct impacts on SINCs, ancient woodland sites, priority habitats and trees in accordance with policy recommendations for ancient woodland. Stand offs of at least 5 m from trees (or the root protection zones of trees if larger than 5 m) and 15 m from woodland have been built into development design.
- The temporary loss of land under temporary construction areas will be minimised, and reinstatement and enhancement of habitats will be undertaken in line with enhancement measures outlined at the end of this Chapter (to be detailed within a LEMP).
- Vegetation removal will be limited to the removal of 14 scattered hawthorn trees within a defunct field boundary (over approximately 180 m in length) in centre of the Proposed Development.

Tertiary Mitigation Measures

6.4.3 The following best practice construction techniques and mitigation measures will be implemented during the construction phase:

- Measures to avoid impacts on SINCs, ancient woodland sites, priority habitats and trees during construction will need to be detailed in a Construction Environmental Management Plan (CEMP). Ways in which accidental physical damage, lighting, pollution, soil compaction and sediment mobilisation will be set out. There may be a requirement for the presence of an Ecological Clerk of Works (ECoW) to assist in effective implementation of the CEMP.

- Measures to avoid killing / injuring of great crested newt will be implemented during construction, to include staged removal of vegetation (if required), hand-searching where necessary and discussion of material storage, vehicle access or compound locations / positioned, as required, by a Suitably Qualified Ecologist. These measures should be included within a CEMP.
- Clearance of grassland vegetation (where required) will be conducted outside bird nesting season to avoid disturbing or destroying birds' nests. Should works commence during the nesting bird season (which is typically taken as March to August inclusive), any removal of vegetation or construction within marshy grassland fields should be preceded by a walkover survey by a suitably experienced ecologist. The surveyor will identify any active nests, and in the event that nests are found, work in their immediate vicinity (that could result in the damage / destruction of the nest and / or killing / injury of adult birds or dependent young) will be suspended until the nest is no longer active. A 5 - 15 m buffer around the field boundary and woodland features will be in place during construction to minimise disturbance to breeding birds, as a matter of good practice. A practical method statement will be produced detailing measures to avoid impacts on nesting birds (as outlined above) and included in the CEMP. This will provide clear guidance to contractors working on the construction of the proposed development.
- A pre-commencement check for new badger setts will be completed in advance of ground investigation and construction works. Appropriate further mitigation measures to protect badgers, and avoid contravention of the law, will be set out in the CEMP (as necessary).
- Measures to avoid killing / injuring of amphibians and reptiles will be implemented during construction. These will include staged removal of vegetation and hand-searching by a Ecological Clerk of Works (ECoW) where necessary. These measures should be included within a CEMP.
- Construction and pre-commencement ground investigations will be timed, to minimise night-time working to minimise disturbance to bats. Artificial light to aid construction will be minimised with that present designed to minimise light spillage outside active construction areas. Artificial light will be directed away from any field boundaries, trees or buildings within and / or adjacent to the Site. Ground investigations will be undertaken away from any potential bat roosts to minimise disturbance by noise / vibration. Control measures should be outlined in a CEMP.
- The CEMP will identify best practice to be applied to minimise water pollution from spillages associated with construction works and air pollution from construction vehicle emissions and dust generation.
- Night working will be avoided where possible during the construction phase, however where required, by using sensitive lighting strategies to direct light away from habitat features as outlined within the CEMP.
- Sufficient gaps will be left under perimeter security fences to allow access for small mammals (it is noted that animals will also be able to dig under these fences in normal circumstances). Gaps of approximately 35 x 35 cm at ground level will allow for continued use by species such as hedgehog.
- Sensitive working practices will be adopted during the construction phase to prevent entrapment or other causes of harm to mammals (i.e. providing means of escape for any uncovered excavations, appropriately store chemicals and capping exposed piping). These mitigation measures should be included in a method statement within a CEMP.

Assessment of Potential Effects during the Construction Phase

6.4.4 The mitigation measures are designed to address the potential adverse effects that might arise from the Proposed Development in its construction phase, and they are taken in to account in considering the potential for impact on each of the ecology receptors (sites, habitats, and species).

Impacts on Non-statutory Designated Sites

6.4.5 This section assesses potential impacts on five SINCs and Ancient Woodland Sites that have been identified as being on or immediately adjacent to or close to the boundaries of the Site for direct and indirect effects from the construction phase of the Proposed Development.

SINC's

6.4.6 Mynydd Maen SINC is present on-Site and Gwydon Valley Woodlands, Cwm Hafod-fach, Coed Cil-lonydd and Edlogan Common SINCs are present immediately adjacent to the Site. SINCs are of county importance for biodiversity conservation.

6.4.7 The cable installation will require trenching and backfilling as the cable is laid. The proposals will invariably result in a temporary direct impact of up to 1.52 ha of habitats within Mynydd Maen SINC (less than 1 % of the total area of the SINC). This area also includes a small section (0.42 ha) of Annex 1 habitat (dry heath) which is a feature of the SINCs designation.

6.4.8 The remaining SINCs are further away than at-a-distance adverse effects (e.g. noise, light and the presence of vehicles and people) can be expected to occur and no adverse effects are identified.

6.4.9 Overall, given the small scale of temporary loss / modification of habitats and the assumption that measures within the CEMP is effectively implemented, the Proposed Development would result in an adverse effect (a temporary loss of dry heath, that is significant adverse at the local level). Impacts to the remaining SINC sites are likely to be of negligible significance.

Ancient Woodland Sites

6.4.10 All boundary features are retained within the scheme and no direct impacts to ancient woodland sites are anticipated as a result of the Proposed Development during the construction phase.

6.4.11 Indirect effects and at-a-distance effects of boundary woodland / ancient woodland sites are reduced by placing a buffer between boundary features and construction works. Residual effects from accidental damage or pollution events are mitigated for by ensuring sensitive working practices / procedures as set in the CEMP (as outlined above) are implemented effectively. Therefore, impacts on ancient woodland sites would be negligible.

Impacts on Habitats

Broadleaved Semi-natural Woodland

6.4.12 All boundary features are retained within the scheme and no direct impacts to broadleaved semi-natural woodland are anticipated as a result of the Proposed Development during the construction phase.

6.4.13 Indirect effects and at-a-distance effects of boundary woodland are reduced by placing a buffer between boundary features and construction works. Residual effects from accidental damage or pollution events are mitigated for by ensuring sensitive working practices / procedures as set in the CEMP (as outlined above) are implemented effectively. Therefore, impacts on broadleaved semi-natural woodland would be negligible.

Scattered Trees

6.4.14 Fourteen individual hawthorn trees forming a defunct field boundary in the centre of the Site will be lost as part of the Proposed Development (approximately 180 m in length). The field boundary has no functional connectivity due to the lack of overlap between tree canopies and has no onward connectivity to other habitats. All other mature trees along field boundaries will be retained.

6.4.15 Scattered trees are important at the Site level; the scale of loss and the effect on connectivity will be limited and, as such, it is unlikely to be a significant at more than this.

Dry heath

6.4.16 Dry heath is a priority habitat at the European and regional (Wales) level and a reason for designation for Mynydd Maen SINC.

6.4.17 The cable installation will require trenching and backfilling as the cable is laid. The proposals will result in a temporary direct effect, following the loss of 0.42 ha of dry heath habitat. Following the installation of the cable route, the habitats on Site will be allowed to re-establish. Soil disturbance elsewhere on Site (including historic cable routes) have resulted in bands of marshy and / or improved grassland recolonising in habitats previously dominated by dry heath vegetation. It follows, this is likely to be the case here in the absence of further mitigation, resulting in an overall loss of up to 0.42ha of dry heath.

6.4.18 The overall the area of dry heath habitat that would be affected is small in comparison within the wider Mynydd Maen common area, given the significance of this habitat type, it is assessed that the loss would be significant adverse at the local level.

Dry heath and acid grassland mosaic

6.4.19 Dry heath component of this habitat is a priority habitat at the European and regional (Wales) level and a reason for designation for Mynydd Maen SINC.

6.4.20 The cable installation will require trenching and backfilling as the cable is laid. The proposals will result in a temporary direct effect, following the loss of 0.26 ha of dry heath / acid grassland mosaic habitat. Once completed the habitats will be allowed to re-establish. However, as above, it is unlikely the cable route will reestablish with dry heath / acid grassland species (as evidenced elsewhere on the common) which will result in the overall loss of up to 0.26 ha of dry heath / acid grassland mosaic.

6.4.21 Taking the proportion of the total area of dry heath / acid grassland mosaic within the common that would be affected, it is assessed the loss would be significant adverse effect at the site level.

Acid flush

6.4.22 Acid flush habitat is retained within the scheme and no direct impacts to this habitat are anticipated as a result of the Proposed Development during the construction phase.

6.4.23 The potential for indirect adverse effects (i.e., pollution, disturbance, degradation) to acid flush is mitigated for by ensuring sensitive working practices / procedures as set in the CEMP (as outlined above) are implemented effectively. Therefore, impacts on acid flush would be negligible.

Impacts on Protected Species

Badger

6.4.24 Badger are protected from persecution and are assessed here in order to ensure legal compliance

6.4.25 Due to the absence of setts within the Proposed Development, no direct or indirect impacts on badger are anticipated. However, badger is a highly mobile species and there is potential for sett building to occur ahead of construction. If badger do establish setts and / or territories on or adjacent to the Site, there is potential for killing / injury or impacts to badger setts, during the construction phase. This would result in a significant adverse effect to badger at the site level.

Bats

6.4.26 Field boundaries trees and woodland on and adjacent to the Site offer potential foraging and commuting resource for bats in the wider surrounding locale. Mature trees on Site may also offer potential roosting features for bat species.

6.4.27 The construction area is predominantly within a pasture which provides limited opportunities for bats. No mature trees with PRFs will be removed, or heavily pruned and removal will be limited to 14 individual hawthorn trees (with no PRF for bats) in the centre of the Proposed Development. As such, no direct impacts on bats or their roosts will result from the Proposed Development.

6.4.28 Indirect effects on bat roosts in trees and on bat commuting and foraging along boundary features that are within and on the boundary of, or adjacent to, the Proposed Development will be avoided by placing a buffer between all trees and hedgerows and the construction works. Additionally, night working will be avoided where possible, and if required will be undertaken using sensitive lighting strategies to direct light away from bat habitat features.

6.4.29 The Proposed Development avoids impact on, and harm to, bats as a result of its layout, and best practice working methods within / near to field boundaries and potential bat roost features on trees, measures for which will be included within the CEMP. Accounting for the mitigation measures, construction phase impacts to bats are considered negligible.

Breeding birds

6.4.30 The majority of breeding bird species recorded holding territory on Site were associated with field boundary trees or woodland bordering the Site. As the construction area is contained within fields these features will be retained within the Proposed Development and are buffered by a distance to avoid adverse effects. However, the removal of 14 small trees is proposed, and, if carried out in the breeding season, risks the damage and destruction of birds' nests.

6.4.31 A small number of ground nesting species, including meadow pipit and skylark (both of which nest on open ground) are known to hold territories in the marshy grassland on Site. Potential impacts to ground nesting birds during the construction phase include disturbance and displacement of ground nesting species as a result of the Proposed Development.

6.4.32 The Proposed Development avoids impact on, and harm to, most breeding birds as a result of its layout and buffers to hedgerows. However, impacts to nesting species within scattered trees or marshy grassland within the Proposed Development may result in a significant adverse effect on breeding birds at the site level, in the absence of further mitigation.

6.4.33 Additionally, a goshawk territory was recorded approximately 80 m from the northern edge of the Site, within plantation woodland. Goshawk typically nesting mature coniferous woodland / end stage forestry plantation and are known to return to the same nest site / tree each year. However, given their preference to end stage plantations, goshawk is known to habituate to some level of disturbance (including logging activity (McAurther Green, 2022)) and may have up to four nesting sites within their territory range. Goshawk are most vulnerable to disturbance effects during early nest buildings stages and incubation and may move up to 2.5 km away if disturbed during this period (MacArthur Green, 2022).

6.4.34 The Proposed Development will result in an increase of noise and activity on Site from vehicles and people above the current norm, therefore, given the proximity of the nesting site to the construction

area, there is potential for disturbance/ displacement effects to goshawk during the construction phase. This is assessed as a significant adverse effect at the local level on goshawk (Schedule 1 species), in the absence of further mitigation.

Great Crested Newt

6.4.35 A small population of great crested newt is present within two ponds approximately 240 m from the cable route at the closest point. There would be no direct impacts on any ponds as a result of construction, including those that are known to support great crested newt. However, there is the potential for killing and injury of great crested newts when outside of the ponds, for the temporary loss of terrestrial habitat used by the newts (1.25 ha, across the entire cable route length), and for prevention of access to breeding ponds by newts during the cable route installation.

6.4.36 The Proposed Development avoids impact on, and harm to, great crested newt as a result of its layout, and best-practice working methods within field boundaries which will be included within the CEMP. However, in the absence of further mitigation there the potential effect on the small population of great crested newt is likely to be significant adverse at the local level.

Hazel dormouse

6.4.37 The installation of the solar array and other infrastructure will not affect any dormice since these components of the Proposed Development are all located within the fields and are buffered from the suitable habitat (i.e., woodland edge) by a distance to avoid adverse effects. Tree removal is limited to removal of 14 individual hawthorns within the central part of the Site, which has no connectivity to surrounding suitable habitat.

6.4.38 The Proposed Development avoids impact on, and harm to, hazel dormouse as a result of its layout, and best practice working methods within / near to field boundaries, and potential hazel dormouse nesting habitats, and sensitive lighting measures for which will be included within the CEMP. Therefore, the effect is therefore likely to be negligible and would not require further mitigation.

Reptiles and common toad

6.4.39 Common reptile and common toad may use field boundaries, dry stone walls, heath and woodland edge habitats within the Site for foraging, commuting and cover.

6.4.40 The installation of the cable route will result in the temporary loss of 1.25 ha of habitat suitable to support reptiles and amphibians (across the entire route). Once completed the habitats along the cable route will be allowed to re-establish and return to their previous condition, This is considered to be a short-term effect.

6.4.41 Elsewhere on Site the installation of the solar array and other infrastructure will not affect reptiles and amphibian species since these components are all located within the fields and are buffered from boundary features by a distance to avoid adverse effects. However, there is a risk that small scale tree / vegetation removal / cutting works within field margins or boundary features in preparation for enhancement / planting could result in harm to reptiles and amphibians.

6.4.42 The Proposed Development avoids impact on, and harm to, reptiles and common toad as a result of its layout, and best practice working methods within field boundaries which will be included within the CEMP. However, in the absence of further mitigation, will result in a significant adverse effect at the Site level.

Other notable mammal species

6.4.43 Other notable mammal species such as stoat are present on Site. The Site also offers suitable habitat to support hedgehog and polecat within field boundary features.

6.4.44 The Proposed Development avoids impact on, and harm to, notable mammal species as a result of its layout, and best practice working methods within field boundaries which will be included within the CEMP. Therefore, the effect is likely to be negligible and would not require further mitigation.

Operational Phase

6.4.45 The following types of environmental effects have been identified as potentially occurring during the operational phase of the Proposed Development in the absence of mitigation:

- Loss of breeding habitat for farmland birds (namely ground nesting species) due to the loss of marshy grassland. This could result in an overall long-term decrease in the breeding population within the Site of the Proposed Development due to loss of suitable habitats.
- Exclusion of animals from the Site by security / stock-proof fencing.

Tertiary Mitigation Measures

6.4.46 The following best practice construction techniques and mitigation measures will be implemented during the construction phase:

- Sufficient gaps will be left under perimeter security / deer fences to allow access for small mammals (it is noted that animals will also be able to dig under these fences in normal circumstances). Gaps of approximately 35 x 35 cm at ground level will allow for continued use by species such as hedgehog.

Assessment of Potential Effects during the Operational Phase

Impacts on Protected Species

Breeding Birds

6.4.47 The installation of the solar array and other infrastructure is on fields that are not used for nesting or foraging by most of the bird species that have been identified as potentially breeding within the boundary of the Proposed Development. Most of the bird species nest and forage within trees within field margins that are buffered by a distance to avoid adverse effects.

6.4.48 Skylark and meadow pipit are species that nests in open grassland (Donald, 2004). Due to the installation of solar panels and this species' preference for open space with few visual barriers, skylark is unlikely to breed in the footprint of solar farms (Montag et al., 2016) and extensive monitoring to date in the UK has not recorded any nesting skylark beneath or adjacent to ground mounted solar panels (Solar Energy UK, 2023). For this reason, the marshy grassland habitat where the solar farm is to be constructed would be lost as nesting habitat for the species. This is estimated to be one territory for skylark and one territory for meadow pipit, based on 2023 survey data. Nesting in suitable habitat adjacent to the Proposed Development will likely continue to occur and both species will forage within and adjacent to the solar array footprint (Solar Energy UK, 2023) with birds from nesting territories outside of the Site foraging in the grassland within the Proposed Development.

6.4.49 As such, it is likely that a minor, long-term displacement impact to ground nesting birds will occur at a Site level as a result of the Proposed Development, given the availability of off-Site breeding habitat in the wider surrounding area (i.e., Mynydd Maen Common). This effect is assessed as significant adverse at the site level.

Decommission Phase

6.4.50 The solar farm will be operated for 40 years after which it will be decommissioned, the infrastructure removed, and the land returned to agriculture. Impacts on ecology receptors during decommissioning are expected to be no more than during the construction phase.

6.4.51 There are unlikely to be any significant ecological effects as a result of decommissioning. Any temporary localised effects on non-statutory sites, Annex 1 habitats (dry heath) and other habitats around the Site are likely to be short term. Habitats are likely to regenerate to a condition representative of the baseline over time.

6.4.52 Species most likely to be disturbed and displaced from the Site during decommissioning are those that breed, shelter or forage within it at that time. Decommissioning would therefore need to be informed by baseline survey work.

6.4.53 It is reasonable to expect that there would be changes in legislation concerning protected species, as well as changes in local populations and distribution over the operational life of the Proposed Development. These may be driven by climatic change, landscape-scale land management, increased effectiveness / policing of protection, the spread of populations, reintroduction programmes and other factors.

6.4.54 Predictions are not therefore possible, with any confidence, over a 50-year period (particularly given the rate of change in number and distribution of many protected species over the past 50 years). It follows that effects on habitats and species would be best addressed through a decommissioning phase Environmental Management Plan.

Secondary mitigation and enhancement

6.4.55 The assessment concludes that without secondary mitigation measures the following ecological features would be significantly affected during the construction phase:

- Mynydd Maen SINC (significant adverse effect at the local level),
- Scattered trees (significant adverse effect at the site level),
- Dry heath (significant adverse effect at the local level),
- Acid grassland / dry heath mosaic (significant adverse effect at the site level),
- Badger (significant adverse effect at the site level),
- Breeding birds (significant adverse effect at the local level, and
- Great crested newt (significant adverse effect from the local level).

6.4.56 The assessment also concludes that without secondary mitigation measures the following ecological features would be significantly affected during the operational phase:

- Breeding birds (significant adverse effect at the site level).

