

LLANWONNO ENERGY PROJECT

ENVIRONMENTAL STATEMENT

Volume 1, Chapter 1: Introduction

March 2025

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Darren Parker

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Glossary

Term	Meaning
Baseline	The status of the landscape without the Proposed Development in place.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Infrastructure	This is used to describe the various elements of the Proposed Development that require construction activities, both temporary and permanent; including turbines, hard standings and tracks (where new or existing road widened).
Llanwonno Energy Project (the “Proposed Development”)	The energy project located south of Llanwonno, which comprises wind turbines and solar photovoltaic array with a combined installed generation capacity of approximately 61 MW, Battery Energy Storage System (BESS), cable route and ancillary development (referred to as the “Proposed Development”).
Mitigation	Measures to avoid, prevent, reduce or control effects on the environment.
Applicant	The Applicant is Cenin Renewables Limited.
The Site	The area within which the elements of the Proposed Development are located, including the areas required on a temporary basis during construction or decommissioning.

Abbreviations

Abbreviation	Meaning
DNS	Development of National Significance
EIA	Environmental Impact Assessment
ES	Environmental Statement
PAC	Pre-Application Consultation
PEDW	Planning Environment Decisions Wales
PPW	Planning Policy Wales

Units

Unit	Description
km	Kilometre
ha	Hectare
MW	Megawatt

1 INTRODUCTION

1.1 Background

- 1.1.1 This Environmental Statement (ES) has been prepared by RPS Consulting Services Limited on behalf of Cenin Renewables Limited “Cenin” (the Applicant). The ES sets out the findings of the Environmental Impact Assessment (EIA) process and accompanies the application for a Development of National Significance (DNS) to the Planning and Environment Decisions Wales (PEDW) for the development of the Llanwonno Energy Project (referred to hereafter as ‘the Proposed Development’).
- 1.1.2 The ES contains four volumes:
- Volume 1: Main text of the ES (Written Statement);
 - Volume 2: Figures to accompany Volume 1; and
 - Volume 3: Technical reports to accompany Volume 1.
- 1.1.3 This chapter of the ES introduces the Proposed Development, the Applicant, the EIA process and the purpose and structure of the ES.

1.2 Overview of the Proposed Development

- 1.2.1 The Proposed Development is located to the north east of Porth, south of Llanwonno, which lies approximately 5 km from Pontypridd. The Proposed Development lies within the administrative boundary of Rhondda Cynon Taff County Borough Council. A location plan is provided within Volume 2, Figure 1.1: Site Location Plan.
- 1.2.2 The Proposed Development comprises the construction and operation of eight electricity generating wind turbines and a solar photovoltaic array with a combined installed generation capacity of approximately 61 Megawatts (MW). The Proposed Development will also include a Battery Energy Storage System, cable route and associated ancillary development and would be distributed across approximately 112.4 hectares (ha) of land (‘the Site’).
- 1.2.3 Further information with regard to the location and design of the Proposed Development is provided in Volume 1, Chapter 2: Project Description.

1.3 The Applicant

- 1.3.1 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.

1.4 Statutory Framework and Purpose of the Environmental Statement

- 1.4.1 The planning system in Wales operates under a framework designed to promote sustainable development, with the overarching goal of balancing economic, environmental, and social factors in land use planning. It is distinct from the planning systems in England, Scotland, and Northern Ireland, though they share some similarities.
- 1.4.2 The primary legislation governing planning in Wales includes the Town and Country Planning Act 1990 and the Planning (Wales) Act 2015.
- 1.4.3 The Welsh Government is responsible for setting national planning policy. The key policy document is Planning Policy Wales (PPW) Version 12 (Welsh Government, 2024), which outlines how the planning system should contribute to the achievement of sustainable development, and improve the social, economic, environmental, and cultural well-being of Wales (as required by the Planning (Wales) Act 2015, and the Well-being of Future Generations (Wales) Act 2015). PPW is supported by Technical Advice Notes, which provide detailed guidance on specific planning issues (e.g. housing, transportation, the environment).
- 1.4.4 Future Wales: The National Plan 2040 is a strategic development plan for Wales, published in 2021 (Welsh Government, 2021). It is the first national development framework for Wales and provides a long-term vision for land use and development up to 2040. The plan is a key part of the Welsh planning system and sets out where large-scale infrastructure projects, housing developments, and other significant developments should occur to support sustainable growth and tackle issues like climate change, housing shortages, and economic inequality.
- 1.4.5 The Planning (Wales) Act 2015 amended the Town and Country Planning Act 1990 and the Planning and Compulsory Purchase Act 2004 to introduce reforms to strengthen development planning, including the introduction of the National Plan 2040 in place of the Wales Spatial Plan (Welsh Government, 2008), and provisions for the establishment of Strategic Planning Panels to prepare Strategic Development Plans. It made other improvements to the development management and enforcement systems. The Act provided for nationally significant development applications to be made to the Welsh Ministers instead of to local planning authorities as DNS's.

Development of National Significance

- 1.4.6 DNS refers to large-scale infrastructure projects or other major developments that are deemed to be of national importance, meaning their impact goes beyond local boundaries and they are significant to Wales as a whole.
- 1.4.7 The criteria for qualifying as a DNS are set out in the Developments of National Significance (Wales) Regulations 2016 (as amended). Projects that meet the defined thresholds for scale or potential national impact fall under the DNS category. These thresholds are based on the size, complexity, and potential environmental or social effects of the development. On 1 April 2019, the DNS

thresholds relating to generating stations were extended; and as a result, all energy generation projects of between 10 MW and 350 MW are now captured by the DNS system.

- 1.4.8 Paragraph 5.7.5 of the PPW (Welsh Government, 2024) highlights the following:
- 1.4.9 '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 made directly to the Welsh Ministers under the DNS process and considered under policies in Future Wales'.
- 1.4.10 The anticipated maximum export capacity of the Proposed Development is 61 MW. Therefore, the Proposed Development falls within the definition of a DNS under Regulations 3 and 4 of the Developments of National Significance (Specified Criteria and Prescribed Secondary Consents) (Wales).

DNS Application Process:

- **Stage 1 Pre-application:** The Applicant notifies PEDW of their intention to submit an application, commencing a 1 year period in which they must submit. Applicants must engage in Pre-Application Consultation (PAC) with statutory consultees (such as Natural Resources Wales) and the public before submitting an application.
- **Stage 2 Application:** DNS applications are submitted directly to PEDW who manage the DNS process on behalf of the Welsh Ministers. Once the application is validated, PEDW will publicise the application and write to consultees, commencing a 5 week consultation period to receive representations on the application.
- **Stage 3 Examination:** A Planning Inspector will be appointed. The Inspector decides whether a hearing, inquiry, or additional written representations are needed. The Inspector will examine the DNS application and will make a recommendation on behalf of PEDW to the Welsh Ministers.
- **Stage 4 Decision:** After a recommendation from PEDW, Welsh Ministers make the final decision on whether to grant or refuse permission.

- 1.4.11 The Proposed Development is currently at Stage 1: Pre-application, undergoing statutory PAC.

Consultation

Scoping

- 1.4.12 In October 2024, the Applicant submitted a Scoping Report to PEDW. The Scoping Report detailed the proposed scope and methodology for the technical studies to provide an assessment of any likely significant effects, and where necessary. It also described those topics or sub-topics which were to be scoped out of the EIA process, including justification as to why the Proposed Development would not have the potential to give rise to significant environmental effects in these areas.

- 1.4.13 PEDW subsequently issued a Scoping Direction on 14 February 2025. This ES is based upon the Scoping Opinion and considers the key comments raised by consultees. The ES topic chapters provide a summary of the key points raised and feedback provided during Scoping and as a result of any further consultation with both statutory and non-statutory consultees.
- 1.4.14 Following receipt of the Scoping Direction (see Volume 3, Appendix 4.2: Scoping Direction), the Applicant submitted a notification of intention to submit a DNS to PEDW on the 5 March 2025, which was subsequently accepted on the 12 March 2025. In accordance with Regulation 7 of the Developments of National Significance (Procedure) (Wales) Order 2016, the Applicant is required to undertake statutory PAC at least six weeks (42 days) prior to the submission of the DNS application.

Non-Statutory Consultation

- 1.4.15 The Applicant intends to release an information brochure in Spring 2025 informing stakeholders of PAC which will be available to local politicians, community councils, Rhondda Cynon Taff councillors and the general public (including residents of Ynysbwl, Glyncoch, Ponypridd, Llwyncelyn, Porth, Ynyshir and Trehafod).

Statutory Consultation

- 1.4.16 The DNS (Wales) Regulations 2016 (the DNS regulations) requires the Applicant to undertake statutory PAC on the full draft planning application prior to submission. This is a crucial stage in the DNS process where the developer engages with the community, statutory consultees, and other stakeholders before formally submitting their application.
- PAC involves engaging the public and statutory consultees (e.g. Natural Resources Wales, local planning authorities) at least 42 days before the application submission.
 - The Applicant must notify statutory bodies and give them at least 28 days to respond to the proposal.
 - The PAC process includes a public consultation (e.g. website publication, site notices, letters to neighbours, local newspaper notices), ensuring transparency and public participation.
 - The Applicant must provide detailed documentation about the development (e.g. plans, environmental impact assessments).
 - After the PAC, the applicant submits a PAC Report as part of the DNS application, summarising feedback and any changes made to the proposal.
 - The PAC helps identify issues early and allows the applicant to address them before submitting the final application.
 - It improves transparency, public engagement, and quality of decision-making, reducing potential objections and delays.

- 1.4.17 The Applicant is undertaking the statutory 42-day PAC commencing in March 2025.

The EIA Regulations

- 1.4.18 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.
- 1.4.19 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’.
- 1.4.20 The EIA Regulations are designed to assess the potential significant effects of certain developments on the environment before planning permission is granted. These regulations ensure that environmental considerations are integrated into the planning process, helping to protect the environment and promote sustainable development.

Need for EIA

- 1.4.21 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.’
- 1.4.22 The Proposed Development exceeds the applicable thresholds set out in paragraph 3, column 2 of Schedule 2 of the EIA Regulations, which comprise:
- ‘i) The development involves the installation of more than 2 turbines; or*
(ii) the hub height of any turbine or height of any other structure exceeds 15 metres.’
- 1.4.23 As such, the need for an EIA to be undertaken for the Proposed Development has been considered against the criteria set out in Schedule 3 of the EIA Regulations.

Purpose of EIA

- 1.4.24 EIA is a means of identifying and collating information to inform an assessment of the likely significant environmental effects of a project. This, in turn, can lead to the identification of measures to avoid or reduce such effects, which may inform the design process. Once the EIA process on the developer’s part is complete, the findings are reported in an ES in order to inform the relevant

consenting authority and interested parties as part of the decision-making process.

1.5 Content of this ES

- 1.5.1 This ES has been prepared in accordance with the EIA Regulations and informed by the Scoping Direction (dated 14 February 2025). 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.
- 1.5.2 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 additional mitigation proposed, taking account of the fact that effects will be both negative and positive.
- 1.5.3 Table 1.1 below sets out the information required under Schedule 4 of the EIA regulations, including where this has been addressed in the ES.

Table 1.1: Information required under Schedule 4 of the EIA Regulations

Information required	How and where this is addressed in the ES
1. A description of the development, including in particular - a. a description of the location of the development; b. a description of the physical characteristics of the whole development, including, the land-use requirements during the construction and operational phases; c. a description of the main characteristics of the operational phase of the development; and d. an estimate of expected residues and emissions and quantities and types of waste produced during the construction and operational phases.	A description of the Proposed Development, including the location and characteristics during the construction, operation and maintenance and decommissioning phase is provided in Volume 1, Chapter 2: Project Description of the ES. An estimate of the quantities and types of waste this will be reported in a Site Waste Management Plan, which will be submitted as part of the final Construction Environmental Management Plan prior to the commencement of construction of the Proposed Development.
2. A description of the reasonable alternatives studied by the applicant which are relevant to the proposed development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	A description of the reasonable alternatives to the Proposed Development studied by the Applicant is provided in Volume 1, Chapter 3: Need and Alternatives Considered of the ES.
3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far	Details of the baseline environmental conditions (existing and future), methodologies used, mitigation measures and likely effects are

Information required	How and where this is addressed in the ES
as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	provided in each of the topic chapters set out within Volume 1 of the ES: Chapter 5: Landscape and Visual Assessment Chapter 6: Transport Chapter 7: Hydrology and Flood Risk Chapter 8: Historic Environment Chapter 9: Ecology Chapter 10: Ornithology Chapter 11: Acoustics Chapter 12: Shadow Flicker Chapter 13: Aviation and Telecommunications Chapter 14: Socioeconomics
4. A description of the factors likely to be significantly affected by the development: population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and landscape.	A description of the likely significant effects of the Proposed Development on the environment, including direct and indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects, is provided in the relevant sections of each topic chapter of the ES.
5. A description of the likely significant effects of the development on the environment resulting from, inter alia	In addition, the cumulative effects and inter-related effects within and between environmental topics have also been considered within relevant sections of each topic chapter of the ES.
a. the construction and existence of the development; b. the use of natural resources in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; c. the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances and the disposal and recovery of waste; d. the risks to human health, cultural heritage or the environment; e. the cumulation of effects with other existing and/or approved projects; f. the impact of the project on climate and the vulnerability of the project to climate change; and g. the technologies and the substances used. The description of the likely significant effects should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.	
6. A description of the forecasting methods or evidence used to identify and assess the effects on the environment, including details of the difficulties encountered compiling the required information and the main uncertainties involved.	The overarching methodology used to undertake the EIA for the Proposed Development is provided in Volume 1, Chapter 4: Environmental Assessment Methodology of the ES. Topic specific forecasting methods used to identify and assess the effects on the environment, including details of the difficulties encountered are set out in relevant sections of Volume 1, Chapter 5 to 14 of the ES, where appropriate.

Information required	How and where this is addressed in the ES
7. A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned.	A description of the key areas of concern for major accidents and disasters and how these have been addressed is provided in Volume 1, Chapter 2: Project Description of the ES. In addition, major accidents and disasters have also been considered in relevant sections of Volume 1, Chapter 5 to 14 of the ES, where appropriate.
8. A non-technical summary of the information provided under paragraphs 1 to 8.	A Non-Technical Summary has been submitted as a standalone document as part of the DNS application for the Proposed Development. The Non-Technical Summary provides a summary of the information provided under paragraphs 1 to 8 of Schedule 4 of the EIA Regulations, including: - the Proposed Development description, including information on the Site, design, size and other relevant features; - a description of likely significant effects; - a description of measures to avoid, prevent or reduce and if possible, offset likely significant effects; and - a description of reasonable alternatives to the Proposed Development, including the main reasons for the chosen option, taking into account the effects on the environment.
9. A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.	A reference list detailing the sources used for the descriptions and assessments is provided at the end of each chapter and appendices of the ES.

1.5.4 Regulation 17 of the EIA Regulations sets out the information required to accompany an EIA. Table 1.2 below sets out the information required under Regulation 17 of the EIA Regulations, including where this has been addressed in this ES.

Table 1.2: Information required under Schedule 17 of the EIA Regulations

Information required	How and where this is addressed in the ES
1. An environmental statement is a statement which includes at least—	A description of the Proposed Development is provided in Volume 1, Chapter 2: Project Description of the ES.
a. a description of the proposed development comprising information on the site, design, size and other relevant features of the development;	A description of the likely significant effects of the Proposed Development on the environment is provided in the relevant sections of each topic chapter of the ES, which includes Volume 1, Chapter 5 to 14 of the ES.
b. a description of the likely significant effects of the proposed development on the environment;	A description of the mitigation measures required to avoid, prevent or reduce and,
c. a description of any features of the proposed development, or measures envisaged in	

Information required	How and where this is addressed in the ES
order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment; d. a description of the reasonable alternatives studied by the applicant or appellant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account e. a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and f. any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected.	if possible, offset adverse environmental effects is provided in the relevant sections of each topic chapter of the ES, which includes Volume 1, Chapter 5 to 14 of the ES. Mitigation measures are also set out in the following documents/management plans submitted in support of the DNS application: • Volume 1, Chapter 2: Project Description. • Volume 3, Appendix 6.2: Construction Traffic Management Plan. • Volume 3, Appendix 7.2: Conceptual Drainage Strategy. A description of the reasonable alternatives considered to the Proposed Development is provided in Volume 1, Chapter 3: Need and Alternatives Considered of the ES. A Non-Technical Summary of the information referred to in sub-paragraphs (a) to (d) of Regulation 17 of the EIA regulations is provided in the Non-Technical Summary, which has been submitted as a standalone document as part of the DNS application for the Proposed Development. Additional information specified in Schedule 4 relevant to the specific characteristics of the Proposed Development is addressed Volume 1, Chapter 5 to 14 of the ES and supporting documentations.
2. An environmental statement must - a. be prepared by persons who in the opinion of the relevant planning authority or the Welsh Ministers, as appropriate, have sufficient expertise to ensure the completeness and quality of the statement; b. contain a statement by or on behalf of the applicant or appellant describing the expertise of the person who prepared the environmental statement; c. where a scoping opinion or direction has been issued in accordance with regulation 14 or 15, be based on the most recent scoping opinion or direction issued (so far as the proposed development remains materially the	A statement setting out the relevant expertise of the EIA team responsible for the preparation of the ES is provided in Volume 3, Appendix 1.1: Statement of Expertise of the ES. Feedback received as part of the Scoping Direction (Volume 3, Appendix 4.2) has been used to inform the scope of the EIA and relevant sections of the ES for the Proposed Development. The information reasonably required for reaching a reasoned conclusion on the significant effects of the development on the environment is provided in Volume 1, Chapters 1 to 14 of the ES and supporting documentation.

Information required	How and where this is addressed in the ES
same as the proposed development which was the subject of that opinion or direction); d. include the information reasonably required for reaching a reasoned conclusion on the significant effects of the development on the environment, taking into account current knowledge and methods of assessment; and e. take into account other relevant environmental assessments required under Union legislation or any other provision of domestic legislation, with a view to avoiding duplication of assessment.	

- 1.5.5 As demonstrated in Table 1.1 and Table 1.2 above, the ES for the Proposed Development provides all information required under Schedule 4 and Regulation 17 of the EIA Regulations.
- 1.5.6 Regulations 18 and 21 of the EIA Regulations sets out the procedure where an ES is submitted to the Welsh Ministers. On submission of the DNS application, the relevant procedural requirements will be met as set out in Regulations 18 and 21.

1.6 Structure of the ES

- 1.6.1 The ES has been structured in order to allow relevant environmental information to be easily accessible. The ES is divided into three volumes:
- Volume 1 – Main text of the ES (Written Statement);
 - Volume 2 – Figures to accompany Volume 1;
 - Volume 3 – Technical reports to accompany Volume 1;
- 1.6.2 This volume of the ES (Volume 1) includes the main text. The location and description of the Proposed Development is provided in Volume 1, Chapter 2: Project Description. Information relating to the main alternatives considered during the evolution of the Proposed Development and the reasons for the choices made is found within Volume 1, Chapter 3: Need and Alternatives Considered. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains environmental assessment information by topic, as shown in Table 1.3.
- 1.6.3 A Non-Technical Summary of the ES is provided as a separate summary document.
- 1.6.4 The structure of the ES is presented within Table 1.3 below.

Table 1.3: Structure of the Environmental Statement

Chapter	Title	Author
Volume 1: Written Statement		
Chapter 1	Introduction	RPS

Chapter	Title	Author
Chapter 2	Project Description	RPS
Chapter 3	Need and Alternatives Considered	RPS
Chapter 4	Environmental Assessment Methodology	RPS
Chapter 5	Landscape and Visual Assessment	Galpin Landscape Architecture
Chapter 6	Transport	Arcitrán
Chapter 7	Hydrology and Flood risk	RPS
Chapter 8	Historic Environment	Archaeology Wales
Chapter 9	Ecology	BSG Ecology
Chapter 10	Ornithology	BSG Ecology
Chapter 11	Acoustics	Rappor Consultants
Chapter 12	Shadow Flicker	Pager Power
Chapter 13	Aviation and Telecommunications	Pager Power
Chapter 14	Socioeconomics	RPS
Volume 2: Figures		
Figures submitted in support of each chapter within the main text (Volume 1).		
Volume 3: Technical Appendices		
Technical appendices submitted in support of each chapter within the main text (Volume 1).		

1.7 The EIA Team

- 1.7.1 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 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 Volume 3, Appendix 1.1: Statement of Expertise.

1.8 Further Information

- 1.8.1 Copies of the ES and planning application documents can be viewed on the PEDW DNS website:
<https://gov.wales/developments-national-significance-dns-applications>
- 1.8.2 Further copies of the ES can be obtained from the following address:
RPS
2 Callaghan Square
Cardiff
CF10 5AZ
- 1.8.3 A paper copy of the full ES can be obtained from RPS for a cost of £250 plus VAT. A hard copy of the NTS can also be obtained from RPS, free of charge.
- 1.8.4 Further information on how to comment on the ES, Non-Technical Summary and other supporting documentation can be found via the Welsh Government DNS Planning Casework Website:

<https://planningcasework.service.gov.wales/>

1.9 References

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 2: Project Description

March 2025

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Approval for issue

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2.11	Constraints Plan: Ecology, Heritage and Water Courses
2.12	Constraints Plan: Utilities and Infrastructure
2.13	Enhancement Areas

Glossary

Term	Meaning
Baseline	The status of the landscape without the Proposed Development in place.
Conservation Area	An area of special architectural or historic interest, the character of which it is desirable to preserve or enhance.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Infrastructure	This is used to describe the various elements of the Proposed Development that require construction activities, both temporary and permanent; including turbines, hard standings and tracks (where new or existing road widened).
Landscape	An area, as perceived by people, the character of which is a result of the action and interaction of natural and/or human factors.
Llanwonno Energy Project	The energy project located south of Llanwonno, which comprises wind turbines and solar photovoltaic array with a combined installed generation capacity of approximately 61 MW, Battery Energy Storage System (BESS), cable route and ancillary development (referred to as the "Proposed Development").
Mitigation	Measures to avoid, prevent, reduce or control effects on the environment.
Public Right of Way	A Public Right of Way is a right by which the public can pass along linear routes over land at all times.
Site of Importance for Nature Conservation (SINC)	Sites of Importance for Nature Conservation (also known as Wildlife Sites) are non-statutory sites of nature conservation value that are designated locally on biological and/or geological grounds.
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
The Applicant	The Applicant refers to Cenin Renewables Limited.
The Site	The area within which the elements of the Proposed Development are located, including the areas required on a temporary basis during construction or decommissioning.

Abbreviations

Abbreviation	Meaning
BESS	Battery Energy Storage System
CEMP	Construction Environmental Management Plan
CDM	Construction Design and Management
DNS	Development of National Significance
EIA	Environmental Impact Assessment
ES	Environmental Statement
FCA	Flood Consequence Assessment

Abbreviation	Meaning
GRP	Glass Reinforced Plastic
HGV	Heavy Goods Vehicle
HSE	Health and Safety Executive
LDP	Local Development Plan
LGV	Light Goods Vehicle
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
PAC	Pre-application Consultation
PEDW	Planning Environment Decisions Wales
PV	Photovoltaic
PRoW	Public Right of Way
RCTCBC	Rhondda Cynon Taf County Borough Council
SINC	Site of Importance for Nature Conservation
SWMP	Site Waste Management Plan

Units

Unit	Description
%	Percentage
m	Metre
km	Kilometre
Ha	Hectares
ft	Feet
MW	Megawatt(s)

PROJECT DESCRIPTION

Introduction

- 2.1.1 This chapter of the Environmental Statement (ES) provides a description of the Llanwonno Energy Project (referred to as the “Proposed Development”). This chapter of the ES provides the following:
- A brief description of the Proposed Development Site, as defined by the red line boundary in Volume 2, Figure 1.1 of the ES (referred to as the “Site”) and its surrounding environs. Detailed descriptions of the environmental baseline at the Site are provided in the relevant topic chapters within the ES.
 - A description of the Proposed Development, including a summary of the key components of infrastructure, a description of the activities associated with their construction, operation and maintenance and decommissioning and the parameters of which form the basis for the assessment provided in this ES.
 - Details of the measures to avoid, reduce, or offset any adverse environmental effect, which are embedded as part of the Proposed Development design. Details of these measures are provided in this chapter and are set out in each topic chapter where applicable.
- 2.1.2 This chapter, together with the topic chapters, provides the data required to identify and assess the main and likely significant effects of the Proposed Development in accordance with Regulation 17 and Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (referred to as the EIA Regulations).

Site and Surrounding Area

Site Location

- 2.1.3 The Site comprises land to the north east of Porth, south of Llanwonno, which lies approximately 5 km from Pontypridd within the administrative boundary of Rhondda Cynon Taf County Borough Council (RCTCBC). The Site is approximately 112.4 hectares (ha) and consists of several parcels of land. The Site is currently used for semi-improved pasture in an extensive pattern of irregularly shaped large fields.
- 2.1.4 The Site is located approximately 270 m east of the consented Llwynycelyn Wind Project which comprises two turbines (application reference: 15/1635/FUL, approved in 2017). Installation of the Llwynycelyn Wind Project has commenced with construction to be completed by mid-2025.
- 2.1.5 The location and geographic extent of the Site is provided in Volume 2, Figure 1.1: Site Location Plan.

Baseline Environment

- 2.1.6 The Proposed Development is centred at ST 045 025 and is at a maximum elevation of approximately 300 to 350 m AOD. The Site is not located within an statutory designated site for ecology. The Site contains scattered parcels of ancient woodland. The following non-statutory designated sites are situated within 500 m of the Site:
- Llys Nant & Graig Twyn-y-glog Woodlands Site of Interest for Nature Conservation (SINC) is situated partially within the Site.
 - Coed-yr-Hafod Woodland Complex SINC, situated immediately adjacent to the Site.
 - St Gwynno Forest SINC, which is located 7 m to the west of the Site.
 - Cwm Hafod Woodland SINC, which is situated 174 m south of the Site.
 - Birch Grove Slopes SINC, which is situated 335 m to the west of the Site.
- 2.1.7 Within a 5 km radius of the Site, there are 14 Scheduled Monuments, 149 listed buildings, eight Conservation Areas and a Registered Historic Park and Garden. Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5) is situated partially within the boundary of the Site.
- 2.1.8 The closest residential properties to the Site includes the property at Blaenhenwysg located approximately 160 m to the east of the southern Site boundary, and Llysant Farm which is situated approximately 180 m to the north east of the eastern Site boundary.
- 2.1.9 The following Public Rights of Way (PRoW) are adjacent to the Site (no PRoW directly traverses the Site):
- Footpath YCC/28/3;
 - Footpath YCC/36/2; and
 - Bridleway YCC/14/1.

Site Planning History

- 2.1.10 The Site lies within the local planning authority of RCTCBC. The LPA online records outline the following historic planning applications of relevance:

Table 2.1 Site Planning History

Application Ref.	Address	Description of Development	Decision	Decision Date	Distance from Proposed Development
15/1635/FUL	Llwyncelyn Farm Hafod Lane Porth CF39 9UE	Erection of two wind turbines with a tip maximum height of 125 m, associated infrastructure, transformer cabin	Granted	24 Nov 2017	270 m NW

Application Ref.	Address	Description of Development	Decision	Decision Date	Distance from Proposed Development

and access track, including access via the public highway and across Cribin Ddu Farm and Llwynceilyn Farm.

Planning Context

- 2.1.11 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
 - RCTCBC Local Development Plan up to 2021
- 2.1.12 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:
- Sandstone Resource Area;
 - Ancient Woodland; and
 - A SINC.

Key components of the Proposed Development

- 2.1.13 The Proposed Development comprises the construction and operation of up to eight wind turbines and solar PV panels with battery storage facility and associated infrastructure/hardstanding. The Proposed Development comprises the following key components, which have been further described in this chapter of the ES:
- 2.1.14 Wind Farm:
- Wind turbines
 - Access tracks and turning heads
 - Construction Material
 - Temporary construction compounds and holding areas
 - Crane pads
 - GRP Substation and Control Building
- 2.1.15 Solar array:
- Solar panels and mounting structures
 - Inverters

- Transformers
- Cabling

2.1.16 The main components of a BESS facility are:

- Battery storage units
- Battery interface cabinets

2.1.17 The location and geographic extent of the key components of the Proposed Development is provided in Volume 2, Figure 2.1: Site Layout Plan.

2.1.18 Where practicable, the design and layout of the Proposed Development, including the key components set out above has been amended in response to identified design and/or environmental constraints. The design and layout of the Proposed Development may be further amended in response to feedback received as part of the Pre-Application Consultation (PAC) stage of the DNS application process. Justification for the location of the Proposed Development, including the design and environmental constraints considered as part of the iterative design process is provided in Volume 1, Chapter 3: Need and Alternatives Considered.

Wind Turbines

2.1.19 The Proposed Development comprises the construction, operation and maintenance and decommissioning of eight wind turbines, the proposed model of turbine is Vensys V126. The turbine layout is outlined in Volume 2, Figure 2.1: Site Layout Plan of the ES and Turbine specifications are detailed in Volume 2, Figure 2.2: Typical Turbine Elevations and Volume 2, Figure 2.3: Turbine Foundation Details.