6.4.57 The effects predicted are due to the SINC, and the dominant habitats within (dry heath and dry heath / acid grassland mosaic) being reduced in extent. The great crested newt population and nesting birds are features of the habitats present on and close to the Site, and dependent on them for shelter. It follows that secondary mitigation and enhancement measures should be aimed at maintaining the existing habitats, and where possible, improving their condition and extent.

Designated Sites

SINCs

6.4.58 Habitat loss / modification for habitats associated within the SINCs will be reduced during the construction phase by minimising the working footprint as far as practicable. This will be achieved by following footpath / tracks which support poorer areas of habitat (resulting from frequent disturbance) to reduce impact to habitats which are features of the SINC (i.e., dry heath).

6.4.59 Additionally, any temporary lay-down, vehicle access points, material storage or construction compounds (as required during the cable route installation) will be confined to tracks, laybys or appropriate areas as identified / discussed with the project Ecologist and agreed with the commoners.

6.4.60 Any soil removal undertaken as part of the cabling works should be done so following a Soil Management Plan, to ensure soils are replaced in the appropriate locations to allow habitats to re-establish and return to their previous condition. This management plan should be detailed within the condition CEMP.

6.4.61 Following the mitigation measures outlined above, it is assessed that the Proposed Development would result in a negligible effect on Mynydd Maen SINC.

Habitats

Scattered trees

6.4.62 The limited loss of scattered trees will be compensated for by the creation of new boundary planting which will include approximately 400 trees (and 400 m of hedgerow canopy) to improve field boundary features. The hedgerows will be planted with mixture of native species of local provenance and include a various fruiting species to provide a long-term food resource, and overall resilience. The recreation of hedgerows will improve ecological connectivity and resource across the Site for a range of protected species. The hedgerows will be appropriately managed, with rotational cutting to create a robust and to create a robust and functional structure and increase local ecological connectivity across the Site.

6.4.63 Following the compensation and enhancement measures outlined above, the Proposed Development will result in a significant beneficial effect at the local level.

Dry heath

6.4.64 As with mitigation for Mynydd Maen SINC, the loss / modification for dry heath will be reduced by minimising the working footprint as far as practicable. This will be achieved by following footpaths / tracks supporting poorer areas of habitat within the common to reduce impacts during the construction phase.

6.4.65 Additionally, any temporary lay-ups, vehicle access points, material storage or construction compounds (as required) will be confined to tracks, laybys or appropriate areas as identified / discussed with the project Ecologist and agreed with commoners.

6.4.66 Any soil removal undertaken as part of the cabling works should be done so following a Soil Management Plan, to ensure soils are replaced in the appropriate locations to allow habitats to re-establish and return to their previous condition. This management plan should be detailed within the condition CEMP. Given dry heath vegetation readily regrows following cutting this is considered to be a short-term effect.

6.4.67 Following the above mitigation measures it is assessed at the overall effect of the Proposed Development on dry heath habitat will be negligible.

Dry heath / acid grassland

6.4.68 Similarly to above, impacts to dry heath / acid grassland will be reduced by avoiding habitats of higher quality during the construction phase and any temporary lay-ups, vehicle access points, material storage or construction compounds (as required) will be confined to tracks, laybys or appropriate areas as identified / discussed with the project Ecologist.

6.4.69 Any soil removal undertaken as part of the cabling works should be done so following a Soil Management Plan, provided as part of a conditioned CEMP. Given dry heath vegetation readily regrows following cutting this is considered to be a short-term effect.

6.4.70 Following the above mitigation measures it is assessed at the overall effect of the Proposed Development on dry heath / acid grassland habitat will be negligible.

Protected Species

Badger

6.4.71 A pre-construction 'check' survey will be carried out for badger setts to ensure that any new badger setts are identified, ahead of the construction phase. If identified, further survey to inform appropriate mitigation measures and a disturbance licence from NRW may also required. This pre-construction 'check' survey will be secured through its inclusion in the CEMP.

6.4.72 The proposed enhancement measures within the scheme include the enhancement of grassland habitats, rough grassland margins, tree planting and other actions identified in the LEMP will provide an enhanced foraging resource for badgers and potentially lead to an increase in their population in the area.

6.4.73 Following the mitigation and enhancement measures above, it is assessed that the Proposed Development will result in a significant beneficial effect on badger at the local level.

Breeding birds

6.4.74 To avoid impacts to breeding birds using field boundary trees during the construction phase, tree removal will be undertaken outside of the breeding bird season (March to August inclusive), or following a pre-works check of the area by a Suitably Qualified Ecologist. Additionally, ground works associated with the cable route installation and / or within fields will be time to avoid the breeding season or undertaken following a pre-works check of the area by a Suitably Qualified Ecologist.

6.4.75 In order to avoid impacts to goshawk nesting in neighbouring woodland, a pre-construction survey in later winter / early spring, to identify potential nesting locations will be undertaken. The information will be used to inform a sensitive working / mitigation plan to be adhered to during the construction phase. This may involve a construction watching brief under licence, by a Suitably Qualified Ecologist, or restrictions on timing of works (avoiding March to May, inclusive, when birds are most sensitive to disturbance).

6.4.76 During the operational phase there will be a permanent loss of a small area of nesting habitat (marshy grassland) for ground nesting species (i.e., meadow pipit and skylark). The loss of ground nesting habitat as a result of the Proposed Development will be compensated for by the enhancement measures delivered by the scheme. This includes the enhancement of grassland, rough field margins and the creation of a hedgerow network across the Site to provide an increased foraging resource to support these species and other ground nesting species within Mynydd Maen common.

6.4.77 The enhancement of fields, rough grassland margins, the creation of hedgerows, the planting of trees, the installation of bird boxes and other actions identified in the LEMP will enhance the habitat for breeding birds and potentially lead to an increase in their populations in the area. This includes

Section 7 listed species (i.e., dunnock and mistle thrush) recorded in low numbers elsewhere on Site. The increase in bird populations will provide an additional benefit by increasing the breeding opportunities for the parasitic cuckoo or bird prey for raptor / owl species including goshawk and owl on, and adjacent to, Site.

6.4.78 Overall, the impacts on open-field ground nesting species will be offset through the enhancement of retained grassland and boundary features, and the large area of good foraging resulting from the grassland planting below and around the solar arrays. Accounting for the mitigation and enhancement measures, the Proposed Development results in a neutral effect on ground nesting species and a significant beneficial effect on breeding birds at the local level.

Great crested newt

6.4.79 Harm to great crested newt can be avoided by timing construction works to within the hibernation period (October to February), to reduce the likelihood of encountering animals during works. As the cable route follows existing footpaths, vegetation removal is not anticipated to facilitate works. However, if it is necessary in localised areas impacts will be avoided by staged cutting of vegetation and hand-searching by a suitably qualified Ecologist. This mitigation measure will be secured through the inclusion of a specific method statement (great crested newt Conservation Plan) in the CEMP.

6.4.80 The enhancement of fields under the solar arrays, rough grassland margins, planting of trees and hedgerow to enhance boundary features, creation of hibernacula and other actions identified in the LEMP will enhance the habitat in the wider surrounding area for great crested newt. Overall, this is assessed as a significant beneficial effect at the Site level.

Reptiles and common toad

6.4.81 As above, harm to reptiles and common toad can be avoided by timing construction works to within the hibernation period (October to February), to reduce the likelihood of encountering animals during works. As the cable route follows existing footpaths, vegetation removal is not anticipated to facilitate works. However, if it is necessary in localised areas impacts will be avoided by staged cutting of vegetation and hand-searching by a suitably qualified Ecologist. This mitigation measure will be secured through the inclusion of a specific method statement in the CEMP.

6.4.82 This can be avoided by using a combination of staged cutting of vegetation to discourage reptiles or amphibians from the area and in more sensitive areas, such as potential hibernacula, with hand-searching by a Suitably Qualified Ecologist. This mitigation measure will be secured through the inclusion of a specific method statement in the CEMP.

6.4.83 The enhancement of fields under the solar arrays, planting of trees and hedgerow to enhance boundary features, creation of hibernacula and other actions identified in the LEMP will enhance the habitat for reptiles and amphibians and potentially lead to an increase in their population in the area, this is assessed as a significant beneficial effect at the local level. .

Biodiversity Net Benefit

6.4.84 Planning Policy Wales 12 sets out that development should not cause any significant loss of habitats or populations of species, locally or nationally, and must provide a net benefit for biodiversity.

6.4.85 A letter from the Welsh Government's Chief Planner has clarified that, "a net benefit for biodiversity can be secured through habitat creation and / or long-term management arrangements to enhance existing habitats, to improve biodiversity and the resilience of ecosystems." The Proposed Development will deliver biodiversity net benefit though the following principles (outlined below). Evidence of how this has been considered, following a stepwise approach and considering ecosystem resilience using the DECCA framework is presented in Appendix 6.7. The approach to

delivering Biodiversity Net Benefit as part of the Proposed Development would be contained in the LEMP.

6.4.86 The LEMP would aim to deliver the following measures (further details for each prescription is provided in Appendix 6.7):

6.4.87 Creation / enhancement of approximately 400 m of new hedgerow canopy along historic field margins / fence lines between mature trees and planting of 400 new hedgerow trees and prescriptions for the appropriate management of.

6.4.88 Management of 5 m -15 m perimeter grassland strips to improve species (floristic) diversity over time, and the creation of habitat that will support small mammals and a wide variety of invertebrates.

6.4.89 Management prescriptions for the enhanced areas of species-rich semi-improved neutral grassland.

- The creation of habitat piles and hibernacula within filed margins and close to off-Site ponds.
- The installation of owl nest boxes, breeding bird boxes and bat boxes in suitable locations.
- The potential for low intensity grazing of areas between and beneath solar panels by sheep.
- An appropriate monitoring scheme to ensure the enhancement measures are delivered in accordance with the objectives set out within the LEMP.

6.4.90 Overall, the enhancement measures delivered by the scheme will provide improved ecological connectivity and diversity (and subsequently resilience) across the Site. Additionally, the creation and enhancement will offer an increased foraging, sheltering and commuting resource to benefit a range of species including invertebrates, bats, badgers, breeding birds, hazel dormouse, reptiles, amphibians and other notable mammal species.

Residual Effects

6.4.91 If the mitigation and enhancement measures detailed in this Chapter and the LEMP are implemented effectively, then there will be no residual adverse impacts on habitats, species, or sites as a result of the Proposed Development.

Table 6.4: Summary of Residual Ecological Effects

Feature	Impact	Importance of Feature / Site to feature	Magnitude of Impact[1]	Significance of Effect (in absence of further mitigation)	Type of Mitigation (and Enhancement)	Significance of Residual Effect
SINCs	Loss of extent and condition	County	Moderate	Local	Tertiary mitigation (CEMP). Secondary measures identified to retain condition	Neutral
ANWS	Loss of condition	County	Moderate	Local	Primary. Design phase avoidance.	Neutral

[1] This considers factors such as extent, duration, and severity, and is expressed as minor, moderate, or major.

Feature	Impact	Importance of Feature / Site to feature	Magnitude of Impact[1]	Significance of Effect (in the absence of further mitigation)	Type of Mitigation (and of Enhancement)	Significance of Residual Effect
					Tertiary measures (in CEMP)	
Broadleaved semi-natural woodland	Loss of condition	Local	Moderate	Site	Primary. Design phase avoidance. Tertiary measures (in CEMP)	Neutral
Scattered trees	Loss of extent and condition	Local	Minor	Site	Primary. Design phase avoidance. Tertiary measures (in CEMP). Secondary measures identified to enhance resource.	Locally positive (extent and condition improved).
Dry heath	Loss of extent	County	Moderate	Local	Tertiary mitigation (CEMP). Secondary measures identified to retain condition	Neutral
Dry heath / acid grassland mosaic	Loss of extent	County	Moderate	Local	Tertiary mitigation (CEMP). Secondary measures identified to retain condition	Neutral
Acid flush	Loss of condition	Local	Moderate	Local	Primary. Design phase avoidance. Tertiary measures (in CEMP)	Neutral
Badger	Killing injury and disturbance	/N/A	Minor	Site	Primary. Design phase avoidance. Tertiary measures (in CEMP).	Negligible

Feature	Impact	Importance of Feature / Site to feature	Magnitude of Impact[1]	Significance of Effect (in the absence of further mitigation)	Type of Mitigation (and Enhancement)	Significance of Residual Effect
					Secondary measures identified to avoid killing / injury and disturbance.	
Bats	Killing /injury, loss of habitat and disturbance	Local	Moderate	Local	Primary. Design phase avoidance. Tertiary measures (in CEMP). Secondary measures identified to enhance habitat resource.	Positive at local level
Breeding birds (including ground nesting & schedule 1 species)	Killing /injury, loss of habitat and disturbance	Local	Moderate	Local	Primary. Design phase avoidance. Tertiary measures (in CEMP). Secondary measures identified avoid killing / injury and disturbance to and enhance habitat resource.	Positive at local level
Great crested newt	Killing /injury, loss of terrestrial habitat	County	Moderate	Local	Tertiary measures (in CEMP). Secondary measures identified avoid killing / injury and disturbance to and enhance habitat resource.	Positive at the site level
Reptiles and common toad	Killing /injury, loss of habitat	Local	Minor	Site	Primary. Design phase avoidance. Tertiary measures (in CEMP). Secondary measures identified	Positive at local level.

Feature	Impact	Importance of Feature / Site to feature	Magnitude of Impact[1]	Significance of Effect (in the absence of further mitigation)	Type of Mitigation (and Enhancement)	Significance of Residual Effect
					avoid killing / injury and disturbance to and enhance habitat resource.	
Other notable mammal species	Killing /injury, loss of habitat	Local	Minor	Site	Tertiary measures (in CEMP).	Positive at local level.

6.5 Assessment of Cumulative Impacts

6.5.1 Consideration has been given as to whether any of the ecological features that have been taken forward for assessment in this chapter are likely to be subject to cumulative effects as a result of the Proposed Development and other developments. Cumulative effects are most likely to result with regard to those receptors for which a significant residual effect is predicted, particularly if the core range of these receptors includes other planned, consented or built development. This assessment also includes consideration of effects considered non-significant, as a number of minor effects on ecological features from multiple projects may result in a significant cumulative effect.

6.5.2 Cumulative effects may therefore be:

- Cumulative 'zone of influence' effects whereby two or more developments affect the same specific feature (e.g. two developments within the same SINC or area of heathland).
- Cumulative effects on the total resource (or population) of an ecological feature in a region due to two or more developments (e.g. two developments affecting the same feature reducing its overall extent or number).

6.5.3 Assessment of cumulative effects is is reliant on the availability of suitable information from other schemes in the wider area and the definition of an appropriate and realistic scope. For the Mynydd Maen wind farm a 2 km EZoI has been considered, as this is considered sufficient to cover the core ranging area for mobile species using the Site.

6.5.4 The main potential for cumulative effects arising from projects in the wider area is with regard to proposed wind farm schemes on and adjacent to Mynydd Maen common. These include the proposed Mynydd Maen wind farm located less than 500 m north-east and Treclyn wind farm which is split over two land parcels the first is 200 m north and the second borders the southern edge of the Site.

6.5.5 Mynydd Maen wind farm proposal includes the construction of up to thirteen turbines, and other on-site infrastructure including new access tracks, crane hardstanding, substation compound, electricity transformers, underground cabling and drainage works. Mynydd Maen wind farm is located within Mynydd Maen SINC, and the land within the red-line boundary includes areas of dry heath, acid grassland, dry heath / acid grassland mosaic and acid flush habitat. The draft Environmental Statement (available on Mynydd Maen wind farm website - https://www.mynyddmaen-windfarm.co.uk/dns-application) includes a suite of Phase 1 and 2 surveys and protected species surveys including great crested newt. Great crested newt surveys recorded several ponds are

present on and adjacent to, the red line boundary which support the small population of great crested newt assessed as part of this evaluation.

6.5.6 The land within the Trecelyn red line boundary takes in enclosed upland fringe farmland that is similar in character to the habitats present on Site. No turbine layout was included in the Trecelyn scoping report (Wood Group, 2022). The applicant has undertaken Phase 1 and Phase 2 botanical surveys. Bat transects and automated detector work have also been completed and surveys have been carried out for dormouse and great crested newt. The results have shown the habitats are agriculturally improved, and that hedge lines are largely defunct, and are characterised by beech. A low population of great crested newt have been recorded. Otter and water vole are assumed absent due to a lack of suitable habitats, and reptiles, if present, occur in low numbers.

6.5.7 It follows that the primary cumulative effect of proposed windfarms and the Proposed Development is the loss of the extent of SINC and the dominant habitats within (dry heath (Annex 1 habitat) and dry heath / acid grassland mosaic) and impacts to the small population of great crested newt which are a feature of the habitats close to the windfarm site.

6.5.8 In making a cumulative assessment it is reasonable to assume that to achieve biodiversity net benefit and obtain planning consent each of the schemes would need to deliver proportionate biodiversity enhancement aimed at the features impacted. Without doing so, the development in question should not be consented.

6.5.9 In the case of Mynydd Maen wind farm, the ES documents state the intention to deliver biodiversity enhancement to the common land (Mynydd Maen SINC), though improvement of the habitat condition across the Site. This includes restoration and management of dry heath, bracken control, control of feral (invasive) trees, pond creation and management and hydrological re-naturalisation improving condition of wet heath. Additionally, works undertaken at Myndd Maen wind farm would be done so under a European Protected Species mitigation licence for great crested newt. The licence will include a mitigation strategy, detailing measures to avoid construction phase disturbance, killing or injury and ensure the long-term management of any new receptor sites. As part of the licensing agreement, it is proposed to create two new ponds, these would be purpose-built ponds in accordance with industry standard guidance.

6.5.10 Therefore, It is therefore concluded that if all mitigation proposed in this assessment is applied, and Welsh Government policy on net benefit is applied when determining other schemes, no significant cumulative effects on ecological features would occur.

6.6 Conclusion

6.6.1 The assessment has concluded that there are unlikely to be any significant residual effects on ecological receptors during the construction and operation phases of the Proposed Development. The significance of effects during the operational phase of the Proposed Development is negligible and not significant for designated and ancient woodland sites and priority habitats, minor and not significant for ground nesting birds, and significantly beneficial for all other species receptors and hedgerows.

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7 CULTURAL HERITAGE

Introduction

7.1 This chapter assesses the likely significant effects of the Proposed Development relating to historic assets, including archaeology and built heritage. It considers all phases of the Proposed Development's lifespan and impacts relating to both physical fabric and changes in setting.

Assessment Methodology

7.2 This chapter should be read in conjunction with the following appendices and figures, which have been used to inform the assessment:

- Appendix 7.1 Cultural Heritage Desk-Based Assessment;
- Appendix 7.2 Geophysical Survey;
- Figure 7.1 Designated heritage assets within 5km of the Site;
- Figure 7.2 Historic Environment Record data plot, 1km radius;
- Figure 7.3 Hedgerows as shown on the 1839 Tithe Map

7.3 This chapter has been prepared by RPS Consulting, one of the UK's largest heritage consultancies. The RPS heritage team have extensive experience of undertaking impact assessments in the context of EIA for a wide range of developments including residential, logistics, infrastructure and renewables throughout the UK. RPS is a Registered Organisation of the Chartered Institute for Archaeologists (CIfA).

Planning Policy Context

- Ancient Monuments and Archaeological Areas Act 1979
- National Heritage Act 1983 and 2002, and updated in April 2014
- Well-being of Future Generation (Wales) Act 2015
- Historic Environment (Wales) Act 2016
- The new Historic Environment (Wales) Act 2023
- Hedgerow Regulations 1997
- Future Wales – the National Plan 2040 (February 2021)
- Planning Policy Wales (PPW)
- Hedgerow Regulations

Relevant Guidance

- Cadw (2011) Conservation Principles, Policies and Guidance for the Sustainable Management of the Historic Environment in Wales;
- Cadw (2017a) Heritage Impact Assessment in Wales;
- Cadw (2017b) Setting of Historic Assets in Wales; and
- Welsh Government (2017) TAN24 The Historic Environment.

Local Planning Policy

- Caerphilly Borough Council Adopted Local Development Plan (LDP)

Study Area

7.4 The baseline studies comprise a review of known historic assets within a 5km radius of the Site. The 5km study area was considered proportionate to identify historic assets in the surrounding area that might be adversely affected by the Development, taking into account their existing setting, its contribution to their cultural significance and intervisibility with the Site. It should be noted that the study area has been applied with a degree of professional judgement and not as an absolute cut off.

Baseline Methodology

7.5 The following data sources have been used:

- Cadw data sets – designated historic assets;
- Glamorgan-Gwent Archaeological Trust (GGAT)/Heneb Historic Environment Record (HER);
- Coflein – The online catalogue of archaeology, buildings, industrial and maritime heritage in Wales
- Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW);
- Satellite imagery;
- Environment Agency Lidar Data;
- A model Zone of Theoretical Visibility (ZTV);
- British Geological Survey; and
- Cranfield Soil and Agrifood Institute.

Consultation

7.6 The scope of this chapter has been informed by the DNS: EIA Scoping Direction. Consultation responses relating to cultural heritage are summarised in Table 7.1.

Table 7.1: Consultation Responses Relevant to this Chapter

Date	Consultee and Issues Raised	How/ Where Addressed
Date	Consultee and Issues Raised	How/ Where Addressed
6th October 2023	Cadw Cadw has agreed, the Cultural Heritage desk-based assessment followed appropriate methodologies and they agreed that no further assessment of the impact on the settings of designated historic assets is required. They concur with the DBA that a geophysical survey is required to be carried out in support of the EIA and identified the neccessity for further	The initial filtering process undertaken to identify potential significant effects relating to change in setting is presented in full in Appendix 7.1. This concluded that no significant effects were likely and effects relating to setting have duly been scoped out.

Date	Consultee and Issues Raised	How/ Where Addressed
	archaeological work depending on teh results of the survey.	
17th October 2023	Glamorgan-Gwent Archaeological Trust (GGAT) Commenting on an early draft of the DBA, GGAT advised that amendments were required to comply with relevant guidance, but agreed with the conclusions regarding archaeological potential and the recommendation that a geophysical survey be undertaken to characterise the archaeological potential. GGAT did not agree that Cultural Heritage could be scoped out of the EIA.	The Cultural Heritage Statement was updated to conform to both requirements of CIfA and WHER. The geophysical survey was carried out in November 2023 and the scope was agreed in advance with the archaeological advisors to the LPA (GGAT) and that a WSI was submitted, reviewed and approved. A programme of trial trenching will be undertaken in line with a WSI agreed with GGAT. The results will be provided prior to determination as addendum to the ES.

Assessment Criteria and Assignment of Significance

Receptor Sensitivity/Value

7.7 The sensitivity of heritage receptors reflects their relative importance, which will depend on factors such as condition, rarity, potential as a data source, associations with events or people, architectural or historic interest. Importance, and hence sensitivity, has been defined here with reference to designation, where applicable, and professional judgement. Table 7.2 sets out the guideline criteria for assessing sensitivity.

Table 7.2: Example Definitions of Sensitivity or Value

Sensitivity	Typical Descriptors
Very High	Historic assets of international importance. World Heritage Sites and the individual attributes that convey their Outstanding Universal Value. Areas associated with intangible heritage and areas with associations with particular innovations, scientific developments, movements or individuals of global importance. Assets that can contribute significantly to acknowledged international research objectives.
High	Scheduled Monuments, Listed Buildings (Grade I, II*), Registered Historic Parks and Gardens (Grade I, II*), Registered Historic Landscapes, Registered Battlefields, Protected Wrecks, Protected Military Remains. Other listed buildings that can be shown to have exceptional qualities in their fabric or historical association not adequately reflected in the listing grade. Unscheduled sites and monuments of schedulable quality and/or importance including those discovered through the course of evaluation or mitigation. Archaeological assets that can contribute significantly to acknowledged national research objectives. Conservation Areas containing very important buildings. Undesignated structures of clear national importance.

Sensitivity	Typical Descriptors
	Deposits with a demonstrable high potential to contain artefactual and/or palaeoenvironmental material, possibly as part of a prehistoric site or landscape.
Medium	Conservation Areas, Grade II Listed Buildings and Registered Historic Parks and Gardens. Undesignated archaeological assets that can contribute to regional research objectives. Historic townscapes and landscapes with reasonable coherence, time depth and other critical factor(s). Unlisted assets that can be shown to have exceptional qualities or historic association. Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value. Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factors. Prehistoric deposits with moderate potential to contribute to an understanding of the palaeoenvironment.
Low	Historic assets with importance to local interest groups or that contribute to local research objectives. Locally Listed Buildings and Sites of Importance within a district level. Robust undesignated assets compromised by poor preservation and/or poor contextual associations. Robust undesignated historic landscapes. Historic landscapes with importance to local interest groups. Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations. Prehistoric deposits with low potential to contribute to an understanding of the palaeoenvironment.

Magnitude of Impact

7.8 The magnitude of impact is assessed with reference to the degree of change in the receptor's cultural significance. Guideline criteria for assessing magnitude of predicted change on historic assets are given in Table 7.3 below.

Table 7.3: Example Definitions of Magnitude

Sensitivity	Typical Descriptors
High	Change to most or all key elements of the historic asset, or changes within the setting of the asset, such that the cultural significance of the asset is lost or substantially harmed.
	Change to most or all key elements of the historic asset, or changes within the setting of the asset, such that the cultural significance of the asset is substantially enhanced.
Medium	Change to elements of the historic asset, or changes within the setting of the asset, such that the cultural significance of the asset is clearly harmed.
	Change to elements of the historic asset, or changes within the setting of the asset, such that the cultural significance of the asset is clearly enhanced.
Low	Change to elements of the historic asset, or changes within the setting of the asset, such that the cultural significance of the asset is slightly harmed.
	Change to elements of the historic asset, or changes within the setting of the asset, such that the cultural significance of the asset is slightly enhanced.

Sensitivity	Typical Descriptors
Negligible	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is barely affected.
	Change to elements of the historic asset, or changes within the setting of the asset, such that the significance of the asset is barely affected.
No change	Change to elements of the historic asset or its setting that leave its cultural significance unchanged.

7.9 The sensitivity of the heritage receptor, together with the magnitude of impact, defines the significance of the effect (Table 7.4). The impacts could potentially be adverse, neutral or beneficial. The matrix (Table 7.4) is not intended to mechanise judgement of the significance of effect, but to act as a check to ensure that judgements regarding sensitivity, magnitude of impact and significance of effect are reasonable and balanced and hence aid professional judgement. In some cases, the matrix allows a choice of significance of effect when a magnitude of impact and a value are combined. In these cases, the individual attributes of a specific asset, along with any relevant Site-specific factors and consideration of other influencing elements, have been taken into account when considering which is the most appropriate significance of effect to apply.

Significance of Effects

Table 7.4: Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

Limitations of the Assessment

7.10 A geophysical survey (Appendix 7.2) formed part of the work undertaken to establish baseline conditions for assessment, but no intrusive archaeological fieldwork has been undertaken to confirm its results. It is considered that there is a degree of limitation, as the survey did not cover all areas and the state of preservation of the anomalies encountered has not yet been established. This will be addressed through a programme of trial trenching, which will be undertaken in line with a WSI agreed with GGAT. The results will be provided prior to determination as an addendum to the ES.

7.11 In conclusion, the available datasets allow a reasonable amount of reliance and the above identified limitations do not materially affect the conclusions reached below.

Baseline Environment

7.12 The following section provides a summary of the baseline conditions and identifies the historic assets that may be affected by the Development and hence have been carried through to assessment. The information presented here is summarised from the Cultural Heritage Desk-Based Assessment and Geophysical Survey (Appendices 7.1-2).

Designated Historic assets within the 5km Study area

7.13 The designated historic assets within a 5km radius of the Site (see Appendix 7.1) comprise the following:

- Ten Scheduled Monuments of national significance
- 163 Listed Buildings of national significance
- Five Conservation areas of local/regional significance (Figure 7.1).

7.14 There are no designated historic assets (Scheduled Monuments, Listed Buildings, Conservation Areas, Registered Parks and Gardens) located within the Site.

7.15 There are no Registered Parks and Gardens, World Heritage Sites, Landscapes of Outstanding Historic Interest or Historic Battlefields within the 1km study area, or within 5km of the Site.

7.16 In keeping with the approach espoused in Cadw guidance (2017b), the above have been reviewed in order to identify those that might be affected by the proposed development. This has been informed by a Zone of Theoretical Visibility (ZTV) that took into account the screening effect of buildings and woodland supported by site visits where necessary. A detailed description of the methods used in the production of the ZTV is presented in Chapter 5: Landscape and Visual. This review[1] concluded that the proposed development would result in change in the setting of three historic assets but that this would be neutral and would not affect their cultural significance.

7.17 Consequently, it is considered that there will be no impact and designated historic assets have been scoped out of the assessment. This is in line with the scoping opinion received from Cadw.

Non-Designated Historic assets

Known Historic assets within the Site and Archaeological Potential

7.18 There is no evidence for Prehistoric or Roman activity recorded on the HER or the recent geophysical survey within the Site. The potential for any hitherto unknown archaeological remains from these periods is considered to be low.

7.19 The only identified potential for archaeological remains date to the Early Medieval and Medieval period. A site of a monastic grange is recorded on the HER at the centre of the Site at Cil-Lonydd (see Appendix 7.1 for further details). Placename evidence relating to a field in the Site indicates that this may have had Early Medieval antecedents in the form of a hermitage (GGAT 00094g, Figure 7.2).

7.20 The Post-Medieval and later farmhouse of Cil-Lonydd Farm (GGAT 05035g) is thought to occupy the site of the grange farmstead itself (GGAT 08327g; Figure 7.2) and probable physical evidence for the ecclesiastical site is recorded just north of Cil-Lonydd farm as fragments of lime-mortared masonry found during ploughing (GGAT 00094g, 00095g) – although no actual walling or

[1] Presented in full in Appendix 7.1.

foundations were seen. To the north-west of this area a small rectangular enclosure has been recorded from cropmarks (GGAT 03289g). This has been interpreted as a church and churchyard. Re-examination of available aerial photographs at the RCHAMW collection and CRAPW in February 2024 has not confirmed the presence of the cropmarks and the geophysical survey did not record any anomalies in the given location corresponding with the description.

7.21 The geophysical survey recorded anomalies of possible archaeological origin in the vicinity of the cropmarks and the area of the believed location of the grange (see Appendix 7.2). A possible archaeological enclosure has been identified in the centre of the survey area, which may be linked to the features on the historic record.

7.22 Any buried remains associated with the grange could be of up to regional value. The potential for archaeological remains from the Early Medieval and Medieval periods is considered high. It is considered that any archaeological remains present in the Site are unlikely to be of more than regional significance.

7.23 Former field boundaries and historical agriculture have been identified by the geophysical survey across the survey area in the form of ridge and furrow – no earthworks were visible during the site visit in support of the Cultural Heritage desk-based assessment. A track corresponding with a mapped (but no longer extant) Modern farm road was also detected, as well as further modern agricultural trends.

7.24 A Post-Medieval square structure (GGAT05036g) is recorded towards the northern boundary of the Site. However, it appears the location may be plotted erroneously to the north of an internal boundary, when its location was confirmed to be to the south of that boundary. The structure has been interpreted as possibly military, or more generally to be of Modern date. It is assumed this structure will be retained within the development design.

7.25 Finally, the HER (GGAT 00094g) describes ‘faint traces of a mound which may cover vestiges of a small building’, although this was not clear on the site visit supporting the Cultural Heritage Desk-Based Assessment.

Historic Hedgerows

7.26 Most of the extant hedgerows were present on the Tithe mapping from 1839 (Figure 7.3) and are therefore considered to be of historic importance under the Hedgerow Regulations 1997 and as part of a historic landscape of local importance, they are of low sensitivity.

Future Baseline Conditions

7.27 In the absence of the Development, the baseline is likely to remain substantively unchanged. The designated historic assets and their settings within the study area would remain as they are currently. Any hitherto unknown archaeological features within the Site would continue to be located within improved pasture fields and would remain at risk of being slowly eroded and, if converted to arable land, degraded by ploughing and other agricultural activity.

Mitigation Measures Adopted as Part of the Project

7.28 Depending on the results of the trial trenching, potential impacts upon buried archaeological remains will be mitigated where necessary through a programme of archaeological works allowing for the appropriate excavation and recording of the affected assets and/or preservation in situ through methods such as the use of ‘feet’ for the mounting of the solar arrays, which would minimise ground disturbance in areas of archaeological sensitivity. These measures will be agreed with GGAT.

7.29 The Modern, possible military square structure (GGAT05036g) within the northern part of the Site is assumed to be retained within the development design.

7.30 Hedgerows are for the most part retained in the design and will be fenced off during the construction phase to prevent accidental damage.

Assessment of Construction Effects

7.31 Construction work will result in ground disturbance in the form of:

- Topsoil stripping for access tracks, compounds and transformer and substation locations;
- Excavation of cable trenches linking the ends of arrays;
- Driving of piles for the arrays and posts for security fencing and CCTV system.

7.32 This has the potential to disturb archaeological remains within the Site, resulting in adversely altering their archaeological value and hence cultural significance. This will be prevented by detailed design measures, e.g. the use of concrete feet for the mounting of solar arrays to prevent ground disturbance, or offset through archaeological recording and analysis, depending on the results of archaeological trial trenching. For the purposes of this assessment, it has been assumed that mitigation in all cases takes the form of offsetting, as this represents the worst-case scenario.

7.33 Based on the results of the baseline studies (Appendices 7.1 & 7.2), the Site was part of a monastic grange in the Medieval period, which had Early Medieval antecedents, and there are buried remains present that are likely to be associated with this. The cultural significance of such assets would relate entirely to their archaeological interest and hence fabric. Such remains could potentially be of regional significance and hence medium sensitivity. They would be subject to localised disturbance primarily by driven piles, but also potentially be topsoil stripping and the excavation of cable trenches. This would result in the partial loss of their archaeological interest. Mitigation in the form of excavation and appropriate subsequent work would offset the loss of such remains by realising their archaeological potential and will reduce the impact of the scheme to a low magnitude.

7.34 It is considered that there is low potential for hitherto unrecorded archaeology not related to the grange to be present. Given the groundworks associated with the Proposed Development, there is potential to that such remains would be disturbed, though this is correspondingly low. The importance and sensitivity of such remains is unknown.

7.35 Based on the Masterplan provided by the client, the majority of the hedges are to be retained. A fragmented section of hedge within the centre of the Site is planned to be cleared. Based on the available historic mapping, this part of the Site has already seen the loss of several boundaries and has thus already experienced some erosion. The loss of these hedgerows, although fragmentary, will substantially reduce the legibility and hence illustrative value of the field-system resulting in a permanent adverse impact of medium magnitude. The hedgerows are considered to be of local importance and low sensitivity. As such, this is considered to represent an effect of minor significance.

Assessment of Operational Effects

7.36 The operational phase of the Proposed Development will not have any direct physical effect on archaeological remains within the Site as this will not typically involve any ground disturbance. In the event that ground disturbance is required, for example where repairs are necessary to buried infrastructure, this will be contained within ground disturbed during the construction phase of the Proposed Development. There is therefore no potential for operational effects upon buried archaeology.

7.37 Historic hedgerows will be maintained throughout the operational phase. There is therefore no potential for operational effects upon historic hedgerows.

Assessment of Decommissioning Effects

7.38 Ground disturbance associated with decommissioning phase will be restricted to those areas disturbed during the construction phase. It is therefore considered that there is no potential for decommissioning to affect the physical fabric of any heritage assets.

Assessment of Cumulative Effects

7.39 In the current context, there is no potential for cumulative effects relating to fabric. Possible archaeological features have been recorded within the Site by the HER and the geophysical survey, but there is no indication that these might also be affected by any of the cumulative schemes. The closest cumulative scheme is Trecelyn Windfarm. The construction footprint of which is c.50m to the east of the Site. Based on the geophysical survey, there is no indication of any archaeological remains extending into the area between the Site and Trecelyn and it is concluded that there is no potential for cumulative effects to occur.

Inter-relationships

7.40 No potential inter-relationships with other chapters have been identified.

Summary of Effects

7.41 No Effects are predicted in respect of designated historic assets at any stage of the Proposed Development's lifespan.

7.42 The construction phase of the Proposed Development has the potential to disturb archaeological remains associated with a Medieval grange and, potentially, earlier features. This will be addressed through mitigation measures that will allow for the preservation in situ of remains, the offsetting of physical loss through a programme of archaeological work or a combination of the two. Following the implementation of mitigation measures, such effects will be reduced to at most minor significance. This is not significant in the context of the EIA Regulations.

7.43 Elements of the hedgerows within the Site will be removed during construction. The hedgerows meet the criteria for important historic hedgerows under the Hedgerow Regulations. They are considered to be of local importance and low sensitivity. The loss of small sections would result in an effect of minor significance. This is not significant in the context of the EIA Regulations.

7.44 No effects are predicted in respect of the operational or decommissioning phases.

7.45 No potential cumulative effects have been identified.

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Table 7.5: Summary of Likely Environmental Effects on Cultural Heritage

Receptor	Sensitivity of Receptor	Description of impact	Short/medium/long term	Magnitude of impact	Significance of effect	Significant/Not significant
Early Medieval/Medieval monastic grange	Medium	Potential for disturbance or total loss without mitigation	Permanent	Permanent	Permanent adverse	Minor Significance
Historic Hedgerows	Low	Removal of a fragmented section of hedgerow	Permanent	Permanent	Permanent adverse	Not significant
Early Medieval/Medieval monastic grange	Medium	No impact	None	None	None	Not significant
Historic Hedgerows	Low	No impact	None	None	None	Not significant

8 HUMAN HEALTH

Introduction

8.1 This health chapter identifies and assesses the potential effects (both adverse and beneficial) of 'Cil-lonydd Solar Farm', referred to hereafter as the 'Proposed Development', on population health. Cenin (the applicant) proposes to develop a solar photovoltaic electricity generating station (or 'solar farm') with an installed generation capacity of approximately 35MW and associated ancillary development, including battery energy storage systems (BESS). The Site comprises approximately 37.5ha. The point of connection is proposed to be located at an existing 132 kV substation to the southeast on Mynydd Maen Common, which would be connected to the Site by a cable route of 3km.