2.1.20 The turbines will have a varying base to blade tip height of 150-200m. An outline of the individual turbine sizes and their grid ref locations is as follows:

Table 2.2: Individual Turbine Specifications and Grid References

Name	Hub Height (m)	Rotor Diameter (m)	Tip Height (m)	Easting	Northing
T1	86.9	126	150m	304040	192899
T2	86.9	126	150m	304351	192699
T3	86.9	126	150m	304938	192145
T4	96.9	126	160m	304259	193208
T5	96.9	126	160m	304507	192945
T6	96.9	126	160m	304751	192555
T7	117	126	180m	304875	192841
T8	136.9	126	200m	305102	192578

2.1.21 However, it should be noted that the final location of each of the eight wind turbines and associated infrastructure may be subject to further micro-siting following submission of the DNS application in response to detailed design and/or environmental constraints. The maximum allowance for micro-siting the wind

turbines, based on best practice for other similar DNS applications, would be up to 50 m.

Access tracks and turning heads

- 2.1.22 The Proposed Development comprises the construction, operation and maintenance and decommissioning of on-site surfaced tracks providing access to the wind turbines, onsite substation compound and temporary construction compounds from the local highway network.
- 2.1.23 The material used for the access tracks will be graded stone of 5.5 m widths and a total track footprint/excavated area of 1.41 ha.
- 2.1.24 Most of the on-site access tracks would be required to facilitate the construction of the Proposed Development.
- 2.1.25 Additionally, a number of access tracks will be retained after construction in order to facilitate maintenance activities during the operational phase.
- 2.1.26 Details of the proposed access tracks are shown within Volume 2, Figure 2.4: Typical Track and Trench Detail.

Construction Material

- 2.1.27 Borrow pits are not included within the Proposed Development. Stone for roads will be taken from turbine foundation excavations.

Temporary construction compounds and holding areas

- 2.1.28 The compound would be used, where necessary, for temporary storage of the various components and materials which are required for construction.
- 2.1.29 The material used for the construction compound will be graded stone with a width of 95 m to 115 m. The length will be 120 m to 140 m (non-rectangular) and a footprint area/excavated area of 1.37 ha. The excavation depth will be 0.2 m to 5 m subject to existing slope to create flat area.
- 2.1.30 The temporary construction compounds will be reinstated at the end of the construction phase. The stored subsoil and the stored topsoil would be laid over the underlying stone surface and then reseeded using a seed mix selected or, where possible, turfs would be reinstated.
- 2.1.31 Details of the Construction Compound are shown in Volume 2, Figure 2.5: Construction Compound Details.

Crane pads

- 2.1.32 Permanent crane hardstandings (pads) as well as temporary lay down areas will be constructed to facilitate the cranes required for the erection of turbine components. To provide stable, firm ground for safe operation of the cranes, areas of hardstanding would be laid down on one side of each turbine foundation.

GRP Substation and Control Building

- 2.1.33 The proposal includes a GRP Substation and Control Building. Their layout and specification are shown within Volume 2, Figure 2.6: BESS and Substation Layout Details and Volume 2, Figure 2.7: Electrical Infrastructure Cabinet Details, respectively. The GRP Substation includes substation switches to be chosen on the advice of an electrical engineer.

Solar panels and mounting structures

- 2.1.34 The Solar PV panels are fixed panels which will be positioned at a south facing 'fixed' tilt. There are no moving elements associated with the panels. They will be arranged in a series of rows known as arrays.
- 2.1.35 The panels are 2.8 m at their highest point, including posts which elevate the panel 1 m off the ground. The panel itself is 6.7 m long and tilted southwards at an angle of 15 degrees. See Volume 2, Figure 2.8: Solar PV Panels Elevations.
- 2.1.36 The metal support frames or mounting structures for the panels will be installed by piled technique and there would be no significant ground works required with this installation method.

Inverters and Transformers

- 2.1.37 '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 RCTCBC.

Cabling

- 2.1.38 The proposals include 33kV cabling which will connect the scheme components to the onsite GRP substation.
- 2.1.39 Indicative dimensions of the 33 kV trench required are shown in Volume 2, Figure 2.4: Typical Track and Trench Details. This includes the following dimensions:
- A trench depth of 1.4 m.
 - A width of trench at the base of 1.5 m.
- 2.1.40 Following the excavation of the trenches, the 33 kV cables would be placed towards the base and the excavated material would be backfilled. A protection tile and warning tape would be utilised above the cables to ensure they are protected. Topsoil would then reinstated, as shown within Volume 2, Figure 2.4 of the ES.

BESS

- 2.1.41 The proposal will also include a 30 MW / 4 hours BESS (24 no. 40 ft containers), which will store any surplus electricity generated by the solar panels and wind

turbines and release it when needed. The proposed layout of the BESS facility can be seen in Volume 2, Figure 2.6: BESS and Substation Layout Details.

Highway Access and Parking

- 2.1.42 The Site access will make use of the existing access track which serves the two existing turbines to the west (Llwyncelyn) of the Site via Griagwen road and then via the unnamed road to the Energy Project Site.
- 2.1.43 A variety of vehicles will need to access the Site during construction. These will include rigid and articulated Heavy Goods Vehicles (HGVs), and a large mobile crane associated with manoeuvring the requisite materials (including aggregate, mounting frames and the solar panels and wind turbines) and prefabricated buildings.
- 2.1.44 A framework Traffic Management Plan describing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic is submitted with the planning application at Volume 3, Appendix 6.2: Framework Traffic Management Plan.

Landscaping and ecological enhancement

- 2.1.45 With regards to Landscape, a number of habitat creation measures are proposed to enhance the host landscape character area CYNONVS141 – Ynysbwl and the landscape character of LANDMAP Landscape Habitats Aspect Area CYNONLH083. Further detail is provided within Table 5.19: Mitigation measures to be adopted as part of the Proposed Development within Volume 1, Chapter 5: Landscape and Visual Impact of the ES.
- 2.1.46 An Outline Habitat Management Plan will be prepared and submitted with the DNS application. It will include the provision of the following measures in relation to ecological enhancement:
 - Enhancement of the mixed plantation woodland (Perry's Wood), the creation of habitat piles and retained dead wood from the pruned / felled materials within the woodland;
 - The creation of habitat piles and retained dead wood from the pruned / felled materials within the woodland;
 - Fencing of field margins within the solar array (between solar panels and walls), to prevent overgrazing and allow the development of a longer and more diverse sward.
 - Habitat enhancement for reptile including the creation of simple structures such as hibernacula and grass snake egg laying heaps;
 - Provision of 5 bat and 5 dormouse boxes in woodland;
 - SuDS to be designed to create valuable new features (particularly for water vole).
 - Scrub control within the small area of dry dwarf shrub heath.

- Control of encroaching bracken within semi-improved acid and marshy grassland.
- Damming recently dug field drains to rewet the marshy grassland, to compensate for the reduction in the extent of this habitat.
- Cessation of reprofiling along the larger canalised stream to increase the structure and density of streamside vegetation. Scrub along the banks will be controlled, and controlled sectional dredging of the channel will be carried out to ensure continued flow of water along it.
- Cessation of regular cutting of the marshy grassland south of Perry's Wood, to mitigate for the reduction in the extent of this habitat.

2.1.47 Enhancement areas are outlined within Volume 2, Figure 2.13: Enhancement Areas.

Drainage and Flood Risk

2.1.48 A Conceptual drainage strategy has been prepared for the Site, please see Volume 3, Appendix 7.2: Conceptual Drainage Strategy for details.

Glint and Glare

2.1.49 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 is being undertaken and will form part of the DNS planning application.

Geology. Hydrogeology and Peat

2.1.50 The potential effects of the Proposed Development on geology, hydrology and hydrogeology during construction, operation and decommissioning stages are currently being assessed in accordance with the scope outlined in the Scoping Report (Appendix 4.1) and also considering the comments/responses received in the Scoping Direction (Appendix 4.2).

2.1.51 The impact assessment will be informed by various sources such as site visits/walkover surveys, Coal Authority reports including mining and geological survey data. The walkover survey was undertaken on the 13th and 14th March 2025 and findings from the surveys and initial reports on existing ground conditions including mining surrounding the turbine locations have been fed back to the design and engineering teams.

2.1.52 While initial site visits indicate that any peat resources within the site are expected to be of a shallow thickness and of limited extent, a programme of Peat Probing is being developed and will be undertaken, and the assessment results will be included in the Final ES. An Outline Soil Management Plan including measures relating to peat resources, if identified, will be developed and the assessment of land use and will be included in the Final ES.

Summary of Key Parameters

Table 2.3: Key parameters of the Proposed Development

Element of Development	Key Parameter for EIA
Site area	112.4 ha
Maximum height of solar panels	2.8 m
Maximum base to blade tip height of wind turbines	200 m
BESS	A 30 MW / 4 hours battery storage facility within 24 x 40 ft containers.

Mitigation Measures

Embedded Mitigation

- 2.1.53 Embedded mitigation consists of measures that have been incorporated into the design of development to prevent, reduce or offset any significant effects upon a receptor.
- 2.1.54 Embedded mitigation developed through the EIA process has been incorporated into the construction, operation and maintenance, and decommissioning of the Proposed Development in order to avoid and reduce the potential environmental impacts as far as it is practical to do so.
- 2.1.55 The design has inherently implemented a range of embedded mitigation measures to reduce and minimise impacts to the environment, examples include but are not limited to:

Table 2.4: Embedded Mitigation

Topic	Mitigation Measure	How will the measure be secured
Landscape	The process of design iteration has considered landscape and visual aspects throughout the design process from an early stage. This included the relocation of a turbine (now T7) to mitigate landscape and visual impacts.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
	The colour of the Proposed wind turbines is 'Goosewing grey'. This colour has been shown in studies to be the least visible colour against UK skies. Mitigating the visual impact for some days and from some views.	It is anticipated that the colour of the turbines will be secured via condition as part of any consent.
Transport	It is proposed that stone for roads will be taken from turbine foundation excavations to reduce the level of traffic associated with the import of aggregate from off-site locations.	It is anticipated that this measure will be secured via condition as part of any consent.
Ecology	Routeing and design of the solar array and access tracks to minimise impacts on the habitats of highest ecological value within the Proposed Development site.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
	Rotation and micro-siting of the crane pad locations to avoid the habitats of highest ecological value within the Proposed Development site	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.

	Limitation as far as possible of habitat loss / modification within the SINC will be during the construction phase by minimising the working footprint as far as practicable. Any temporary lay-down, vehicle access points, material storage or construction compounds (as required during the turbine installation) will be confined to tracks, laybys or appropriate areas as identified / discussed with the Ecological Clerk of Works (ECOW).	The measure will be detailed in the CEMP, which will be secured via planning condition.
	Retained habitats including buffers and root zones and / or working areas will be clearly demarcated with high visibility fencing and maintained until works are complete. The fenced area will act as an exclusion zone. All equipment / plant will operate from within the marked working area, and no spoil, vegetation or other materials are to be placed or stored outside of the working area.	The measure will be detailed in the CEMP, which will be secured in a planning condition.
	Provision of a bat buffer of 50 m from blade tip to retained forest edge (as recommended in SNH, 2021) to reduce the risk of bat-strike. All other linear features that are likely to be well used by bats (i.e. woodland edge, watercourses and hedgerows) are outside the bat buffers around proposed turbines.	This measure will be secured in a planning condition for the scheme.
	Feathering of the turbines blades at idle to minimise the potential for killing and injury of bats.	This measure will be secured in a planning condition for the scheme.
	The design has taken consideration and avoided (with stand-offs wherever possible): • Potential roost features for bats, • Watercourses suitable for otter and water vole, and • The areas of highest habitat quality for these species.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
	A preconstruction ecological survey programme to provide updated baseline information to feed into the CEMP and other operational plan documents	The measure will be detailed in the CEMP, which will be secured in a planning condition.
	A detailed Construction Environmental Management Plan (CEMP) will be secured by condition post-consent and produced in consultation with stakeholders (i.e. NRW and RCTCBC). The CEMP will outline measures to prevent effects arising on biodiversity (and other environmental) receptors during the construction phase.	These measures will be detailed in the CEMP, which will be secured in a planning condition.
Historic Environment	The site is currently enclosed by historic drystone wall field boundaries. Where possible these should be retained and repaired. The walls stand at least 1.5m in height which would help screen certain elements of the proposed development from view, lessening the impact on some of the historic assets surrounding the site.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
Aviation	The Proposed Development will adopt a lighting scheme, in accordance with the CAA and MOD to ensure visibility and reduce risk of a collision risk.	This measure will be detailed in a lighting scheme, which will be secured in a planning condition.
Ornithology	Routeing and design of the solar array and access tracks to minimise impacts on the lapwing breeding area (no panels are proposed within the breeding fields, one of which is within the landholding), or habitats likely to be of high ecological value to most passerines (e.g. marshy grassland, scrub and hedgerows) within the Proposed Development site (in line with the step-wise approach set out in PPW 12).	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.

Retained habitat (suitable for nesting passerines) including buffers and root zones and / or working areas will be clearly demarcated with high visibility fencing and maintained until works are complete. The fenced area will act as an exclusion zone. All equipment / plant will operate from within the marked working area, and no spoil, vegetation or other materials are to be placed or stored outside of the working area.

The measure will be detailed in the CEMP, which will be secured in a planning condition.

A preconstruction ornithological survey programme to provide updated baseline information to feed into the CEMP and other operational plan documents.

The measure will be detailed in the CEMP, which will be secured in a planning condition.

The development of a detailed CEMP in consultation with stakeholders (i.e. NRW and RCTCBC) to build on the principles of the outline CEMP submitted as part of this planning application. The CEMP will include provisions relevant to birds, to prevent an offence from being committed under the Wildlife and Countryside Act 1981 (as amended), which prevents intentional or reckless killing, injury or taking of any wild bird; taking, damaging, destroying or otherwise interfering with the nest of that bird while it is in use or being built; obstruction of any wild bird from using its nest; and taking or destroying an egg of any wild bird.

The measure will be detailed in the CEMP, which will be secured in a planning condition.

- 2.1.56 Mitigation measures are also detailed within the relevant sections of the individual topic chapters within the ES (see Volume 1, Chapters 5 to 15).

Construction Phase

- 2.1.57 The specific techniques, timings and phasing to be adopted during construction of the Proposed Development have not yet been determined at this stage in the DNS application process. However, for the purposes of the EIA, the worst-case maximum parameters have been identified and assessed with respect to the construction phase.
- 2.1.58 Indicative Phasing of Construction Works
- 2.1.59 The timing of construction and phasing of construction works would be dependent on securing planning permission for the DNS application and the discharge of subsequent planning conditions. Therefore, at this stage in the DNS application process, the dates for construction of the Proposed Development remain indicative.
- 2.1.60 The construction phase of the Proposed Development is anticipated to commence in approximately 2030. The total duration of the construction phase would be 24 months.
- 2.1.61 Prior to the commencement of construction, there may be some advanced enabling works required. These may include surveys and studies required to inform the final design of the Proposed Development.

Construction Working Hours

- 2.1.62 Normal construction working hours would be between 08:00 and 18:00 hours Monday to Friday, with limited construction activities on Saturdays between 08:00 and 13:00 hours. No construction activities would take place on a Sunday or Bank Holidays.
- 2.1.63 Up to an hour before and after the normal construction working hours, the following activities may be undertaken
- Arrival and departure of the workforce at the site and movement around the Project site that does not require the use of plant;
 - Site inspections and safety checks; and
 - Site housekeeping that does not require the use of plant.
- 2.1.64 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.

Construction Staff

- 2.1.65 The number of workers on-site would vary depending on the construction activities. It is anticipated that a peak workforce of approximately 24 staff members per day would be required to facilitate construction of the Proposed Development.

Construction Access

- 2.1.66 Llanwonno Energy Project will comprise two access route arrangements; one for AILs, and another for general construction traffic. Access to the Site would be required for HGVs, abnormal loads for certain items (steel work for the buildings, transformers, large cranes or construction plant) and for construction workforce traffic. Access for general construction access from the A470 follows the A4223, B4273, Heol-Y-Mynach, and Pleasant View before reaching the Pen-y-Wal Road leading to the Site.

Construction Vehicles

- 2.1.67 The exact type and specification of HGVs and Light Goods Vehicles (LGVs) to be used during construction of the Proposed Development would be determined by the principal contractor and sub-contractors prior to the commencement of construction works. However, an indicative list of the types of vehicles to be used during construction of the Proposed Development is provided in Table 2.5 below.

Table 2.5: Indicative list of vehicles to be used during construction

Vehicle type	Description
Heavy Goods Vehicles	

Vehicle type	Description
Tracked bulldozer	These will be used for various tasks, including stockpiling material from turbine excavations, managing stockpiles during construction, preparing crane platforms, and re-grading the on-site access track running surface.
Dump trucks	These vehicles will be utilised for various material handling tasks around the Site. This includes transporting excavated peat and soils from cut site tracks, relocating materials to designated stockpile areas, and distributing construction materials where needed within the Site.
Cable laying vehicles	These will comprise a lorry or tractor equipped with a revolving drum attachment for laying cables in trenches alongside site tracks. Additionally, a tracked excavator with a drum attachment will be used for laying cables offsite in areas where the cables are not routed alongside new or existing tracks.
Lorries with flatbed trailers	These vehicles will include lorries with flatbed extendable trailers for transporting all turbine components, such as blades, nacelles, and transformers. Additionally, there will be lorries carrying cabling, steel rods for concrete reinforcement, and concrete lorries with revolving drums for delivering concrete.
Light Goods Vehicles	
Small trucks	These would be used for transporting of small loads around the Site. For example, ducting pipes for cables in turbine foundations.
Four wheel drive vehicles	These would be used for transporting construction workers and other members of on-site staff within the Site.

2.1.68 The exact type and specification of plant and equipment to be used during construction of the Proposed Development would be determined by the principal contractor and sub-contractors prior to the commencement of construction works.

2.1.69 However, an indicative list of the types of plant and equipment to be used during construction of the Proposed Development is provided in Table 2.6 below.

Table 2.6: Indicative list of plant and equipment to be used during construction

Plant or equipment	Description
Cranes	Two types of cranes would be required, a large crane with a carrying capacity of approximately 750 tonnes and a smaller crane with a lower carrying capacity of approximately 200 tonnes (or less). The larger crane would primarily be responsible for heavy lifting, for example the wind turbine assembly. The smaller crane would primarily be used for offloading and manoeuvring of construction materials/equipment.
Small excavators	These excavators would be in the weight range of approximately 13 to 30 tonnes and would be used for on-site access track construction and profiling, restoration of verges, excavation of wind turbine foundations and cable trenches.
Heavy duty vibrating rollers	The rollers are used for compacting various surfaces on the construction site. This includes compacting new roads to ensure they are stable and durable, preparing turbine foundation formations to provide a solid base, and compacting crane pads to the necessary densities for safe crane operation. Additionally, they are essential for compacting the backfill around turbine foundations to achieve the appropriate densities required for structural integrity.

Plant or equipment	Description
A mobile concrete pump	This would comprise a lorry-mounted concrete pump, equipped with a large boom, which will be used for turbine foundation concrete works. Concrete wagons will reverse to the pump, delivering concrete into a connected hopper. This setup allows for controlled and flexible pouring of the foundations.

Lighting

- 2.1.70 Some temporary task lighting may be required to facilitate construction and maintenance and repair activities of the Proposed Development depending on the time of year and weather conditions. No permanent lighting is proposed as part of the Proposed Development, apart from aviation lighting (ADLS) associated with the wind turbines. However, ADLS would only activate when an aircraft is detected to avoid visual impacts associated with blinking lights on each of the wind turbines.

Operation and Maintenance

- 2.1.71 Operation of the Proposed Development is anticipated to commence in 2030 and end in 2080. As such, the operational lifetime of the Proposed Development is 50 years.
- 2.1.72 The facility is expected to have no full-time equivalent staff during the operation. However, access would be required for staff to undertake inspection, maintenance, repairs and make adjustments. For the majority of the time, the facility would be controlled remotely.
- 2.1.73 Maintenance visits will be undertaken at regular intervals throughout the lifetime of the Proposed Development to ensure the effective and safe operation of the wind turbines, solar array, BESS and associated infrastructure.

Decommissioning

- 2.1.74 At the expiry of consent or end of the scheme's useful life, the Proposed Development would be decommissioned. The works required for decommissioning of the Proposed Development would be similar in nature to those required during construction and are anticipated to commence in 2080 and take up to approximately one year to complete.
- 2.1.75 For the purposes of the EIA, the potential impacts and mitigation requirements during the decommissioning phase are assumed to be similar to that of construction of the Proposed Development.
- 2.1.76 At least six months prior to the commencement of decommissioning works, a Decommissioning Strategy will be prepared and submitted to RCTCBC for approval. The Decommissioning Strategy will set out how the wind turbines and associated infrastructure will be removed, and land restored or reinstated upon completion of decommissioning works.

- 2.1.77 All waste and material generated during decommissioning of the Proposed Development would be recycled, re-used or disposed of at an approved landfill location in accordance with the Site Waste Management Plan (SWMP) and Decommissioning Strategy.

Environmental Management

Construction Environmental Management

- 2.1.78 Construction of the Proposed Development would be managed through a Construction Environmental Management Plan (CEMP) that sets out the principles of good environmental management to be followed in order to avoid or minimise environmental impacts. This includes principles for the management of construction noise, dust, traffic, materials storage and waste management, drainage and ecological protection. The CEMP will be developed and submitted to RCTCBC for acceptance prior to the commencement of construction of the Proposed Development.
- 2.1.79 A Framework Traffic Management Plan is included at Volume 3, Appendix 6.2: Framework Traffic Management Plan.

Use of Natural Resources

- 2.1.80 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 materials during the construction process:
- 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).
- 2.1.81 The EIA Regulations also refer to the use of land and biodiversity resources. Further details are provided in Volume 1, Chapter 9: Ecology of the ES.

Construction Drainage

- 2.1.82 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. Flood response and pollution prevention measures would be implemented as part of the CEMP during construction of the Proposed Development. These flood response and pollution prevention measures include (but are not limited to):
- The storage of construction materials and waste within the temporary construction compounds;

- All waste arising from construction activities would be removed from site via registered waste carriers and transported to a suitable waste management facility;
- All bonfires and burning of waste will be prohibited and labelled double skinned waste tanks will be used for the storage of waste oils on-site;
- All waste stored within the temporary construction compounds would be isolated from surface drains and bunded to contain any spillages;
- The installation of a wastewater collection systems to prevent contamination of nearby surface water or ground water features;
- Use of sediment fences along existing watercourses/waterbodies when working nearby to prevent sediment being washed into them;
- Covers for lorries transporting materials to/from site to prevent releases of dust/sediment to watercourses/drains;
- Concrete to be stored and handled appropriately to prevent release to drains;
- Obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the consent would be specified to ensure that construction does not result in significant alteration to the hydrological regime or an increase in fluvial risk; and
- 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.

Waste Management

- 2.1.83 Construction, operation and maintenance and decommissioning of the Proposed Development will generate general waste, municipal and hazardous waste. Therefore, to reduce the environmental impact of waste and promote suitable waste management, the waste hierarchy approach will be adopted during each phase of the Proposed Development. A summary of the waste hierarchy approach is presented in Diagram 2.1 below, which has been taken from the Department for Environment, Food & Rural Affairs (Defra) Guidance on applying the Waste Hierarchy (Defra, 2011).

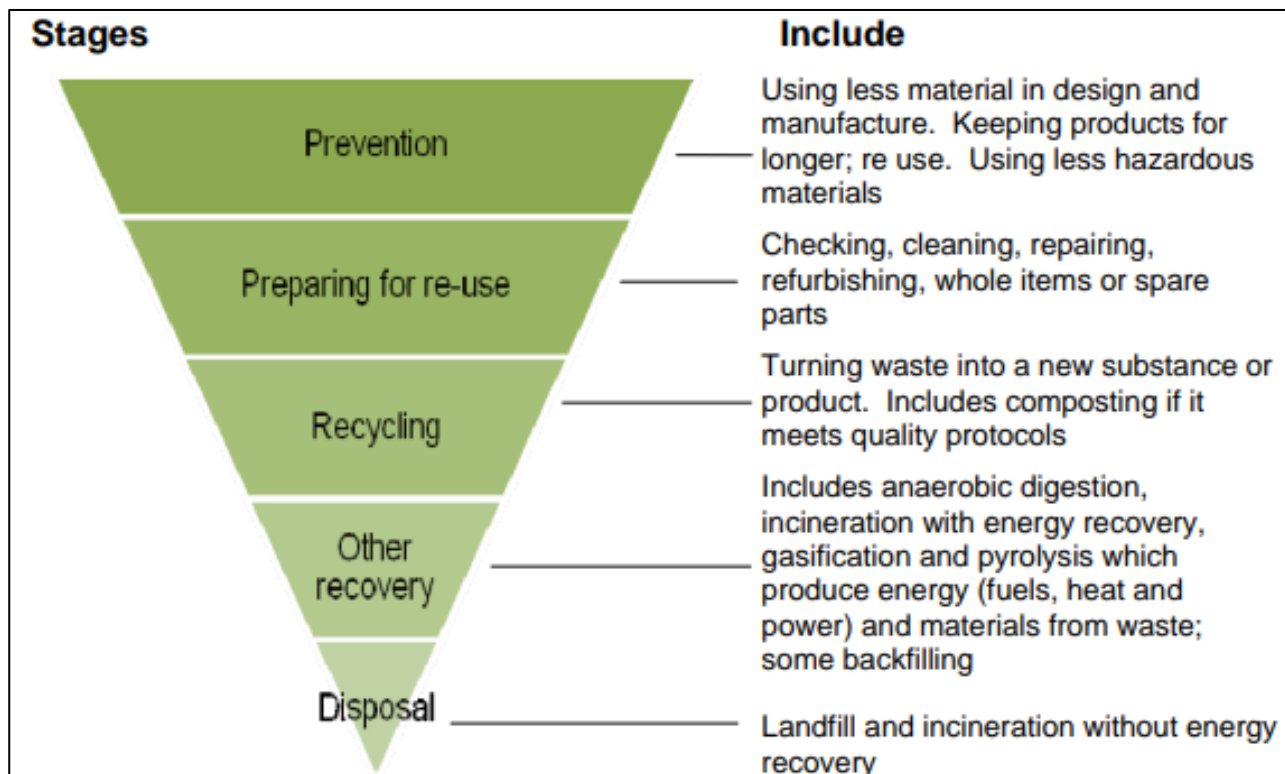


Diagram 2.1: Waste hierarchy (Defra, 2011)

Construction Waste

- 2.1.84 Site waste generated during construction of the Proposed Development would typically comprise materials generated during excavation or earthworks, such as surface vegetation, soil, stone and rock. However, excavated materials would be re-used onsite where these deemed suitable for re-use (e.g. as fill materials). Where not deemed suitable for re-use, site waste would either be transported to a suitable recycling facility or landfill site (if non-recyclable).
- 2.1.85 A Site Waste Management Plan (SWMP) will be prepared and submitted as part of the detailed CEMP prior to the commencement of construction of the Proposed Development. The SWMP will set out how waste generated during construction of the Proposed Development will be managed, including the safe, efficient and lawful disposal of site waste. The measures included in the SWMP address the following:
- Waste identification and segregation: the SWMP will identify the type and quantities of waste to be generated during construction of the Proposed Development and describe how these are to be separated to facilitate effective disposal and recycling;
 - Waste reduction and management: the SWMP will include practices to minimise waste generation, such as using materials efficiently and avoiding over-ordering, and set out how each type of waste will be managed, including the re-use, recycling, recovery and disposal methods to be used;

- Compliance and training: the SWMP will ensure all waste management activities comply with relevant regulations and legal requirements and set out procedures for training workers on effective site waste management practices, including the importance of reducing waste;
- Environmental protection: the SWMP will set out measures required to avoid or reduce potential environmental impacts associated with construction waste, including the identification, storage and disposal of hazardous waste and maintaining a clean and organised site to prevent waste accumulation;
- Monitoring and reporting: the SWMP will establish the procedure for tracking waste management activities and reporting and non-compliance issues, including nomination of approved person(s) responsible for site waste management; and
- Health and safety: the SWMP will address any health and safety concerns relating the handling and disposal of construction waste.

2.1.86 The measures to be included in the SWMP will ensure that waste generated during construction of the Proposed Development is kept to a minimum and does not result in unnecessary pressure on local waste management infrastructure, either alone or cumulatively with other nearby developments.

Operational Waste

2.1.87 On the basis that the Proposed Development would be automated, waste generated during the operational phase would be limited to repair and maintenance activities. Waste produced during the operation and maintenance of the Proposed Development would typically comprise materials required for maintenance activities (e.g. oils, lubricants), old components, packaging waste (e.g. cardboard, plastic, metal), general waste produced by personnel on-site (e.g. food wrappers, bottles), hazardous waste (e.g. batteries, solvents, other chemicals) and office waste (e.g. paper, electronics) associated with administrative activities.

2.1.88 Waste generated during operation and maintenance of the Proposed Development would be managed in a similar way to construction waste, including adherence to the waste hierarchy and measures to be set out in the SWMP and CEMP.

Decommissioning Waste

2.1.89 Waste generated during decommissioning of the Proposed Development would comprise demolition waste, turbine components, electrical cabling (where removed), municipal waste, waste chemicals, fuel and oil, sewage and waste water. Waste generated during decommissioning of the Proposed Development would be managed in a similar way to construction waste, including adherence to the waste hierarchy and measures set out in the SWMP, CEMP and Decommissioning Strategy.