8.2 The chapter considers appropriate actions to avoid or mitigate health risks and promote health opportunities.

8.3 Health is a *"state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity"* (World Health Organization, 1948). Mental health, which is a *"state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community"* (World Health Organization, 2024). 'Population health' refers to the health outcomes of a group of individuals, including the distribution of such outcomes within the group (Kindig & Stoddart, 2003).

8.4 The chapter's scope has been informed by the determinants of health set out in the Institute of Environmental Management and Assessment (IEMA) guidance (Pyper, Lamming, et al., 2022) and Wales Health Impact Assessment Support Unit (WHIASU) guidance (Wales Health Impact Assessment Support Unit, 2012). This considers how the Proposed Development affects health in relation to social and community influences on health; and macro-economic, environmental and sustainability factors.

8.5 Regard has also been had to vulnerable groups described in WHIASU guidance (Wales Health Impact Assessment Support Unit, 2012), including vulnerability due to age, income, discrimination or social disadvantage or geographical factors.

8.6 This chapter explains the public health implications of findings reported in other chapters of this ES.

Table 8.1 summarises the issues covered by this assessment; it also explains why some health determinants are not included in the assessment.

Table 8.1: Issues considered within the assessment based on WHIASU and IEMA guidance

Health determinant group	Issues covered within the assessment
Social and community influences	
Community identity, culture, resilience and influence	Operation and maintenance phase • The visual impact of the Proposed Development is scoped in to consider the potential for the introduction of visual change in the landscape to influence community context to an extent that could significantly affect population mental health and wellbeing. This includes any issues of local pride, sense of belonging and attractiveness of the area. This scope also considers the Proposed Development's influence on community identity as a beneficial visual cue that society is responding to the locally declared climate change emergency.
Macro-economic, environmental and sustainability factors	

Health determinant group	Issues covered within the assessment
Wider societal infrastructure and resources	Operation and maintenance phase • The Proposed Development's wider societal contribution to supporting public health is scoped in. The Proposed Development would provide energy infrastructure that supports many aspects of public health. A reliable supply of electricity is required in relation to factors including population food safety, thermal conform, healthcare, learning, income generation and social networking. Benefits to climate change from renewable energy generation are also scoped in.

Table 8.2: Issues scoped out of the assessment

Health determinant group	Issues scoped out of the assessment
Lifestyles	
Physical activity	All phases • It is noted that there are a number of Public Rights of Way (PRoW) bordering, adjacent to and near the Site, with a small section of one within the Site boundary. Potential disruptions to these are assessed under the 'Community identity' determinant. Disruptions during construction would be temporary, with access maintained and impacts minimised through a Construction Environmental Management Plan (CEMP) which will be conditioned. Operation of the Proposed Development is not anticipated to result in behaviour changes that could materially affect population physical activity. These effects are therefore scoped out.
Risk-taking behaviour	Construction and decommissioning phases • Issues of community health behaviours being detrimentally affected by the presence of the workforce are scoped out. This reflects a workforce of professionals who are assumed to return to their usual place of residence during periods of leave. The workforce is unlikely to be sufficiently large in number to affect local markets, e.g. for alcohol, cigarettes or gambling, to an extent which could significantly affect community health. Healthy workforce behaviour would be encouraged through a workforce management plan. There is not considered to be the potential for a likely significant population health effect, this issue is scoped out. Operation and maintenance phase • The scale of operational workforce numbers to check and maintain the Proposed Development infrastructure are not anticipated to affect risk taking behaviour to an extent that could influence population health effect for the same reasons as stated for construction and decommissioning phases. This issue is therefore scoped out.
Diet and nutrition	Construction and decommissioning phases • The Proposed Development would not require any temporary reduction in availability or quality of agricultural land to an extent that could affect food markets or food availability for the local population. This issue is therefore scoped out. Operation and maintenance phase • No effects on diet and nutrition are expected from operation of the Proposed Development, as there would be no, or minimal, further disturbance on agricultural lands to an extent that could affect food markets or food availability for the local population. This issue is therefore scoped out.
Social and community influences on health	

Housing	Construction and decommissioning phases • The majority of workers are assumed to be based in the regional area, returning to their usual place of residence when not working. Where temporary accommodation is required, this would be existing B&B/hotel bed spaces, as is typical for the construction industry. It is not expected that use of temporary accommodation would be on a scale to significantly: displace local residents; adversely affect seasonal tourism; or otherwise affect housing availability. There is not expected to be a loss of residential housing or permanent loss of outdoor spaces associated with dwellings. Housing effects are scoped out. Operation and maintenance phase • The scale of operational workforce numbers to check and maintain the Proposed Development infrastructure are not anticipated to affect risk taking behaviour to an extent that could influence population health effect for the same reasons as stated for construction and decommissioning phases. This issue is therefore scoped out.
Relocation	Operations and Maintenance and Decommissioning phases • Construction works would not involve compulsory purchases of homes or community facilities. This issue is therefore scoped out.
Open space, leisure and play	All phases It is noted that there are a number of Public Rights of Way (PRoW) bordering, adjacent to and near the Site, with a small section of one running through the Site boundary. Potential disruptions to these are assessed under the 'Community identity' determinant, where the potential for behaviour change is discussed. Disruptions during construction would be temporary, and impacts would be minimised through appropriate management plans. Operation of the Proposed Development is not anticipated to result in behaviour changes that could materially affect health outcomes related to access to open space, leisure and play. These effects are therefore scoped out.
Transport modes, access and connections	Construction and decommissioning phases • While there would be construction and decommissioning related transport effects as a result of the Proposed Development, these are not anticipated to be of a scale or duration that would influence population health. Any temporary changes to traffic flows and access would be managed through suitable management plans. Operation and maintenance phase • Operation and maintenance of the Proposed Development is likely to result in little to no changes in transport modes, access and connections, therefore this issue has been scoped out.
Community safety	All phases • Where surface excavations are undertaken these would be within controlled work areas, including use of appropriate fencing and notifications as required. Best practice measures would be secured through suitable management plans. The risk to the public from accidental injury, e.g. falls or drowning is scoped out. There are not anticipated to be community safety or security issues associated with worker behaviour in communities. The Proposed Development would have appropriate safeguarding and modern slavery policies. The potential for widespread actual or perceived crime that could affect population health is unlikely. These issues are scoped out.
Community identity, culture, resilience and influence	Construction and decommissioning phases • Transient effects, including due to temporary lighting and temporary changes in views, are not expected to influence community identity or disrupt community gatherings to an extent that could affect population health. This issue is therefore scoped out.

Social participation, interaction and support	All phases • The Proposed Development would not directly affect land used for community interaction (e.g., meeting places, village greens, community centres, etc. that promote community voluntary, social, cultural or spiritual participation). This issue is scoped out.

Living and environmental conditions affecting health

Climate change and adaptation	Construction and decommissioning phases • Embodied carbon and climate altering pollutant emissions are not of a scale to have the potential for population level effects associated with climate change. This issue is scoped out. Operations and maintenance phase • Operation of the Proposed Development would provide a positive climate adaptation in the form of renewable energy generation. However, to avoid double counting, this issue is discussed in 'Wider societal infrastructure and resources'.
Air quality	Construction and decommissioning phases • Construction and decommissioning activities are not expected to result in localised dust and construction traffic emissions. Effects resulting from emissions to air, including dust emissions and other pollutants, such as emissions from traffic have been scoped out. Operational and maintenance phase • Operational air quality effects (e.g. maintenance vehicle emissions) are not anticipated to be of a scale, even accounting for non-threshold effects, that could affect population health. This issue is therefore scoped out.
Water quality and availability	Construction and decommissioning phases • The Proposed Development would adopt standard best practice spill avoidance and response measures including the production of an CEMP which would be conditioned. Based on the effectiveness of such measures pollution risk issues are scoped out. Temporary increases in non-harmful suspended sediments are scoped out. Effects to public drinking water infrastructure is scoped out on the basis that disruption of the existing water utilities network would be avoided, including through diversions if appropriate. Operations and maintenance phase • Impacts resulting from emissions to water (i.e., surface runoff) from the operation of the Proposed Development have been scoped out, on the basis that operational activities are unlikely to affect local water quality.
Land quality	Construction and decommissioning phases • Risks of new or historic pollutant mobilisation, including direct exposure and food contamination, are highly likely to be addressed by standard good practice mitigation measures that would be secured through management plans. • Impacts arising from any contamination risk to construction workers or the public, such as existing areas of contaminated land, are scoped out. Operational and maintenance phase • Operations and maintenance activities are unlikely to require excavations or result in land quality related risks to public health. Any risks would be managed through standard best practice contamination avoidance and response measures that would be secured through management plans. This issue is therefore scoped out.
Noise and vibration	Construction and decommissioning phases • Construction of the Proposed Development has the potential to generate noise from construction activities and traffic. These impacts would be temporary, and best practice measures would be put in place through a CEMP to minimise any potential effects. Given the

	nature, scale and duration of construction activities, and distance from nearby sensitive receptors, significant population health effects related to changes in noise exposure are not anticipated. This issue is therefore scoped out. Operations and Maintenance phase • As stated in the Noise Assessment, operation of the proposed battery unit and substation are predicted to result in low noise impacts well within thresholds set to be protective of the environment and health. Operational infrastructure and maintenance activities are therefore not expected to result in noise and vibration levels that could affect population health. This issue is therefore scoped out.
Radiation	Construction and decommissioning phases • Works would not include using, or making changes to, active major electrical infrastructure producing EMF. Relevant public and occupational safeguards, secured through management plans, would be followed for the temporary electrical equipment used. Electric and magnetic fields strength reduce rapidly with distance, often requiring only a few meters separation between the source and receptor, to reach background levels. No ionising radiation sources are proposed. These issues are scope out. Operational and maintenance phase • For electrical infrastructure, the 'actual EMF' risks are scoped out on the basis that the Proposed Development would adopt the International Commission on Non-ionizing Radiation Protection (ICNIRP) guidelines (ICNIRP, 1998, 2010) and Government voluntary Code of Practice on EMF public exposure (Department for Energy and Climate Change, 2012). Such considerations are inherent to the detailed engineering considerations of cable specification and routing. These guidelines are long standing and have a high safety margin. The levels of exposure that they require would not pose a risk to public health.

Economic conditions affecting health

Education and training	Construction and Decommissioning phases • A large influx for workers, including those bringing families, is not expected, so changes to educational capacity or quality are unlikely and are scoped out. Operations and maintenance phase • Operational education and training opportunities associated with the Proposed Development are not expected to be on a scale that could influence population health, even with benefits targeted to vulnerable groups. No effects on educational outcomes are expected due to noise. These issues are therefore scoped out.
Employment and income	Construction and decommissioning phases • While there would be some temporary construction and decommissioning employment opportunities from the Proposed Development, these are not anticipated to be of a scale or duration that could influence population health. These issues are therefore scoped out. Operations and maintenance phase • Operational employment associated with the Proposed Development infrastructure is not expected to be on a scale that could influence population health, even with benefits targeted to vulnerable groups. These issues are therefore scoped out. • The Proposed Development's supply chain would be expected to operate appropriate policies that safeguard against significant population challenges to equality, health and safety, for both workers and, as appropriate, the public. These issues are scoped out. The Proposed Development would operate appropriate employment equality policies but is not expected to influence how employment affects family structures and relationships in local populations. Occupational working conditions include particular risks, which are appropriately

	managed through health and safety policies and practices. Proposed Development activities are not expected to differ from industry norms. These issues are scoped out.

Access and quality of services

Health and social care services	Construction and Decommissioning phases • Effects on health and social care are scoped out. The Proposed Development workforce is assumed to include a high proportion of people who are resident in the regional area. The UK workforce would have NHS entitlement irrespective of place of residence. It is not expected that a high proportion of workers would move to the area with dependants requiring social care. Health protection measures such as screening and immunisations are expected to continue from the workers' usual place of residence. Similarly routine dental appointments are assumed to be with the worker's dental practice close to their usual place of residence. Other health services are not expected to be affected as no largescale in-migration is expected. This issue is therefore scoped out. Operation and maintenance phase • The scale of operational workforce numbers to check and maintain the Proposed Development infrastructure are not anticipated to affect risk taking behaviour to an extent that could influence population health effect for the same reasons as stated for construction and decommissioning phases. This issue is therefore scoped out.

Macro-economic, environmental and sustainability factors

Wider societal benefits and infrastructure	Construction and decommissioning phases • Wider societal benefits of the Proposed Development would be during the operational phase, therefore this has been scoped out at construction and decommissioning phases.
Built environment	Construction and Decommissioning phases • The potential for the Proposed Development to affect existing features of the built environment that are supportive of population health has been considered and scoped out. The Proposed Development would have a relatively low impact, including due to the use of trenchless techniques to avoid surface disruption at road crossings. Operation and maintenance phase • The Proposed Development infrastructure would have a very limited long-term impact on land use patterns, with the main change relating to the converter station. Appropriate buffer zones would be maintained between infrastructure and communities and the design is resilient to accidents and disasters. These issues are therefore scoped out.

Assessment Methodology

Planning Policy Context

Planning Policy Wales (PPW)

8.7 The PPW (Welsh Government, 2024) underlines the significance of undertaking health impact assessment with a wider determinants of health framework to address health inequalities:

- PPW paragraph 3.20 highlights: *"disadvantaged and deprived communities tend to be disproportionately affected by health problems. There are links between the built and natural environment and health throughout a person's lifetime and an understanding of the wider determinants of health should be a key component of development plan preparation. The planning system should identify proactive and preventative measures to reduce health*

inequalities. This will include enabling opportunities for outdoor activity and recreation, reducing exposure of populations to air and noise pollution, promoting active travel options and seeking environmental and physical improvements, particularly in the built environment." (p. 29).

- PPW paragraph 3.24 advises: *"Where significant effects on human health are likely to arise as a result of development plans or individual development proposals, environmental impacts should be considered in full knowledge of the likely consequences for health [...] where relevant, health impacts should be incorporated into such assessments. [...] Health Impact Assessment makes a valuable contribution towards plan making. It may be useful when proposing or making decisions on new development along with evidence collected by Public Service Boards. Evidence on health impacts can help the planning system develop stronger and more coherent approaches towards maximising health and well-being."* (p. 30).

8.8 The PPW is structured by relevant overarching determinants of health:

Social and community influences on health and economic conditions affecting health

- PPW paragraph 3.19 states: "*The planning system has an important role in shaping the social, economic, environmental and cultural factors which determine health and which promote or impact on well-being in line with the Healthier Wales goal. The way places work and operate can have an impact on the choices people make in their everyday lives, including their travel and recreational choices and how easy it may be to socialise with others*." (p. 29).
- PPW paragraph 3.42 states: *"development plans must include a spatial strategy covering the lifetime of the plan which establishes a pattern of development for improving social, economic, environmental and cultural well-being."* (p. 33).

Macro-economic, environmental and sustainability factors

- PPW paragraph 3.3.0 outlines *"In 2019 the Welsh Government declared a climate emergency in order to co-ordinate action nationally and locally to help combat the threats of climate change. The planning system plays a key role in tackling the climate emergency through the decarbonisation of the energy system and the sustainable management of natural resources. The transition to a low carbon economy not only brings opportunities for clean growth and quality jobs, but also has wider benefits of enhanced places to live and work, with clean air and water and improved health outcomes."* (p. 30 – 31).
- PPW paragraph 3.38 advises that *"fostering adaptability and resilience will be a key aim for rural places in the face of the considerable challenge of maintaining the vibrancy of communities and availability of services as well as contributing to the Cohesive Communities well-being goal. This is coupled with ensuring the countryside is resilient to the impacts of climate change and plays a role in reducing the causes of climate change through the protection of carbon sinks and as a sustainable energy source in line with the Resilient Wales well-being goal."* (p. 32).
- PPW Paragraph 5.7.7 promotes *"the benefits of renewable and low carbon energy, as part of the overall commitment to tackle the climate emergency and increase energy security, is of paramount importance. The continued extraction of fossil fuels will hinder progress towards achieving overall commitments to tackling climate change. The planning system should:*
  - Integrate development with the provision of additional electricity grid network infrastructure and;
  - Maximise renewable and low carbon energy generation." (p. 92).

Technical Advice Note (TAN)

Technical Advice Note (TAN) 5 – Nature and Conservation

8.9 Paragraph 1.5.1 advises that wildlife and its habitats are of fundamental importance to our future well-being and prosperity because a rich and diverse environment supports a long-term sustainable economy and contributes to a healthier and happier society (Welsh Government, 2009a).

Caerphilly County Borough Local Development Plan up to 2021

8.10 The Caerphilly County Borough Local Development Plan aims “to ensure that new development minimises emissions of greenhouse gases as far as is practically possible in order to mitigate the effects of climate change” and this includes through improving energy, waste and water efficiency while promoting environmentally acceptable renewable energy to maintain a cleaner environment and help reduce impact on climate change (Caerphilly County Borough Council, 2010)..

8.11 The local plan notes "renewable energy technologies such as microgeneration have an important role to play in the built environment. However, there are a number of renewable energy sources that have the potential to have an adverse impact on valued aspects of the countryside, for example the potential impact of wind-generated energy on the landscape. The energy provision benefits of renewable energy schemes therefore need to be balanced against the potential impact of such development on the landscape(Caerphilly County Borough Council, 2010).

8.12 Policy CW19 (paragraph 2.42) of the Caerphilly County Borough Local Development Plan states that “all proposals for rural development or diversification schemes will need to demonstrate that they are compatible with their rural location. The scale and nature of the development should not have an unacceptable impact upon the rural character or the area by way of design [or] *visual* impact. *Immediate and distant views should be considered*” [emphasis added] (Caerphilly County Borough Council, 2010).

Caerphilly Wellbeing Plan (2018-2023)

8.13 The Caerphilly Wellbeing Plan (Caerphilly Public Services Board, 2018) includes four wellbeing objectives designed to be cross-cutting in nature and to make a maximum contribution to the national well-being goals. These objectives are:

- Positive change- this includes a shared commitment to the way the County Borough works together
- Positive start- this includes ging future generations the best start in life
- Positive people- this includes empowering and enabling all residents of the County Borough to achieve their own potential
- Positive places- this includes enabling communities to be resilient an sustainable.

Relevant Guidance

Table 8.3: Guidance relevant to human health

Guidance	Description
WHIASU, Health Impact Assessment A practical guide, 2012 (Wales Health Impact Assessment Support Unit, 2012).	Longstanding guidance on Health Impact Assessment (HIA) for Wales. The delivery of health in EIA is not explicitly covered, but principles of HIA have informed the approach taken in this chapter.

Guidance	Description
Institute of Environmental Management and Assessment (IEMA) 2022 guidance on health in EIA series, effective scoping (Pyper, Lamming, et al., 2022) and determining significance (Pyper, Waples, et al., 2022).	Practitioner guidance on the general principles and methods for assessing human health in EIA. The guidance applies in Wales, Scotland, England, Northern Ireland and the Republic of Ireland.
Institute of Public Health (IPH), Guidance, Standalone Health Impact Assessment and health in environmental assessment, 2021 (Pyper et al., 2021).	Sets current good practice for the assessment of human health in EIA, including assessment methods. This guidance for Northern Ireland informs wider UK practice.
International Association for Impact Assessment and European Public Health Association. A reference paper on addressing Human Health in EIA (Cave et al., 2020).	The publication explains EIA for public health stakeholders and sets out transparent assessment approaches.
International Association for Impact Assessment. Health Impact Assessment International Best Practice Principles, 2021 (Winkler et al., 2021).	Confirms the relationship between HIA and EIA. Confirms the application of HIA principles when undertaking health in EIA.

Human Health Study Area

8.14 The health assessment has regard to the zone of influence defined earlier in this EIA chapter. This zone of influence is relevant and informs the health chapter's consideration of effect magnitude.

8.15 The following study areas are used in the assessment:

- The 'site-specific' population is defined using the electoral wards of Newbridge and Abercarn (where the Site is located). Within Newbridge ED, Lower Super Output Area W01001381 is representative of higher deprivation.
- The 'local' population is defined using the local authority area of Caerphilly.
- The 'regional' population is defined using the area of South East Wales.
- The national area is Wales.

Baseline Methodology

8.16 Data from other ES chapters have been used to inform the health assessment. Data informs the health assessment by identifying potential receptors and community assets for these disciplines, such as schools, residential properties, walking and cycling routes, as well as tourism and recreational amenities. No bespoke baseline human health surveys have been undertaken as part of the assessment. The health analysis is informed by project wide consultation.

8.17 The following data sources have informed the health baseline assessment:

Table 8.4: Summary of desk study sources used

Title	Source	Year	Author	Date accessed
Catalogue	(Welsh Government, 2023)	2023	Welsh Government	Accessed 1 April 2024
Welsh Index of Multiple Deprivation	(Welsh Government, 2019)	2019	Welsh Government	Accessed 1 April 2024
2021 Census	(Office for National Statistics, 2021)	2021	Office for National Statistics	Accessed 1 April 2024

Title	Source	Year	Author	Date accessed
Google Earth Pro 2021	Google	2024	Google	Accessed 1 April 2024

Assessment Criteria and Assignment of Significance

8.18 This section sets out the methods for assessment of any likely significant population health effects of the Proposed Development.

8.19 The generic project-wide approach to the assessment methodology is set out in Chapter 4 (Environmental Assessment Methodology). This section sets how the generic approach is refined to address the specific needs of the EIA health assessment. Namely criteria for sensitivity, magnitude and significance that inform a professional judgment and reasoned conclusion as to the public health implications of the Proposed Development.

8.20 The methodology outlined in this section follows the IEMA 2022 and IPH 2021 guidance, which sets out best practice for the consideration of health in EIA. The IPH guidance was informed by the international consensus publication between impact assessment and public health practitioners, the IAIA/EUPHA Reference Paper 2020. Regard has also been given to WHIASU HIA guidance 2012.

8.21 Where significant adverse population health effects are identified, including for vulnerable groups, then mitigation has been proposed to avoid or reduce the effects. Mitigation is secured as part of the Proposed Development design or development consent. In line with good practice the Proposed Development takes a proportionate approach to identifying opportunities to enhance beneficial population health effects, including for vulnerable groups.

8.22 Cumulative effects are considered, including inter-related effects of the Proposed Development. This analysis considers how the same geographic or vulnerable group populations may be affected by more than one change in relevant health determinants, for example the combined effects of changes in air quality and noise on population health outcomes.

8.23 Where proportionate, the need for monitoring has been considered, including relevant governance.

Determinants of health, risk factors and health outcomes

8.24 Health and wellbeing are influenced by a range of factors, termed the ‘wider determinants of health’. Determinants of health span environmental, social, behavioural, economic and institutional factors. Determinants therefore reflect a mix of influences from society and environment on population and individual health.

8.25 Impacts of the Proposed Development that result in a change in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, given the degree of personal choice, location, mobility and exposure.

8.26 A change in a determinant of health affects does not equate directly to a change in population health. Rather the change in a determinant alters risk factors for certain health outcomes. The assessment considers the degree and distribution of change in these pathways. The analysis of health pathways focuses on the risk factors and health outcomes that are most relevant to the determinants of health affected by the Proposed Development. As there are both complex and wide-ranging links between determinants of health, risk factors and health outcomes, it would not be proportionate or informative for an assessment to consider every interaction.

8.27 Typically, the change in a risk factor may need to be large, sustained and widespread within a population for there to be a significant influence on public health outcomes.

Population health approach and vulnerable groups

8.28 In line with guidance a population health approach has been taken (see Table 8.3). This is informed by discussion of receptors within the other technical chapters of the EIA.

8.29 For each determinant of health, the health chapter identifies relevant inequalities through consideration of the differential effect to the 'general population' of the relevant study area and effects to the 'vulnerable population group' of that study area. The vulnerable population group being comprised of relevant sensitivities for that determinant of health.

8.30 The methods draw on the list of vulnerable population groups set out in IEMA 2022 Scoping Table 9.2 (Pyper, Lamming, et al., 2022) and regard has been had to the populations listed in WHIASU Appendix 2. The following six broad population groups are used to inform a consistent narrative on potential health inequalities across the assessment, people falling into more than one group may be especially sensitive:

- Young age: Children and young people (including pregnant women and unborn children).
- Old age: Older people (particularly frail elderly).
- Low income: People on low income, who are economically inactive or unemployed/workless.
- Poor health: People with existing poor health; those with existing long-term physical or mental health conditions or disability that substantially affects their ability to carry out normal day-to-day activities.
- Social disadvantage: People who suffer discrimination or other social disadvantage, including relevant protected characteristics or groups who may experience low social status or social isolation for other reasons.
- Access and geographical factors: People experiencing barriers in access to services, amenities and facilities and people living in areas known to exhibit high deprivation or poor economic and/or health indicators.

8.31 The following general characterisations of how the 'general population' may differ from 'vulnerable group populations' were considered when scoring sensitivity. These statements are not duplicated in each assessment and apply (as relevant) to the issues discussed for both construction, operation and decommissioning.

- In terms of life stage, the general population can be characterised as including a high proportion of people who are independent, as well as those who are providing some care. By contrast, the vulnerable group population can be characterised as including a high proportion of people who are providing a lot of care, as well as those who are dependant.
- The general population can be characterised as experiencing low deprivation. However, the professional judgment is that the vulnerable group population experiences high deprivation (including where this is due to pockets of higher deprivation within low deprivation areas).
- The general population can be characterised as broadly comprised of people with good health status. Vulnerable groups, however, tend to include those parts of the population reporting bad or very bad health status.
- The general population tends to include a large majority of people who characterise their day-to-day activities as not limited. The vulnerable group population tends to represent those who rate their day-to-day activities as limited a little or limited a lot.
- Based on a professional judgement the general population's resilience (capacity to adapt to change) can be characterised as high whilst the vulnerable group population can be characterised as having limited resilience.

- Regarding the usage of affected infrastructure or facilities, the professional judgement is that the general population are more likely to have many alternatives to resources shared with the Proposed Development. For the vulnerable group population, the professional judgement is that they are more likely to have a reliance on shared resources (e.g. the road network).
- The general population includes the proportion of the community whose outlook on the Proposed Development includes support and ambivalence. The vulnerable group population includes the proportion of the community who are uncertain or concerned about the Proposed Development.

8.32 The following establishments in the site-specific area (see paragraph 8.15) have been identified as facilities associated with relevant vulnerable groups:

- Education:
  - Newbridge School
  - Pantside Primary School
  - Tynewydd Primary School
  - Pentwynmawr Primary School
  - Cwtsh Nursery
  - Chou Chous Day Nursery
- Health and wellbeing:
  - Aneurin Bevan University Health Board
  - Bridge Dental Care
  - Newbridge Clinic
  - Newbridge Dental Care
  - Trecelyn Court
  - TY Iscoed Residential Home
  - Lloyds Pharmacy Newbridge
  - Knights Newbridge Pharmacy
- Recreation:
  - Newbridge Leisure Centre
  - Newbridge Rugby Football Club
  - Newbridge Cricket Club
  - Newbridge Library
- Tourism
  - Travelodge Newport Central
  - Ibis Budget Newport
  - Holiday Inn Express Newport
  - Mercure Newport Hotel
  - The Priory Hotel & Restaurant
  - Caerleon House Hotel

- Walkabout Hotel Newport
- Glenroy Hotel
- The Queens Hotel Newport
- Gateway Hotel
- Crescent Guest House
- Silurian Hotel
- Quay Apartments Clarence House
- Night Lodge

Temporal Scope

8.33 The temporal scope of the assessment is consistent with the period over which the Proposed Development will be carried out and therefore covers the construction, operational and decommissioning periods.

8.34 Where relevant EIA chapters define specific assessment years, the health chapter assessment used those same assessment years.

8.35 The temporal scope of the health chapter assessment used the following summary terms:

- 'Very short term' relates to effects measured in hours, days or weeks (e.g. effects, associated with changes in exposure during weather conditions);
- 'Short term' relates to effects measured in months, (up to 12 months duration) (e.g. activities near particular dwellings within the construction phase);
- 'Medium term' relates to effects of more than one year and up to five years; (e.g. the entire construction phase); and
- 'Long term' relates to effects of more than five years (e.g. the long-term effects on health from Cil-lonydd).

Determining Effect Significance

8.36 The assessment of EIA health significance is an informed expert judgement about what is important, desirable or acceptable for public health with regards to changes triggered by the Proposed Development. These judgements are: value dependant (underpinned by scientific data, but also informed by professional perspectives); and are context-dependent (judgements reflect relevant social, economic and political factors for the population) (European Commission et al., 2017).

8.37 The determination of significance has two stages:

- Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change to consider; and
- Secondly, a professional judgement is made as to whether the expected change in a population's health outcomes would be significant in public health terms. This judgement is explained using an evidence-based narrative setting out reasoned conclusions.

8.38 Table 8.5, Table 8.6, Table 8.7 and Table 8.8 together summarise the assessment methodology that has been adopted. Terms in bold within these tables show indicative qualitative terminologies to indicate levels (e.g. high, medium, low or negligible) within the criteria described by the IEMA 2022 guidance (Pyper, Waples, et al., 2022) This approach shows how the general EIA methods of using sensitivity and magnitude to inform a judgement of significance, are applied for human health.

The approach uses professional judgement, drawing on consistent and transparency criteria for sensitivity and magnitude. It also references relevant contextual evidence to explain what significance means for public health in terms of a change in population health outcomes.

8.39 The EIA human health assessment uses qualitative analysis following the IEMA 2022 guidance approach (Pyper, Waples, et al., 2022). This draws on qualitative and quantitative inputs from other EIA topic chapters. This is considered the most appropriate methodology for assessing wider determinants of health proportionately, consistently and transparently.

8.40 The criteria for defining sensitivity in this chapter are outlined in Table 8.5 below.

Table 8.5: Health sensitivity methodology criteria

Category/ Score	**Indicative criteria** (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories) **The narrative explains that the population or sub-population's sensitivity is driven by:**
High	**high** levels of deprivation (including pockets of deprivation); **reliance** on resources shared (between the population and the project); existing **wide** inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or **concern**; people who are **prevented** from undertaking daily activities; **dependants**; people with **very poor** health status; and/or people with a **very low** capacity to adapt.
Medium	**moderate** levels of deprivation; **few alternatives** to shared resources; existing **widening** inequalities between the most and least healthy; a community whose outlook is predominantly **uncertainty** with some concern; people who are **highly limited** from undertaking daily activities; people providing or requiring **a lot of care**; people with **poor** health status; and/or people with a **limited** capacity to adapt.
Low	**low** levels of deprivation; **many alternatives** to shared resources; existing **narrowing** inequalities between the most and least healthy; a community whose outlook is predominantly **ambivalence** with some concern; people who are **slightly limited** from undertaking daily activities; people providing or requiring **some care**; people with **fair** health status; and/or people with a **high** capacity to adapt.
Very Low	**very low** levels of deprivation; **no** shared resources; existing **narrow** inequalities between the most and least healthy; a community whose outlook is predominantly **support** with some concern; people who are **not limited** from undertaking daily activities; people who are independent (not a carer or dependant); people with **good** health status; and/or people with a **very high** capacity to adapt.

8.1.1 The criteria for defining magnitude in this chapter are outlined in Table 8.6 below.

Table 8.6: Health magnitude methodology criteria

Category/ Score	Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories) **The narrative explains that the project change has:**
High	**High** exposure or scale; **long-term** duration; **continuous** frequency; severity predominantly related to **mortality** or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; **majority** of population affected; **permanent** change; **substantial** service quality implications.
Medium	**Low** exposure or **medium** scale; **medium-term** duration; **frequent** events; severity predominantly related to moderate changes in **morbidity** or major change in quality-of-life; **large minority** of population affected; **gradual** reversal; **small** service quality implications.

Category/ Score	Indicative criteria (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories) **The narrative explains that the project change has:**
Low	**Very low** exposure or **small** scale; **short-term** duration; **occasional** events; severity predominantly related to minor change in **morbidity** or moderate change in quality-of-life; **small minority** of population affected; **rapid** reversal; **slight** service quality implications.
Negligible	**Negligible** exposure or scale; **very short-term** duration; **one-off** frequency; severity predominantly relates to a minor change in **quality-of-life**; very few people affected; immediate reversal once activity complete; no service quality implication.

Significance of Effects

8.41 The assessment of significance is a professional judgement. That judgment is informed by the indicative matrix of sensitivity and magnitude set out in Table 8.7. Table 8.8 provides additional explanation of how contextual evidence also informs the significance conclusion and what the conclusion means for public health.

Table 8.7: Assessment Matrix

Sensitivity	Magnitude of Impact			
	Very low	Low	Medium	High
Very Low	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible	Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible or Minor	Minor or Moderate	Moderate or Major	Major

8.42 Where the matrix offers more than one significance option, professional judgement is used to decide which option is most appropriate.

8.43 Moderate and major effects are considered significant in terms of the EIA Regulations.

Table 8.8: Health significance methodology criteria

Category/ Score	**Indicative criteria** (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)
Major	The narrative explains that this is significant for public health because (most relevant statements used as appropriate): • Changes, due to the project, have a **substantial** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by **consensus** in consultation themes among stakeholders, particularly public health stakeholders. • Change, due to the project, could result in a regulatory threshold or standard being **crossed** (if applicable). • There is likely to be a **substantial** change in the health baseline of the population, including as evidenced by the scientific literature showing there is a **causal** relationship between changes that would result from the project and changes to health outcomes.

Category/ Score	**Indicative criteria** (judgment based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories)
	Health priorities for the relevant study area are of **specific** relevance to the determinant of health or population group affected by the project.
Moderate	The narrative explains that this is significant for public health because (most relevant statements used as appropriate): • Changes, due to the project, have an **influential** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by **mixed views** in consultation themes among stakeholders. • Change, due to the project, could result in a regulatory threshold or standard being **approached** (if applicable). • There is likely to be a **small** change in the health baseline of the population, including as evidenced by the scientific literature showing there is a **clear** relationship between changes that would result from the project and changes to health outcomes. Health priorities for the relevant study area are of **general** relevance to the determinant of health or population group affected by the project.
Minor	The narrative explains that this is not significant for public health because (most relevant statements used as appropriate): • Changes, due to the project, have a **marginal** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by **no** consultation themes emerging among stakeholders. • Change, due to the project, would be **well within** a regulatory threshold or standard (if applicable). • There is likely to be a **slight** change in the health baseline of the population, including as evidenced by the scientific literature showing there is only a **suggestive** relationship between changes that would result from the project and changes to health outcomes. Health priorities for the relevant study area are of **low** relevance to the determinant of health or population group affected by the project.
Negligible	The narrative explains that this is not significant for public health because (most relevant statements used as appropriate): • Changes, due to the project, are **not related** to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by consultation for the project having **no responses** on this issue among stakeholders. • Change, due to the project, would **not affect** a regulatory threshold or standard (if applicable). • There is likely to be a **very limited** change in the health baseline of the population, including as evidenced by the scientific literature showing there is an **unsupported** relationship between changes that would result from the project and changes to health outcomes. Health priorities for the relevant study area are **not** relevant to the determinant of health or population group affected by the project.

8.44 Ultimately a likely significant health effect is one that should be brought to the attention of the determining authority, as the effect of the Proposed Development is judged to provide, or be contrary to providing, a high level of protection to population health.

8.45 Where significant adverse effects are identified, mitigation is considered to reduce the significance of such effects. Similarly, enhancements are considered where significant and proportionate opportunities to benefit population health are identified.

Limitations of the Assessment

8.46 This assessment is based on publicly available statistics and evidence sources. No new primary research or bespoke analysis of non-public data was undertaken for the assessment.

8.47 In line with proportionate EIA coverage of the human health topic, comprehensive HIA methods, e.g. setting up of a steering group or generating new primary evidence, do not form part of the approach. The health chapter has been informed by wider consultation for the Proposed Development and good practice methods have been used to proportionately reflect HIA elements as appropriate to EIA, these include a wider determinants of health scope and consideration of vulnerable groups and health inequalities.

8.48 Such limitations do not affect the robustness of the assessment for EIA purposes.

Baseline Environment

General Health

8.49 The following baseline data indicators have been selected to provide coverage of the wider determinants of health. The selected indicators also reflect a focus on small area statistics, which are the most relevant spatial resolution for the Proposed Development level effects. At this resolution sources include the 2021 Census Data for Wales where available. The Site falls with electoral wards of Newbridge and Abercarn, which are the most recent (2022) ward designations. Where available, regional data for South East Wales has also been collected for comparison. Data sources are set out at paragraph 8.17.

Table 8.9: Population structure – key age groups (Census 2021)

Indicator	Newbridge ED	Abercarn ED	Wales
Age			
Aged 0 to 14	17.9%	17.9%	16.5%
Aged 15 to 64	59.7%	65.4%	62.2%
Aged 65+	22.4%	16.7%	21.3%
Sex			
Male	50.6%	49.9%	48.9%
Female	49.4%	50.1%	51.1%
Ethnicity			
Asian, Asian British or Asian Welsh	0.6%	0.8%	2.9%
Black, Black British, Black Welsh, Caribbean or African	0.1%	0.3%	0.9%
Mixed or Multiple Ethnic groups	1.1%	1.6%	1.6%

White	98.0%	97.1%		93.8%
Other ethnic group	0.2%	0.2%		0.9%

8.50 As seen in Table 8.9, the population in Newbridge and Abercarn EDs is largely similar to the national average, with a large proportion of working age population, and a slightly lower percentage of those aged 65 and above than across Wales.

8.51 The distribution of males and females differs slightly in Newbridge ED as compared to Wales. The proportion of males in Newbridge ED is slightly higher than that of female. The opposite is observed in Abercarn ED which compares similar to the national average.

8.52 The majority of the population across the electoral division study area is White consistent with the national average. The proportion of the study area (less than 5%) population who are Asian, Black or other ethnicities is lower than the national average (6.3%).