- 2.1.90 According to an article produced by Orsted titled 'Can wind turbines be recycled' (Orsted, 2023), it is estimated that between 85-95 % of a wind turbines material can be recycled. In addition, According to Sustainable Decommissioning: Wind Turbine Blade Recycling, Report from Phase 1 of the Energy Transition Alliance Blade Recycling Project (Catapult Offshore Renewable Energy et al., 2021), significant efforts are underway to ensure all elements of the wind turbine, including the wind turbine blades (which are typically more difficult to re-cycle due their construction) are fully recyclable. As such, it is likely that the wind turbines would become 100 % recyclable during the operational lifetime of the Proposed Development.

Sustainability

- 2.1.91 This section outlines the effects of the Proposed Development on sustainability factors such energy demand, waste, use of natural resources, and residues and emissions.
- 2.1.92 The Welsh Government (WG) has formally committed Wales to legally binding targets to deliver the goal of net-zero emissions. Part 2 of the Climate Change Act 2008 required the formation of a body corporate to be known as the Committee on Climate Change or, in Welsh, as y Pwyllgor ar Newid Hinsawdd. The Committee on Climate Change was formed in December 2008 and is now known as the Climate Change Committee (CCC). It is an independent non-departmental public body to advise the United Kingdom and devolved Governments and Parliaments on tackling and preparing for climate change. The proposal would contribute towards the following targets set by the CCC:
- 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).
- 2.1.93 The DNS application will be accompanied by two technical appendices:
- Greenhouse Gas (GHG) Emissions Technical Report - the carbon balance will consider the GHG emissions sources including embodied carbon, construction emissions, on-site emissions and emissions associated with transport to and from the site, as well as the potential emissions savings due to the output of the solar/wind generation. The technical report will consider the whole life carbon or net effects of the Proposed Development.
 - Climate Change Risk Assessment Technical Report - the consideration of the Proposed Development's vulnerability and resilience to projected climate change.

Vulnerability to Accidents and Disasters

- 2.1.94 Given the nature of the Proposed Development, it is considered that the key areas of concern for major accidents and disasters include fires, flooding, mechanical failure (e.g. collapse, blade throw or ice throw) and aviation.

Fire Risk

- 2.1.95 The Proposed Development comprises electrical infrastructure which presents a potential fire risk, such as the on-site substation compound and wind turbines. Therefore, the Proposed Development will include several passive, active and additional measures to mitigate against fire risk:

Passive fire protection

- Non-combustible materials: the utilisation of non-combustible materials, such as fire resistant cables and insulation, where possible;
- Compartmentalisation: the division of the substation and control compound into fire-resistant compounds to prevent the spread of fire; and
- Lightning protection: the installation of lightning protection on each of the wind turbines to transfer electrical energy into the ground.

Active fire protection

- Fire detection systems: the installation of smoke and heat detectors within the on-site substation compound to provide early warning of a fire;
- Automated fire suppression systems: installation of systems such as clean agents, inert gases or aerosol extinguishing systems which would activate upon detection of a fire; and
- Regular maintenance: undertaking regular inspections and maintenance of electrical infrastructure to ensure that all systems are in good working order and undertake repairs where required.

Additional measures

- Training: all on-site staff and personnel would undertake relevant fire safety training as part of their site induction process; and
- Emergency plans: emergency response plans setting out fire response procedures would be developed and regularly updated during operation of the Proposed Development.

Flood Risk

- 2.1.96 The evaluation of flood risk associated with the Proposed Development is provided within the Hydrology and Flood Risk Chapter and the Flood Consequence Assessment (FCA) which are in Volume 1, Chapter 7 and Volume 3, Appendix 7.1 of the ES, respectively.

Accidental Pollution

- 2.1.97 The impact of accidental pollution or contamination on the quality of groundwater, surface water and watercourses, ecology and ornithology are addressed within the following topic chapters:
- Volume 1, Chapter 7: Hydrology and Flood Risk;
 - Volume 1, Chapter 9: Ecology;
 - Volume 1, Chapter 10: Ornithology; and

Mechanical failure or blade/ice throw

- 2.1.98 The wind turbines will be designed and constructed to withstand extreme wind and weather conditions. The wind turbine scenarios under consideration at this stage in the DNS application process all have a proven record in terms of safety and reliability. As such the likelihood of collapse or blade throw is low.
- 2.1.99 However, multiple PRowS are in proximity to the proposed wind turbines. Therefore, several measures have been incorporated into the design of the Proposed Development to reduce the likelihood of mechanical failure or blade/ice throw and ensure the safety of PRow users and members of the public:
- Separation distance: establishing a minimum separation distance between each of the wind turbines and definitive PRow of a turbine blade length (61.7 m) to prevent turbine blades rotating above PRow;
 - Warning signage: warning signs will be placed at entry points to the Proposed Development Site and in proximity to each of the wind turbines to inform members of the public of the presence and potential dangers of wind turbines; and
 - De-icing system: Implementation of anti-icing solutions, including climatic detection systems to detect ice build-up and stop operation (rotation) of the wind turbines and prevent potential ice throw (ice being ejected from rotating wind turbines).
 - Resilient design: the wind turbines will be constructed from resilient materials, such as carbon fibre-reinforced composite for the turbine blades, to enhance strength and fatigue resistance;
 - Condition monitoring: the wind turbines will include sensors to monitor parameters, such as vibration and temperature to detect early signs of wear and/or misalignment;
 - Emergency cutoff: the wind turbines will include systems that would automatically shut down operation upon detection of abnormal conditions (e.g. excessive wind speeds, ice build-up); and
 - Regular maintenance: the wind turbines and supporting infrastructure will be subject to regular maintenance to ensure all components are in good working order.

- 2.1.100 It is considered that implementation of the above measures will ensure the safety of members of the public during operation and maintenance of the Proposed Development. In addition, prior to the start of commercial operation, the Applicant will notify RCTCBC that warning signs and de-icing systems have been installed.

Health and Safety

Construction Staff

- 2.1.101 The construction of the Proposed Development will be undertaken in accordance with the following primary health and safety legislation and regulations:
- The Health and Safety at Work Act 1974: this requires employers to ensure the health, safety, and welfare of their employees at work, and establishes the Health and Safety Executive (HSE) to enforce these regulations;
 - The Management of Health and Safety and Work Regulations 1999: this requires employers to assess and manage health and safety risks in the workplace, ensuring a safe and healthy environment for employees; and
 - The Construction (Design and Management) (CDM) Regulations 2015: require those involved in construction projects to plan and manage health, safety, and welfare from the start to the finish of the project.
- 2.1.102 As required under the CDM Regulations 2015, a Health and Safety Plan setting out the health and safety procedures to be adhered to by construction staff will be prepared and submitted prior to the commencement of construction of the Proposed Development.
- 2.1.103 Overall, the Proposed Development is not of a type to give rise to potential for any unusual accidents or disasters during its construction phase. Therefore, construction legislation and good practice would be sufficient to control risks to an acceptable level.

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LLANWONNO ENERGY PROJECT

ENVIRONMENTAL STATEMENT

Volume 1, Chapter 3: Need and Alternatives

March 2025

Document status					
Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
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Glossary

Term	Meaning
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Infrastructure	This is used to describe the various elements of the Proposed Development that require construction activities, both temporary and permanent; including turbines, hard standings and tracks (where new or existing road widened).
Llanwonno Energy Project	The energy project located south of Llanwonno, which comprises wind turbines and solar photovoltaic array with a combined installed generation capacity of approximately 61 MW, Battery Energy Storage System (BESS), cable route and ancillary development (referred to as the “Proposed Development”).
Mitigation	Measures to avoid, prevent, reduce or control effects on the environment.
The Applicant	The Applicant is Cenin Renewables Limited.
The Site	The area within which the elements of the Proposed Development are located, including the areas required on a temporary basis during construction or decommissioning.

Abbreviations

Abbreviation	Meaning
BESS	Battery Energy Storage System
BMV	Best and Most Versatile
EIA	Environmental Impact Assessment

Abbreviation	Meaning
ES	Environmental Statement
FES	Future Energy Scenarios
POC	Point of Connection
PPW	Planning Policy Wales
PV	Photovoltaic
RCTCBC	Rhondda Cynon Taf County Borough Council

Units

Unit	Description
m/s	Metres per second
MW	Megawatt

3 NEED AND ALTERNATIVES CONSIDERED

3.1 Introduction

- 3.1.1 This chapter of the Environmental Statement (ES) provides a description of the site selection process and alternatives considered for the Llanwonno Energy Project (referred to as the “Proposed Development”). This chapter also demonstrates how the location and layout of the Proposed Development has responded to environmental constraints identified as part of the Environmental Impact Assessment (EIA) process, including feedback received from relevant stakeholders during statutory and non-statutory consultation.
- 3.1.2 Further detail with respect to the design of the Proposed Development is set out within the Planning Statement and Design and Access Statement.

3.2 Legislative Context

- 3.2.1 Regulation 17 of The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (‘the EIA Regulations’) requires an Environmental Statement to include the following information:
- ‘A description of the reasonable alternatives studied by the applicant..., which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the significant effects of the development on the environment.’*
- 3.2.2 Paragraph 2 of Schedule 4 of the EIA Regulations states the following with respect to alternatives:
- ‘A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant..., which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects...’*
- 3.2.3 As such, the following sections of this chapter of the ES set out the reasonable alternatives considered, including the main reasons for the location, layout and design of the Proposed Development with reference to identified design and/or environmental constraints.

3.3 Need for Development

- 3.3.1 The need for the Proposed Development is based on the following considerations, having regard to the relevant national and local policy context:
- Increasing demand for electricity;
 - The need to decarbonise energy systems and combat the potentially devastating effects of climate change on current and future generations; and
 - Energy security for Wales.

Well-being of Future Generations (Wales) Act 2015

- 3.3.2 The Act is concerned with improving the social, economic, environmental and cultural well-being of Wales. It aims to put sustainable development at the centre of decision-making and is designed to ensure actions meet the needs of the present, without compromising the ability of future generations to meet their own needs.
- 3.3.3 The Act provides the legislative foundations to achieve a more sustainable Wales, outlining 7 well-being goals.
- 3.3.4 The Act sets the milestone for Wales to achieve net-zero greenhouse gas emissions by 2050.

The Environment (Wales) Act 2016

- 3.3.5 The Environment (Wales) Act requires the Welsh Government to reduce emissions of greenhouse gases in Wales to net zero for the year 2050 with a system of interim emissions targets and carbon budgets.

Net Zero Wales Carbon Budget 2 - 2021 to 2025 (Welsh Government, 2021)

- 3.3.6 Based on the above legislation, the Welsh Ministers had a statutory duty to prepare and publish a report before the end of 2021 setting out their proposals and policies for meeting Carbon Budget 2. This is the second carbon budget (2021–2025), setting out the plan to net zero.
- 3.3.7 The following policies from the carbon budget outline Welsh Government support for wind proposals:
- *‘Policy 17 – Reducing emissions from the combustion of fuels for electricity generation. We aim to reduce carbon emissions from the power sector in Wales whilst maintaining security of supply in a high renewables system.’*
 - *‘Policy 22 – Increasing renewable energy developments on land through our planning regime ... Future Wales’ policies provide a positive policy framework to support the consenting and development of large-scale renewable energy projects. Proposals are beginning to come forward in the pre-assessed areas and, subject to consenting by Welsh Ministers, are likely to be built and producing energy within the Carbon Budget 2 period.’*
- 3.3.8 According to a report produced by RenewableUK Cymru (2023), Wales needs four times more wind power in 10 years to meet green ambitions.

Wales Renewable Energy Targets

- 3.3.9 In January 2023, it was announced via a press release that the Welsh Government (Welsh Government, 2023b) has set a target for renewable electricity generation to be equivalent to 100% of annual electricity consumption by 2035.

Energy Generation in Wales 2023

- 3.3.10 The Energy Generation in Wales 2023 (Welsh Government, 2023a) report sets out the energy generation capacity in Wales at the end of 2023 and analyses changes over time. The report aims to support the Welsh Government in developing energy policy and help to evidence the economic, social, and environmental benefits of Welsh energy projects.
- 3.3.11 According to the report, in regards to status of onshore wind within the planning system: 'No new onshore wind sites were commissioned in Wales in 2023, marking the fourth consecutive year of decreasing deployment and the first year since 2000 without any new capacity. This decline sharply contrasts with the period between 2016 and 2019, when an average of 160 MW was installed annually.'

National Grid Future Energy Scenarios (July 2024)

- 3.3.12 Future Energy Scenarios (FES) (National Grid, 2024) builds on their previous framework of pathways to net-zero, by exploring a narrower range of credible outcomes by identifying strategic choices that can be made on the route to net zero. The FES proposes three new pathways – Holistic Transition, Electric Engagement and Hydrogen Evolution.
- 3.3.13 The 'key actions' of the FES report, with regards to the Proposed Development, include:
- Accelerate the delivery of whole system infrastructure through a strategic approach to network investment and introduction of planning reforms.
 - Deliver market reform, considering electricity, gas, hydrogen and CO₂, to ensure we have energy markets that provide for and work with a reliable and strategically planned energy system.
- 3.3.14 FES declares that wind generation plays an important role in the transition away from the use of fossil fuels as the primary energy supply of electricity, with its share of energy supply increasing from 6% today to a projected 41% in 2050.
- 3.3.15 FES states that onshore wind generation remains one of the lowest cost options to meet our energy needs and, if efficiently integrated, can minimise the total system cost.

Welsh Government Declaration of Climate Emergency

- 3.3.16 On 29th 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

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

UK Government Net Zero 2050

- 3.3.18 On 27th 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, 2020) was published, setting out the pathway to achieving net zero through the greater reliance on wind and solar energy.

- 3.3.19 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 wind and solar technologies during the 2020s, reaching up to 630GW of solar and 390GW of wind by 2030, four times the set record levels in 2020.

Planning Policy Wales

- 3.3.20 PPW paragraph 5.7.14 (Welsh Government, 2024) 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.

Future Wales: The National Plan 2024

- 3.3.21 We note that it is vital that we reduce our carbon emissions to protect our own wellbeing and to demonstrate our global responsibility. Future Wales (Welsh Government, 2021) 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 through how we live and travel.
- 3.3.22 Regarding climate change, Future Wales recognises that changes to our climate and weather patterns will have a significant impact on well-being on both current and future generations. Increasing temperatures and extreme weather events are putting pressure on ecosystems, infrastructure, built environment and our unique landscape and cultural heritage, which all contribute to social, economic and ecological resilience.
- 3.3.23 Regarding energy generation, Future Wales identifies that Wales can become a world leader in renewable energy technologies. Wales's wind and tidal resources, its potential for solar generation, its support for both large and community scaled projects, and its commitment to ensuring the planning system provides a strong lead for renewable energy development, means Wales is well placed to support the renewable sector, attract new investment, and reduce carbon emissions.

Local Policy Context

- 3.3.24 RCTCBC published its 'Making Rhondda Cynon Taf Carbon Neutral by 2030' strategy in June 2022. The strategy states that plans include 'progressing wind, hydro and solar energy schemes to reduce the cost of meeting our energy needs, whilst reducing our carbon footprint'.

Overall Need

- 3.3.25 Overall, there is a significant need to transition away from fossil fuels to achieve 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. There is also a strong requirement to consider energy security and the avoidance of the importation of energy. A mix of non-fossil fuel energy sources are required, and onshore wind generation has an important role to play as part of the mix of energy sources required to meet increasing electricity demand in the future.
- 3.3.26 The Proposed Development would contribute to the delivery of these National and Local policy objectives, diversify our energy mix, and facilitate the transition to low carbon energy, whilst decreasing the dependency on fossil fuels. As declared by National Grid FES (2024), onshore wind generation remains one of the lowest cost options to meet our energy needs and, if efficiently integrated, can minimise the total system cost.

3.4 Do nothing scenario

- 3.4.1 Under the 'do nothing' scenario, the Site would continue to be used for semi-improved pasture and the following benefits would not be realised:
- The carbon dioxide offset would make an important contribution towards the government target to reduce carbon dioxide emissions by 100% by 2050.
 - The Proposed Development could make a significant contribution towards the renewable energy objectives of RCTBC, the Welsh Government, and UK Government.
 - The Proposed Development provides diversity and security of energy supply, reducing reliance on importing of energy.
 - Onshore wind farms, particularly those close to areas of electricity demand, provide an important contribution towards making Wales and the UK more energy self-sufficient. If constructed, the Proposed Development would help improve this self-sufficiency and narrow the energy supply gap.
 - The Proposed Development will provide a net benefit for biodiversity.
- 3.4.2 As demonstrated above, when compared to the 'do nothing' scenario, the Proposed Development will enable the generation of green, renewable energy, contribute towards national targets for Net Zero and energy security and support local biodiversity.

3.5 Site Selection

- 3.5.1 The Applicant undertakes continuous nationwide assessment for suitable land opportunities to build renewable energy schemes, including onshore wind farms. The suitability of land for onshore wind farms, including the Proposed Development is dependent upon a number of design and environmental constraints.
- 3.5.2 Plate 3.1 highlights the alternative land considered for the Proposed Development during the initial site selection process. Individually owned land is shaded below with landowner details redacted.

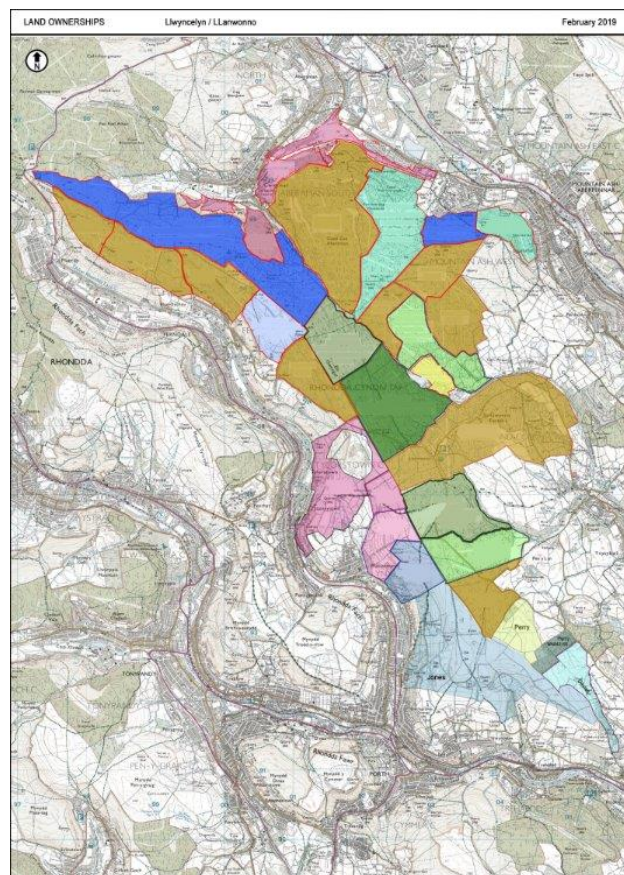


Plate 3.1: Initial Site Selection – Alternative Land Considered (2019)

- 3.5.3 Once a potential site location is identified, the Applicant undertakes a more detailed site selection process. This process is critical to ensuring that an efficient, technically and economically viable wind project can be developed without causing unacceptable significant adverse environmental effects.

Design Constraints

- 3.5.4 An evaluation of site constraints and opportunities was undertaken to inform an initial concept design. This has subsequently been refined through a combination of technical assessments and engagement with various stakeholders. The

location for the Proposed Development site has been influenced by the following design constraints:

Wind Resource

- 3.5.5 To be economically viable, the average wind speed of the Site should be of at least 5 metres per second (m/s) and free from turbulence caused by nearby features, such as hills, buildings or trees. For example, hills or coastal areas situated away from large urban areas.

Grid Connection

- 3.5.6 The site must be in suitable proximity to a Point of Connection (POC), such as an existing substation or transmission line, the connection must be compatible with existing grid infrastructure and the capacity of the local grid must be sufficient to accommodate additional power generated by the onshore wind farm. The Site was chosen because it benefits from a suitable POC within proximity.

Access

- 3.5.7 The site must be readily accessible by roads which can handle the transportation of large turbine components, heavy machinery and equipment and facilitate vehicle movements required during repair and maintenance activities.

Land Availability

- 3.5.8 The site must be of sufficient size to accommodate an onshore wind farm, solar array and BESS, including associated infrastructure.

Ground Conditions

- 3.5.9 The site must be stable enough to support the weight of the wind turbines and their foundations, with a topography that is suitable for construction and maintenance activities associated with onshore wind development.

Planning and Environmental Constraints

- 3.5.10 Planning designations (both national and local level) must be considered as well as existing land use, landscape designations, ecological designations, heritage designations, flood risk, neighbouring land uses, potential visual receptors and the presence of Best and Most Versatile (BMV) Agricultural Land.

3.6 Site Layout and Design

- 3.6.1 The Applicant needs a willing landowner in order to develop a project. Once the above criteria have been taken into account, it is often that agricultural land is the most suitable option for proposed solar and wind energy development, as is the case for the Proposed Development.

- 3.6.2 The site selection process identifies potentially suitable land / fields for the Proposed Development, and once established, the site layout and design is further developed. Careful consideration of various factors including, but not limited to engineering constraints, generating capacity and environmental constraints, have helped to guide the design of this project. Environmental constraints were given particular regard and often prioritised wherever practicable when making design decisions. The design has evolved through several iterations following consideration of environmental factors and consultation with local stakeholders. The site selection process and design development is described below.
- 3.6.3 Following the site selection process, further design evolution and refinement of the land parcels selected for inclusion of the Proposed Development took place as detailed below.
- 3.6.4 The EIA process has influenced the iterative design process of the Proposed Development through the identification of the above constraints, responses to consultation undertaken to date and identification of environmental effects. As a result, the Proposed Development has undergone a number of design iterations and refinements summarised below.

3.7 Design Evolution

First Design Iteration (2019)

- 3.7.1 Initial site investigations and site constraints analyses were undertaken on a wide area of land north of Llywelyn with a view to identifying landowners interested in collaborating.
- 3.7.2 It was considered that pastureland to the south comprised the most suitable location for a wind farm. The visual impact was assessed at this stage to inform the First Design Iteration. Taller towers were suggested for turbines set back lower in the landscape to keep hub heights consistent.
- 3.7.3 The initial turbine specification was for V136 3.5 MW machines, six turbines were proposed at this stage and comprised an 'extension' to the two consented Llwynceilyn wind turbines.



Plate 3.2: First Design Iteration (2019)

Second Design Iteration (2021)

- 3.7.4 In autumn 2021, WindPro noise and shadow assessments were completed. Wind shear analysis was also undertaken to assess the suitability of the ridgeline for turbine placement.
- 3.7.5 The Site's relationship to the national register of peatlands and coal authority records was assessed at this stage to inform further design iterations. No peat was found on site and the layout was amended to avoid siting turbines within coal high risk areas.

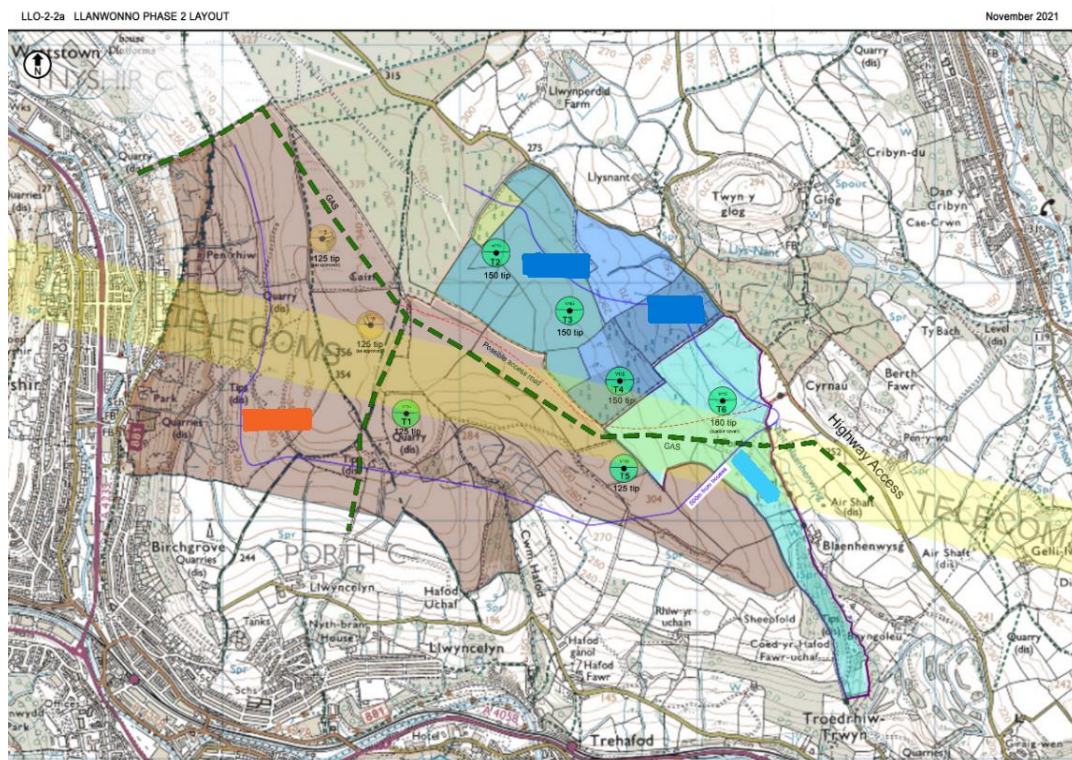


Plate 3.3: Second Design Iteration (2021)

Third Design Iteration (2024)

3.7.6	A habitat survey of the Site was completed in 2022 and informed the evolving Site layout.
3.7.7	In 2023, a stand-alone scheme comprising eight V126 3.45 MW machines was designed entirely separate from the consented Llwynceilyn scheme to the north west and referred to as 'Llanwonno Energy Project'.
3.7.8	In 2024, the wider landscape surrounding the Site was assessed for viability of additional solar to increase the projects overall generation capacity. This was with a view to providing power to the University of South Wales for their 'net zero' Treforest campus.
3.7.9	Following the identification of predominantly flat, south facing fields, 30.7 MW of photovoltaic (PV) panels were incorporated within the design. A battery energy storage system (BESS) was also incorporated within the scheme.
3.7.10	Biodiversity net gain areas were identified within the Site boundary at this stage.

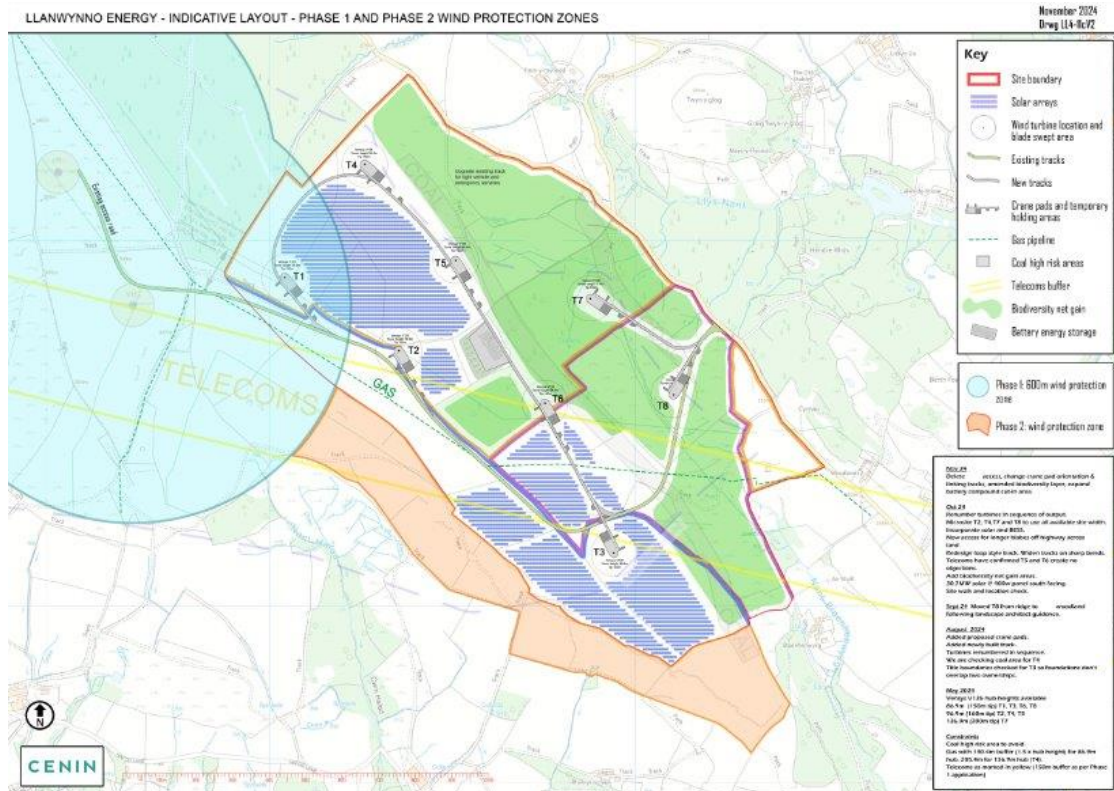


Plate 3.4: Third Design Iteration (2024)

Fourth Design Iteration (2025)

- 3.7.11 The fourth design iteration layout incorporates an improved solar layout, updated BESS design and improved track layout and construction compound (Plate 3.).