Table 8.10: Health baseline indicators (StatsWales 2021 and NOMIS 2022)

Indicator	Year	Newbridge ED	Abercarn ED	Caerphilly	South East	Wales
Life Expectancy						
Life expectancy 3 Yr avg (male)	2018-20	n/a	n/a	77.4	n/a	78.3
Life expectancy (female)	2018-20	n/a	n/a	81.1	n/a	82.1
Healthy life expectancy (HLE) (male)	2018-20	n/a	n/a	55.7	n/a	61.5
Healthy life expectancy (HLE) (female)	2018-20	n/a	n/a	57	n/a	62.4
General Health						
Very good health	2023	40.9%	46.2%	43.6%	n/a	46.2%
Good health	2023	34.5%	31.9%	32.1%	n/a	32.4%
Fair health	2023	16.5%	14.6%	15.7%	n/a	14.5%
Bad	2023	5.8%	5.6%	6.4%	n/a	5.3%
Very bad health	2023	2.3%	1.7%	2.1%	n/a	1.7%
Disability						
Disabled under the Equality Act: Day-to-day activities limited a lot	2023	12.8%	10.5%	12.2%	n/a	10.3%
Disabled under the Equality Act: Day-to-day activities limited a little	2023	11.7%	11.5%	11.6%	n/a	11.3%
Not disabled under the Equality Act: Has long-term physical or mental health condition but day-to-day activities are not limited	2023	6.1%	6.3%	6.3%	n/a	6.6%
Not disabled under the Equality Act: No long-term physical or mental health conditions	2023	69.4%	71.7%	70.1%	n/a	71.8%
Education (highest qualification level of working age adults)						

Indicator	Year	Newbridge ED	Abercarn ED	Caerphilly	South East	Wales
No qualifications	2021	21.4%	17.6%	19.7%	n/a	16.4%
Level 1 and entry level qualifications	2021	8.0%	8.6%	8.2%	n/a	7.2%
Level 2 qualifications	2021	13.8%	12.5%	12.6%	n/a	11.8%
Apprenticeship	2021	5.1%	4.3%	4.5%	n/a	4.6%
Level 3 qualifications	2021	13.0%	15.2%	13.7%	n/a	14.2%
Level 4 qualifications or above	2021	18.3%	21.3%	20.6%	n/a	26.0%
Other qualifications	2021	2.4%	1.6%	2.2%	n/a	2.2%
Employment (economic activity of working age adults)						
Economically-active:In employment[1]	2021	51.4%	59.4%	54.0%	n/a	53.5%
Economically-active: Unemployed	2021	2.7%	3.3%	3.1%	n/a	3.1%
Economically inactive[2]	2021	45.9%	37.2%	43.0%	n/a	43.5%

8.53 Both male and female life expectancy is similar but slightly lower in Caerphilly compared to the national average, which is also the case with health life expectancy (i.e. the number of years spent in good health).

8.54 In terms of general health, the proportion of people in Newbridge ED with "*very good health"* (40.9%) is slightly lower than the average for Wales (46.2%). For Abercarn ED the percentage is the same as the national average. The proportion of people reporting "good health" is higher in Newbridge ED (34.5%) than in Wales (32.4%), but lower in Abercarn ED (31.9%) than the national average. There is a higher proportion of those reporting "*bad"* in Newbridge ED (5.8%) and Abercarn ED (5.6%) compared to the Wales average (5.3%).

8.55 The proportion of the population disabled under the Equality Act and "*limited a lot*" in day-to-day activities is higher in Newbridge ED (12.8%) than in Caerphilly (12.2%) and Wales (10.3%). The percentage for Abercarn ED is on par with the national average. The percentage of the population that is disabled under the Equality Act reporting day-to-day activities "*limited a little*" is similar across all regions: 11.7% for Newbridge ED; 11.5% for Abercarn ED; 11.6% for Caerphilly; and 11.3% for Wales.

8.56 Education status and qualifications can influence future health. Most recent statistics (2021) show that the highest level of qualification (level 2 and 3) achieved by working age adults in Caerphilly is similar to the national average. The percentage of the population achieving level 4 qualifications or above is lower in Caerphilly (25.3%) than in Wales overall (31.5%).

8.57 Economic activity and income can influence future health. Most recent statistics (2021) show that the Abercarn ED has the highest proportion of people who are in employment as compared to the national average. Newbridge ED had a slightly lower proportion of people in employment than

[1] Economically active: In employment including economically active students employed as part-time, full-time or self-employed.

[2] Economically inactive including retired; student; looking after home or family; long-term disabled or sick and other unstated reasons.

Wales. Economic activity rates in Caerphilly are consistent with the national average, with a higher proportion of people in employment than those who are not in employment or economically inactive.

Social and community influences on health

Table 8.11: Social and community influences on health indicators (Census 2021 data via StatWales)

Indicator	Year	Caerphilly	South East	Wales
Percentage of people satisfied with their ability to get to/access facilities and services they need	2021-22	84.8%	n/a	85.8%
People who attend or participate in arts culture or heritage activities three or more times a year (16+)	2022-23	71.3%	n/a	72.1%
People who feel able to influence decisions affecting their local areas (16+)	2021-22	26.3%	n/a	29.7%

8.58 The way people feel about and experience their community is a significant determinant of individual and population health. A large majority (84.8%) of the population in Caerphilly is satisfied with their ability to get to/access facilities they need. This is on par with the national percentage (85.8%) for the same indicator. Similarly, a majority of the local population (aged 16 and above) (71.3%) attend or participate in arts culture or heritage activities three or more times a year. For the national population, the percentage is 72.1%. Overall, this data suggests high satisfaction rates with mobility and accessibility in Caerphilly, and active yearly participation in arts culture or heritage activities. The percentage of people (aged 16 and above) who feel able to influence decisions affecting their local area is slightly lower in Caerphilly (26.3%) than the average (29.7%).

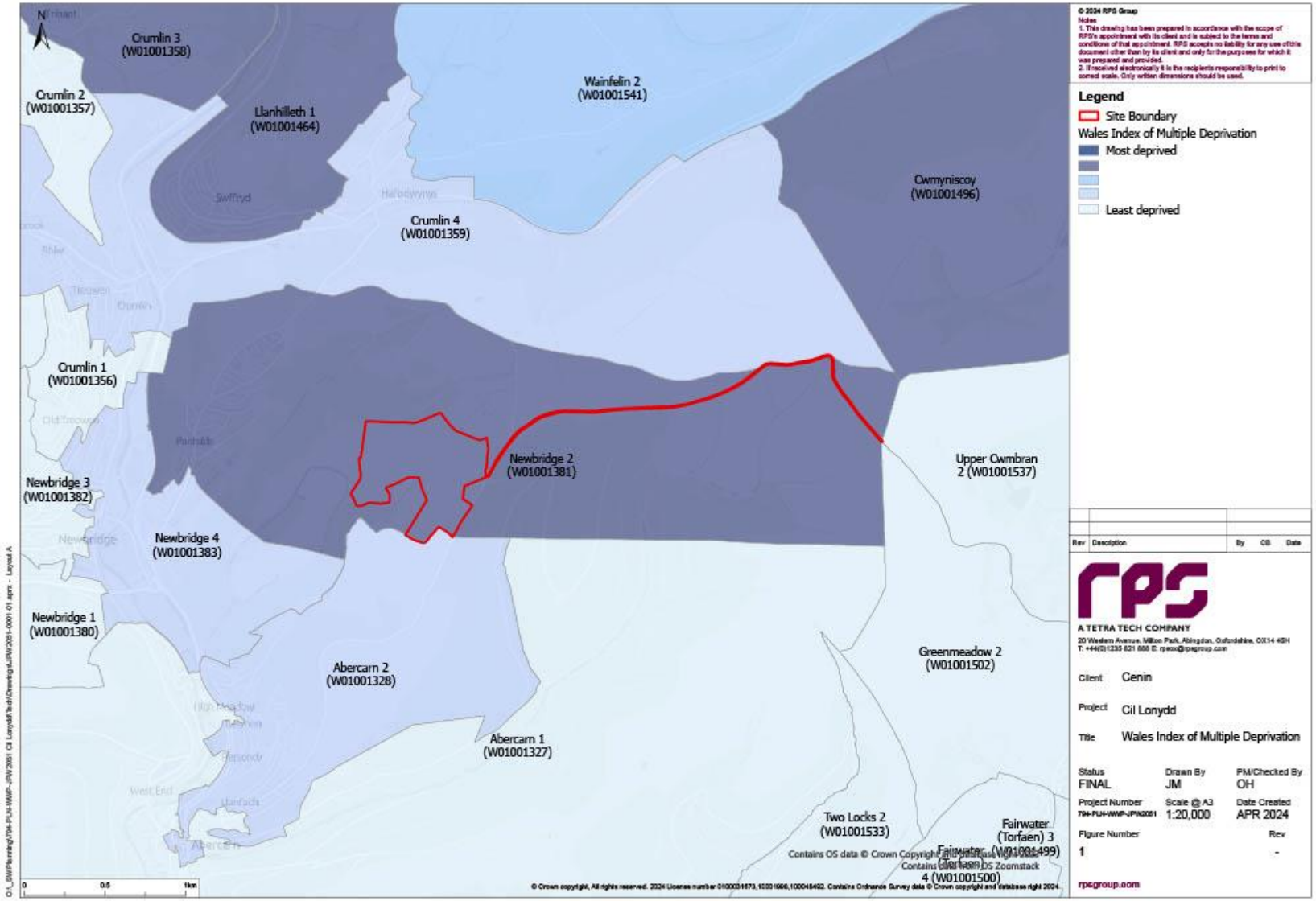
Crumlin 3 (W01001358)
Crumlin 2 (W01001357)
Llanhilleth 1 (W01001464)
Wainfelin 2 (W01001541)
Cwmyniscoy (W01001496)
Crumlin 4 (W01001359)
Crumlin 1 (W01001356)
Newbridge 2 (W01001381)
Upper Cwmbran 2 (W01001537)
Newbridge 3 (W01001382)
Newbridge 4 (W01001383)
Newbridge 1 (W01001380)
Abercarn 2 (W01001328)
Abercarn 1 (W01001327)
Greenmeadow 2 (W01001502)
Two Locks 2 (W01001533)
Fairwater (Torfaen) 3 (W01001499)
4 (W01001500)
© 2024 RPS Group
Legend
Site Boundary
Wales Index of Multiple Deprivation
Most deprived
Least deprived
A TETRA TECH COMPANY
Client Cenin
Project Cil Lonydd
Title Wales Index of Multiple Deprivation
Status FINAL
Drawn By JM
PM/Checked By OH
Project Number 704-PUH-WWP-JPA0061
Scale @ A3 1:20,000
Date Created APR 2024
Figure Number 1
Rev -
rpsgroup.com

Figure 8-1: Deprivation map showing overall deprivation for LSOAs relevant to the Proposed Development site (WIMD, 2019)

Deprivation

8.59 Using deprivation as a health resilience indicator, data for the lower layer super output areas (LSOAs) of Newbridge 1 (W01001380), Newbridge 2 (W01001381), Newbridge 3 (W01001382), Newbridge 4 (W01001383), Abercarn 1 (W01001327) and Abercarn 2 (W01001328) has been collected from the Welsh Index of Multiple Deprivation (WIMD) 2019 online portal. WIMD 2019 rankings for the 5 LSOAs show that 3 LSOAs (Newbridge 1, Newbridge 3 and Abercarn 1) fall under the 50% least deprived bracket for overall deprivation. Newbridge 2 is ranked under the 10-20% most deprived, and Abercarn 2 is ranked under the 30-50% most deprived for overall deprivation in Wales.

Table 8.12: Deprivation breakdown by indicator

Deprivation indicator	Newbridge 1	Newbridge 2	Newbridge 3	Abercarn 1	Abercarn 2
Overall	50%	10-20%	50%	50%	30-50%
Income	50%	10-20%	50%	50%	30-50%
Employment	50%	10-20%	30-50%	50%	20-30%
Health	30-50%	10%	30-50%	30-50%	30-50%
Education	50%	10-20%	50%	30-50%	30-50%
Access to services	50%	10-20%	50%	50%	50%
Community safety	30-50%	20-30%	30-50%	10-20%	50%
Physical environment	30-50%	50%	30-50%	30-50%	50%
Housing	50%	50%	50%	10-20%	30-50%
Legend					
		Least deprived			
		Most deprived			

8.60 When considering other deprivation domains (income, employment, health, education, access to services, community safety, physical environment and housing), outcomes for the 5 LSOAs vary:

- For health, 4 LSOAs (Newbridge 1, Newbridge 3, Abercarn 1 and Abercarn 2) are ranked within the 30-50% most deprived. Newbridge 2 is ranked amongst the 10-20% most deprived in Wales.
- For community safety, 2 LSOAs (Newbridge 1 and Newbridge 3) fall under the 30-50% most deprived in Wales. Newbridge 2 falls under the 20-30% most deprived in Wales. Abercarn 1 is ranked as 10-20% most deprived in Wales.
- For physical environment, 3 LSOAs (Newbridge 1, Newbridge 3 and Abercarn 1) fall under the 30-50% most deprived in Wales.

Future Baseline Conditions

8.61 Population health data presents a snapshot at a particular time. It is well recognised that population health is subject to continuing influences, both at the individual and community level. Influences may

be environmental, such as seasonal variation in wellbeing and communicable diseases, they may also respond to socio-economic factors, such as migration and the availability of jobs.

8.62 Longer term trends and interventions in population health may influence the future baseline. NHS and social care, public health initiatives and government policies aim to reduce inequalities and improve quality of life. The historic success of such interventions is increasingly challenged by national trends such as an aging population and rising levels of obesity and the COVID-19 pandemic. The implications of COVID-19 for public health will take years to be reflected within statistical data releases, but is it expected that the pandemic will have exacerbated public health challenges. The pandemic disproportionately affected vulnerable groups, including due to age and ill-health.

8.63 Climate change may also exacerbate physical and mental health risk factors, particularly around flooding and extremes of temperature. The impacts of climate change including extreme temperatures, flooding, increase in atmospheric pollutants and drought are well documented. These noted impacts on the future human health baseline are summarised below and taken into account by the assessment.

- Without adaptation, heat and cold-related deaths are forecasted to rise in the UK due to climate change and sociodemographic factors. Mortality risk from extreme temperatures rises with age, and despite fewer cold days expected mortality due to moderate cold is projected to increase with the ageing population with heat-related mortality increasing over time (UKHSA, 2023a).
- Flood-affected individuals are prone to adverse health effects including death, injury, increased risk of infectious disease, and mental health effects including depression, anxiety and post-traumatic stress disorder. Increase in flood risk in the UK is largely driven by coastal flooding (UKHSA, 2023b).
- Weather pattern shifts, notably in temperature, rainfall, and wind speed, are anticipated to influence the dispersion and concentration of air pollutants like PM and O3. Implementing climate change mitigation strategies to cut greenhouse gas emissions will aid in lowering air pollution levels, thus enhancing health outcomes. While long-term exposure to PM2.5 and NO2 is forecasted to decrease by around 25% to 37% compared to 2018 levels, localized urban increases in O3 could heighten health risks (UKHSA, 2023c).
- Climate has a significant impact on infectious diseases, influencing pathogen behaviour, human susceptibility, and transmission periods. Warmer temperatures can expand disease distribution and transmission windows. Weather and climate also play a significant role in influencing the presence and activity of disease-carrying ticks and mosquitoes. Rising temperatures are extending their range and activity periods, affecting the spread of pathogens and their habitats including potential expansion of tick species like Ixodes ricinus, which spread Lyme disease and tick-borne encephalitis, and invasive mosquitoes like Aedes albopictus, capable of transmitting diseases such as dengue and Zika. Climate change also increases the risk of diseases like West Nile virus in the UK, highlighting the need for collaborative efforts across sectors to address these climate-related public health challenges (UKHSA, 2023d).
- Climate change poses a threat to food supplies, increasing the risk of public health issues as the UK becomes more reliant on climate-vulnerable food-producing countries. This dependence on imports, especially plant-based foods, may lead to shortages of nutritious options and unhealthy dietary changes unless local production is strengthened. While initial benefits like crop diversification and extended growing seasons may occur due to warmer, drier conditions, inadequate adaptation measures could decrease overall yields in the long run. As climate impacts intensify, fluctuations in food imports and prices may make it challenging to access healthy foods and follow dietary guidelines (UKHSA, 2023e).

8.64 It would not be proportionate (or consistent with the qualitative assessment approach taken) to quantitatively model the population's future health. This reflects the complexities of interactions between the wider determinants of health, as well as the potential for macro-economic changes in the next decade that are hard to predict. Any prediction would have such wide error margins that it would greatly limit the value of the exercise. Annual national population health trend forecasting is undertaken as a government public health activity (Office for National Statistics, 2021) and has been taken into account by the health assessment.

8.65 It is expected that the pandemic will have exacerbated public health challenges. The pandemic disproportionately affected vulnerable groups, including due to age and ill-health. To reflect such increased population sensitivity the assessment scores all vulnerable groups as having high sensitivity for all determinants of health. This appropriately captures any increase sensitivity within the future baseline.

Mitigation Measures Adopted as Part of the Proposed Development

8.66 The health assessment has taken into account mitigation discussed in other EIA chapters.

8.67 Standard good practice construction management would appropriately reduce disruption and disturbance to users of the public footpaths adjacent and crossing the Site.

8.68 The Proposed Development would adopt the International Commission on Non-ionizing Radiation Protection (ICNIRP) guidelines (ICNIRP, 1998, 2010) and the Government voluntary Code of Practice on EMF public exposure (Department for Energy and Climate Change, 2012).

Assessment of Operational Effects

Social and community influences on health

8.69 This section considers the potential effects to community identity from the visual impact of the operational solar farm. Community identity is a determinant of wellbeing and is influenced by aesthetic elements of the landscape. A range of responses may be expected depending on people's outlook. Some people may experience positive effects due to the Proposed Development's associations with addressing climate change and energy security. Other people may experience negative effects due to a greater degree of built form within their views. To take a conservative approach this section considers the latter response.

8.70 This section has been informed by ES Chapter 5 (Landscape and Visual Impact Assessment), which sets out relevant assessment findings and mitigation measures that have been taken into account.

8.71 Chapter 5 concludes:

- The LVIA chapter identifies several public rights of way (PRoW) that run adjacent to or near the Proposed Development, whereby the solar farm would be visible to users of these PRoW. It was found that in general, the PRoW running through and adjacent to the Site are not well maintaned or easily accessible (due to the existing quality of the route), and are therefore seldom used. Operational effects on views range from negligible to high, though in most cases views would be screened by existing and new trees and hedgrows on the edges of the Site.
- A short section along PRoW NWBG/RBW172/1 which later becomes route NWBG/RBW172/2 is identified as running through the Site, whereby there would be a high magnitude of visual impact on users. However, although NWBG/RBW172/2 is identified in OS maps, no access was found to the route, with no marked paths in the location.

- Other PRoW of note include: public bridleway (ABEC/BR179/4) immediately south of the Site, and restricted byways along western and northern boundaries of the Site (NWBG/RBW172/3 and NWBG/RBW316/1 respectively).
- The Proposed Development would be visible from some residential receptors, though most receptors identified have negligible to no effects. Residents in the northern area of Pantside are identified as having medium magnitude of impact, though this is also anticipated to be reduced through screening from tree planting over time.

8.72 A potential population health effect is considered plausible as there is a theoretical source-pathway-receptor relationship:

- The source is the solar arrays and supporting infrastructure as a new visual element;
- The pathway is visual change triggering psychological and/or physiological responses, which may include behavioural change in PRoW use, affecting physical activity and mental wellbeing; and
- Receptors are local communities and users of PRoW with views of the Proposed Development.

8.73 Furthermore, the theoretical effect is considered applicable in the context of this Proposed Development.

8.74 The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Newbridge and Abercarn.
- The sub-population vulnerable due to:
  - age, particularly children and young people as users of affected PRoW.
  - low income, specifically people who have fewer resources to adapt to change.
  - poor health, specifically people with existing health conditions or high stress or anxiety levels who feel strongly about the changes associated with the Proposed Development; and those with health conditions where physical activity would be beneficial to physical and mental health, including routes suited to additional mobility and sensory needs.
  - access and geographical factors, specifically the population with the greatest visual change due to proximity.

8.75 The assessment covers these populations within two groups. The general population for the geographic area, notably residents of Newbridge and Abercarn, and the vulnerable group population for the area. The latter is a sub-population comprised of the vulnerabilities listed above. The differentiation of these two groups, allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

8.76 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in section 8.31. The general population comprise those members of the community in good physical and mental health and with greater resources to respond to change. Given the topography and low-lying nature of the built elements of the Proposed Development the visual impacts would not affect most residents. Occasional or passing views of the solar arrays are not expected to affect population health, and most people would likely also have a high capacity to adapt by selecting alternative routes or physical activity opportunities to avoid any temporary disruption or disturbance.

8.77 The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes those with existing poor mental health or who have high degrees of concern or uncertainty about the Proposed Development. This sub-population also includes those with near views and dependants, including children, elderly, and those receiving care due to poor health. This sub-

population may have fewer resources and less capacity to adapt to changes. This vulnerable sub-population may experience disproportionate effects.

8.78 The magnitude of change relevant to the health assessment due to the Proposed Scheme is **low**. As reported in ES Chapter 5, there would be tree and hedgerow planting along the boundaries of the Site to provide visual screening, as well as habitat creation and biodiversity gains. Landcover would remain as grazing and retain productivity for farming sheep, ensuring continued use of the area. As noted, there are PRoW to the north, west and south of the development area, which form a small part of the wider active travel network in the area. Where short sections of the PRoW pass through the project's boundary there are alternative routes, and the visual change would be transitory. Occasional and partial views from vantage points or of a transitory nature whilst passing the solar farm (in particular, for users of PRoW NWBG/RBW172/1) are not expected to affect population health outcomes. The visual change is not considered to be on a scale to disincentivise use of the routes, through physical activity behavioural change, to an extent that could affect public health. No visual effects are identified from any national parks in the area, and the context of there being other solar farms and renewable energy infrastructure in the area is noted. As stated in Chapter 5, for residential receptors there would be largely obscured or heavily filtered views of the Proposed Development, which would be confined to a small number of properties within the surrounding landscape. Although this change would be experienced over the long-term on an occasional to frequent basis depending on viewpoints, there is potential, at most, for a *minor* change in quality of life related to community identity and a *very minor* change in morbidity related to physical activity for a *small minority* of the population. A degree of adaptation to views would be expected over time, and no health service implications would be expected.

8.79 The significance of the population health effect for this determinant of health is **minor adverse** (not significant). This conclusion reflects that the scientific literature establishes that there can be an association between visual change and health outcomes, and also potential for influences on physical activity as a result of behavioural change linked to route quality. However, the professional judgment is that there would be a *very limited* adverse change in the health baseline for the local population reflecting that the level of visual change is limited by the site context and mitigation. The Proposed Development would not result in a scale of changes that would affect the delivery of local or national health policy. No change in health inequalities is expected.

Macro-economic, Environmental and sustainability Factors

8.80 Renewable energy generation supports avoiding adverse health effects associated with climate change. These include heat-related disorders (e.g. heat stress and lower work capacity), respiratory disorders (e.g. worsened asthma), infectious diseases, food insecurity (e.g. lower crop yields) and injury and mental stress associated with natural disasters (e.g. flooding or fires). These effects relate to the population of Wales and the wider UK, but also the global population, particularly deprived populations in low- and middle-income countries.

8.81 The Proposed Development also supports UK energy security, which is important for maintaining continuity and affordability of electricity supplies. Public health has a high reliance on electricity supplies. This includes power to safely cook and refrigerate food, regulate the temperature and lighting of homes and schools, operate health and social care services, maintain economic productivity and employment, and operate technologies that improve quality of life. Sustained interruption of supply or rapid increases in costs would both be expected to result in reductions in health and well-being outcomes.

8.82 A potential population health effect is considered plausible as there is a theoretical source-pathway-receptor relationship:

- Source: renewable electricity generation;

- Pathway: energy security whilst avoiding climate altering emissions;
- Receptor: national and global population, particularly deprived populations in low- and middle-income countries.

8.83 Furthermore, the theoretical effect is considered applicable in the context of this Proposed Development.

8.84 The population groups relevant to this assessment are:

- The 'national' population of Wales and the UK of energy security effects, extending to the global population for climate change related effects.
- The sub-population vulnerable due to low incomes, including where this overlaps with being a dependant (children, older adults and people with poor health requiring care) and/or other social disadvantage or deprivation.

8.85 The assessment covers these populations within two groups. The general population for the geographic area, notably the national (Wales and the UK) population, but also deprived populations globally, and the vulnerable group population for the area. The latter is a sub-population comprised of the vulnerabilities listed above. The differentiation of these two groups, allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

8.86 The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in section 8.31. The general population comprise those members of the community in good physical and mental health and with greater resources to respond to the costs of energy and of climate adaptation.

8.87 The sensitivity of the vulnerable group population is **high**. This reflects the sub-population on low incomes for whom energy security, climate adaptation or the adverse effects of climate change pose a greater risk. This is particularly the case for dependants on issues such as health risks of temperature extremes, including heatwaves and cold weather.

8.88 The magnitude of change due to the Proposed Development's 35 MW of renewable electricity is **medium**. This is driven by the long-term and continuous public health benefits to energy security, albeit for a small minority of the national population. The score also reflects the contribution to reducing global climate change health effects. The latter is a very small scale of change in the context of the wider energy sector, but with implications for a global population. Both energy security and climate change effects relate to the Proposed Development providing a *minor* reduction in risks for population mortality (e.g. reducing excess winter deaths) and morbidity (e.g. reducing exacerbation of respiratory and mental health conditions). Such effects may bring *small* benefits to healthcare services by reducing capacity burdens.

8.89 The significance of the population health effect for this determinant of health is **moderate beneficial** (significant). The professional judgment is that the Proposed Development provides a *protective* effect on the health baseline and that this would be important for public health. This conclusion reflects the scientific literature establishes associations between both energy security and climate change and health outcomes. The Proposed Development supports health policy, including being influential for local public health and wider sustainability agendas. The Proposed Development contributes to narrowing inequalities that are at risk of widening due to reduced national energy security and global climate change.

Further Mitigation

8.90 Any PRoWs through the development will likely be extinguished (after permission if granted) with alternative routes proposed to replace the original route which will be fully accessible and managed. This is due to safety reasons with the public unable to walk through a solar farm.

8.91 Some routes are inaccessible so creating new managed, well-kept routes would be beneficial for all. Any PRoW outside of the proposal will not be affected.

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Future Monitoring

8.92 No monitoring is proposed in relation to population health. This reflects that there are neither residual significant adverse population health effects, nor mitigation to avoid such effects, the efficacy of which is subject to a high degree of uncertainty. Monitoring in other circumstances would not be proportionate.

Accidents/Disasters

8.93 During operation there is the potential that the electricity supply from the Proposed Development could be interrupted by a variety of unforeseen circumstances. However, given the nature of the national grid in linking consumers to alternative electricity generating sources there is not considered to be a risk to population health. Surveillance equipment, regular maintenance and fencing provided around the Proposed Development's infrastructure mitigates against injury risk to the public. No other accident or disaster scenarios are considered relevant to the determinants of health discussed within this health chapter.

Potential Changes to the Assessment as a Result of Climate Change

8.94 The future baseline is likely to reflect an increase in the number of sensitive people within vulnerable groups. This is both in relation to factors such as poor health linked to the direct and indirect effects of the COVID-19 pandemic; and in relation to future climate conditions increasing health related risks, such as temperature extremes. The assessment has taken a conservative approach in adopting a high sensitivity score for all vulnerable groups for all determinants of health. No change to the assessments is therefore expected as a result of climate change.

Assessment of Cumulative Effects

8.95 The potential for cumulative population health effects with the following schemes have been considered, on the basis of their proximity to the Proposed Development, and their potential to result in population level effects:

- Treowen Solar Farm (W) – on the opposite side of the valley to the Site
- Trecelyn Wind Farm – immediately adjacent to the Site
- Mynydd Maen Wind Farm – approximately 2km from the Site

8.96 These schemes have been considered within this chapter based on the cumulative assessments of the ES topic chapters that inform the health assessment, i.e. those projects with the potential to influence population health cumulatively. The full list of cumulative schemes has also been considered and is set out in the Landscape and Visual Impact Assessment

8.97 During construction, these projects would also have workforces which may share transport routes. Cumulatively, these projects and the Proposed Development are not expected to result in an influx of workers that could place significant pressure on local communities or NHS services, or increase levels of risk-taking behaviour. The collective construction employment opportunity is likely to be beneficial, however it is not expected to be of a scale that would be considered as a significant population health effect.

8.98 The use of routine good practice traffic management across the projects is assumed. Given the very low transport requirements of the Proposed Development, the contribution to a cumulative effect on transport related determinants of health would be negligible. No significant population health effects are therefore expected.

8.99 During operation the projects could collectedly contribute to national energy security and, in terms of providing renewable energy, contribute to reductions in climate change related adverse health effects. The collective effect is not considered to exceed the moderate beneficial effect on population health of the Proposed Development in isolation. This reflects that the relative scale within the context of global climate altering emissions is of a similar order of magnitude whether the projects are considered in isolation or combined. It also reflects a conservative assessment position of limited potential for a given individual or public service to simultaneously accrue additive energy supply benefits from multiple energy projects.

8.100 Whilst the projects are within a similar local geographic area (within 5 km), the potential for the projects to cumulatively have site-specific effects in Newbridge and Abercarn are considered limited. Chapter 5 (Landscape and Visual Impact Assessment) identifies negligible cumulative visual impacts on landscape character, and negligible to medium cumulative impacts on visual amenity (not significant). No significant cumulative population health effect is therefore expected in relation to use of public footpaths and PRoW associated with the Proposed Development.

Inter-relationships

8.101 The geographic populations of Newbridge and Abercarn would experience visual impacts during the operation of the solar farm, though these effects are scored as minor adverse. The same population, along with other local, regional and national populations, would experience significantly beneficial operational effects on population health as a result of energy security and climate change mitigation. These effects are not expected to overlap and produce greater population level effects in combination.

8.102 Local vulnerable groups potentially experiencing combined effects of the Proposed Development include children and young people, particularly those from low-income households or who experience social disadvantage. This group may, as dependants, benefit from the Proposed Development's contribution to energy security. This group may also experience some of the short-term impacts on community identity. The combined effects for this vulnerable sub-population are not considered to differ from the individual effects. This reflects that different individuals may experience the effects and that beneficial and adverse effects do not necessarily cancel each other out.

Summary of Effects

8.103 An assessment of the likely significant population health effects of the Proposed Development has been undertaken. The approach follows health in EIA good practice and has had regard to relevant HIA guidance as is applicable in the EIA context. The assessment has been undertaken by a competent expert.

8.104 The visual impacts of the Proposed Development during operation were considered to determine whether population health may be affected by a change in community identity. This assessment considered the population of Newbridge and Abercarn, and a relevant sub-population of vulnerable groups who may be more susceptible to health effects due to low income, age, poor health and/or proximity. The assessment was informed by the Chapter 5 (Landscape and Visual Impact Assessment). The assessment identifies, at most, a **minor adverse** (not significant) effect. This is driven by the local topography and vegetation providing screening, such that the effect on population health is very limited.

8.105 The operation of the Proposed Development would support energy security nationally in Wales and the UK, as well as contributing to reducing adverse health effects of climate change. The climate change related benefits apply to a global population, particularly deprived populations in low- and middle-income countries. The assessment identifies a **moderate beneficial** (significant) effect driven by the energy security benefits, but also accounting for the climate change related benefits. Health protection, healthcare, and health improvement are the three pillars of public health, and many day-to-day activities relating to these are reliant on energy security; with low-income groups benefiting, particularly where this overlaps with poor health or social disadvantage.

8.106 Cumulative and inter-related effects have been assessed. The effects of these are not considered to result in combined population health effects that are greater than the individual effects.

8.107 Table 8.13 summarises the health assessment conclusions.

Table 8.13: Summary of Likely Environmental Effects on Human Health

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant
Operational phase						
Social and Community Influences on Health (community identity)	Low (general population) and High (vulnerable sub-population)	Visual impact of the solar farm on community identity, use of PRoW, and uptake of physical activity affecting health and wellbeing outcomes.	Long-term	Low	Minor adverse	Not significant
Macro-economic, Environmental and Sustainability Factors (energy security and climate change)	Low (general population) and High (vulnerable sub-population)	Public health benefit of greater energy security that also supports avoidance of adverse health effects of climate change.	Long-term	Medium	Moderate beneficial	Significant

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9 RISK OF MAJOR ACCIDENTS

Introduction

9.1 This chapter of the ES describes and assesses the potential effects of the Development in terms of major accidents and disasters that could have the potential to occur on the Site in construction and its 50-year operational lifetime.

9.2 This chapter describes the assessment methodology and the baseline conditions relevant to the assessment and a summary of the likely significant effects resulting from the vulnerability of the Proposed Development to the risk of major accident(s) and/or disaster(s) in relation to fire risk. Where appropriate, this chapter includes the further mitigation measures required to prevent, reduce or offset any significant adverse effects, the preparedness for and proposed response to emergencies, and the expected residual effects after these measures have been employed.

9.3 This topic is included within this ES due to the Scoping Direction that was issued by the then Planning Inspectorate in November 2023 (Appendix 4.2). In relation to major accidents, the Scoping Direction states:

The SR highlights that the battery storage is also proposed as part of the development. At this stage it is not clear which type of batteries are proposed. PEDW notes that there is a potential fire risk associated with certain types of batteries such as lithium-ion and that safety measures are required in the design to minimise the risk of fire. PEDW considers this to be part of the EIA process in line with Schedule 4 of the EIA Regulations (Wales) 2017.

The proposed development should include adequate measures to ensure that an isolated fire would not become widespread and lead to a major incident. The Applicant's attention is drawn to comments from South Wales Fire and Rescue Service contained at Appendix 1 regarding wildfires, solar arrays and battery storage facilities as well as the requirement for adequate water supplies. PEDW welcome that the SR states the proposal will be supported by a Battery Safety Management Plan, confirming that the risks are understood, accounted for and mitigated as far as practicable. As the Battery Safety Management Plan could identify potential significant effects, it is not possible to scope out Risk of Major Accidents at this stage. The Applicant is reminded of the responsibilities set by the Regulatory Reform (Fire Safety) Order 2005. The ES should ensure that risks of accidents are accounted for and mitigated in line with Schedule 4. A proportionate section on this aspect should be included in the ES and as such and as such Risk of Major Accidents and Disasters is scoped in.

9.4 The Scoping Direction also requests a Battery Safety Management Plan, which will be produced in regard to the development.

Assessment Methodology

9.5 Information regarding baseline conditions has been obtained from reviewing the following sources:

- Features of the Proposed Development that contribute a potential source of hazard to the Proposed Development;
- Sensitive environmental receptors at risk of significant effect; and
- Current (without the Proposed Development) major accident and disaster risks for the existing area.

9.6 In line with Regulation 4(4) of the EIA regulations, the following sensitive receptors were considered with respect to major accident(s) and/or disaster(s), specifically related to fire risk:

- Members of the public and local communities;

- The natural environment, including ecosystems, land and soil quality, air quality, surface and groundwater resources and landscape;
- The interaction between the factors above.

9.7 The assessment of major accident(s) and/or disaster(s) has been achieved through a review of available documentation and regulatory requirements. To date, there is no specific guidance on how to consider major accidents and disasters within the context of EIA. However, the assessment takes account of emerging EIA good practice.

Legislation

9.8 This chapter has been produced in accordance with the following key legislation:

- EU Regulation 402/2013 on the Common Safety Method on Risk Evaluation and Assessment (CSM-RA) (as amended by Regulation EU 2015/1136);
- EU Directive 2014/52/EU;
- Seveso III Directive;
- The Planning (Hazardous Substances) Regulations 2015;
- Control Of Major Accident Hazards (COMAH) Regulations 2015;
- Health and Safety at Work etc. Act 1974;
- Management of Health and Safety at Work Regulations 1999; and
- Construction (Design and Management) Regulations 2015 (CDM).

Planning Policy Context

National Planning Policy

9.9 There are no applicable national policy documents at the time of writing.

Local Planning Policy

9.10 There are no applicable local policy documents at the time of writing.

Relevant Guidance

9.11 This chapter has been produced in accordance with the principles outlined in the following key guidance documents:

- Institute of Environmental Management and Assessment (IEMA) Major Accidents and Disaster in EIA: A Primer (2020);
- A Guide to Risk Assessment in Major Emergency Management (January 2010);
- The Energy Operators Forum “Good Practice Guide” (December 2014);
- Institute of Engineering and Technology - Code of Practice for Electrical Energy Storage Systems (August 2017); and
- The Energy Institute: Battery Storage Guidance Note 1 - Battery Storage Planning (August 2019).

9.12 More detailed UK guidance is emerging, and it is expected that the regulatory environment will be more developed by the detailed design stage.

Study Area

9.13 The location of the Proposed Development is shown in Figure 2.1(Site Location Plan) and Figure 2.2 (Site Layout Plan) in Volume 2 of this ES.

9.14 A 1km buffer around the Site has been adopted as the study area for this assessment to identify receptors which could potentially be impacted by major accidents related to fire hazards. Through consideration of the general characteristics and extent of fire hazards, it is considered that this 1km distance would reasonably encompass any foreseeable major accident hazards.

Baseline Methodology

9.15 No standard EIA methodologies exist for risk of major accident assessment. The applied assessment methodology for this chapter has been guided by various published documents including the IEMA Major Accidents and Disaster in EIA: A Primer and A Guide to Risk Assessment in Major Emergency Management January 2010.

9.16 The underlying objective of the assessment is to ensure that appropriate precautionary actions are taken for those developments which: '…because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment.' (Paragraph 15 of Directive 2014/52/EU)

9.17 The following steps were undertaken as part of the assessment:

- Risk identification;
- Risk classification;
- Likelihood and consequence;
- Risk evaluation.

Consultation

9.18 Formal consultation was undertaken during the course of this assessment. Table 9.1 sets out consultation responses received in relation to risk of major accidents.