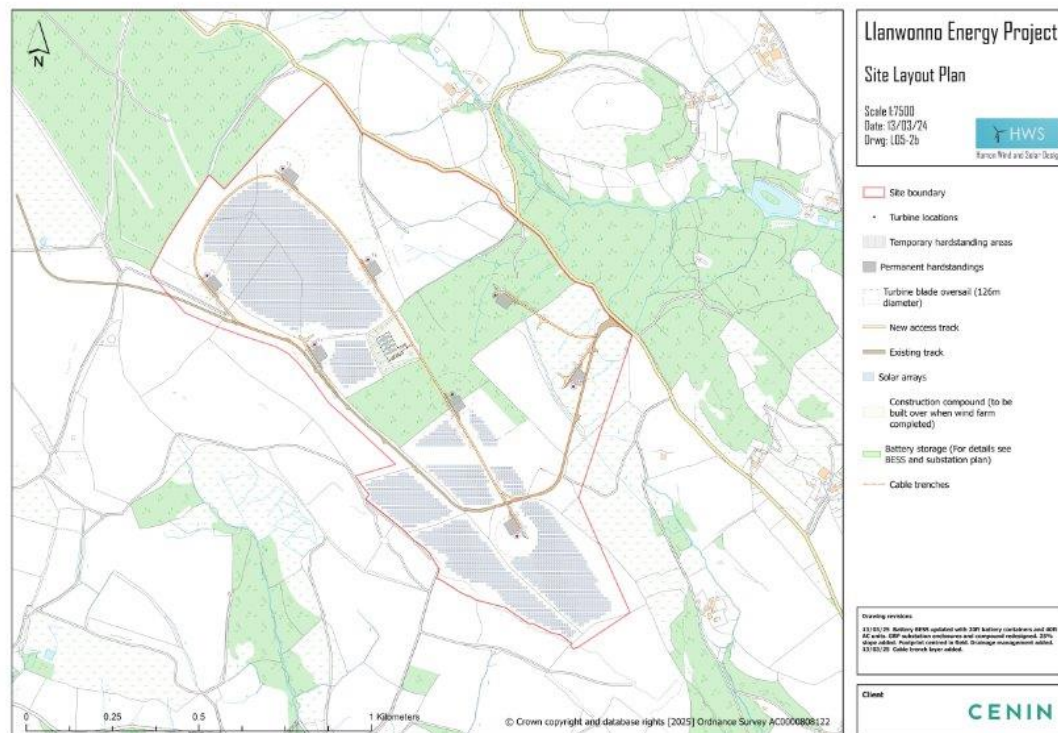


Plate 3.5: Fourth Design Iteration (2025)

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LLANWONNO ENERGY PROJECT

ENVIRONMENTAL STATEMENT

Volume 1, Chapter 4: Environmental Assessment Methodology

March 2025

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
01	PAC	RI	RI	DP	25/03/25

Approval for issue

Darren Parker

25 March 2025

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Appendices (See Volume 3: Appendices)

Appendix number	Appendix title
4.1	Scoping Direction Request Report
4.2	PEDW Scoping Direction

Glossary

Term	Meaning
Applicant	The Applicant is Cenin Renewables Limited.
Baseline	The status of the landscape without the proposed development in place.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment.
Cumulative Effects	The combined effect of the Llanwonno Energy Project in combination with the effects from other proposed developments, on the same receptor or resource.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Infrastructure	This is used to describe the various elements of the Proposed Development that require construction activities, both temporary and permanent; including turbines, hard standings and tracks (where new or existing road widened).
Inter-related effects	The potential effects of multiple impacts from the construction, operation and maintenance and decommissioning of the Proposed Development, affecting one receptor.
Llanwonno Energy Project (the "Proposed Development")	The energy project located south of Llanwonno, which comprises wind turbines and solar photovoltaic array with a combined installed generation capacity of approximately 61 MW, Battery Energy Storage System (BESS), cable route and ancillary development (referred to as the "Proposed Development").
Mitigation	Measures to avoid, prevent, reduce or control effects on the environment.
The Site	The area within which the elements of the Proposed Development are located, including the areas required on a temporary basis during construction or decommissioning.

Abbreviations

Abbreviation	Meaning
BESS	Battery Energy Storage System
CAA	Civil Aviation Authority
CEMP	Construction Environmental Management Plan
DIO	Defence Infrastructure Organisation
DNS	Development of National Significance
EIA	Environmental Impact Assessment
ES	Environmental Statement
HSE	Health and Safety Executive
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
LQAS	Land Quality Advisory Services
NATS	National Air Traffic Services
NRW	Natural Resources Wales
PAC	Pre-application Consultation
PEDW	Planning Environment Decisions Wales
SWMP	Site Waste Management Plan

Units

Unit	Description
m	Metre

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

4.1 Introduction

- 4.1.1 This chapter of the Environmental Statement (ES) sets out the overarching approach taken to the Environmental Impact Assessment (EIA) process to date, to identify, evaluate and mitigate the likely significant adverse and beneficial effects associated with the Llanwonno Energy Project (referred to as the “Proposed Development”). This chapter also provides a summary of the consultation and engagement which has been undertaken to inform the EIA.
- 4.1.2 Further detail with respect to topic specific assessment methodologies are set out within the individual topic chapters in Volume 1, Chapters 5 - 15 of the ES.

4.2 Overview of the EIA Process

- 4.2.1 As detailed within Volume 1, Chapter 1: Introduction of the ES, EIA is the process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
- 4.2.2 The following provides a summary of the EIA process undertaken for the Proposed Development from the initial scoping stages to the development of the ES:
- Scoping Process – the Applicant submitted a Scoping Report in October 2024, which established the proposed scope of the assessment (see Section 4.3).
 - Consultation – this provides opportunities for consultees to provide feedback that can be incorporated into the progression of the design evolution and EIA (further details provided in Section 4.4).
 - ES – this ES has been prepared in accordance with the EIA Regulations, as detailed within Volume 1, Chapter 1: Introduction. It considers the feedback provided as part of the scoping process and further consultation undertaken throughout the EIA process to date.

4.3 EIA Scoping

- 4.3.1 Scoping is the process of identifying the environmental issues to consider in the EIA and establishing the scope of the subsequent ES. Scoping is therefore an important preliminary procedure, which sets the context for the EIA process. Through scoping, the key environmental issues are identified at an early stage in the DNS application process, which permits subsequent work to concentrate on those environmental topics for which significant effects may arise as a result of the Proposed Development.
- 4.3.2 Regulation 33 of the EIA Regulations allows an applicant to request that Planning and Environment Decisions Wales (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.

4.3.3 A Scoping Report was submitted to PEDW in October 2024. A copy of the Scoping Report has been provided in Volume 3, Appendix 4.1: Scoping Direction Request Report of the ES. PEDW subsequently provided their Scoping Direction in February 2025. A copy of the Scoping Direction has been provided in Volume 3, Appendix 4.2: PEDW Scoping Direction of the ES.

4.3.4 In accordance with Regulation 33(7) of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 ('the EIA Regulations'), PEDW consulted the following bodies on scope of the EIA for the Proposed Development:

- Rhondda Cynon Taf County Borough Council;
- Caerphilly County Borough Council;
- Cadw;
- Natural Resources Wales;
- Transport Directorate, Welsh Government;
- Agricultural Land Use & Soil Policy, Welsh Government (Land Quality Advisory Services);
- Coal Authority;
- Health and Safety Executive;
- Civil Aviation Authority;
- Cardiff Airport;
- National Air Traffic Services Holdings Ltd;
- Defence Infrastructure Organisation;
- Dŵr Cymru Welsh Water; and
- South Wales Fire and Rescue Service.

4.3.5 The general comments raised by PEDW in the Scoping Direction (Volume 3, Chapter 3: PEDW Scoping Direction) and how/where these have been addressed in the ES are set out in Table 4.1 below.

Table 4.1: General comments raised by PEDW in the Scoping Direction

Scoping Comment	How/where addressed in the ES
Description of Development: <i>'As outlined in Section 3 above, the scope of the EIA should include all elements of the development as identified in the SR, both permanent and temporary. The SR is somewhat vague regarding the associated ancillary development proposed to be included as part of the development. PEDW notes for example that there are only brief references to a temporary construction compound, access tracks and cable route. As the worst-</i>	A description of the Proposed Development, including all temporary and permanent elements, is provided in Volume 1, Chapter 2: Project Description of the ES, and has informed the assessment undertaken across the relevant EIA topics.

Scoping Comment	How/where addressed in the ES
case scenario that relates to different elements of the project may vary, it is important that the ES is clear as to all elements of the proposal at the time of submission and contains a clear justification for the approach to worst case scenario adopted for each element of the development in relation to the relevant aspects of the environment / receptors.' (ID.1, Scoping Direction)	The cable route does not form part of the DNS application and therefore has not been subject to further assessment in the ES.
Grid connection: 'The SR does not provide any detail on the grid connection. The ES should address the grid connection in a proportionate manner based on the level of certainty as to the likely connection route at the time of the DNS application being made.' (ID.2, Scoping Direction)	
Cumulative assessment: 'To ensure a comprehensive assessment in the final ES, the applicant is advised to liaise with the LPA on development proposals that should be included in the cumulative assessment, as they will be aware of developments in there are which will need to be considered, which may extend beyond other renewable energy developments.' (ID.3, Scoping Direction)	The assessment of cumulative effects has been reported within each Volume 1, Chapters 5 – 15 of the ES. <i>Consultation with the LPA (RCTCBC) regarding cumulative applications to be included will be undertaken during the PAC period.</i>
Approach to mitigation: 'The applicant's attention is drawn to comments from NRW about the approach to mitigation, stating they expect the ES to explain how the findings of the Landscape and Visual Impact Assessment (LVIA) have informed the design process, including the location, scale, number, siting, and layout / arrangement of the turbines. PEDW's position is that 'primary mitigation' is better addressed under the 'Reasonable alternatives considered' in the ES.' (ID.4, Scoping Direction)	Volume 1, Chapter 3: Need and Alternatives Considered of the ES provides a description of the site selection process and alternatives considered for the Proposed Development. This chapter also demonstrates how the location and layout of the Proposed Development has responded to environmental constraints identified as part of the EIA process. Further detail with respect to the design of the Proposed Development is set out within Planning Statement and Design and Access Statement. Embedded and further mitigation measures are set out in Volume 1, Chapter 2: Project Description and Chapters 5-15 of the ES and associated management plans, such as the Construction Traffic Management Plan.
Decommissioning: 'PEDW advises that at a minimum, the ES should clearly indicate how decommissioning of the site will take place, clearly indicate what will be left on site and what will be removed. The ES should address what the end of life cycle will be for the infrastructure on site. Therefore, decommissioning is scoped into the ES in a proportionate manner. The applicant's attention is drawn to comments from LQAS regarding the need for a detailed scheme for site decommissioning. PEDW notes the SR at chapter 7 states that a Decommissioning Plan will be produced which would consider in detail all potential environmental risks on the site. PEDW recommends the draft Decommissioning Plan should be	Decommissioning is considered in a proportionate manner within Chapters 5 – 15 of the ES. For the purposes of the EIA, the potential impacts and mitigation requirements during the decommissioning phase are assumed to similar to that of construction of the Proposed Development. Decommissioning is also considered within Volume 1, Chapter 2: Project Description of the ES confirming that at least six months prior to the commencement of decommissioning works, a Decommissioning Strategy will be prepared and submitted to Rhondda Cynon Taf County Borough Council for approval. The Decommissioning Strategy

Scoping Comment	How/where addressed in the ES
<i>included as a technical appendix to the ES.</i> (ID.5, Scoping Direction)	will set out how the wind turbines and associated infrastructure will be removed, and land restored or reinstated upon completion of decommissioning works.

- 4.3.6 Further details of the topic specific consultation responses, including how these have been considered, is provided within Volume 1, Chapters 5-15 of the ES.

Topics Scoped into the EIA

- 4.3.7 Considering the feedback received as part of the Scoping Direction provided by PEDW, in addition to the nature, scale and location of the Proposed Development, several environmental topics were scoped into the EIA and required stand-alone chapters in the ES. The topics scoped into the EIA and requiring stand-alone chapters in the ES are summarised in Table 4.2 below.

Table 4.2: Environmental topics requiring standalone chapters in the Environmental Statement

Topic	Where/how addressed in the ES
Landscape and Visual Assessment	Volume 1, Chapter 5: Landscape and Visual Impact Assessment
Transport	Volume 1, Chapter 6: Transport
Hydrology and Flood risk	Volume 1, Chapter 7: Hydrology and Flood Risk
Historic Environment	Volume 1, Chapter 8: Historic Environment
Ecology	Volume 1, Chapter 9: Ecology
Ornithology	Volume 1, Chapter 10: Ornithology
Acoustics	Volume 1, Chapter 11: Acoustics
Shadow Flicker	Volume 1, Chapter 12: Shadow Flicker
Aviation and Telecommunications	Volume 1, Chapter 13: Aviation and Telecommunications
Socioeconomics	Volume 1, Chapter 14: Socioeconomics
Geology and Hydrogeology	Volume 1, Chapter 15: Geology and Hydrogeology

- 4.3.8 Other environmental topics, which do not require stand-alone chapters in the ES but still require consideration as part of the EIA process are summarised in Table 4.3 below. These have been addressed either as part of the stand-alone chapters of the ES or in separate reports included as part of the wider DNS application for the Proposed Development.

Table 4.3: Environmental topics that did not require standalone chapters in the Environmental Statement

Topic	Where addressed in the ES or wider DNS application
Population	The potential effects on population, including employment, commuting, tourism and recreation have been considered within Volume 1, Chapter 14: Socioeconomics.
Human Health	Human health is addressed within the relevant topic chapters of the ES, including the following: • Volume 1, Chapter 5: Landscape and Visual Impact Assessment – visual effects on residential, recreational and road user receptors. • Volume 1, Chapter 7: Hydrology and Flood Risk – inter-related effects on humans due to increased flood risk. • Volume 1, Chapter 11: Noise and Vibration – noise and vibration effects on noise sensitive receptors (including residential properties) • Volume 1, Chapter 12: Shadow Flicker – shadow flicker impacts upon dwelling receptors. • Volume 1, Chapter 14: Socioeconomics – considers recreational receptors, education and skills, job creation, commuting patterns, etc. Therefore, a standalone chapter for human health has not been included within the ES.
Climate Change	Sustainability is considered within Volume 1, Chapter 2: Project Description of the ES. The DNS application will be accompanied by two technical appendices: • Greenhouse Gas (GHG) Emissions Technical Report - the carbon balance will consider the GHG emissions sources including embodied carbon, construction emissions, on-site emissions and emissions associated with transport to and from the site, as well as the potential emissions savings due to the output of the solar/wind generation. The technical report will consider the whole life carbon or net effects of the Proposed Development. • Climate Change Risk Assessment Technical Report - the consideration of the Proposed Development's vulnerability and resilience to projected climate change.
Electromagnetic Interference	Electromagnetic Interference is addressed within the relevant topic chapters of the ES, including the following: • Volume 1, Chapter 13: Aviation and Telecommunications. Therefore, a standalone chapter for electromagnetic interference has not been included within the ES.
Risk of Major Accidents and Disasters	The potential for major accidents and disasters arising from the construction, operation and maintenance, and decommissioning phases of the Proposed Development has been considered in the

Topic	Where addressed in the ES or wider DNS application
	topic chapters of the ES. In particular, the following effects have been identified: • Fire risk, mechanical failure or blade/ice throw and aviation: Volume 1, Chapter 2: Project Description. • A reduction in groundwater quality and quantity resulting from accidental pollution: Volume 1, Chapter 15: Geology and Hydrogeology. • The impact of accidental pollution on the quality of surface water and watercourses: Volume 1, Chapter 7: Hydrology and Flood Risk. • Increased flood risk: Volume 1, Chapter 7: Hydrology and Flood Risk. • Accidental pollution: – Volume 1, Chapter 9: Ecology. – Volume 1, Chapter 10: Ornithology. • The impact of construction traffic on accidents and safety: Volume 1, Chapter 6: Traffic. • Collision risk for aviation: Volume 1, Chapter 13: Aviation and Telecommunications. • The vulnerability of the Proposed Development to climate change: a climate risk technical report will be submitted in the updated ES, as part of the DNS application.
Waste	The potential effects of waste have been considered within Volume 1, Chapters 5-15 of the ES, where relevant. An Outline Site Waste Management Plan will be prepared and submitted as part of the DNS application. It will set out appropriate measures for managing the waste in accordance with the waste hierarchy principle, where these may be relevant during construction, operation and decommissioning of the Proposed Development.
Land and Soil	The assessment of Peat Soils is considered in Volume 1, Chapter 15: Ground Conditions of the ES, where relevant.

Topics scoped out of the EIA

- 4.3.9 Effects on other aspects of the environment (not set out above) have been scoped out of the EIA on the basis that they are unlikely to be significantly affected by the Proposed Development. Further detail on the sub-topic issues scoped out of the EIA is provided in Volume 1, Chapters 5-15 of the Environmental Statement.
- 4.3.10 Considering the feedback received as part of the Scoping Direction (Volume 3, Appendix 4.2 of the ES) provided by PEDW, in addition to the nature, scale and location of the Proposed Development, several topics were scoped out of the EIA and subsequent Environmental Statement.

4.3.11 The topics scoped out of the EIA, including justification with reference to relevant sections of the Scoping Direction provided by PEDW is provided in Table 4.4 below.

Table 4.4: Topics scoped out of the EIA

Topic	Justification
Planning Policy Context	A standalone planning policy chapter has been scoped out of the EIA process on the basis that the ES provides an overview of relevant legislative and planning policy context within each topic chapter. A Planning Statement also forms part of the DNS application, which includes details on the relevant legislation and policy. The Scoping Direction (see ID.6) confirms that PEDW is content with this approach.
Land and Soil – Best and Most Versatile (BMV) land	The Site comprises mainly grassland agricultural fields. A review of the Welsh Government's Data Map Wales online predictive mapping resource identifies that the Site is a mixture of Grade 4 and 5 so does not include any high-grade land that would be considered to be best and most versatile (BMV). Notwithstanding, the Proposed Development is temporary nature and fully reversible and following decommissioning would ensure that the future quality of agricultural land is maintained with no likely significant lasting adverse effects on the quality of soil. Therefore, BMV agricultural land has been scoped out of the ES. The Scoping Direction (see ID.8) confirms that PEDW is content with this approach.
Air Quality	The Proposed Development is not considered likely to give rise to significant impacts on air quality. The main activities and production of any emissions will be limited to construction works and use of mobile construction plant and construction vehicles. Construction works will be localised, short term, sporadic and controlled through the implementation of good construction practice. Fixed and mobile plant will be limited in size and number and operate for short periods. Dust impacts are unlikely to occur due to the distances of receptors from areas where works are proposed to be undertaken. Best practice measures would be put in place during construction to minimise dust impacts. Therefore, no significant dust effects are anticipated. Due to the scale of the Proposed Development and the temporary nature of the construction works, air quality impacts are not likely to be significant and have therefore been scoped out of the ES. The Scoping Direction (see ID.16) confirms that PEDW agrees this topic can be scoped out of the ES.

Material assets

4.3.12 The EIA Regulations require consideration of 'material assets', including cultural heritage, architectural and archaeological aspects and landscape. The phrase 'material assets' has a broad scope, which may include an asset of human or natural origin, valued for heritage, landscape or socio-economic reasons. As such, material assets are in practice considered across a range of topic areas within the ES, including the following:

- Volume 1, Chapter 8: Historic Environment;

- Volume 1, Chapter 5: Landscape and Visual Impact Assessment; and
- Volume 1, Chapter 14: Socioeconomics

4.3.13 Therefore, it is concluded that separate consideration of material assets as part of the EIA process is not required.

4.4 Consultation

4.4.1 Both statutory and non-statutory consultation with stakeholders has formed a key part of the iterative design process and subsequent EIA of the Proposed Development. Statutory and non-statutory consultation activities relevant to each topic chapter of the ES are set out in the relevant sections of Volume 1, Chapters 5-15 of the Environmental Statement.

4.4.2 As stated in Chapter 1: Introduction, this ES has been provided in support of the DNS application for PEDW to undertake PAC prior to submission of the DNS application, which is anticipated to take place in March - May 2025. Feedback received during PAC will be used to inform the final ES submitted as part of the DNS application for the Proposed Development.

4.5 Environmental Assessment Methodology

Relevant EIA Guidance

4.5.1 The EIA process has considered relevant Government or institute guidance, including:

- Planning Practice Guidance (Ministry of Housing, Communities & Local Government and Department for Levelling Up, Housing and Communities 2024);
- Design Manual for Roads and Bridges (DMRB) LA 104 Environmental assessment and monitoring (Highways England et al., 2020);
- Environmental Impact Assessment Guide to Shaping Quality Development (IEMA, 2015);
- Environmental Impact Assessment: Guide to Delivering Quality Development (IEMA, 2016);
- Guidelines for Environmental Impact Assessment (IEMA, 2004);
- The Planning Inspectorate: Developments of National Significance, Appendix 3: Environmental Impact Assessment (The Planning Inspectorate, 2019);
- Delivering Proportionate EIA, A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice (IEMA, 2017).
- The State of Environmental Impact Assessment Practice in the UK. Special Report (IEMA, 2011); and
- Welsh Office Circular 11/99: Environmental Impact Assessment (Welsh Office, 1999).

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

Structure of Topic Chapters

- 4.5.3 Volume 1, Chapters 5-15 of the ES include the following information with respect to their environment topic:

- **Introduction:** provides a brief introduction regarding the Proposed Development and the purpose of the chapter and identifies relevant supporting documentation;
- **Legislative and policy context:** describes how and where national and local legalisation and policy provisions have been considered;
- **Consultation and engagement:** describes what consultation and engagement activities have been undertaken and how and where these have been considered;
- **Assessment methodology and significance criteria:** describes the methodology and significance criteria used to undertake the assessment
- **Baseline environment conditions:** provides a description of the baseline environmental conditions within the relevant study area adopted for the assessment;
- **Mitigation and enhancement measures:** describes the mitigation and enhancement measures adopted as part of the Proposed Development, including the mechanisms through which these are secured;
- **Assessment of effects:** provides an assessment of the likely significant effects of the Proposed Development with embedded mitigation measures in place and following the implementation of further mitigation measures
- **Assessment of cumulative effects:** provides an assessment of the likely significant cumulative effects between the Proposed Development and other identified projects/plans;
- **Inter-related effects:** provides an assessment of the interrelated effects, including receptor-led and project lifetime effects of the Proposed Development; and
- **Summary of environmental effects, mitigation and monitoring:** provides a summary of the assessment of environmental effects, relevant mitigation measures and requirements for future monitoring.

Baseline Conditions

Existing Baseline Conditions

- 4.5.4 The existing and likely future environmental conditions in the absence of the Proposed Development are known as baseline conditions. Volume 1, Chapters 5-15 include a description of the existing (baseline) environmental conditions. The baseline conditions within Site and the relevant study area form the basis of

the assessment, enabling the likely significant effects to be identified through a comparison with the baseline conditions.

- 4.5.5 In addition, Volume 1, Chapters 5-15 also include a section describing assumptions and limitations of the assessment, including difficulties with regard to the collection of baseline data and/or any assumptions which had to be made to complete the assessment of baseline conditions.

Future Baseline Conditions

- 4.5.6 The future baseline conditions refer to the predicted state of the environment at a specific point in the future, assuming that the Proposed Development does not proceed. Volume 1, Chapters 5-15 include a description of the future baseline conditions. Environmental topics have considered the future baseline scenarios with respect to their subject and applied professional judgement based on reasonable assumptions and limitations. Examples of factors considered as part of the future baseline include changes in population size, changes in protected species/habitat distribution and changes in the status of other projects/plans in the surrounding area.

Changes due to Climate Change

- 4.5.7 The consideration of future baseline conditions has also considered 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) and subsequent updates.

Assessment of Effects

- 4.5.8 The EIA Regulations require the identification of the likely significant environmental effects of the Proposed Development. The overarching approach to the assessment of environmental effects is set out in the following sections below.

Spatial Scope

- 4.5.9 The location and geographical extent of the Proposed Development is presented in Volume 2, Figure 1.1: Site Location Plan and Volume 2, Figure 2.1: Site Layout Plan. The spatial scope considered within each topic chapter is dependent on the nature of potential effects and location of sensitive receptors. In addition, relevant study areas are defined within each topic chapter of the ES, which take into account the following factors:
- Geographic extent of the Proposed Development;
 - Nature of the existing baseline conditions; and
 - Manner and extent to which environmental effects may occur.

4.5.10 The study areas adopted for the assessments are based on topic specific guidance, where available, and take into account relevant feedback from stakeholders acquired during statutory and non-statutory consultation.

Table 4.5: Temporal Scope of the EIA Criteria

Development phase	Temporal scope	Description
Construction	Start: 2028	Construction effects refer to the impacts from preparation, construction, and commissioning activities. This includes issues such as construction traffic, noise and vibration, dust generation, ecological protection, and visual impact from plant, machinery and construction compounds. Some construction-related effects are more temporary than others, such as enabling access and construction compound set up compared against the more drawn out installation of turbines, solar array, BESS and associated landscaping, which will occur throughout the entire construction period.
	End: 2030	
	Duration: 24 months	
Operation and Maintenance	Start: 2030	Operational effects are those associated with operation and maintenance activities during the lifetime of the Proposed Development. This includes the effects of the physical presence and operation of the infrastructure and maintenance activities required (e.g. replacement of turbine blades etc).
	End: 2080	
	Duration: 50 years	
Decommissioning	Start: 2080	Decommissioning effects related to site traffic, noise and vibration, dust generation, landscape/ecological protection, and the visual intrusion of plant and machinery on site. It is assumed that the levels of effect during decommissioning would be similar but of a lesser level than those during construction. Decommissioning would be undertaken in line with best practice methods at that time.
	End: 2081	
	Duration: 1 year	

Receptor Sensitivity or Importance

4.5.11 Receptors are defined as the physical or biological resource or user group that would be affected by a Proposed Development. 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.

4.5.12 Sensitivity is defined within each topic chapter of the ES and takes into account factors including:

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

4.5.13 Sensitivity is generally described within each topic chapter of the ES using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.5.14 However, in some cases, topic chapters of the ES may also use ‘very high’.

4.5.15 The overarching criteria for defining the sensitivity of receptors is based on guidance set out in LA 104 Environmental assessment and monitoring (Highways England et al., 2020), which are outlined in Table 4.6 below.

Table 4.6: Sensitivity criteria

Sensitivity/Value	Definition
Very High	Very high importance and rarity, international scale, very limited potential for substitution.
High	High importance and rarity, national scale and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Magnitude of Impact

4.5.16 Impacts are defined as the physical changes to the environment attributable to the Proposed Development. For each topic, the likely environmental impacts arising from construction, operation and maintenance, and decommissioning of the Proposed Development have been identified and compared with the baseline conditions.

4.5.17 The categorisation of the impact magnitude has considered the following four factors:

- Extent;
- Duration;
- Frequency; and
- Reversibility.

4.5.18 Impacts have been defined as either adverse or beneficial to the environment. They may also be described as:

- **Direct:** arise from activities associated with the Proposed Development. These tend to be either spatially or temporally concurrent; or

- **Indirect:** impacts on the environment which are not a direct result of the Proposed Development, often produced away from the Site or because of a complex pathway.

4.5.19 The magnitude of impact has generally been described using the following scale:

- High;
- Medium;
- Low; and
- Negligible.

4.5.20 However, in some cases, topic chapters of the ES may also use 'no change'. Where the magnitude of impact is 'no change', no effect would arise.

4.5.21 The overarching criteria for defining the magnitude of impacts is based on guidance set out in LA 104 Environmental assessment and monitoring (Highways England et al., 2020), which are outlined in Table 4.7 below.

Table 4.7: Impact magnitude criteria

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

4.5.22 The overarching criteria for defining for describing the duration of impacts in the ES are outlined in Table 4.8 below.

Table 4.8: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year.
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years.
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development.

Significance of Effect

- 4.5.23 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.
- 4.5.24 The significance of the effect is determined by taking into account the sensitivity of the receptor and the magnitude of the impact. In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.
- 4.5.25 Significance levels are defined separately for each topic chapter of the ES, considering relevant topic specific guidance. However, topic chapters generally adhere to the following definitions of significance:
- **Major:** These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed this level of significance;
 - **Moderate:** These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor;
 - **Minor:** These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development;
 - **Negligible:** No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error; and

- **No change:** No loss or alteration of characteristics, features or elements; no observable impact in either direction.

4.5.26 Generally, any effects with a significance level of moderate or above are significant in terms of the EIA Regulations. However, this varies between topic chapters of the ES.

4.5.27 The overarching criteria for defining the significance of effect of impacts is based on guidance set out in LA 104 Environmental assessment and monitoring (Highways England et al., 2020), which are outlined in Table 4.9 below.

Table 4.9: Assessment matrix

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

4.5.28 Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement. Unless otherwise stated, any effects with a significance level of moderate or above are significant in terms of the EIA Regulations.

Mitigation, Monitoring and Enhancement

Mitigation

4.5.29 Environmental constraints have formed a key part of the iterative design process for the Proposed Development. As such, various measures have been adopted as part of the Proposed Development to avoid, prevent, reduce or offset significant adverse effects on the environment. In some cases, these measures may result in enhancement (i.e. an improvement of baseline conditions).