Table 9.1: Consultation Responses Relevant to risk of major accidents

Date	Consultee and Issues Raised	How/ Where Addressed
4th October 2023	South Wales Fire & Rescue Service at scoping stage that where a new development is proposed in an area which is at risk of a wildfire, consideration should be given on how to mitigate the spread of wildfires. The developer of Solar Arrays and Better Energy Storage Facilities should ensure they have suitable safety measures to contain and restrict the spread of fire, using fire-resistant materials and adequate separation between locations where energy systems may be stored. Active fire safety systems should be incorporated into the design if necessary and may include, automatic fire detection systems, automatic fire suppression and smoke control systems.	The potential fire risk has been assessed in this Chapter and appropriate measures to reduce the risk of fire spreading have been incorporated into the design.
23rd November 2023	The Scoping Direction noted that there is a potential fire risk associated with certain types of batteries such as lithium-ion and that safety	The potential fire risk has been assessed in this Chapter and appropriate measures to reduce the

Date	Consultee and Issues Raised	How/ Where Addressed
	measures are required in the design to minimise the risk of fire. PEDW advised that the Proposed Development includes adequate measures to ensure that an isolated fire would not become widespread and lead to a major incident. It is agreed in the Scoping Direction that the proposal will be supported by a Battery Safety Management Plan, confirming that the risks are understood, accounted for and mitigated as far as practicable.	risk of fire spreading have been incorporated into the design. A Battery Safety Management Plan will be produced.

Assessment Criteria and Assignment of Significance

9.19 There is no industry standard approach to the assessment of major accidents and disasters. The approach in this assessment uses a combination of the magnitude and likelihood as this is the emerging industry standard for assessing major accidents and disasters.

9.20 The magnitude of change considered for major accidents and disasters is the severity of harm / damage (hazard) and the duration of exposure. This considers the resistance and resilience of receptors.

Assessment definitions

9.21 This section stets out the terminology used for the assessment of the vulnerability of the Scheme to risks of major accidents and/or disasters. This is to help set out how this assessment has been undertaken.

- Receptor – environmental receptors are specifically defined as: features of the environment that are subject to assessment under Article 3 of the EIA Directive, namely population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape.
- Major Event – an event (for the purposes of this assessment fire risk and the potential impacts arising from the extinguishment of a fire hazard) that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment.
- Significant environmental effect (in relation to a major accident and/or disasters assessment) – could include the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.

Magnitude of Impact

9.22 The determination of magnitude of impact is based on the level of change that the Proposed Development may have on environmental receptors. Development impacts can be characterised as to whether they would be:

- Direct or Indirect;
- Beneficial or Adverse;
- Short, Medium or Long Term;
- Reversible or Irreversible; and/or
- Cumulative.

9.23 The criteria for assessing magnitude of predicted change on environmental receptors are given in **Table 9.2** below.

Table 9.2: Magnitude of Impact

Magnitude of Impact	Typical Descriptors
High	Total or substantial loss of the sensitivity of an environmental receptor, loss of human life.
Medium	Partial loss or alteration of the sensitivity of an environmental receptor, serious injury.
Low	Slight loss of sensitivity of an environmental receptor, minor injury.
Negligible	A very slight change to an environmental receptor, minor short-term impact to human health.
No change	No change to an environmental receptor.

Significance of Effects

9.24 The sensitivity of an environmental receptor, together with the magnitude of impact, defines the significance of the effect for the environmental receptor in question. The significance of effect has been established with reference to the matrix set out in **Table 9.3**. The environmental effect outlined below represents the effect on the environmental receptor without mitigation. A significance of effect of 'major' or 'moderate' would be considered to equate to significant effects highlighted in the context of EIA Regulations.

Table 9.3: Assessment Matrix

Sensitivity	Magnitude of Impact			
	Negligible	**Low**	**Medium**	**High**
Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
Low	Negligible or minor	Negligible or minor	Minor	Minor or moderate
Medium	Negligible or minor	Minor	Moderate	Moderate or major
High	Minor	Minor or moderate	Moderate or major	Major

9.25 The broad definitions of the significance of effect can be defined as:

- Substantial: Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.
- Major: These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.
- Moderate: These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.
- Minor: These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.

- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Limitations of the Assessment

9.26 There is no specific guidance on the methodology to progress a major accident and disaster risk assessment, therefore the approach draws upon guidance from a range of sources as previously detailed in this chapter. The assessment is also dependent on information from other technical assessments within the ES which utilise third party data, as well as information from other sources, also previously detailed in this chapter. The third-party information is taken at face value and no further check or validation of this information has been made.

Baseline Environment

9.27 The environmental receptors of the Scheme are described in detail in Topic Chapters (Chapters 5 to 11) and are not repeated here. This section (**Table 9.4**) identifies a set of selected key major event receptors. Specifically, those receptors that may be directly affected by the occurrence of a major event.

Table 9.4 Identified Key Receptors for Major Events

Receptor	Type	Description
Key settlements located in and around the site, including Newbridge, Crumlin, Abercarn, Hafodrynys.	People	Residential properties, areas, recreational paths and visitors.
Local waterbodies and groundwater resources	Aquatic environment, ecological receptors	High importance in terms of water resouces in the local catchment.
Local wildlife sites, ancient woodland and other designated sites	Ecological receptors	Locally designated sites for their nature conservation importance

Future Baseline Conditions

9.28 The future baseline is not anticipated to differ significantly from the current baseline with regards major accident(s) and/or disaster(s).

Mitigation Measures Adopted as Part of the Project

The Regulatory Reform (Fire Safety) Order 2005 (RRFSO)

9.29 The Development will minimise fire risk via following The Regulatory Reform (Fire Safety) Order 2005 (RRFSO). This provides a framework for regulating fire safety in all non-domestic premises including workplaces and the parts of multi-occupied residential buildings used in common in England and Wales. It consolidated previous fire safety legislation into one Order.

9.30 Essentially, it requires that any person who has some level of control in premises must take reasonable steps to reduce the risk from fire and make sure people can safely escape if there is a fire. It applies to virtually all premises and covers nearly every type of building, structure and open

space including: offices and shops; care homes and hospitals; community halls and places of worship; shared areas of multi-household properties; pubs, clubs and restaurants; schools and sports centres; tents and marquees; hotels and hostels; and factories and warehouses.

9.31 The RRFSO requires the employer, in relation to those parts of their premises where staff may be present to:

- carry out a fire-risk assessment identifying any possible dangers and risks;
- consider who may be especially at risk;
- get rid of or reduce the risk from fire as far as is reasonably possible and provide general fire precautions to deal with any possible risk left;
- take other measures to make sure there is protection if flammable or explosive materials are used or stored;
- create a plan to deal with any emergency and, in most cases, keep a record of findings; and review them when necessary.

9.32 Whilst the above mentioned list does not specifically consider solar farms and there are no internal workspaces included in the Proposed Development, the Applicant is aware of the requirements of the RRFSO and will comply with them as necessary to ensure risk from fire is managed in accordance with the legislation.

9.33 Considering the requirements of the RRFSO, the following specific mitigation measures will be adopted as part of the Proposed Development in order to minimise fire risk:

- Procurement of components and use of construction techniques which comply with all relevant legislation;
- Inclusion of automatic fire detection systems in the development design;
- Inclusion of automatic fire suppression systems in the development design;
- Inclusion of redundancy in the design to provide multiple layers of protection;
- Designing the Proposed Development to contain and restrict the spread of fire through the use of fire-resistant materials, and adequate separation between elements of the battery storage facility; and
- Ensuring that South Wales Fire and Rescue Service recommendations and requirements are addressed to enable an adequate emergency response to a fire.

Per- and polyfluoroalkyl substances (PFAS)

9.34 The Applicant can confirm that it does not use solar panels that contain PFAS. Accordingly, there is no risk of such substances leaching from the Proposed Development.

Assessment of Construction Effects

9.35 This section describes the impacts associated with potential major accidents and disasters specifically related to fire risk that could arise on and off-site during the construction phase of the Proposed Development, the vulnerability of the site to such accident and disasters, and the potential for the Proposed Development to cause major accidents and disasters. The assessment draws upon the potential major accidents and disasters and receptors discussed in **Table 9.4**.

Infrastructure Failure Resulting in a Fire Hazard

9.36 The construction phase is the first phase of the Proposed Development where there is the risk of a major accident or disaster relating fire risk occurring. It also coincides with the largest workforce population associated with the Proposed Development. The construction workforce is a new population which could be affected by a major accident or disaster and may additionally be unfamiliar with the area.

9.37 The risk both to construction workers and the general public is low and not significant during the construction phase. This would be regulated by the Health and Safety Regulations and the Construction (Design and Management) Regulations 2015. The construction of the Proposed Development would be managed in accordance with the Health and Safety at Work Act 1974 and would comply with all other relevant Health and Safety Regulations, including the Construction (Health, Safety and Welfare) Regulations 1996 and Electricity Safety, Quality and Continuity Regulations 2002.

Magnitude of impact

9.38 During the construction phase there is a risk of fire hazard assocated with improper construction practices and installation which could result in a direct impact on receptors through injury, loss of life or loss of the sensitivity of an ecological or hydrological receptor. An indirect impact could also arise as a result of contamination of an environmetal receptor as a result of firefighting chemicals. The impact of this could range from **minor adverse** to **major adverse** depending on the scale of the hazard and the ability of the construction workforce to deal with the hazard.

Sensitivity of receptor

9.39 The proposed development is located within open countryside which is primarily used for pastoral farming purposes. There are some locally designated sites within and adjacent to the site and the upland reaches of both river catchments only have a limited ability to absorb any changes in hydrological regime from hazard events. The Site is affected either in whole or in part by the following designations:

- Visually Important Local Landscape (Abercarn) (Policy NH2.3);
- Coal Mining Development Referral Area;
- Sandstone Resource Area; and
- Mineral Site Buffer Zone – Hafod Fach Quarry to the southwest (Policy MN1.3).

9.40 The sensitivity of the environmental receptors is therefore classified as **High**.

9.41 The risk of impact to human health through loss of life or injury as a result of a fire hazard is also classified as **High.**

Significance of effect

9.42 All construction works will be designed and undertaken in line with current health and safety and technical legislation and guidance. Through the implementation of good construction practice techniques as well as implementation of the measures contained within a Battery Storage Management Plan and Code of Construction Practice (CoCP), this risk can be adequately managed.

9.43 Incorporation of runoff management techniques as outlined in the Flood Consequences Assessment (FCA) will limit the impact on off-site surface water receptors.

9.44 The overall significance of the effect on environmental receptors and human health during the construction phase, taking into account the mitigation measures as described in this Chapter, is assessed as **Minor Adverse**.

Assessment of Operational Effects

9.45 This section describes the impacts associated with potential major accidents and disasters specifically related to fire risk that could arise on and off-site during the operation phase of the Proposed Development, the vulnerability of the site to such accident and disasters, and the potential for the Proposed Development to cause major accidents and disasters. The assessment draws upon the potential major accidents and disasters and receptors discussed in **Table 9.4**.

Infrastructure Failure Resulting in a Fire Hazard

9.46 The operation phase is the final phase of the Proposed Development where there is the risk of a major accident or disaster relating to a fire occurring. It coincides with the smallest workforce population associated with the Proposed Development.

9.47 When operational the majority of the Proposed Development comprises solar PV modules which are inert. Electrical infrastructure will be located across the Proposed Development, in the form of transformers and cabling, all of which will be subject to routine maintenance such that it is not considered to pose a significant risk by creating an accident or disaster. The substation compound will have a concentration of electrical infrastructure which will include the substation itself and transformers - it will be subject to a routine maintenance regime. Accordingly, it is not considered to pose a significant risk of creating an accident or disaster. Overall, no potential has been identified for the development proposal to lead to increased risk of a major accident or disaster in isolation or in combination with cumulative developments.

9.48 Flood risk is assessed in the attached Flood Consequence Assessment and Conceptual Drainage Strategy and recommendations are made for action plans in the event of flooding during construction.

9.49 Fire risk in solar PV modules is very low given the Proposed Development will use solar panels that are manufactured in accordance with fire protection requirements, use high-quality components and are installed correctly and to a high standard by suitably qualified engineers. This is supported by the Fire Protection Association in their ‘Recommendations for fire safety with PV panel installations’ published in September 2023 (Fire Protection Association, 2023 https://www.thefpa.co.uk/resource-download/363). The publication also confirms that ‘the incidence of fires involving PV systems is very low’ and ‘the reliability of PV systems is very high, resulting in a low frequency of documented fires’ (paragraph 1.9).

9.50 Installation of equipment for the Proposed Development will be validated, and this equipment will be inspected and maintained throughout the development’s operational life. As the Proposed Development diligently follows these procedural steps for health and safety, the risk of fire is considered to be very limited for this type of development.

9.51 Fire safety is a matter dealt with by a different set of regulations known as the Fire Safety Act 2021 (The Regulatory Reform (Fire Safety) Order 2005). As the reform order sits outside of EIA regulations, fire safety is not assessed any further in this ES.

Magnitude of impact

9.52 During the operation phase there is a risk of fire hazard assocated with infrastructure failure which could result in a direct impact on receptors through injury, loss of life or loss of the sensitivity of an ecological or hydrological receptor. An indirect impact could also arise as a result of contamination of an environmetal receptor as a result of firefighting chemicals. The impact of this could range from **minor adverse** to **major adverse** depending on the scale of the hazard and the ability of the construction workforce to deal with the hazard although incorporation of runoff management techniques as outlined in the Flood Consequences Assessment (FCA) will limit the impact.

Sensitivity of receptor

9.53 The proposed development is located within open countryside which is primarily used for pastoral farming purposes. There are some locally designated sites within and adjacent to the site and the upland reaches of both river catchments only have a limited ability to absorb any changes in hydrological regime from hazard events.

9.54 The sensitivity of the environmental receptors is therefore classified as **High**.

9.55 The risk of impact to human health through loss of life or injury as a result of a fire hazard is also classified as **High.**

Significance of effect

9.56 All maintenance operations will be undertaken in line with current health and safety and technical legislation and guidance. Through the implementation of a Battery Storage Management Plan, this risk can be adequately managed. These hazards are therefore mitigated through the design of the systems and appropriate safe systems of work being employed for maintenance.

9.57 The overall significance of the effect on environmental receptors and human health during the operation phase, taking into account the mitigation measures as described in this Chapter, is assessed as **Minor Adverse**.

Further Mitigation

9.58 Suitable mitigation measures have been adopted as part of the Proposed Development and would be implemented through a Battery Safety Management Plan.

9.59 The solar farm will be enclosed by appropriately designed security fencing and monitored by CCTV, which will lower the risk of unauthorised access and accidents.

9.60 The assessment has demonstrated that the construction of the Proposed Development would not cause any exceedances of the risk of major accident objectives in relation to fire safety and that the overall effect would be **not significant**. It is, therefore, not considered necessary to propose further mitigation measures for the Proposed Development.

Future Monitoring

9.61 Where required, further mitigation measures have been identified within topic chapters. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment.

9.62 Where relevant and necessary, future monitoring measures have been set out within the topic chapters.

Accidents/Disasters

9.63 The risk of accidents and disasters has been assessed within this chapter.

Assessment of Cumulative Effects

9.64 This section considers the inter-project cumulative effects of Cil-Lonydd Solar Farm on risk of major accidents in conjunction with the other developments set out in Chapter 4: Environment Assessment Methodology.

9.65 The potential cumulative impacts with other developments have been identified outlining likely significant effects (if any) and assessing against the baseline position.

9.66 A review of approved and proposed developments within a 1 km search area from the Site has been undertaken. A 1 km search area is considered appropriate for data collection taking into account the nature of the development and likely zone of influence of a fire hazard.

9.67 Within 1km of the search site the following development is proposed:

- Mynydd Maen Wind Farm
- Trecelyn Wind Farm

9.68 The proposed Mynydd Maen development is understood to be a wind farm located north west of the site. The application is currently at pre-application stage, yet to be submitted.

9.69 The proposed Trecelyn development is understood to be a wind farm located directly north of the site. The application is currently at pre-application stage, yet to be submitted.

9.70 Both projects do not propose battery storage on site. Therefore, there is low risk of spread of a fire hazard between developments.

Inter-relationships

9.71 This chapter has inter-relationships with Chapter 6: Biodiversity and Chapter 8: Human Health.

Summary of Effects

9.72 The significance of effect of major accidents in relation to fire risk has been assessed within this ES Chapter and has assessed the risk of fire hazard as part of the Proposed Development to be **very low** to **negligible.**

9.73 This chapter demonstrates appropriate mitigation measures which will be implemented through the construction and operation of the Proposed Development. This chapter demonstrates that the Proposed Development meets the requirements of existing and emerging legislation and guidance.

9.74 The construction of the proposed development has the potential to result in the risk of fire hazard through poor construction techniques and improper installation. Through the implementation of good construction practice techniques as well as implementation of the measures contained within a Battery Storage Management Plan and Code of Construction Practice (CoCP), this risk can be adequately managed.

9.75 The overall significance of the effect on environmental receptors and human health during the construction phase, taking into account the mitigation measures as described in this Chapter, is assessed as **Minor Adverse.**

9.76 The operation of the proposed development has the potential to result in the risk of fire hazard through infrastructure failure. All maintenance operations will be undertaken in line with current health and safety and technical legislation and guidance. These hazards are therefore mitigated

through the design of the systems and appropriate safe systems of work being employed for maintenance.

9.77 The overall significance of the effect on environmental receptors and human health during the operation phase, taking into account the mitigation measures as described in this Chapter, is assessed as **Minor Adverse.**

9.78 Cumulative impacts with other proposed developments screened into the assessment have been assessed and no significant cumulative effects have been identified.

9.79 A summary of the findings of the risks of major accidents assessment is presented in **Table 9.5.**

Table 9.5: Summary of Likely Environmental Effects on risk of major accidents

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact	Significance of effect	Significant / Not significant	Notes
Construction Phase							
Key settlements located in and around the Site	High	Multiple injuries, loss of life in low numbers	Short term	Medium Adverse	Minor Adverse	Not significant	Direct Temporary
Local waterbodies	Medium	Damage to hydrological receptors via firefighting chemicals	Medium term	Low Adverse	Minor Adverse	Not significant	Direct Temporary
Local wildlife sites, ancient woodland and other designated sites	Medium	Damage to ecological receptors via firefighting chemicals	Medium term	Low Adverse	Minor Adverse	Not significant	Direct Temporary
Operation Phase							
Key settlements located in and around the Site	High	Multiple injuries, loss of life in low numbers	Short term	Medium Adverse	Minor Adverse	Not significant	
Local waterbodies	Medium	Damage to hydrological receptors via firefighting chemicals	Medium term	Low Adverse	Minor Adverse	Not significant	
Local wildlife sites, ancient woodland and other designated sites	Medium	Damage to ecological receptors via firefighting chemicals	Medium term	Low Adverse	Minor Adverse	Not significant	

References

A Guide to Risk Assessment in Major Emergency Management (January 2010);

Construction (Design and Management) Regulations 2015 (CDM)

Control Of Major Accident Hazards (COMAH) Regulations 2015;

EU Directive 2014/52/EU;

EU Regulation 402/2013 on the Common Safety Method on Risk Evaluation and Assessment (CSM-RA) (as amended by Regulation EU 2015/1136);

Health and Safety at Work etc. Act 1974;

Institute of Engineering and Technology - Code of Practice for Electrical Energy Storage Systems (August 2017);

Institute of Environmental Management and Assessment (IEMA) Major Accidents and Disaster in EIA: A Primer (2020);

Management of Health and Safety at Work Regulations 1999;

Seveso III Directive;

The Energy Operators Forum “Good Practice Guide” (December 2014);

The Energy Institute: Battery Storage Guidance Note 1 - Battery Storage Planning (August 2019); and

The Planning (Hazardous Substances) Regulations 2015;