4.5.30 Volume 1, Chapters 5-15 of the ES has considered the following types of mitigation:

- **Embedded mitigation measures:** comprise measures incorporated into the design of the Proposed Development (e.g. ecological habitat creation) or measures which are required under separate legislation or standard best practice; and

- **Further mitigation:** comprise measures which will require further activity to achieve the desired outcome and further reduce or offset identified adverse effects of the Proposed Development on the environment (e.g. monitoring of landscape planting).

4.5.31 The embedded mitigation and further mitigation measures are described in the relevant sections of Volume 1, Chapters 5-15 of the ES.

Embedded Mitigation

4.5.32 In line with guidance (IEMA, 2004), it is considered to be usual practice to assess potential impacts and consequent effects arising from a project's current design, incorporating all embedded mitigation that an applicant is committed to. Therefore, within this ES, embedded measures that will form part of the design of the Proposed Development (and/or are established legislative requirements/good practice) have been taken into account in the assessments presented in each topic chapter. The initial determination of impact magnitude and significance of effects, therefore, assumes implementation of these measures. This ensures that the measures that the Applicant is committed to are taken into account in the assessment of effects.

Further Mitigation and Residual Effects

4.5.33 For further (secondary) measures, which require further activity, both pre-mitigation and residual effects are presented (i.e. these are further mitigation measures). The assessment of residual effects, with further mitigation in place, is presented after the initial assessment within each topic chapter within this ES.

Monitoring

4.5.34 Monitoring commitments may be put in place, as and when necessary, to assess the effectiveness of mitigation measures and validate assessment conclusions. Any monitoring measures are identified within the relevant topic chapters (See Volume 1, Chapters 5-15).

Enhancement

4.5.35 In some cases, the measures identified through the iterative EIA process or stakeholder consultation will result in the enhancement of environmental conditions. Enhancement measures are identified within the relevant topic chapters (See Volume 1, Chapters 5-15).

Assessment of Cumulative Effects

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

4.5.37 The cumulative effects of the Proposed Development 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 relevant local planning policy documents (and emerging planning policy - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.

4.5.38 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. Where practicable, the methodology used to assess cumulative effects follows that used to assess the effects of the Proposed Development alone. This approach is employed in order to maintain consistency throughout each topic chapter within this ES and to allow relevant comparisons to be made.

Inter-Related Effects

4.5.39 Inter-relationships between topics may lead to a greater environmental effect in combination with each other than they otherwise would when considered in isolation. This can take the form of different impacts within the same topic through the lifetime of the Proposed Development, (construction; operation and maintenance, and decommissioning) and the effects on receptors between different topics.

4.5.40 Therefore, the assessment has considered the inter-relationships between environmental topics considered as part of the ES. The assessment considered the following types of inter-related effects:

- **Project lifetime effects:** Assessment of the effects that may occur across multiple phases of the Proposed Development (i.e. construction, operation and maintenance, and decommissioning) and result in a more significant effect on a receptor than if each phase were assessed in isolation; and
- **Receptor led effects:** Assessment of the effects that may occur via the combined interaction between different environmental impacts, either spatially or temporally, on a single receptor and result in a more significant effect than if each environmental impact were assessed in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

4.5.41 The specific inter-related effects considered for each topic chapter are set out in the relevant sections of Volume 1, Chapters 5-15 of the Environmental Statement.

4.6 References

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 5: Landscape and Visual Impact Assessment

March 2025

Document status					
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Annex number	Annex title
5.1	Landscape and Visual Impact Assessment Methodology
5.2	Assessment of Effects on Landscape
5.3	Assessment of Effects on Representative Viewpoints

Glossary

Term	Meaning
Access Land	The Countryside and Rights of Way Act 2000 gives a public right of access to land mapped as 'open country' (mountain, moor, heath, down and coastal margin) or registered common land. These areas are known as 'access land'.
Baseline	The status of the landscape without the Proposed Development in place.
Cumulative effects	The combined effect of the Proposed Development in combination with the effects from other existing or proposed developments, on the same receptor or resource.
Cumulative landscape effects	Cumulative effects as defined above on landscape can impact on either the physical fabric, or character of the landscape.
Cumulative visual effects	Cumulative effects as defined above on people who have differing sensitivity depending on what they are doing and where they are located.

Term	Meaning
Combined visibility / combination views	The visual receptor is able to see two or more developments from and effects one viewpoint. This divided into 'in combination'- several wind turbine developments are within the observer's arc of vision at the same time OR 'in succession', where the observer has to turn to see various wind turbine developments.
Designated landscapes / Designations	Areas of landscape identified as being of importance at international, national or local levels, either defined by statute or identified in development plans or other documents.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Feature	Prominent elements in the landscape, such as tree clumps, church towers or wooded skylines.
Green infrastructure	Networks of green spaces and watercourses and water bodies that connect rural areas, villages, towns and cities.
Impact	Change that is caused by an action/Proposed Development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Landform	The shape and form of the land surface which has resulted from combinations of geology, geomorphology, slope, elevation and physical processes.
Landscape	An area, as perceived by people, the character of which is a result of the action and interaction of natural and/or human factors.
Landscape character	A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.
Landscape Character Areas	These are single unique areas which are the discrete geographical areas of a particular landscape type.
Landscape Character Assessment	The process of identifying and describing variation in the character of the landscape and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscape distinctive. The process results in the production of a Landscape Character Assessment.
Landscape value	The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.
Photomontage	A sequence of photographs taken from representative viewpoints which illustrate the location, size, degree of visibility or appearance of a development.
Sensitivity	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.
Sequential views	Views which vary along the length of a given route.
Special qualities	A term usually used in relation to National Parks or Areas of Outstanding Natural Beauty (now termed National Landscapes). It is given to those qualities for which the area is designated.

Term	Meaning
Study area	This is an area which is defined for each environmental topic which includes the Transmission Assets Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Susceptibility	The ability of a defined landscape or visual receptor to accommodate the specific Proposed Development without undue negative consequences.
Visual amenity	The overall pleasantness of the views people enjoy in their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.
Zone of theoretical visibility	A map, usually digitally produced, showing areas of land within which, a development is theoretically visible.

Abbreviations

Abbreviation	Meaning
BESS	Battery Energy Storage Systems (including substation and battery storage)
CEA	Cumulative Effects Assessment
CLVIA	Cumulative Landscape and Visual Impact Assessment
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
ELC	European Landscape Convention
ES	Environmental Statement
GLVIA	Guidelines for Landscape and Visual Impact Assessment
HFoV	Horizontal Field of View
LCA	Landscape Character Area
LVIA	Landscape and Visual Impact Assessment
NLCA	National Landscape Character Areas (Wales)
PAA	Pre-assessed Area (PPW Policy 17)
PPW	Planning Policy Wales Edition 12
PRoW	Public Right of Way
SLA	Special Landscape Areas
VP	Viewpoint
ZTV	Zone of Theoretical Visibility

Units

Unit	Description
°	Degrees
ha	Hectare
km	Kilometres
km ²	Kilometres Squared
m	Metre
m ²	Square Metre

5 Landscape and Visual Impact Assessment

5.1 Introduction

- 5.1.1 This chapter of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, Sep 2024) and subsequent EIA Scoping Direction (PEDW, Feb 2025). In addition, this chapter of the ES has been informed by the following documents submitted with the application for the DNS.
- 5.1.2 Landscape and / or Visual effects, associated with developments are considered to be an important environmental issue. As such, this Landscape and Visual Impact Assessment (LVIA) forms an important part of the wider Environmental Impact Assessment (EIA) process for the project.
- 5.1.3 Chapter 5: Landscape and Visual Impact Assessment (LVIA), of the Environmental Statement (ES), considers the potential effects of the Proposed Development upon the physical landscape elements and features, landscape character, views and visual amenity within the study area.
- 5.1.4 The LVIA has been undertaken with reference to best practice guidance, as detailed within 'EIA Methodology' section below and completed by Stuart Galpin a suitably qualified and experienced Chartered Landscape Architect (CMLI).

ES Chapters (Volume 1)

- Landscape and Visual Impact Assessment;

ES Appendices (Volume 3)

- Appendix 5.1 Landscape and Visual Impact Assessment Methodology;
- Appendix 5.2 Assessment of Effects on Landscape;
- Appendix 5.3 Visual Impact Assessment on Representative Viewpoint;
- Appendix 5.4 Residential Visual amenity Assessment;
- Appendix 5.5 Aviation Lighting Night Time Landscape and Visual Impact Assessment.

Other Documents (Volume 2)

- Figures

5.2 Legislation and Policy

- 5.2.1 The key national planning policy documents relevant to the assessment of this LVIA for the Proposed Development are as follows:

- **Future Wales: The National Plan 2040** (Welsh Government, 2021), including Policy 17: Renewable and Low Carbon Energy and Associated Infrastructure and Policy 18: Renewable and Low Carbon Energy Developments of National Significance; and
- **Planning Policy Wales Edition 12** (Welsh Government, 2024), including relevant supplementary Technical Advice Notes (TANs), Circulars and Policy Clarification Letters (PCLs).

Table 5.1: Summary of national planning policies relevant to this chapter of the ES

Summary of policy	Further detail of Policy & how and where considered in the ES
Future Wales: The National Plan 2040	

Summary of policy	Further detail of Policy & how and where considered in the ES
<i>'In relation to landscape and visual matters</i> <i>'Proposed Developments for renewable and low carbon energy projects (including repowering) qualifying as Developments of National Significance will be permitted subject to policy 17 and the following criteria' Future Wales: The National Plan 2040]</i>	• <i>there are no unacceptable adverse visual impacts on nearby communities and individual dwellings</i> • <i>there are no adverse effects on the integrity of Internationally designated sites (including National Site Network sites and Ramsar sites) and the features for which they have been designated (unless there are no alternative solutions, Imperative Reasons of Overriding Public Interest (IROPI) and appropriate compensatory measures have been secured);</i> • <i>the Proposed Development includes biodiversity enhancement measures to provide a net benefit for biodiversity</i> • <i>there are no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance</i> • <i>there are acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration</i> • <i>The cumulative impacts of existing and consented renewable energy schemes should also be considered</i> A Residential and Visual Amenity Assessment (RVAA) has been undertaken following Landscape Institute Technical Guidance Note 2/19 Residential Visual Amenity Assessment (TGN 2/19) March 2019. This follows residential visual impact assessment as in section 5.7.29. GLVIA3 paragraph 6.17 notes that RVAA is distinct from LVIA: <i>'Effects of development on private property are frequently dealt with mainly through 'residential amenity assessments'. These are separate from LVIA although visual effects assessment may sometimes be carried out as part of a residential amenity assessment, in which case this will supplement and form part of the normal LVIA for a project. Some of the principles set out here for dealing with visual effects may help in such assessments but there are specific requirements in residential amenity assessment.'</i>
Planning Policy Wales (PPW) Edition 12	

Summary of policy	Further detail of Policy & how and where considered in the ES
The conservation and improvement of the natural heritage of Wales is one of its objectives noting the following (paragraph 6.02 and 6.03) of PPW 12)	<i>‘The special and unique characteristics and intrinsic qualities of the natural and built environment must be protected in their own right, for historic, scenic, aesthetic and nature conservation reasons. These features give places their unique identity and distinctiveness and provide for cultural experiences and healthy lifestyles. As well as those characteristics regarded as special or unique there are other, environmental qualities of places which are ubiquitous. Environmental components of places, such as clean air, access to open spaces and water quality, are linked to the quality of the built and natural environment. The environmental components of places influence and shape health and wellbeing as well as playing a role in sustaining and creating places which are adaptable and resilient to change. Distinctive and Natural places must maintain or incorporate green infrastructure, recognising the wide-ranging role it can play, as key components of their natural and built fabric. Doing so will maximise health and well-being of communities and the environment.’</i> A holistic approach to the landscape assessment has been undertaken using LANDMAP topics and local landscape character assessment information where available. This can be viewed at Volume 3, Appendix 5.2.
PPW 12 also attaches considerable importance to the benefits of good design stating (paragraph 3.10)	<i>‘In areas recognised for their particular landscape, townscape, cultural or historic character and value it can be appropriate to seek to promote or reinforce local distinctiveness. In those areas, the impact of development on the existing character, the scale and siting of new development, and the use of appropriate building materials (including where possible sustainably produced materials from local sources), will be particularly important.’</i> The evaluation scores for the component LANDMAP topic aspect areas in the study area have been reviewed. Local landscape designations e.g. SLAs and national landscape designations have been used to inform landscape value judgements. See Volume 3, Appendix 5.1 – methodology for assessing value and Volume 3, Appendix 5.2 where this has been implemented for assessing landscape value in the landscape reporting framework.

Summary of policy	Further detail of Policy & how and where considered in the ES
PPW 12 attaches considerable importance to the benefits of renewable energy stating (at paragraph 5.77 and 5.91)	<i>‘...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 planning system should: ...optimise energy storage... and ...maximise renewable and low carbon energy generation...’</i> <i>‘Local authorities should facilitate all forms of renewable and low carbon energy development...’</i> The design evolution of the Proposed Development has sought to maximise the renewable energy resource within the Site – whilst balancing this with landscape constraints.

Local Planning Policy Context

- 5.2.2 The Proposed Development site is located within within Rhondda Cynon Taf County Borough Council (RCTBC).
- 5.2.3 The local planning policy document relevant to the assessment of this LVIA for the Proposed Development is:
- **RCTBC Local Development Plan**, adopted March 2011.
- 5.2.4 Table 5.2 provides a summary of the provisions contained within the local plan relevant to the assessment of this LVIA, including how and where these have been considered in the ES.

Table 5.2: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
Policy AW 6 - Design and Placemaking	<i>1. High standard of design, which reinforces attractive qualities and local distinctiveness and improves areas of poor design and layout;</i> <i>2. They are appropriate to the local context in terms of siting, appearance, scale, height, massing, elevational treatment, materials and detailing;</i> <i>7. Landscaping and planting are integral to the scheme and enhance the site and the wider context;</i>	Ensuring that the Proposed Development is of a high standard, that design protects and enhances the landscape and biodiversity whilst further promoting energy efficiency and the use of renewable energy. See section 5.8 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development.

Policy	Summary of policy	How and where considered in the ES
	14. <i>The design protects and enhances the landscape and biodiversity;</i> 15. <i>The development promotes energy efficiency and the use of renewable energy;</i>	
Policy AW 8 - Protection And Enhancement of the Natural Environment	1. <i>They would not cause harm to the features of a Site of Importance for Nature Conservation (SINC) or Regionally Important Geological Site (RIGS) or other locally designated sites</i> 2. <i>There would be no unacceptable impact upon features of importance to landscape or nature conservation</i>	The design of the Proposed Development seeks to protect and enhance the natural heritage of the County Borough. The assessment seeks to assess all impacts and examine all features of importance to landscape.
Policy AW 13 – Large Wind Farm Development	1. <i>Is within the boundary of the strategic search area;</i> 2. <i>Is sited on a predominantly flat, extensive area of upland;</i> 3. <i>Is located a minimum of 500 metres away from the nearest residential property unless it can be demonstrated that locating turbines closer to residential properties will have no unacceptable impact on human health;</i> 4. <i>Will not because of its siting, scale or design have an unacceptable effect on the visual quality of the wider landscape;</i> 5. <i>Will minimise any loss of, and where possible enhance public accessibility to the countryside.</i> <i>Will not cause unacceptable impact on, and where appropriate will enhance, sites designated for their international, national or local nature conservation value.</i>	The boundary of the Site is not within the strategic search area however, the assessment seeks to examine if the Proposed Development fulfil the objectives of the policy: - the Site is on a predominantly flat, extensive area of upland. - the nearest residential property is over 500 metres away. - its siting, scale or design and not have an unacceptable effect on the visual quality of the wider landscape. - minimise any loss of, and where possible enhance public accessibility to the countryside. - does not cause unacceptable impact on, and where appropriate will enhance, sites designated for their international,

Policy	Summary of policy	How and where considered in the ES
	<i>7. Will protect the natural beauty and special qualities of the Brecon Beacons National Park.</i>	national or local nature conservation value. - protect the natural beauty and special qualities of the Brecon Beacons National Park.
<i>Policy NSA 25 - 'Development within the defined Special Landscape Areas</i>	<i>Special Landscape Areas will be expected to conform to the highest standards of design, siting, layout and materials appropriate to the character of the area.'</i>	Examination of SLAs in effect on landscape designations. See section 5.9 Assessments of effects.

5.3 Consultation and Engagement

Scoping

- 5.3.1 In September 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 5.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 14 February 2025. Key issues raised by statutory bodies specific to Landscape and Visual are listed in Table 5.3, including how and where these have been considered in the ES.

Table 5.3: Summary of scoping responses relevant to this LVIA

Comment	How and where considered in the ES
PEDW	
ID.22 Landscape and Visual Impact Assessment (LVIA) methodology	Full Methodology in the form of Volume 3, Appendix 5.1 sent before PAC to PEDW.
ID.23 LVIA guidelines	The current guidance on the use of LANDMAP is Guidance Note (GN)46 (Using LANDMAP in Landscape and Visual Impact Assessments) has been adhered to and included in 5.9 of this chapter and in Volume 3, Appendix 5.2.

Comment	How and where considered in the ES
ID.24 Study Area	Studies areas and explanation included in 5.4.10 to 5.4.14.
ID 5.20 - 5.24 Viewpoints and Visualisations	Additional Viewpoints have been included as requested by RCTCBC, CCBC and BBNP in section 5.10 and in Volume 3, Appendix 5.3. The additional Viewpoints are 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 and 31 (figures 5.1.18.1-4, 5.1.19.1-4, 5.1.20.1-4, 5.1.23.1-4, 5.1.24.1-4, 5.1.25.1-4, 5.1.26.1-4, 5.1.27.1-4, 5.1.28.1-4, 5.1.29.1-4, 5.1.30.1-4 and 5.1.30.1-4). The ZTV plan (figure 5.2.6) has been extended to 33 km taking into account the BBNP.
ID 26 BBNP	The BBNP Management Plan has informed and is included in section 5.9
BBNP	
ID 25 Viewpoints	BBNP requested to be consulted on viewpoints the details of which were forward to the BBNP before PAC on 12 March 2025.

Other consultation

- 5.3.3 Following PAC submission several public consultation events will be held at local community venues. It is anticipated that there will be consultation with interest local planning authorities regarding the Proposed Developments and LVIA.

5.4 Assessment Methodology

Relevant Guidance

- 5.4.1 The assessment of landscape and visual matters has been undertaken in accordance with the methodology set out in Volume 1, Chapter 4: Approach to environmental assessment of the ES in addition to the following guidance,
- 5.4.2 The Landscape and Visual Impact Assessment (LVIA), undertaken as part of the Landscape and Visual Resources chapter, identifies and assesses the likely significant effects that would arise as a result of the Proposed Development on the landscape (its fabric, character and elements) and upon views as experienced by receptors (people). The full methodology for the LVIA can be viewed within Volume 3, Appendix 5.1 of this Chapter.
- 5.4.3 As a matter of best practice, this assessment has been undertaken based on the relevant guidance on landscape and visual impact assessment (LVIA) described in the following documents:

- Guidelines for Landscape and Visual Impact Assessment: Third Edition (GLVIA3) (Landscape Institute and Institute of Environmental Management & Assessment, 2013);
- Landscape Character Assessment Guidance for England and Scotland (The Countryside Agency and Scottish Natural Heritage, 2002);
- An Approach to Landscape Character Assessment (Natural England, 2014);
- Technical Guidance Note 06/19, Visual Representation of Development Proposed Developments (Landscape Institute, September 2019);
- Technical Guidance Note 02/21: Assessing landscape value outside national designations (Landscape Institute, May 2021);
- LANDMAP Information Guidance Note 1. LANDMAP and Special Landscape Areas; Natural Resources Wales (2017);
- Guidance Note 3 LANDMAP and LVIA for onshore windfarms, Natural Resources Wales (2013)
- LANDMAP Guidance Note 4: LANDMAP and the Cultural Landscape; Natural Resources Wales (2016)
- LANDMAP Guidance Note 5: LANDMAP and the Geological Landscape; Natural Resources Wales (2016) and
- LANDMAP Methodologies, Natural Resources Wales (2016) with regard to;
 - Geological Landscape;
 - Landscape Habitats;
 - Visual and Sensory;
 - Historic Landscape;
 - Cultural Landscapes.
- LANDMAP Guidance Note 46: Using LANDMAP in Landscape and Visual Impact Assessments
- Assessing the Cumulative Impacts of Onshore Wind Energy Developments; Scottish Natural Heritage (2012)
- Siting and Designing Wind Farms in the Landscape. Version 3; Scottish Natural Heritage (2017)
- Visual Representation of Wind Farms. Version 2.2 Scottish Natural Heritage (2017)
- Designing for Renewable Energy in Wales Design Commission for Wales (Draft Consultation April 2023)

- Planning Guidance for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements; Gillespies LLP (2014) - Prepared for the Heads of the Valleys Landscape Officers and Planners with support from the South Wales Landscape Liaison Group.

Scope of the Assessment

- 5.4.4 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees.
- 5.4.5 Taking into account the scoping and other consultation, Table 5.4: summarises the issues considered as part of this assessment.

Table 5.4: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Low level construction activities	Landscape and visual impacts of construction works including localised earthworks, the formation of access routes, temporary construction areas and holding bays, turbine blade laydown areas, construction of solar arrays and BESS and turbine hardstanding pads.
High level construction activities	Landscape and visual impacts of crane and lifting gear equipment for turbine construction.
Operation and maintenance	
Turbine operation	Landscape and visual impacts of the operating wind turbines, including maintenance access and operations.
Decommissioning	
Low level decommissioning activities	Landscape and visual impacts of decommissioning works including localised earthworks, the formation of access routes, temporary works areas and holding bays, turbine blade laydown areas, associated earthworks
High level decommissioning activities	Landscape and visual impacts of crane and lifting gear equipment for turbine decommissioning

- 5.4.6 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in Table 5.5:

Table 5.5: Issues scoped out of the assessment

Issue	Justification

Areas outside the ZTV	All landscapes and visual receptors outside the ZTV are proposed to be scoped out of the assessment as the Proposed Development would not be visible from these locations and no change to views or character would occur.

Distinction Between Landscape and Visual Effects

- 5.4.7 As set out in the GLVIA3, paragraph 2.21, landscape and visual effects are assessed separately, although the procedure for assessing each is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:
- 5.4.8 Landscape effects relate to the effects of the Proposed Development on the physical and other characteristics of the landscape and its resulting character and quality.
- 5.4.9 Visual effects relate to the effects on views experienced by visual receptors (e.g. residents, footpath users, tourists etc) and on the visual amenity experienced by those people.

Study Areas

- 5.4.10 As recommended in the NRW Guidance Note 46, the detailed study area to be covered when assessing landscape and visual effects should be based on the extent of landscape aspect areas likely to be significantly affected, either directly or indirectly. It may also be based on the extent of area from which the development is visible, as demonstrated by the Zone of Theoretical Visibility (ZTV), or a combination of the two.
- 5.4.11 The NRW guidance note suggests the typical extent of the initial search area for a tall structure is at a ratio of typically 1:150 (height to search area radius). For the Proposed Development, with a maximum height of 200m, this results in an initial search area of 30 km.
- 5.4.12 The detailed study area is then determined from this initial search area according to where the extent of likely significant effects may occur.
- 5.4.13 The recommended LANDMAP filtering process within the NRW Guidance Note 46 helps to focus the detailed assessment of potentially sensitive landscape and visual receptors to those areas most likely to be affected. Through a combination of this filtering process (see Volume 3, Appendix 5.2 Assessment of Effects on Landscape), comparison with the ZTV area and professional judgement, the detailed study area was identified.
- 5.4.14 The ZTV generated to inform this assessment shows the area from which any part of the Proposed Development would be theoretically visible (figures 5.2.4 to 5.2.7 and 5.2.13). It was prepared using a view height of 2m and 8 origin points to represent the location of the Proposed wind turbines. ZTVs were produced for the blade tip heights. For the Proposed solar array, a blanket surface feature at a height of 2.8m was used with

a view height of 2m with 50 origin points dotted around the perimeter of the Proposed solar array. For the substation 3.9m height was used and 2.6 m for the battery storage.

- 5.4.15 The ZTV plan (figure 5.2.7) has been extended to 33 km taking into account the BBNP as figure 5.2.13.
- 5.4.16 Additionally Cumulative ZTV plans (figures 5.2.27 and 5.2.28) indicate the visibility of both the Proposed wind turbines and the developments of Mynydd y Glyn & Tywel Hywel.

Study Area - Landscape

- 5.4.17 A detailed study area of 15 km from the Proposed Development was determined for the appraisal of the effects on landscape features and landscape character as it is considered that significant landscape effects upon landscape designations would be highly unlikely at separation distances in excess of 15 km.

Study Area - Visual

- 5.4.18 The visual assessment covers a radius of 15 km from the Proposed Development, focussing on key viewpoints and illustrated with photomontages.
- 5.4.19 A representative viewpoint from within the Brecon Beacons National Park was requested by the NRW and is located approximately 18 km from the Proposed Development.
- 5.4.20 The location and geographic extent of the study area is presented in figure 5.2.7.

View Ranges

- 5.4.21 Experience from recent wind farm projects and planning appeals in the UK indicates that 100 m high plus wind turbines are perceived as 'prominent' features in the landscape at 0-3 km; and are 'present' from 3-10 km, with the degree of 'presence' diminishing with distance. Beyond 10 km, the presence of the wind turbines would gradually reduce as they are perceived more and more as part of the landscape at large. For the purposes of this assessment, views have been classified according to three distance 'ranges' as follows:

Table 5.6: View Ranges

Range	Distance threshold	Reasoning
Close	Less than 3 km	At close range the Proposed Developments would appear as dominant to prominent' features in views

Range	Distance threshold	Reasoning
Medium	Between 3 km and 10 km	In medium range views the Proposed Developments could appear as very noticeable to small features.
Long	More than 10 km (to 45 km)	In long range views the Proposed Developments would read as noticeable small features to barely discernible / negligible features

5.5 Assessment Criteria and Assignment of Significance

- 5.5.1 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts.
- 5.5.2 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor.
- 5.5.3 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Approach to Environmental Assessment.
- 5.5.4 GLVIA3 sets out broad guidelines rather than detailed prescriptive methodologies. The methodologies tailored for the assessment of this development is based on GLVIA3 guidance, which recommends that an assessment ‘concentrates on principles and process’ and ‘does not provide a detailed or formulaic recipe’ to assess effects, it being the ‘responsibility of the professional to ensure that the approach and methodology are appropriate to the task in hand’ (preface to GLVIA3). The effects on the landscape resources or visual receptors (people) are assessed by considering the proposed change in the baseline conditions (the impact of the Proposed Development) against the type of landscape resource or visual receptor (including the importance and sensitivity of that resource or receptor). The methodology is set out in Volume 3, Appendix 5.1. These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement.

Receptor Value and Sensitivity

- 5.5.5 The criteria for defining sensitivity in this chapter of the ES are outlined in Table 5.7: below.

Table 5.7: Sensitivity criteria

Sensitivity/Value	Definition
Very High	Very high importance and rarity, international scale, very limited potential for substitution.
High	High importance and rarity, national scale and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Magnitude of impact

5.5.6 The criteria for defining magnitude in this chapter of the ES are outlined in Table 5.8.

Table 5.8: Impact magnitude criteria

Magnitude of impact		Definition
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements
	Beneficial	Large scale or major improvement or resource quality; extensive restoration or enhancement; major improvement of attribute quality
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality
Low	Adverse	Some measurable change in attributes, quality or vulnerability, minor loss or, or alteration to, one (maybe more) key characteristics, features or elements
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements

Magnitude of impact		Definition
	Beneficial	Very minor benefit to, or positive addition of one or more characteristics, features or elements
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Duration of impacts

5.5.7 The criteria for describing the duration of impacts in this chapter of the ES are outlined in Table 5.9.

Table 5.9: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year.
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years.
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development.

Significance of effect

5.5.8 The method employed significance of the effect is presented in Table 5.10. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

5.5.9 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 5.10: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor

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

5.5.10 Where the magnitude of impact is 'No Change', no effect would arise. The definitions for significance of effect levels are described in Table 5.11.

Table 5.11: Definitions of significance criteria

Significance of Effect	Typical Descriptors	
	Landscape Resource	Visual Resource
Substantial	Where proposed changes would be uncharacteristic and/or would significantly alter a landscape of exceptional landscape quality (e.g., internationally designated landscapes), or key elements known to the wider public of nationally designated landscapes (where there is no or limited potential for substitution nationally).	Where proposed changes would be uncharacteristic and/or would significantly alter a view of remarkable scenic quality, within internationally designated landscapes or key features or elements of nationally designated landscapes that are well known to the wider public.
Major	Where proposed changes would be uncharacteristic and/or would significantly alter a valued aspect of (or a high quality) landscape.	Where proposed changes would be uncharacteristic and/or would significantly alter a valued view or a view of high scenic quality.
Moderate	Where proposed changes would be noticeably out of scale or at odds with the character of an area.	Where proposed changes to views would be noticeably out of scale or at odds with the existing view.
Minor	Where proposed changes would be at slight variance with the character of an area.	Where proposed changes to views, although discernible, would only be at slight variance with the existing view.
Negligible	Where proposed changes would have an indiscernible effect on the character of an area.	Where proposed changes would have a barely noticeable effect on views/visual amenity.
Neutral	Where there is a balance of proposed changes, both negative and positive, which leave the character of an area effectively unaltered.	Where there is a balance of proposed changes, both negative and positive, which leave the visual amenity of an area effectively unaltered.

- 5.5.11 In the assessment of visual effects, for the purposes of the Landscape and Visual Impact Assessment (LVIA), those effects indicated as being of 'Substantial' or 'Major', significance (as derived through the application of the methodology set out above) may be regarded as significant effects in EIA terms. An accumulation of individual 'Moderate' effects may also be regarded as significant in terms of the EIA Regulations. Where the sensitivity or magnitude is of the highest level i.e. High, the matrix offers the choice of two potential significances of effect. The assessor is then required to use professional judgement to define the level of significance in these most important scenarios.
- 5.5.12 With respect to the assessment of landscape effects, areas over which the proposed wind farm is likely to give rise to new landscape types / character areas and/or where sub-types/ areas would be established, are most likely to be deemed significant in EIA terms. However, significance can vary depending on individual circumstances and the baseline situation, for example the presence of landscape designations and/or detractors. This is particularly the case in assessing whether (or not) a Proposed Development would (a) give rise to a new landscape character type in its own right, where the Proposed Development would be the defining landscape characteristic and/or (b) give rise to a new landscape sub-type in which the Proposed Development would be a major contributory element in defining character. In the first case, the resulting effect would normally be significant. In the second case, the assessor has used professional judgement to determine if the effect is significant or not.

Types of Effect

- 5.5.13 The landscape and visual resource of an area can be affected both directly and indirectly. Visual effects are always direct, because when an object is not in view, by implication, there can be no effect. Landscape effects on the other hand can be either direct or indirect. Change that affects onsite physical features (e.g., vegetation, buildings, and landform), or the character area/type in which the Site is located, is a direct landscape effect; whereas an effect on the character of the surrounding landscape character areas/type is indirect. It is generally assumed that indirect effects would be intrinsically less significant than direct ones. However, this is not necessarily the case and is dependant on the nature of the Proposed Development and the landscape in which it is situated. The effect on the cultural setting of a particular designated site or object is considered further within Chapter 10: Cultural Heritage and Archaeology.
- 5.5.14 In general the scope of landscape and visual effect is:
- a) Direct effects on the landscape fabric and character of the site, and on views and visual amenity; and
 - b) Indirect effects on the surrounding landscape character.

Approach to Cumulative Effects

5.5.15 This Chapter includes an assessment of cumulative effects of the Proposed Development in association with other Proposed wind turbines within a 15 km buffer study area as set out in Part 3, Table 2 of 'Planning Guidance for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements (2014)'. The guidance provides details of the sizes of study area that should be used in relation to different scale of 'typologies' of wind farm development. Typologies Small to Very Large are considered in the relevant Cumulative Schemes for this assessment. 'Micro' schemes which have turbine tip heights of 25m or less are considered not to contribute significantly the process of cumulative assessment for this Proposed Development and scoped out. A review of the Cumulative Schemes was first undertaken in June 2023 and subsequently updated, and the following categories were assigned; Operational, Consented, In Planning and In Scoping schemes within a 15 km buffer from the Site. Those schemes at screening stage are not considered. This is in accordance with the Planning Guidance for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements (2014).

5.5.16 Assessment of cumulative effects are based on the following scenarios:

Scenario 1 – The Proposed Development + Operational

Scenario 2 – The Proposed Development + Operational + Consented

Assumptions and limitations of the assessment

5.5.17 The visual assessment is based on analysis of OS mapping of the Site and surrounding area, and on field survey and analysis of views towards the Site from publicly accessible viewpoints in the surrounding landscape. Although every effort has been made to include representative viewpoints in sensitive locations and locations from which the Proposed Development would be most visible, not all public viewpoints from which the Proposed Development would potentially be seen have necessarily been included in the assessment. Where impacts to residential and other private views (e.g. commercial occupiers) are noted, these have necessarily been estimated.

5.5.18 The fieldwork and visual assessment were undertaken during winter 2025 when deciduous trees were devoid of leaf and summer 2023. Site work was limited in winter months due to weather conditions which affected some of clear weather for photography.

5.6 Baseline Environment Conditions

Desk studies

5.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment. The existing studies and datasets referred to as

part of the desk-based review for Landscape and Visual are summarised in Table 5.12 below.

Table 5.12: Summary of desk study sources

Title	Source	Year published	Author
LANDMAP Visual and Sensory Aspect Areas	Web based mapping and reports	2016	NRW
LANDMAP Geological Aspect Areas	Web based mapping and reports	2016	NRW
LANDMAP Landscape Habitat Aspect Areas	Web based mapping and reports	2016	NRW
LANDMAP Historic Landscape Aspect Areas	Web based mapping and reports	2016	NRW
LANDMAP Cultural Landscape Services Aspect Areas	Web based mapping and reports	2016	NRW
Brecon Beacons National Park Landscape Character Assessment	Brecon Beacons National Park web site	2012	Fiona Fyffe Associates
Heads of the Valleys - Smaller Scale Wind Turbine Development - Landscape Sensitivity and Capacity Study Final Report	Blaenau Gwent Council on behalf of the five local authorities that cover the Heads of the Valleys study area. The Heads of the Valleys study area extends across the northern parts of Rhondda Cynon Taff, Merthyr Tydfil, Caerphilly, Blaenau Gwent and Torfaen local authorities and includes part of the Beacon Beacons National Park	2015	Gillespies
National Landscape Character Areas of Wales	NRW web site		NRW

5.6.2 The landscape desk-based assessment used for the landscape reporting framework, which draws on the information in TableTable 5.12, can be found at Volume 3, Appendix 5.2.

Site-specific surveys

5.6.3 Site specific surveys were undertaken to inform the baseline assessment for this LVIA. A summary of the site-specific surveys undertaken to inform this chapter of the ES are provided in Table 5.13.

Table 5.13: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
Viewpoint photography and fieldwork	Winter viewpoint photography and fieldwork to inform landscape and visual baseline and assessment within 30 km.	January, February and March and April 2025
Viewpoint photography and fieldwork	Residential Visual Amenity Assessment and check of any change to viewpoints within 10 km buffer.	January, February and March and April 2025

5.6.4 The landscape and visual receptor baseline descriptions and findings can be found at Appendices 5.2 and 5.3 respectively.

Future baseline conditions

5.6.5 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that ‘an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge’ is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.

Renewable energy developments within the study area

5.6.6 The cumulative landscape and visual impact assessment (CLVIA) in this chapter deals with the future scenarios of the addition of potential wind and solar developments schemes in the 30 km buffer study area. Intervisibility of these schemes with the surrounding landscape has been mapped using zone of theoretical modelling.

Climate Change

5.6.7 The Met Office UK Carbon Projections (‘UKCP09’) dataset provides probabilistic projections of change in climatic parameters over time for 25 km grid squares across the UK. Projected changes during low, medium and high future global greenhouse gas emissions scenarios have been reviewed for the period from 2020 up to 2069, encompassing

the potential construction and operational periods of the Proposed Development.

- 5.6.8 The likely ranges of change in climatic parameters including precipitation, temperature, wind speed, humidity and frequency of extreme weather may affect the native flora. However, while this would not increase the sensitivity of receptors, it may affect the magnitude of impact, e.g. the Proposed Development may be more visible to people who only have semi-screened views at present, or it may increase the number of receptors, where loss of trees could enable views not currently possible. As this aspect of the effects of climate change is uncertain, it is difficult to predict the significance of effect. Where there are known issues such as ash die back where trees loss is likely to increase in the future, mitigation through new planting has been targeted in susceptible areas where loss and potentially there may be a reduction in visual screening which may occur.

Key receptors

- 5.6.9 Table 5.14 identifies the visual receptors identified and taken forward for the assessment and shown in figure 5.2.3.

Table 5.14: Key visual receptors taken forward for assessment

VP	View Location Description	Visual Receptors	Grid Reference
VP1	Maxwell Street, Ferndale	Residential	299999,196819
		Road Users	
VP2	Heol Mair, Penrhys	Residential	300103,194798
VP3	Junction of New Bryn Terrace, Wattstown	Residential	301838,193906
VP4	Gilfach Road, Penygraig	Residential	299444,191596
VP5	Pleasant Heights, Porth	Residential	302150,192324
		Recreational	
VP6	Rhiwgarn Road, Trebanog	Residential	302087,189969
		Recreational	
VP7	Eglwysilan Road, Pontypridd	Recreational	309610,190273
VP8	Pontypridd Golf Club, Pontypridd	Recreational	308411,190647
VP9	Brynderwen Road, Cilfynydd	Residential	308967,192289
VP10	Publicly accessible route to Blaenhenwysg	Recreational	305356,192535
		Road Users	

VP11	Daren-Ddu Road, West of Cefn, Glyncoch	Residential Road Users	306621,192418
VP12	Junction of local road and PRow, southwest of Twyn y glog	Recreational Road Users	304817,193174
VP13	PRow north of Twyn y glog	Recreational	304931,193749
VP14	NCN 47, Ynysybwl	Recreational	306171,194132
VP15	Roundabout on Llwynceilyn Road	Road Users	303672,191033
VP16	Mount Pleasant, Trehafod	Residential	304579,190651
VP17	Bethany English Baptist Church, Ford Road, Pontypridd	Residential	306359,190345
VP18	Viewpoint 18 – Cefn Sychbant, BBNP	Recreational	298816, 210774
VP19	Llanwonno – PRow	Recreational	303253,195584
VP20	Informal Car Park, Cefn Gelligaer	Recreational	311763, 200051
VP21	Heol Islwyn, Nelson	Residential	310939,195283
VP22	Rhymney Valley Ridgeway Walk	Recreational	310584,192600
VP23	Trigpoint, Caerphilly Common	Recreational	315295, 185533
VP24	The Rhondda Heritage Trail - Station 4 - Rhondda's Fair	Recreational Residential	299252, 192170
VP25	Marian Street, Clydach Vale	Residential	297221, 192983
VP26	Recreational Route, Llwnypia	Recreational	298898, 193466
VP27	Coedpenmaen Common, Pontypridd	Recreational	307957, 190253
VP28	Recreational Route, Cwar-y-Wningen	Recreational	305349, 200203
VP29	Darren Dyllas, Mynydd y Glyn	Recreational	303269, 190365
VP30	Llantrisant Road, Pontypridd	Residential	306275, 187947
VP31	Recreational Route on Mynydd Troed-y-rhiw (BOAT)	Recreational	301164, 192440

5.7 Landscape and Visual Baseline Environment

Landscape Character Baseline

5.7.1 Landscape character can be defined at a variety of scales and a substantial amount of existing published information is available at national and county / regional levels. The following section sets out the relevant elements of landscape character and landscape designations.

National Landscape Character Areas (NLCA)

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

5.7.3 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 identity – 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

5.7.4 Within the 15 km study area there are 3 other Wales National Landscape Character Areas.

5.7.5 The adjacent National Landscape Character Areas are:

- 36 – Vale of Glamorgan
- 30 – Bannau Brycheiniog (Brecon Beacons) and Black Mountains
- 35 – Cardiff, Barry and Newport

Regional Landscape Character Types (LANDMAP)

5.7.6 NRW Guidance Note 46 recommends that LANDMAP is used as a starting point for creating suitably scaled character-based reporting units and suggests that reporting units may be LANDMAP visual and sensory aspect areas (VSAAs). This recommended approach has been applied to this LVIA and ‘Landscape Units’ have been identified based on VSAAs. In some cases, VSAAs that are ‘filtered out’ (following Natural Resources Wales’ filtering process) have still been considered as they overlap with Historic Landscape Aspect Areas (HLAA) that have been filtered in. This process resulted in a large number of Landscape Units and so an additional filter has been applied which analyses the extent of theoretical intervisibility of the proposed turbine blade tips, as well as the actual visibility, to determine whether any Landscape Units can be further ‘scoped’ out, i.e. ‘filtered-in’ VSAAs which have very limited theoretical visibility of the Proposed Development, or those where intervening vegetation/buildings would screen the Proposed Development.

5.7.7 Following the LANDMAP filtering process, 45 Landscape Units (based on VSAA boundaries) were identified and assessed. The Landscape Units that have been considered for assessment are indicated on s 5.2.19 to 5.2.20.

5.7.8 The Site is located within the Ynysbwl **LANDMAP Visual and Sensory Aspect Area (VSAA)** (CYNONVS141). The area has an overall LANDMAP evaluation of moderate for scenic quality. There are numerous LANDMAP VSAAs within the study area.

Table 5.15: Ynysbwl LANDMAP Visual and Sensory Aspect Area (VSAA)

Aspect Layer	Description	Overall Evaluation
Ynysybwl (CYNONVS141)	Essentially upland in character with built development/associated elements (pylons, telecom masts). Open landscape of rough grazing with conifer plantations, small woodland/broadleaf clumps creating a mosaic pattern, combined with strong rhythmic undulations of minor ridge/crests and valleys provides visual movement and cohesion. Generally, a southerly aspect on rolling landform between approximately 120m and 320m AOD. Away from main valleys, it remains one of the most tranquil parts of county.	Value: Moderate Condition: Unassessed Trend: Constant Scenic quality: Moderate Integrity: Moderate Character: Moderate Rarity: Moderate Overall Evaluation: Moderate ‘Locally important, due to some attractive views and areas of upland character, but this importance is compromised / diminished by the urban associations that are present in parts of the area.’

Landscape Designations

- 5.7.9 The landscape designations are all shown in the vicinity of the Proposed Development on 5.2.1.
- 5.7.10 The nearest World Heritage Site to the Proposed Development is Blaenavon Industrial Landscape which is approximately 24 km from the Site to the northeast. The large separation distance from the Proposed Development would mean that effects on these designations would be very unlikely and as such has been scoped out of this assessment.

National Landscape Designations

- 5.7.11 The closest **National Park** to the Proposed Development, is the Brecon Beacons National Park (BBNP) which lies to the north of the Proposed Development at approximately 14 km to the Application Site at its nearest point.
- 5.7.12 Despite the majority of the National Park being situated outside of the 15 km landscape assessment study area, the BBNP is included in this assessment to ensure that any potential landscape effects on this highly sensitive landscape are assessed.

Local Landscape Designations

- 5.7.13 There are 44 **Special Landscape Areas (SLA)** within the 15 km study area:

- 5.7.14 Those SLAs within 5 km of the Proposed Development:
- Cwm Clydach (approx. 200m north at its nearest point);
 - Llwynceilyn Slopes (approx. 200m south at its nearest point);
 - Mynydd y Glyn & Nant Muchudd Basin (south);
 - Mynydd Troed y Rhiw Slopes (west);
 - Mynydd y Cymmer (southwest);
 - Treforest Western Slopes (southeast);
 - Taff Vale Eastern Slopes (east);
 - Cynon Valley Northern Slopes (northeast);
 - Mynydd Eglwysilan (east);
 - Pontygwaith (northeast).

- 5.7.15 And those within 10 km of the Proposed Development:
- Gelligaer and Taf Bargoed (northeast);
 - Mynydd Hugh & Llantrisant Forest (southwest);
 - Northern Uplands (west);
 - Hirwaun Common, Cwm Dare & Cwm Aman (northwest);
 - Gelligaer (northeast);
 - Efail Isaf, Garth & Nantgarw Western Slopes (southeast);
 - Llantrisant Surrounds (south);
 - Rhondda Fawr Northern Cwm & Slopes (west);
 - Cwm Orci (northwest);
 - Merthyr West Flank (north);
 - North Caerphilly (east);
 - Garth Hill and Pentyrch Ridges (south);
 - Coed yr Hendy and Mwyndy (south);
 - Mynydd y Gaer (southwest).

- 5.7.16 There are 7 Country Parks within the 15 km study area. The Parc Penallta **Country Park** is the only such designation within 10 km of the Proposed Development, it is approximately 7.8 km east-northeast of the Proposed Development.

Visual Amenity Baseline

- 5.7.17 A series of thirty-one representative viewpoints were identified within the study area. These visual receptors are to be found within 30 km of the

Proposed Development and within the ZTV which is shown in figures 5.2.4 to 5.2.7 and 5.2.13.

- 5.7.18 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).
- 5.7.19 A study area of 15 km from the Proposed Development was established as it is not expected there would be significant visual effects over this distance.
- 5.7.20 Viewpoint Susceptibility, Value and a justification of the value are shown in Table 5.16.

Table 5.16: Viewpoint Susceptibility, Value and Sensitivity

VP	Receptors	Susceptibility	Value	Justification of Value	Sensitivity	Distance to Proposed Development (km)
VP1	Residential	Medium	Medium	Within The Rhondda (Registered Historic Landscape) – View of low importance	Medium	5.5
	Road Users	Low			Low	
VP2	Residential	High	Medium	Within The Rhondda (Registered Historic Landscape) – View of low importance	Medium	4.4
VP3	Residential	High	Medium	Within The Rhondda (Registered Historic Landscape) – View of low importance	Medium	2.4
VP4	Residential	High	Medium	Within The Rhondda (Registered Historic Landscape) – View of low importance	Medium	4.8
VP5	Residential	High	Medium	Within The Rhondda (Registered Historic Landscape) – View of low importance On the edge of SLA	High	2.0
	Recreational	High			High	
VP6	Residential	High	Medium	Within The Rhondda (Registered Historic Landscape) – View of low importance On the edge of SLA	High	3.5
	Recreational	High			High	
VP7	Recreational	High	High	Cistercian Way, Within SLA.	High	5.0
VP8	Recreational	High	Medium	Within SLA.	Medium	3.8

VP	Receptors	Susceptibility	Value	Justification of Value	Sensitivity	Distance to Proposed Development (km)
VP9	Residential	High	Medium	On edge of SLA – but view facing away from the designation.	Medium	3.9
VP10	Recreational	High	Medium	On edge of SLA - facing away but within an open landscape, including views of SLA and site.	Medium	0.3
	Road Users	Low			Low	
VP11	Residential	Medium	Medium	On edge of SLA – looking over it towards site.	Medium	1.5
	Road Users	Low			Low	
VP12	Recreational	High	Medium	On edge of SLA – facing away.	Medium	0.3
	Road Users	Low			Low	
VP13	Recreational	High	Medium	Within SLA.	Medium	0.8
VP14	Recreational	High	Medium	NCN route.	Medium	1.8
VP15	Road Users	Low	Medium	On edge of SLA, looking up to SLA. However, within urban valley with limited views.	Low	1.7
VP16	Residential	High	Medium	On edge of the Rhondda (Registered Historic Landscape) with views for local residents.	Medium	1.5
VP17	Residential	Medium	Medium	No designation	Medium	2.3

VP	Receptors	Susceptibility	Value	Justification of Value	Sensitivity	Distance to Proposed Development (km)
VP18	Recreational	High	High	Within BBNP.	High	18.4
VP19	Recreational	High	Medium	No designation (on edge of Conservation Area), but local scenic value.	Medium	2.6
VP20	Recreational	High	High	Within SLA. Within Registered Historic Landscape.	High	9.9
VP21	Residential	Medium	Medium	No designation.	Medium	6.4
VP22	Recreational	High	High	Within SLA. Rhymney Valley Ridgeway.	High	5.5
VP23	Recreational	High	High	Within South Caerphilly SLA.	High	12.2
VP24	Recreational	Medium	High	Within Rhondda Registered Historic Landscape	Medium	4.8
	Residential	Medium			Medium	
VP25	Residential	Medium	High	Within Rhondda Registered Historic Landscape	Medium	6.8
VP26	Recreational	Medium	High	Within Rhondda Registered Historic Landscape	Medium	5.2
VP27	Recreational	Medium	Medium	No designation. Within public park in Pontypridd.	Medium	3.5

VP	Receptors	Susceptibility	Value	Justification of Value	Sensitivity	Distance to Proposed Development (km)
VP28	Recreational	High	High	Within the Cynon Valley Northern Slopes SLA designation	High	7.1
VP29	Recreational	Medium	High	Within Rhondda Registered Historic Landscape	Medium	2.4
VP30	Residential	Medium	High	Within Mynydd y Glyn & Nant Muchudd Basin SLA.	Medium	4.0
VP31	Recreational	Medium	High	Within Ynndd Troed-y-Rhiw Slopes SLA	Medium	2.9

Other Visual Receptors

Recreational Visual Receptors

- 5.7.21 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.
- 5.7.22 The following Table 5.17 shows the Locally promoted trails, Open Access land, National Cycle Network routes and long distance routes in the study area and shown in figures 5.2.26.

Table 5.17: Locally promoted trails, Open Access land, National Cycle Network routes and long distance routes

Locally promoted trails, Open Access land, National Cycle Routes and Long Distance Routes	
Open Access Land and Common Land	
	St Gwynno Forest
	Clydach Vale Forest Park
	Mynydd William Meyrick
	Glyncornel Grounds & Woodland Nature Reserve
	Barry Sidings Countryside Park
	Mynydd Eglwysilan
	Craig-Evan-Leyshon Common
	Parc Penallta Country Park
	Caerphilly Common
	Parc Taf Bargoel
Cycle Routes	
	NCN 4
	NCN 8
	NCN 47
	NCN 476
	NCN 477

Locally promoted trails, Open Access land, National Cycle Routes and Long Distance Routes

NCN 478

NCN 881

Long Distance Routes & Locally Promoted Trails

Cefn Gwyngul

Taff Ely Ridgeway Walk

Cistercian Way

Taff Trail

Rhymney Valley Ridgeway Walk

Coed Morgannwg Way

Penrhys Pilgrimage Way

Sky to Sea: Over the Bwlch

- 5.7.23 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 have been assessed in detail and shown on figure 5.2.1. The remaining PRoWs have been assessed proportionately and are represented in several of the proposed viewpoints.
- 5.7.24 Within 5 km of the Proposed Development there are numerous areas of **Countryside Rights of Way (CRoW)**. The nearest ones are within 1 km of the Site and are both woodland areas (coniferous plantations) immediately north (southern edge of St Gwynno Forest) and immediately northeast (south of Twyn y glog) of the application site. Within 2 km of the application site, there are a further two areas of CRoW access land, a large area on the northern slope of Mynydd y Glyn to the south which includes an area of woodland which forms part of the Barry Sidings Countryside Park. Further to this there is another CRoW area of steep hillside to the east of Ynyshir. There are numerous other CRoW areas within the wider 15 km study area.
- 5.7.25 Eight **Long Distance Footpaths** pass through the 15 km study area surrounding the Proposed Development.

Residential Visual Receptors

- 5.7.26 The context of the visual amenity (within the ZTV) – where residents may be able to see the Proposed Development – includes the following settlements:
- The closest settlements to the south and west (distance to the Proposed Development in brackets) – Porth (1.4 km), Trehafod (1.2 km), Trebanog (3 km), Llwynceilyn (1.3 km) and Llanwonno (2.6 km),
 - In the Rhondda Fach valley to the west and north - Wattstown, Pontygwaith, (Ynysir is outside of the ZTV), Penrhys, Ferndale;
 - To the east of the Site - Ynysybwl, Glyncoch, Coed y Cwm, Cilfynydd (Abercynon is outside of the ZTV);
 - To the west of the Site - Tonypany, Penygraig, Trealaw;
 - To the southeast of the Site - Pontypridd (including Hopkinstown, Penygraigwen, Maesycod, Treforest, Graig, Coed Pen-Maen).
- 5.7.27 The above list includes settlements within 5 km of the Proposed Development. Those outside 5 km are unlikely to be affected as settlements tend to have their own containment (screening by buildings and vegetation) and open views from public spaces are limited. As such, no significant effects on settlements outside 5 km are expected.
- 5.7.28 There are several other hamlets, scattered dwellings and farmsteads within the study area.
- 5.7.29 It should be noted that views from scattered residential properties outside of the settlements and within 2km of the proposed turbines will be considered as part of a Residential Visual Amenity Assessment (RVAA) prepared as part of the Final ES.

Road User Visual Receptors

- 5.7.30 There may be some dynamic views may be seen from roads within the study area (limited to 10 km).
- A4233
 - A4058
 - A4119 – to the southwest
 - A470 – main Pontypridd Road
 - A4093 – near tonyrefail
 - A4054 – road to cilfynydd
 - A472 – main road to nelson
 - A476 – north of nelson
 - B4273 – to ynysybwl
 - B4595 – west of pontypridd
 - B4278 – Trealaw to Porth

- B4254 – north of Nelson

Sequential Views

- 5.7.31 Sequential assessment considers the effects on sequential views, within the ZTV, experienced by users travelling along and through the study area along specific routes close to the Site. Visual receptors may experience sequential visibility of renewable energy installations whilst moving through the landscape for example on roads, cycling and walking routes. They may experience a different view of the same installation or a view of a different installation.
- 5.7.32 The following sequential views are to be considered:
- The sequential views to the Proposed Development from the A4058 between Pontypridd and Porth from the south of the Site.
 - Local road between Pantygraig Wen in the south to Llanwonno in the north with the Site situated on the western side of this route.
 - PRowS which pass to the west of the Proposed Development. A series of Bridleways and a footpath. There may be views to the Proposed Development along these routes at the upper elevations of them.

Cumulative Baseline

- 5.7.33 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 which are operational, consented and those developments which are in planning.
- 5.7.34 Current NRW guidance advises a study area for structures of a height of 176m to 225m should extend to 26 km to 28 km from the Proposed Development. An initial study area of 26 km is considered for the Proposed Development which has a maximum turbine tip height of 200m.
- 5.7.35 A 'sieving' process was undertaken for all schemes within 26 km, to understand those that have a potential for significant cumulative effects, which will then be subject to the cumulative assessment. It is anticipated that schemes beyond 15 km are unlikely to result in significant cumulative effects. Therefore, the final list of cumulative wind farms is for schemes within 15 km of the Proposed Development.
- 5.7.36 Turbines less than 50m height to tip, are not considered within the Cumulative LVIA (CLVIA), unless they are within 3 km of the Site. Turbines of less than 20m height to tip have not been considered.
- 5.7.37 In addition, other renewable energy developments (i.e. solar farms) on the Welsh Government's register of DNS applications located within 5 km of the Proposed Development have been considered within the cumulative assessment.

- 5.7.38 Cumulative visual effects are assessed through analysis of views from individual viewpoints and sequential views from key routes, based on computer-generated wireframes. The magnitude of cumulative change to landscape character reflects the additional influence the Proposed Development has on the character of the landscape, assuming the other wind farms are already present.
- 5.7.39 Various scenarios are considered, reflecting the status and therefore the level of certainty of other wind farms being present in the landscape (i.e. approved, or in-planning). This approach is in accordance with SNH guidance and will be prepared to ensure that, as well as the effects of the Proposed Development, the cumulative effects are also reported to account for two cumulative Scenarios as follows:
- 5.7.40 **Scenario 1:** assumes a baseline including the Proposed Development, all operational and approved (as yet unbuilt) schemes; and
- 5.7.41 **Scenario 2:** also includes schemes which are currently in-planning and at the pre-application stage (where adequate detail is publicly available) as well as operational and approved schemes within the 15 km study area.

Other Wind Energy Sites

- 5.7.42 The following wind Energy Developments, within 15 km of the Proposed Development, are to be considered in the cumulative assessment. See figure 5.2.8 - Cumulative Turbines and Table 5.18:

Table 5.18: Cumulative Sites

Development	Number of Turbines	Height to Blade Tip (m)	Local Authority	Approximate Distance from Proposed Development (km)	Status
Llwyncelyn Farm	2	125	Rhondda Cynon Taff	0.4	Operational
Mynachdy Farm	2	67.5	Rhondda Cynon Taff	2.3	Operational
Ferndale	8	74	Rhondda Cynon Taff	5.6	Operational
Nant-y-Gwyddon	1	85	Rhondda Cynon Taff	6.4	Operational
Cefn Fforest Farm	1	102	Merthyr Tydfil	6.8	Operational
West of Rhiwfelin Farm	1	100	Rhondda Cynon Taff	6.8	Operational

Development	Number of Turbines	Height to Blade Tip (m)	Local Authority	Approximate Distance from Proposed Development (km)	Status
Fforch Nest	11	115	Bridgend	6.8	Operational
Pant-y-Wal	10	115	Bridgend	6.8	Operational
Tir Cook Farm	1	77	Merthyr Tydfil	7.5	Operational
Graig Fatha Farm	1	126	Rhondda Cynon Taff	7.8	Operational
Castell Llwyd Farm	1	77	Caerphilly County	7.8	Operational
Bwlfa Farm, Gelli	1	77	Rhondda Cynon Taff	7.9	Operational
Mynydd Portref Extension	6	110	Rhondda Cynon Taff	8.0	Operational
Mynydd Portref	11	75/86	Rhondda Cynon Taff	8.4	Operational
Headwind Taff Ely	7	110	Rhondda Cynon Taff	8.4	Operational
Taff Ely	20	53	Rhondda Cynon Taff	8.5	Operational
Pant-y-Wal Extension	8	125	Bridgend	8.8	Operational
Maerdy	8	145	Rhondda Cynon Taff	10.9	Operational
Mynydd Bwlfa	9	125	Rhondda Cynon Taff	11.1	Operational
Pen y Cymoedd	76	145	Rhondda Cynon Taff	11.8	Operational
Groesfaen Farm	1	77	Caerphilly County	12.1	Operational
Bryn Ysgawen	1	77	Caerphilly County	12.2	Operational

Development	Number of Turbines	Height to Blade Tip (m)	Local Authority	Approximate Distance from Proposed Development (km)	Status
Tyle Crwth	1	76	Caerphilly County	12.3	Operational
Llynfi Afan	15	118	Bridgend	12.5	Operational
Cefn Bach Farm	1	78	Caerphilly County	12.6	Operational
Gelli-wen Farm	1	77	Caerphilly County	14.9	Operational
Mynydd y Glyn	7	155	Rhondda Cynon Taff	2.6	Approved
Twyn Hywel	14	200	Caerphilly County	4.9	Approved
Bryntail Farm	2	71	Rhondda Cynon Taff	4.9	Approved
Land at Graig yr hufen Road	1	77	Caerphilly County	6.3	Approved
Abergorki	3	145	Rhondda Cynon Taff	9.8	Approved
Maerdy T9	1	145	Rhondda Cynon Taff	10.5	Approved
Upper Ogmored	7	150	Neath Port Talbot	11.6	Approved
Cwmbargoed Disposal Point	1	126	Caerphilly County	13.4	In Planning
The Grange	1	77	Vale of Glamorgan	14.6	In Planning
Mynydd y Gaer	13	180	Bridgend	9.9	Pre-Application

5.7.43 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.

Other renewable energy developments

- 5.7.44 Other renewable energy developments within the study area include solar developments and BESS. Table 5.19 shows solar developments within the 30 km study area of the Proposed Development.
- 5.7.45 Solar developments have been scoped out beyond 5km because the visibility generally diminishes after 5km.

Table 5.19: Solar Developments

Development	Local Authority	Approximate Distance from Proposed Development (km)	Status
Wauntysswg	Caerphilly County	16	Approved
Pen Rhiw Solar Farm	Rhondda Cynon Taff	4	Operational
Land at Penyrheol Las	Caerphilly County	16.3	Operational
Maes Mawr Solar	Rhondda Cynon Taff	8.7	Operational
Cil Lonydd Solar Farm	Caerphilly County	18.2	Planning
Oaklands Solar Farm and BESS	Vale of Glamorgan	19.2	Approved
Glyntaff Solar Farm	Rhondda Cynon Taff	4.7	Scoping
Parc Dyffryn Solar Park	Vale of Glamorgan	18.7	Approved
Ty'n Y Waun	Bridgend	13.3	Approved
Cwm Ifor Solar	Caerphilly County	9.2	Approved
Afon Ddaw Solar and BESS Energy Project	Vale of Glamorgan	12	Scoping
Rassau Industrial Estate	Blaenau Gwent	22.1	Operational
Mynydd Fforch Dwm	Neath Port Talbot	22.6	Approved
Brynwell Farm Solar Park	Vale of Glamorgan	19.9	Approved
Land at Pen Onn Solar Farm	Vale of Glamorgan	16.3	Planning
East Aberthaw Solar Farm	Vale of Glamorgan	24.6	Scoping
Parc Worlton Solar Farm	Vale of Glamorgan	21	Approved

Development	Local Authority	Approximate Distance from Proposed Development (km)	Status
Maesgwyn Solar Farm	Neath Port Talbot	2.2	Operational

5.8 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

5.8.1 Both embedded and additional mitigation measures relevant to the assessment of Landscape and Visual are summarised in Table 5.20 below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 5.20: Mitigation measures to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
The Site – there are a number of habitat creation measures that would also enhance the host landscape character area CYNONVS141 - Ynysbwl these include: • Enhancement of the mixed plantation woodland through measures such as limited selective felling / thinning of non-native species (e.g. spruce sp.), planting of native fruiting understorey species (tolerant of low light levels) and overseeding with a native-species woodland ground flora seed mix, to compensate for the reduction in the extent of this habitat. • The creation of habitat piles and retained dead wood from the pruned / felled materials within the woodland, which would provide habitat for invertebrates and reptiles. • Cessation of regular cutting of the marshy grassland south of the mixed plantation woodland, to compensate for the reduction in the extent of this habitat. • Control of encroaching bracken within semi-improved acid and marshy grassland. • Scrub control within the small area of dry dwarf shrub heath.	A maintenance schedule for five years would be prepared to ensure the measures are fulfilled.

Mitigation measure	How the measure will be secured
• Fencing of field margins within the Proposed solar array (between solar panels and walls), to prevent overgrazing and allow the development of a longer and more diverse sward. This habitat will be cut annually in late summer / early autumn. • Incorporating habitat enhancement for reptile including the creation of simple structures such as hibernacula and grass snake egg laying heaps. • Provision of bird, bat and dormouse boxes (approx. 10-15 of each) in Perry's woodland. • A treatment plan to remove / reduce the invasive Japanese knotweed present on Site should be produced. • Creation of Lapwing Management Areas (in addition to those being created for Llwynneclyn). The outline proposals are: ○ Creation of a 3.2 ha lapwing management area in the southern half of the field centred on OSGR ST 03872 92713 in which lapwing bred during the second year of survey (additional to those created for the Llwynneclyn scheme) ○ The extension of the existing 3.6 ha lapwing management area in 'Field 1' of the Llwynneclyn LMP, by 1.0 ha. ○ The lapwing management area will be sown with cereal crop during February / early March or will be a set-aside derogation plot (a spring-sown crop / derogation plot within the field will provide vegetative cover from predators for breeding lapwing).	
The elements of habitat that include enhancement of the mixed plantation woodland, planting of native fruiting understorey species and overseeding with a native-species woodland ground flora seed mix (as detailed above) all contributes to the landscape character of LANDMAP Landscape Habitats Aspect Area CYNONLH083.	A maintenance schedule for five years would be prepared to ensure the measures outlined are fulfilled.
Further mitigation	

Mitigation measure	How the measure will be secured
Design Iteration: The process of design iteration has considered landscape and visual aspects throughout the design process from an early stage. Several layouts of wind turbines were tested since 2023. Throughout the process, the landscape and visual impacts have been considered and mitigated where possible.	17/9/24 An outlining turbine was further south and more exposed. A series of tests through preparing comparison wirelines showed that this was the most prominent wind turbine. This turbine was subsequently moved within other turbines – now T7.
The colour of the Proposed wind turbines is 'Goosewing grey'. This colour has been shown in studies to be the least visible colour against UK skies. Mitigating the visual impact for some days and from some views.	The manufacturer will be requested to provide the wind turbines with the colour of 'Goosewing grey'.

5.9 Assessment of Effects – Landscape

5.9.1 The assessments of Landscape Designations including the Brecon Beacons National Park, Special Landscape Areas, Registered Historic Areas and Country Parks are presented within this chapter and can be found below.

5.9.2 The landscape Character assessment is found in Volume 3, Appendix 5.2 with summary tables within this report.

5.9.3 For the purposes of the landscape assessment, the magnitude of impact was assessed only in those areas of a landscape unit or landscape designation which lies within the ZTV. In those areas within an assessed landscape unit or designations which are outside of the effect of the ZTV, it is assumed that there would be no change to the existing baseline condition.

The Effect on Landscape Character

5.9.4 The assessment of effects upon the 45 Landscape Units which are based on filtered-in Visual and Sensory Aspect Areas which have been scoped into the assessment is set out in detailed assessment tables in Volume 3, Appendix 5.2 Assessment of Effects on Landscape.

5.9.5 A summary of the assessment of effects which may arise as a consequence of the Proposed Development is presented in Table 5.21 with significant landscape effects indicated in bold.

Directly affected Landscape Units

5.9.6 Includes only those Landscape Units which are directly impacted by the Proposed development, that is any VSAA which contains all of or part of the Proposed wind turbines, Proposed solar arrays and BESS. The detailed assessment of this landscape unit can be found in Volume 3, Appendix 5.2 (Table 1).

Table 5.21: Assessment of Effects – Directly affected Landscape Units Summary

Landscape Unit (VSAA)	Sensitivity	Magnitude of Impact	Significance of Effect
CYNONVS141 - Ynysybwl	Medium	Low to High	Minor to Major

Indirectly affected Landscape Units (based on filtered-in VSAA's) up to 30 km from the Proposed Development

5.9.7 The following Landscape Units are based on LANDMAP Visual and Sensory Aspect Areas (VSAAs) that are located within 30 km of the Proposed Development that have initially been 'filtered-in' following the NRW filtering process, and that have been 'scoped in' for further assessment based on an appraisal of theoretical and actual visibility. The

detailed assessment of this landscape unit can be found in Volume 3, Volume 3, Appendix 5.2 (Table 2).

Table 5.22: Assessment of Effects – Indirectly affected Landscape Units Summary

Landscape Unit (VSAA)	Sensitivity	Magnitude of Impact	Significance of Effect
CRDFFVS002 – Tyn-y-Coed	Medium	Negligible	Negligible
CRDFFVS003 – Garth-west	Medium to High	Negligible	Minor
CRDFFVS004 – Garth Hill	High	Low	Minor
CRDFFVS013 – St Fagans farmland	Medium	No change	No change
CRDFFVS015 - River Ely valley sides	Medium	Negligible	Negligible
CRDFFVS017– Tongwynlais Scarp slopes	Medium	No change to Negligible	No Change to Negligible
CYNONVS113 – Cwm dar	Medium	Negligible to Low	Negligible to Minor
CYNONVS129 – Mynydd Y Grug	Medium	Low	Minor
CYNONVS142 – Mynydd y Glyn	Medium	Low to High	Minor to Major
CYNONVS317 – Mynydd Eglwysilon & Mynydd Meio	Medium	Low to Medium	Minor to Moderate
CYNONVS361 – Rhoslas	Medium	Negligible	Negligible
CYNONVS404 – Gelligaer Common	Medium to High	Low	Minor
CYNONVS430 – Hirwaun Common	Medium	Negligible to Low	Negligible to Minor
CYNONVS436 – Mynydd Gaer	Medium	Negligible to Low	Negligible to Minor
CYNONVS496 – Mynydd Maes-teg	Medium	Low	Minor
CYNONVS605 – Cefn Y Brithdir	Medium to High	Negligible	Minor
CYNONVS622 – Mynydd Llangeinwyr	Medium	Negligible	Negligible
CYNONVS735 – Cadair Fawr	High	Negligible	Minor
CYNONVS854 – Mynydd Y Lan	Medium	Negligible	Negligible
MRTHRVS119 – Gelligaer Farmlands	Medium	Negligible to Low	Negligible to Minor

Landscape Unit (VSAA)	Sensitivity	Magnitude of Impact	Significance of Effect
MRTHRVS767 – Taff/Bargoed Confluence	Medium	Negligible	Negligible
MRTHRVS858 – Gelligaer Common	Medium to High	Low	Minor
VLFGVLV002 – Hensol Park	Medium	Negligible	Negligible
VLFGVLV406 – Ely Valley Flood plain	Medium	No Change	No Change
VLFGVLV683 – Ely Valley	Medium	Negligible	Negligible
VLFGVLV913 – Hensol Forest	Medium	No Change	No Change
VLFGVLV962 – Ystradowen/Hensol Area	Medium	Negligible	Negligible

Indirectly affected Landscape Units (based on VSAA's) up to 30 km that overlap with 'filtered-in' Historic Landscape Aspect Areas evaluated as Outstanding overall

5.9.8 The following indirectly affected Landscape Units are based on LANDMAP Visual and Sensory Aspect Areas (VSAAs) that are located within 30 km of the Proposed Development, but that have not been 'filtered in' following NRW filtering process. However, they are included in the assessment as they overlap with Historic Landscape Aspect Areas (HLAAs) that have been initially 'filtered in' and have an overall evaluation of Outstanding. The detailed assessment of this landscape unit can be found in Volume 3, Appendix 5.2 (Table 3).

Table 5.23: Assessment of Effects – Indirectly affected Landscape Units that overlap with 'filtered-in' HLAA's Summary

Landscape Unit (VSAA)	Sensitivity	Magnitude of Impact	Significance of Effect
BLNGWVS226 - St. Illtyd	Medium to High	Negligible	Negligible
BLNGWVS688 - Hafod-y-dafel/Arail	Medium	Negligible	Negligible
CYNONVS143 – Llanfabon	Medium	Low to Medium	Minor to Moderate
CYNONVS260 – Valley slopes Machen	Medium	Low	Minor
CYNONVS271 – Rhymney Valley South of Caerphilly	Medium	Negligible	Minor
CYNONVS337 – Treherbert	Low	Low to Medium	Minor
CYNONVS357 – Mynydd Ton, Bwllfa	Medium	Low	Minor

Landscape Unit (VSAA)	Sensitivity	Magnitude of Impact	Significance of Effect
CYNONVS580 – St Gwynno	Medium	Low	Minor
CYNONVS709 – Pontypridd	Low	Low to Medium	Negligible to Minor
CYNONVS738 – Cefn y Rhondda	Medium	Low to High	Minor to Major
CYNONVS903 – West of Mountain Ash	Medium	Medium	Moderate
MRTHRVS452 – Merthyr Common	Low	Low	Minor
MRTHRVS908 – Cwm Cothi Farmlands	Medium	Low	Minor
TRFNVS024 – No name	Medium to High	No Change	No Change
VLFGVL271 – St Nicholas and Bonvilston Ridge Crest	Medium	No Change	No Change
VLFGVL596 – Cwrt yr Ala Valley	Medium to High	No Change	No Change
VLFGVL614 – St Nicholas and Bolvilston Ridge slopes	Medium to High	Negligible	Negligible to Minor

The Effect on Landscape Designations

5.9.9 The following assessments examine the effect of the Proposed Development on the landscape settings of each of the landscape designations as introduced in section 5.7 – Landscape and Visual Baseline Environment.

Special Landscape Areas

5.9.10 Within the 15 km detailed study area, there are 44 SLAs. In order to ensure that the special qualities of these local designations are considered, a separate assessment of the SLAs has been undertaken. As there is significant overlap between the SLAs and the LANDMAP assessment, a more selective approach has been taken and those SLAs within 10 km of the Site have been assessed. The remaining SLAs within the study area are considered as part of the LANDMAP assessment (Volume 3, Appendix 5.2).

5.9.11 Judgements of landscape susceptibility and landscape value have been informed by the following reports:

- *Proposed Developments for Designation of Special Landscape Areas in Rhondda Cynon Taff – Draft Report (2007)*
- *Caerphilly County Borough Local Development Plan up to 2021 Appendices to the Written Statement (Adopted November 2010)*

- *Merthyr Tydfil County Borough Council Replacement Local Development Plan 2016 - 2031 Background Paper: Special Landscape Areas (June 2018)*

5.9.12 The effect of the Proposed Development on SLAs within 5km of the Site are assessed and can be found in Table 5.24 below:

Table 5.24: Special Landscape Areas Assessment (within 5 km)

Local Landscape Designation	Assessment
Cwm Clydach (approx. 200m north at its nearest point)	<i>Sensitivity:</i> The value of the Cwm Clydach SLA is Medium to High. Its landscape susceptibility is assessed to be Medium. Therefore, the Sensitivity of this area is judged to be Medium. <i>Assessment:</i> The southern portion of this SLA (between Penygraigwen and the forest north of Mynachdy) is very close to the Site and there would be a very high level of visibility to the Proposed Development (both the turbines, the solar array and BESS). Existing detracting vertical features include the wind turbines at Llwynceilyn Farm and Mynachdy Farm as well as a line of pylons in the south of the area. The aspect of this area is generally north-eastwards, with a sense of the wider landscape and views being in that direction, away from the Site. However, the Proposed Development would be a prominent new feature which would increase the perception of detracting vertical structures in the landscape. In the northern part of this SLA, there would still be intervisibility, but tree cover and intervening landforms would create a slight sense of separation, and the impact would reduce. There would be a High magnitude of impact in the southern part of this SLA, reducing to Medium in the north. <i>Significance of Effect:</i> Major to Moderate and significant.
Llwynceilyn Slopes (approx. 200m south at its nearest point)	<i>Sensitivity:</i> The landscape value is judged to be Medium and the susceptibility is Medium-High. The overall sensitivity of the SLA is assessed to be Medium. <i>Assessment:</i> Although this SLA is in close proximity to the Site, the nature of the terrain is steep valley sides with an aspect either to the south or the west. While the Proposed Development would be visible within part of this area (mostly on the gentler south-facing slopes immediately south of the Site), only the southern-most turbine would be visible to hub height in much of this area. There are also trees and small woodlands on the upper slopes of these valley slopes which would further reduce intervisibility. The sense, therefore, of additional incongruous built development in this area would be limited to a few areas within this SLA. The magnitude of impact would be Low.

Local Landscape Designation Assessment

Significance of Effect: Minor and not significant.

Mynydd y Glyn & Nant Muchudd Basin (south)

Sensitivity: The value is judged to be Medium and the susceptibility is Medium-High which results in a judgment of overall sensitivity to landscape change of Medium.

Assessment: Only the northern section of this SLA, the peak of Mynydd y Glyn and the north-facing slopes north of that are within the ZTV of the Proposed Development. Therefore, only the northern part of this area would be affected by the Proposed Development. Where there is visibility to the Proposed wind turbines, solar array and BESS, the proximity to the Proposed Development, and aspect towards it would result in an indirect and High magnitude of impact, as the Proposed Development would be perceived as a prominent new element in the landscape. There would be No Change to the landscape characteristics in much of the area where there is no intervisibility with the Site. The area shown in the ZTV where the magnitude of impact is High, there would be a Major significance of effect which would be significant.

Significance of Effect: Major to No Effect and **significant**.

Mynydd Troed y Rhiw Slopes (west)

Sensitivity: A Medium landscape value and a Medium-High susceptibility results in a Medium sensitivity.

Assessment: Much of this area is out of the ZTV, and the area that is within the ZTV would have views to only one of the turbines to hub height. The landscape of this designation is the slopes of the valley between the urban area in the valley and the open uplands landscape above. The western half of the SLA has an aspect facing either southwards or westwards and would not be affected by the Proposed Development. The eastern half has slopes facing south and east, towards the site. However, due to the steep nature of the valley sides between this area and the Site, there would be little association with the Proposed Development. Only in a small part of this SLA may there be a slightly more perceptible change, however, the existing wind turbines at Llwyncelyn Farm are an existing detracting urbanising feature here. Therefore, there would be a Low to Negligible magnitude of impact as a result of the addition of the Proposed Development.

Significance of Effect: Minor to Negligible and not significant.

Local Landscape Designation	Assessment
Mynydd y Cymmer (southwest)	<i>Sensitivity:</i> The landscape value is judged to be Low and the susceptibility to development is assessed as Medium-High. The SLA, therefore, has a Medium sensitivity. <i>Assessment:</i> There would be clear views to the Proposed Development from much of this landscape designation. The landscape is an 'abrupt steep-sided hill with crags and scree slopes forming great contrasts to the settlements all around'. There is an existing sense of wind energy development from this SLA, owing to the presence of existing wind farms in the vicinity (Fforch Nest and Pant y Wal to the west, Llwyncelyn to the northeast). The Proposed Development would be perceived as a prominent new feature in the wider landscape, adding to the existing sense of wind energy development. The magnitude of impact is assessed to be Medium. <i>Significance of Effect:</i> Moderate and significant.
Treforest Western Slopes (southeast)	<i>Sensitivity:</i> The value of the landscape is judged to be Medium-Low. The susceptibility to change is assessed to be Medium. The resultant sensitivity is Medium. <i>Assessment:</i> In the northern part of the SLA, close to Graig and Treforest, there would be a noticeable increase in the perception of renewable energy development with potential visibility to the wind and solar elements of the Proposed Development. In this northern part of the area there is tree cover on the valley sides which reduces open views to the north. Further south, the sense of the addition of these elements would reduce. The magnitude of impact would vary from Medium in the north to Low in the south of the designation. <i>Significance of Effect:</i> Moderate to Minor and not significant.
Taff Vale Eastern Slopes (east)	<i>Sensitivity:</i> The landscape value is Medium-High with a susceptibility judged to be Medium. Therefore, the sensitivity of the SLA is Medium. <i>Assessment:</i> The Proposed Development would be an additional urbanising element in the wider landscape. This would be particularly true from the upper elevations of this SLA which have an aspect to the west and in closest proximity to the Site (i.e. the upper slopes of Mynydd Eglwysilan). Here, there would be a Medium magnitude of impact as the Proposed Development would be a prominent new built development feature within a landscape which has a strong connection to the urban area in the valley below. Further north,

Local Landscape Designation	Assessment
	and further south in this SLA, the magnitude of impact would reduce to Low. <i>Significance of Effect:</i> Moderate to Minor and significant.
Cynon Valley Northern Slopes (northeast)	<i>Sensitivity:</i> The landscape value is judged to be Medium-Low. The susceptibility is judged to be Medium. Therefore, the sensitivity is Medium. <i>Assessment:</i> The area covers the slopes on the north side of the Cynon Valley and is a prominent feature from within the valley. There are multiple different land uses along the slopes including woodland and open grassland among others. There are wider views from the upper slopes and from the areas of open grassland, and some of these face towards the Site. The area of the SLA nearest to the Proposed Development is mostly wooded and has a sense of enclosure. Where it is more open, there is a separation distance of over 7 km to the Proposed Development and the perception of the Proposed turbines would be diminished as a result. There would be a perceptible, incremental increase in wind energy development within the wider landscape. A magnitude of impact of Low. <i>Significance of Effect:</i> Minor and not significant.
Mynydd Eglwysilan (east)	<i>Sensitivity:</i> Medium-High landscape value and a Medium susceptibility results in a Medium sensitivity. <i>Assessment:</i> A large designation which has an area within the ZTV of the Proposed Development in the centre and norther regions. While the addition of the Proposed Development would be a perceptible new vertical feature from within this area, there is generally a separation distance of over 5 km and intervening landforms reduce the sense of the Proposed Development within this area. Existing detracting vertical elements within the landscape and wider perception of the landscape include pylons and existing turbines, including those at Llwynceilyn and Mynachdy. There would be a Low magnitude of impact on this SLA. <i>Significance of Effect:</i> Minor and not significant.
Pontygwaith (northeast)	<i>Sensitivity:</i> The landscape value is judged to be Low. The susceptibility to change is assessed to be Medium. Therefore, the sensitivity is Medium. <i>Assessment:</i> Most of this area, the sides of a steep-sided, narrow valley, is entirely out of the ZTV of the Proposed Development where there is unlikely to be any perceptible change as a result of the Proposed Development. The areas where there is intervisibility are in the south of the SLA, some

Local Landscape Designation Assessment

of these areas are forested and have no visual connection but there is an area of fields in the south (near to Whitehall Golf Club) where there would be visibility. Here, there may be a Low magnitude of impact on the receiving landscape as a result of the Proposed Development, but in the remainder, and majority, of the area there would be No Change.

Significance of Effect: Minor to No Effect and not significant.

5.9.13 In Table 5.25 below is the assessment of the SLAs within 10 km of the Site:

Table 5.25: Special Landscape Areas Assessment (within 10 km)

Local Landscape Designation	Assessment
Gelligaer and Taf Bargoed (northeast)	Sensitivity: The value of the SLA is Medium to High. Landscape susceptibility is assessed to be Medium-High. Therefore, the Sensitivity of this area is judged to be Medium-High. Assessment: From the open area of the common there would be a perceptible and incremental increase in wind energy development as a result of the Proposed Development. This would result in a Low magnitude of impact. Significance of Effect: The resulting Significance of Effect is judged to be Minor and not significant.
Mynydd Hugh & Llantrisant Forest (southwest)	Sensitivity: The landscape value is judged overall as Medium. The susceptibility of the SLA is Medium. Therefore, the sensitivity is also Medium. Assessment: There is a strong existing presence of wind energy developments within this SLA with the Mynydd Portref and Taff Ely wind farms sited on Mynydd Maendy and Mynydd Hugh. Further to this, the Fforch Nest and Pant y Wal wind farms to the north are further existing detracting vertical elements in the landscape. The Proposed Development, where it would be visible (in the north and west), would be another urbanising element in the wider landscape, incrementally adding to the existing baseline. There would be a Low magnitude of impact. Significance of Effect: Minor and not significant.
Northern Uplands (west)	Sensitivity: Landscape value is High and landscape susceptibility is Medium, resulting in a Medium sensitivity. Assessment: This exposed uplands landscape is of a large scale. The Pant y Wal wind farm lies within the SLA in the

eastern part of the area. It is in this eastern part of the area where there is intervisibility with the Proposed Development. Although the Proposed Development would increase the presence of wind energy development as seen from this SLA, it is the Pant y Wal wind farm which creates an existing impression of wind development and as such the addition of the Proposed Development has a Low magnitude of impact. Much of the area is outside of the ZTV and so there would be No Change to the existing baseline.

Significance of Effect: Minor and not significant.

Hirwaun Common,
Cwm Dare & Cwm
Aman (northwest)

Sensitivity: Landscape value is High. Landscape susceptibility is judged to be Medium. Therefore, the sensitivity is assessed to be Medium.

Assessment: This is a large SLA, most of which is outside of the ZTV. The area of this SLA which is within the ZTV is around the peak of Mynydd Bwllfa, which is over 12 km from the Site. There is an existing wind energy development within the SLA which coincides with the area within the ZTV. The magnitude of impact of the Proposed Development on this landscape receptor would be Low to Negligible to No Change where there is no intervisibility.

Significance of Effect: Minor and not significant.

Gelligaer
(northeast)

Sensitivity: The value of the SLA is Medium to High and the landscape susceptibility is judged to be Medium-High. This results in a judgment of sensitivity of Medium-High for the SLA.

Assessment: From the open area of the common there would be a perceptible and incremental increase in wind energy development as a result of the Proposed Development. This would result in a Low magnitude of impact.

Significance of Effect: The resulting Significance of Effect is judged to be Minor and not significant.

Efail Isaf, Garth &
Nantgarw Western
Slopes (southeast)

Sensitivity: The value of the SLA is Medium. The landscape susceptibility is assessed to be Medium-High. Therefore, the sensitivity of this area is judged to be Medium.

Assessment: A large portion of the area is within the ZTV, however, there is tree cover across a large part of the SLA and there would be limited intervisibility. Existing detractors include electricity pylons and a solar farm. There would be a Negligible magnitude of impact.

Significance of Effect: Negligible and not significant.

Llantrisant
Surrounds (south)

Sensitivity: Landscape value is judged to be Medium. Landscape susceptibility is assessed as Medium-High. The resulting sensitivity is judged to be Medium.

Assessment: Only from the upper parts of this SLA (around the hillfort) would there be intervisibility with the Proposed Development. Due to intervening landform, this would be of the nature of mostly just the upper parts of the proposed turbines, so the blades may be seen and would add movement on the horizon. This would be an incremental increase on the existing wind energy development baseline. There would be a Negligible magnitude of impact.

Significance of Effect: Negligible and not significant.

Rhondda Fawr
Northern Cwm &
Slopes (west)

Sensitivity: Judged to have a High landscape value and a susceptibility of Medium. The overall sensitivity of the SLA is Medium.

Assessment: The ZTV covers the most elevated portions of this SLA. There are existing detracting features including the Bwllfa wind turbine and masts. To the north, on the far side of the valley, the Maerdy wind farm is an existing wind farm to the north and the Ferndale wind farm is also visible. There would be a perceptible incremental increase in the presence of wind energy developments as a result of the Proposed Development. This is offset by the existing presence of other wind developments in the vicinity of the SLA, as well as the prominent impression of the urban developments in the valleys below this SLA. There would be a Low magnitude of impact.

Significance of Effect: Minor and not significant.

Cwm Orci
(northwest)

Sensitivity: Landscape value is judged to be Medium-High and the susceptibility is judged as Medium. The sensitivity is therefore Medium.

Assessment: The only part of this area with intervisibility to the Proposed Development is along the top of the ridgeline of Mynydd Maerdy. There is a strong existing presence of wind energy developments in the immediate north due to the Maerdy wind farm. The Proposed Development would add incrementally to the sense of wind energy development in the wider landscape. There would be a Low magnitude of impact.

Significance of Effect: Minor and not significant.

Merthyr West Flank
(north)

Sensitivity: Landscape value is Medium. Landscape susceptibility is judged to be Medium. The sensitivity is therefore Medium.

Assessment: The entirety of this SLA area is outside of the ZTV. Therefore, the magnitude of impact is No Change.

Significance of Effect: No Effect and not significant.

North Caerphilly
(east); – scope out

Sensitivity: Landscape value is judged to be Medium and the susceptibility is judged as Medium. Therefore, the sensitivity is also Medium.

distance (only just in 10 km)	<i>Assessment:</i> There is a large separation distance between the Proposed Development and the part of the SLA which is within the ZTV (approx. 11.5 km). While there may be a slight sense of an increase in built development as a result of the Proposed wind turbines, the overall magnitude of impact would be Low. <i>Significance of Effect:</i> Minor and not significant.
Garth Hill and Pentyrch Ridges (south)	<i>Sensitivity:</i> The landscape value is High and the susceptibility is Medium-High. This area is assessed as a Medium-High sensitivity overall. <i>Assessment:</i> This is a large SLA and only the northern part of it, mostly on Garth Hill, is within the ZTV. Where there is no visibility of the Proposed Development, there is no change to the existing landscape baseline. On the top of Garth Hill, the Proposed Development would add incrementally to the sense of wind energy development in the wider landscape. There would be a Low magnitude of impact. <i>Significance of Effect:</i> Minor to No Effect and not significant.
Coed yr Hendy and Mwyndy (south)	<i>Sensitivity:</i> Landscape value is judged to be Medium and susceptibility is judged to be Medium. Therefore, the sensitivity of the SLA is Medium. <i>Assessment:</i> Only a slight portion of the SLA lies within the tip height ZTV. At the separation distance (over 9 km), there would be No Change to the landscape receptors as a result of the Proposed Development. <i>Significance of Effect:</i> No Effect and not significant.
Mynydd y Gaer (southwest)	<i>Sensitivity:</i> The landscape value is judged overall as High. The susceptibility of the SLA is Medium. Therefore, the sensitivity is judged to be Medium. <i>Assessment:</i> There would be a perceptible and incremental increase in wind energy development as a result of the Proposed Development. This would result in a Low magnitude of impact. <i>Significance of Effect:</i> Minor and not significant.

Bannau Brycheiniog (Brecon Beacons) National Park National Park

- 5.9.14 The effect of the Proposed Development on Bannau Brycheiniog (Brecon Beacons) National Park National Park.
- 5.9.15 The Bannau Brycheiniog National Park (BBNP) is situated approximately 14 km north of the Proposed Development at its nearest point and within the 15 km detailed study area, there are 3 BBNP Landscape Character Areas. These are assessed below in Table 5.26.

5.9.16 Descriptions of the landscape character areas have informed the judgments of landscape susceptibility and landscape value and can be found in the *Bannau Brycheiniog National Park Authority's Landscape Character Assessment (August 2012)*.

Table 5.26: Special BBNP Landscape Character Areas (within 15 km)

Landscape Character Area	Assessment
4 - Waterfall Country and Southern Valleys (13.8 km north-northwest)	<i>Sensitivity:</i> The landscape value is assessed as High as a character area within the National Park. The susceptibility of the landscape is judged to be Medium-High. Therefore, the Sensitivity of the landscape character area is High. <i>Assessment:</i> Owing to the nature of this landscape character area as predominantly a sloping, more enclosed, lowland character area, there is limited intervisibility with the Proposed Development. The Proposed turbine tips may be visible on some southern facing slopes in the eastern part of the character area, and only in the far north (approx. 24 km) is there potential visibility of the turbine hubs. Within views southwards, there are existing wind farm developments. These detracting features, and their movement have a slight urbanising effect on this remote landscape. The Proposed Development would add incrementally to this built development where there would be views to it. However, the separation distance is large and the level of tranquillity, quality of extensive views from prominent hilltops and the level of remoteness would not be reduced by the Proposed Development. It is anticipated that there would be a Low to Negligible magnitude of impact on the landscape receptor. This would reduce to No Change in areas with no intervisibility with the Proposed Development. <i>Significance of Effect:</i> Minor to No Effect and not significant.
8 - Talybont and Taff Reservoir Valleys (14.3 km north)	<i>Sensitivity:</i> The landscape value is assessed as High as a character area within the National Park. The susceptibility of the landscape is judged to be Medium-High. Therefore, the Sensitivity of the landscape character area is High. <i>Assessment:</i> This landscape character area is 'characterised by its reservoirs, surrounded by steep sided, dark green forested valleys. Between the reservoir valleys are more open ridges of upland moorland'. Due to these characteristics and the landforms associated with the area, there is relatively little intervisibility with the Proposed Development. Parcels of land lie within the ZTV of the Proposed Development, and these are mostly at higher elevations on the open moorland. There is a larger area within the ZTV (including the hub ZTV) in the south which lies over Penmoelallt forest. As this is a forested

Landscape Character Area	Assessment
	landscape, views are limited, and the overall sense of the landscape is not associated with wider views. The main views within the LCA are over reservoirs and down the valley corridors within the LCA itself. In those limited areas where there is visibility of the Proposed turbines, there would be a Low to Negligible magnitude of impact. The majority of the area would experience No Change. <i>Significance of Effect:</i> Minor to No Effect and not significant.
3 - Fforest Fawr (14.7 km north)	<i>Sensitivity:</i> The landscape value is assessed as High as a character area within the National Park. The susceptibility of the landscape is judged to be Medium-High. Therefore, the Sensitivity of the landscape character area is High. <i>Assessment:</i> This landscape character area is characterised by bleak, upland moorland. There are some views southwards over the area outside of the national park boundary and owing to its upland nature, a moderate portion of this LCA is covered by the Proposed Development ZTV. The existing presence of wind farms to the south of the national park boundary can be felt within this open, exposed landscape and the Proposed Development would contribute to an increase in this sense of wind energy development in the wider landscape, albeit at a significant distance and an incremental increase. There would be, in those areas within the hub height ZTV, a Low to Negligible magnitude of impact, reducing to No Change where there is no intervisibility. <i>Significance of Effect:</i> Minor to No Effect and not significant.
5.9.17	Minor adverse effects are predicted for LCAs 4, 7 and 9 in the Brecon Beacons National Park BBNP.
5.9.18	The High sensitivity of these landscapes result in that even a Low to Negligible level of change results in a Minor effect. The Proposed Development would be at a large separation distance to the edge of the BBNP. The level of tranquillity, quality of extensive views from prominent hilltops and the level of remoteness would not be reduced by the Proposed Development.
5.9.19	The recent Planning Inspector report for Twyn Hywel found that, <i>‘In terms of the impact of the Proposed Development on BBNP, I note that the methodology used for defining the boundaries of the pre-assessed areas in FW specifically considered the landscape impacts of wind turbines up to 250 m in height. Policy in FW has therefore concluded that landscape impacts of Proposed Developments within these areas would be acceptable in principle. The ES has examined likely effects on landscape character of the landscape units within the National Park and concluded that there would be no significant effects on the character of BBNP. It has</i>

also assessed the effects on the special qualities of BBNP as defined in the BBNP Management Plan. I consider that the Proposed Development would add to man-made features visible from the park rather than detracting from the features and special qualities that define the park itself. The Proposed Development would only be seen in favourable weather and atmospheric conditions. I consider that the Proposed Development would be a relatively small element in these views.'

Registered Historic Landscapes

- 5.9.20 The effect of the Proposed Development on Registered Historic Landscapes is assessed in Table 5.27.
- 5.9.21 Descriptions of these designations have informed the judgments of landscape susceptibility and landscape value and can be found in the *CADW Full Reports of Registered Historic Landscape*.
- 5.9.22 Within the 15 km detailed study area, there are 3 Registered Historic Landscapes.

Table 5.27: Registered Historic Landscapes (within 10 km)

Local Landscape Designation	Assessment
The Rhondda	<i>Sensitivity:</i> The landscape value is Medium and the susceptibility to change is Medium. The sensitivity is therefore Medium. <i>Assessment:</i> This large designation covers the Rhondda Fach and Fawr valleys and is designated due to the history of coal mining in the area and its historic effect on the landscape. It encompasses both the urban areas which line the valley bottoms as well as the uplands. There is a patchwork of theoretical visibility within this area which predominantly covers the upland areas and the east facing valley sides. The proximity to the Proposed Development would heighten the sense of the increase in wind energy development within the southeast part of this designation particularly. There would be a magnitude of impact ranging from High in the southeast, adjacent to the Site, to Negligible in the far northwest (in areas within the ZTV). Significance of Effect: Major to Negligible and significant.
Merthyr Tydfil	<i>Sensitivity:</i> The landscape value is judged to be Low-Medium and the susceptibility is Medium. Therefore, the sensitivity is judged to be Low-Medium. <i>Assessment:</i> Only a small portion of this designation lies within the ZTV of the Proposed Development as the majority of the area lies within the valley and the town of Merthyr Tydfil. Part of the area which is within the ZTV is a large quarry area. The presence of the Proposed Turbines would only be felt in those areas within the ZTV where they would add incrementally to the

Local Landscape Assessment Designation

presence of modern built development in the wider landscape. However, the reasons for the designation of this landscape would not be harmed by this increase and so there would be a Negligible magnitude of impact on the designation.

Significance of Effect: Negligible and not significant.

Gelli-Gaer Common

Sensitivity: Landscape value is Medium to High and the landscape susceptibility is judged to be Medium-High. Therefore, the sensitivity of this designation is Medium-High.

Assessment: There would be some intervisibility with the Proposed Development from the higher elevations of the Common. Some parts of these upper elevations are within the hub height ZTV. There would be an incremental increase in the sense of wind energy development from the areas within the ZTV. The magnitude of impact would be Low.

Significance of Effect: The Significance of Effect is therefore judged to be Minor and not significant.

Country Parks

5.9.23 The effect of the Proposed Development on Country Parks is assessed below.

5.9.24 Although there are 7 Country Parks within the 15 km study area, the majority of these are at a large separation distance from the Proposed Development and are outside of the ZTV. The Parc Penallta Country Park is approximately 7.8 km east-northeast of the Site and falls within the ZTV.

5.9.25 This park is a former coal tip site, transformed into a public open space. There are sculptures and a viewpoint with 360-degree views. Much of the park is wooded, although there are clear views of the surrounding landscape from the plateau at the highest point of the park. The Proposed Development would be visible at a distance to the west and would be a new wind energy element in the wider landscape. As a restored former industrial site which has a strong connection to surrounding urban and detracting elements, the sensitivity of this designation is judged to be Low-Medium. The magnitude of impact would be Low, resulting in a Significance of Effect judged to be Minor and not significant.

Assessment of effects - Landscape Summary

5.9.26 The effect on landscape character was carried out following the NRW recommendations in Guidance Note 46. The assessment focussed on 44 'Landscape Units' which were identified through the LANDMAP filtering process and the landscape unit boundaries are based on the LANDMAP Visual and Sensory Aspect Areas. As a result of the Proposed

Development, the magnitude of impact ranges between No Change and High. Therefore, the overall Significance of Effect of the Proposed Development on the Landscape Units would range between No Effect and Major.

- 5.9.27 A summary of the significant effects as a result of the landscape character assessment is provided in Table 5.28. It highlights the landscape units on which the Proposed Development is assessed to have a significant adverse effect.

Table 5.28: Summary of significant landscape character effects

Landscape Unit (VSAA)	Sensitivity	Magnitude of Impact	Significance of Effect
CYNONVS141 - Ynysybwl	Medium	Low to High	Minor to Major
CYNONVS142 – Mynydd y Glyn	Medium	Low to High	Minor to Major
CYNONVS317 – Mynydd Eglwysilon & Mynydd Meio	Medium	Low to Medium	Minor to Moderate
CYNONVS143 – Llanfabon	Medium	Low to Medium	Minor to Moderate
CYNONVS738 – Cefn y Rhondda	Medium	Low to High	Minor to Major
CYNONVS903 – West of Mountain Ash	Medium	Medium	Moderate

Special Landscape Areas

- 5.9.28 The effect of the Proposed Development on Special Landscape Areas (SLA) has been assessed. The significance of effects assessed for the SLAs ranged between No Effect and Major.
- 5.9.29 A summary of significant effects on the Special Landscape Areas landscape designations is provided in Table 5.29.

Table 5.29: Summary of significant effects on Special Landscape Areas

Special Landscape Area (SLA)	Sensitivity	Magnitude of Impact	Significance of Effect
Cwm Clydach	Medium	High to Medium	Major to Moderate
Mynydd y Glyn & Nant Muchudd Basin	Medium	High to No Change	Major to No effect
Mynydd y Cymmer	Medium	Medium	Moderate
Taff Vale Eastern	Medium	Medium to Low	Moderate to Minor

Brecon Beacons National Park

- 5.9.30 An assessment of the effects on the Brecon Beacons National Park landscape character areas was undertaken. The Significance of Effect for the assessed character areas was judged to be Minor to No Effect and not significant.

Registered Historic Landscapes

- 5.9.31 An assessment of the Registered Historic Landscapes within 15 km of the Proposed Development concluded that the range of effects on these designations as a result of the introduction of the Proposed Development was judged to range from Negligible to Major.
- 5.9.32 A summary of significant effects on the Registered Historic Landscapes landscape designations is provided in Table 5.30.

Table 5.30: Summary of significant effects on Registered Historic Landscapes

Registered Historic Landscape	Sensitivity	Magnitude of Impact	Significance of Effect
The Rhondda	Medium	Negligible to High	Negligible to Major

Country Parks

- 5.9.33 An assessment of the Country Parks within 15 km of the Proposed Development was carried out. Only one Country Park was scoped into the assessment - The Parc Penallta Country Park. The significance of effects on this designation as a result of the introduction of the Proposed Development was judged to be Minor and not significant.

5.10 Assessment of Effects – Visual

- 5.10.1 This section sets out the assessment of the significance of the predicted visual effects that will arise because of construction activity and the operational scheme.
- 5.10.2 Judging the significance of visual effects requires consideration of the nature of the visual receptors (sensitivity) and the nature of the effect on those receptors (magnitude of impacts), as described in the assessment methodology (Volume 3, Appendix 5.1).
- 5.10.3 The assessment of effects on views has been undertaken with reference to the representative viewpoints in the baseline section, which are considered representative of the range of views that are available to receptors in the study area. A detailed assessment of effects at each of these viewpoints is included in Volume 3, Appendix 5.3 and has been informed by the visualisations presented for the 31 viewpoints in figures 5.1.1.1 to 5.1.31.4.

Visual Effects During Construction, and Decommissioning

- 5.10.4 During construction and decommissioning phases, significant (moderate) short term effects are predicted to affect visual receptors within the

vicinity of the Proposed wind turbines, solar arrays and BESS. These receptors may have views of construction works and disturbance associated with creation of the access tracks, earthworks associated with turbine platforms, blade laydown areas, and storage areas and as well as erecting the turbines, solar array and BESS. Construction activity (other than turbine erection) is unlikely to be visible from more than 10 km, and effects at all other locations are predicted to be not significant. Significant short-term construction and decommissioning impacts are predicted to arise for the same visual receptors as in the operation period assessed below. There are detailed assessments for each viewpoint in Volume 3, Appendix 5.3.

Visual Effects During Operation

Representative Viewpoints

- 5.10.5 The viewpoint assessment identified significant effects on visual amenity with the introduction of the Proposed Development.
- 5.10.6 Moderate and Major adverse effects that are significant are identified for 8 viewpoint locations that are all within 4km from the Site. Although 2 of these viewpoints 12 and 13, to the southeast of the Proposed Development are considered to have close (less than 1 km away) views of the proposed turbines within the context of baseline features including development such as existing wind turbines and / or intervening landform is such that the level of change or impact is considered to be less than high.
- 5.10.7 The significant visual effects are likely to occur would be a Major significance of effect on views from the south including Rhiwgarn Road, Trebanog and Mount Pleasant, Trehafod and Darren Dyllas, Mynydd y Glyn.
- 5.10.8 The following summary table, Table 5.31 summarises the assessment of the visual effects on the 31 representative viewpoints: Table 5.5:

Table 5.31: Assessment of Effects – Viewpoint Summary

VP	Location	Receptor Type	Sensitivity	Magnitude of Impact	Significance of Effect	Level of Effect
VP1	Maxwell Street, Ferndale	Residential	Medium	Negligible	Negligible	Not Significant
		Road Users	Low	Negligible	Negligible	Not Significant
VP2	Heol Mair, Penrhys	Residential	Medium	Medium	Moderate	Not Significant
VP3	Junction of New Bryn Terrace, Wattstown	Residential	Medium	Negligible	Minor	Not Significant
VP4	Gilfach Road, Penygraig	Residential	Medium	Medium	Moderate	Not Significant
VP5	Pleasant Heights, Porth	Residential	High	Negligible	Minor	Not Significant
		Recreational	High	Negligible	Minor	Not Significant
VP6	Rhiwgarn Road, Trebanog	Residential	High	Medium	Major	Significant
		Recreational	High	Medium	Major	Significant
VP7	Eglwysilan Road, Pontypridd	Recreational	High	Medium	Moderate	Not Significant
VP8	Pontypridd Golf Club, Pontypridd	Recreational	Medium	Medium	Moderate	Significant
VP9	Brynderwen Road, Cilfynydd	Residential	Medium	Medium	Moderate	Significant
VP10	Publicly accessible route to Blaenhenwysg	Recreational	Medium	High	Major	Significant
		Road Users	Low	High	Moderate	Not Significant
VP11	Daren-Ddu Road, West of Cefn, Glyncoch	Residential	Medium	Medium	Moderate	Not Significant
		Road Users	Low	Medium	Minor	Not Significant

VP	Location	Receptor Type	Sensitivity	Magnitude of Impact	Significance of Effect	Level of Effect
VP12	Junction of local road and PRoW, southwest of Twyn y glog	Recreational	Medium	High	Major	Significant
		Road Users	Low	High	Moderate	Significant
VP13	PRoW north of Twyn y glog	Recreational	Medium	High	Major	Significant
VP14	NCN 47, Ynysybwl	Recreational	Medium	Medium	Moderate	Not Significant
VP15	Roundabout on Llwynceilyn Road	Road Users	Low	Low	Minor	Not Significant
VP16	Mount Pleasant, Trehafod	Residential	Medium	Medium	Moderate	Significant
VP17	Bethany English Baptist Church, Ford Road, Pontypridd	Residential	Medium	Medium	Moderate	Not Significant
VP18	Cefn Sychbant, BBNP	Recreational	High	Negligible	Minor	Not Significant
VP19	Llanwonno – PRoW	Recreational	Medium	Medium	Moderate	Not Significant
VP20	Informal Car Park, Cefn Gelligaer	Recreational	High	Low	Minor	Not Significant
VP21	Heol Islwyn, Nelson	Residential	Medium	Low	Minor	Not Significant
VP22	Rhymney Valley Ridgeway Walk	Recreational	High	Low	Minor	Not Significant
VP23	Trigpoint, Caerphilly Common	Recreational	High	Negligible	Minor	Not Significant
VP24	The Rhondda Heritage Trail - Station 4 - Rhondda's Fair	Recreational	Medium	Low	Minor	Not Significant
		Residential	Medium	Low	Minor	Not Significant
VP25	Marian Street, Clydach Vale	Residential	Medium	Low	Minor	Not Significant

VP	Location	Receptor Type	Sensitivity	Magnitude of Impact	Significance of Effect	Level of Effect
VP26	Recreational Route, Llwnypia	Recreational	Medium	Negligible	Negligible	Not Significant
VP27	Coedpenmaen Common, Pontypridd	Recreational	Medium	Negligible	Minor	Not Significant
VP28	Recreational Route, Cwar-y-Wningen	Recreational	Medium	Low	Minor	Not Significant
VP29	Darren Dyllas, Mynydd y Glyn	Recreational	Medium	High	Major	Significant
VP30	Llantrisant Road, Pontypridd	Residential	Medium	Low	Minor	Not Significant
VP31	Recreational Route on Mynydd Troed-y-rhiw (BOAT)	Recreational	Medium	Low	Minor	Not Significant

Group Receptors

Effects on Settlement receptors

- 5.10.9 The assessment of visual effects from settlements is set out in Table 5.32.
- 5.10.10 As stated in paragraph 5.7.26, those settlements outside 5 km are unlikely to be affected as settlements tend to have their own containment (screening by buildings and vegetation) and open views from public spaces are limited. As such, no significant effects on settlements outside 5 km are expected.
- 5.10.11 The assessment of visual effects from settlements has therefore been restricted to those which lie within 5 km of the Proposed Development, and which coincide with the blade tip ZTV shown in figure 5.2.13.

Table 5.32: Residential Visual Assessment

Settlement	Assessment
Porth	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> The orientation of the streets is generally southeast northwest. Even though a number of the dwellings are therefore oriented northeast towards the Proposed Development, the dense nature of the built form and the narrow streets limits views out to the hillside. The Morrisons car park is at a slightly higher elevation to the rest of the settlement and is open in nature and thus has views to the Site. The magnitude of impact would range from Medium in the area near Morrisons to Negligible in areas of the settlement with little visibility to the Proposed Development. <i>Significance of Effect:</i> The resulting Significance of Effect would range from Negligible to Moderate and not significant.
Trehafod	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> The majority of the settlement is set in the lower part of the valley and with wooded slopes leading up to the Site there are limited views from the eastern part. The western part of Trehafod, around Woodfield Terrace is at a higher elevation and the aspect is distinctly northeast towards the Site. The Coed y Graig Road continues up the

Settlement	Assessment
	valley side and there are open views to the northern valley sides and ridgeline. See also VP 16 for a representative viewpoint. The magnitude of impact would range from Medium along Coed y Graig Road and the area around Woodfield Terrace to Low in the main nucleus of the eastern part of Trehafod. <i>Significance of Effect:</i> The resulting Significance of Effect would range between Minor to Moderate and significant
Trebanog	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. Residents along the northern edge of Rhiwgarn Road may have a High sensitivity. <i>Assessment:</i> This settlement is set at a high elevation and features far-reaching views northwards over Porth and the Rhondda Fach valley along the northern edge of the settlement (along Rhiwgarn Road) and these views face to the existing turbines at Llwynceilyn Farm and the Site. Within the housing development, there may be some glimpsed views down streets, or possibly views from upstairs windows in properties facing northwards. The magnitude of impact is High on the northern edge of the settlement, reducing to Low within the heart of the housing development. See also VP6 for a representative viewpoint. <i>Significance of Effect:</i> The Significance of Effect would therefore range from Minor to Major (along Rhiwgarn Road) and significant.
Glynfach	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> The streets generally align east-west with the properties facing mostly north. The landform rises to the south, therefore dwellings further south are at higher elevations with more open views. There is a degree of screening from built form owing to the dense nature of the development, however there would be views from some properties (particularly upper windows) towards the Site. The magnitude of impact would range from High where there are direct views towards the Site to Low within the majority of the area where the density of the development provides screening effects.

Settlement	Assessment
	<i>Significance of Effect:</i> The resulting Significance of Effect would therefore range from Minor to Major and significant.
Wattstown	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> Set on the eastern slopes of the Rhondda Fach valley, this village has a southern aspect with views down the valley. The Proposed Development would be sited to the east, behind the existing turbines of Llwyncelyn Farm, which can be seen from much of the village. The elevation of the dwellings in the village changes dramatically from the valley floor in the south to high up the hillside in the north. Views to the Proposed Development would therefore be more likely in the northern parts of the village. The magnitude of impact would range from Medium in the north, to Negligible in the south. Viewpoint 3 is representative of views from this settlement. <i>Significance of Effect:</i> The resulting Significance of Effect would be Negligible to Moderate and not significant.
Penrhys	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> Views from this settlement are represented by Viewpoint 2. The village is set high on the uplands between the Rhondda Fach and Rhondda Fawr valleys. It is a low density housing development with large open spaces between the blocks of houses and flats. Generally, the aspect of the dwellings faces south-southeast. There would be views of the Proposed Development which would bring a noticeable addition to the existing wind turbines of Llwyncelyn. The magnitude of impact would be overall Medium. <i>Significance of Effect:</i> The Significance of Effect would therefore be Moderate and not significant.
Ferndale	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> A representative viewpoint has been provided for this settlement, see Viewpoint 1. The village is set within

Settlement	Assessment
	the narrow valley of Rhondda Fach and the majority of the built form is orientated northeast-southwest with the streets generally running northwest-southeast. When moving south along the streets, there may be views to the Proposed Development. From the higher elevations of the village (in the west), the built form tends to screen longer distance views towards the Proposed Development. There would be a Negligible magnitude of impact. <i>Significance of Effect:</i> This would result in a Significance of Effect of Negligible and not significant.
Ynysybwl	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> See Viewpoint 14 for representative view. Generally, views from within the village face either north-south down the main street and the general orientation of the streets, or views from the dwellings are typically eastwards due to the siting of the village on the lower slopes of the western valley side, thus facing east. Much of the village is within the ZTV, so there is theoretical visibility to the Proposed turbines. In reality, the buildings and trees on the hillside between the village and the Proposed Development would screen views. Glimpses of the Proposed Development may be gained from various locations within the village but overall, a Low magnitude of impact would be experienced. <i>Significance of Effect:</i> The resulting Significance of Effect is therefore Minor and not significant.
Glyncoch & Coed y Cwm	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> The aspect of Glyncoch is generally north to northeast. There may be some views from rear windows of dwellings but generally these would be at an oblique angle. Cefn Lane aligns towards Site, so there may be views in a westerly direction, but trees provide some screening effects. Coed y Cwm generally has limited intervisibility to the Proposed Development due to the tight knit nature of the housing and tree cover around the housing development. The magnitude of impact for both Glyncoch and Coed y Cwm is anticipated to be Low.

Settlement	Assessment
	<i>Significance of Effect:</i> The resulting Significance of Effect is therefore Minor and not significant.
Cilfynydd	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> The properties face directly towards the Site as the aspect of the village, which sits on the hillside, is westwards. The dense nature of the dwellings provides some mitigation, but views to the Site, particularly from upstairs windows of dwellings would be likely. Views down Cross Street (as per VP9) and parallel roads are channelled towards the Site. The direct view of the Proposed Development and the change of view would result in a Medium magnitude of impact. <i>Significance of Effect:</i> The Significance of Effect is judged to be Moderate and significant.
Tonypandy	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> Much of Tonypandy lies outside of the ZTV, and therefore experiences No Change. However, there would be some views towards the Site from the area between the A4058 and the A4119 (particularly nearest the A4119 which is at a higher elevation) which is represented by VP24. There may also be some visibility to the Site at an oblique angle from the far west (Clydach Vale) which is represented by VP25. The magnitude of impact from those areas within Tonypandy with views to the Site is predicted to be Low. <i>Significance of Effect:</i> The resulting Significance of Effect is therefore Minor and not significant.
Penygraig	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> Although some views would be aligned towards the Site as in the representative viewpoint VP4 where there may be a Medium magnitude of impact, the density of the housing prevents views to the Site from large

Settlement	Assessment
	parts of the settlement and as such the overall magnitude of impact is likely to be Low. <i>Significance of Effect:</i> The resulting Significance of Effect therefore ranges from Minor to Moderate and not significant.
Trealaw	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> There may be some limited views to the Proposed development from along the route of B4278 (Brithweunydd Road) when travelling east towards the Site. Most of the dwellings within the settlement face south, not towards the Site. There would be some views to the Site from the cemetery, which is a large open space, but there is likely to be limited visibility of the turbines, with blade tips visible above the horizon. The magnitude of impact would range from Low, where the views are primarily to the south, to Medium from those areas which have views towards the Site. <i>Significance of Effect:</i> The Significance of Effect is judged to be Minor to Moderate and not significant.
Pontypridd (including Hopkinstown, Penygraigwen, Maesycloed, Treforest, Graig, Coed Pen-Maen)	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> Pontypridd is a small town which comprises of a number of settlements which stretches along the rivers Rhondda and Taff, to their confluence (roughly the centre of Pontypridd) and then down the river Taff as it moves southwards down the valley. From Hopkinstown there would be very limited visibility to the Site due to the density of the dwellings. The majority of Penygraigwen would be out of the ZTV with views to the Site mostly limited to the northernmost edge of the village. Within Maesycloed, most of the buildings are facing northeast and away from the Site. There would be some views towards the Site seen along the line of the roads. The main street (B4595) of Treforest aligns towards the Site and there would be some views when travelling north. From the dwellings along Rickards Street, between Treforest and Graig there would be open views north towards the Site. Most of the built form of Graig is so

Settlement	Assessment
	densely formed that views to the Site are not possible, except for the highest elevations (e.g. Dan-Y-Coedcae Rd) where there would be some views towards the Site. From Coed Pen-Maen there would mostly be very limited views (see VP 27) either due screening effects of landform, built form or trees. Overall, the dense urban nature of the Pontypridd area mitigates the impact of the Proposed Development on the settlement where there are views towards the Site. There would be a range of Negligible to Moderate magnitude of impacts. <i>Significance of Effect:</i> The resulting Significance of Effect is therefore Negligible to Moderate and not significant.
Llwynncelyn	<i>Sensitivity:</i> Residents have a Medium susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium value resulting in an overall Medium sensitivity. <i>Assessment:</i> Dwellings are generally facing south on this south-facing hillside location. Although it is on the same landform as the Proposed Development, most views from this settlement are in a southerly direction and there is not a direct association with the Site. The magnitude of impact would be Low. <i>Significance of Effect:</i> The resulting Significance of Effect is therefore Minor and not significant.
Llanwonno	<i>Sensitivity:</i> Residents have a High susceptibility to change. The views in the direction of the Site are assessed to be of a typically Medium to High value resulting in an overall High sensitivity. <i>Assessment:</i> The hamlet, which is within a conservation area, includes the church and pub. Although it is close to the Site, views south towards the Site are well screened by landform and trees. There may be some views of the Proposed Development from the surrounding area, see representative viewpoint VP 19 (outside of the conservation area) for a view from a recreational route just outside the hamlet. The magnitude of impact would be Medium. <i>Significance of Effect:</i> The resulting Significance of Effect is therefore Minor and not significant.

Effects on Recreational users

- 5.10.12 This section discusses potential effects on receptors using the area for recreational enjoyment, including people using the cycle routes and walking routes considered in the assessment.
- 5.10.13 The viewpoint assessment, presented in Volume 3, Appendix 5.3 identified no significant visual effects beyond 3.9 km from the Proposed Development. Proportionally, the assessment of potential visual effects from group recreational receptors is focussed within this radius. A higher level assessment of more distant group receptors is also considered.
- 5.10.14 Table 5.33 provides an examination of locally promoted Trails.

Table 5.33: Locally promoted trails

Locally Promoted Trails	Assessment
Cefn Gwyngul	<i>Sensitivity:</i> The sensitivity would be High. <i>Assessment:</i> This is Open Access of St Gwynno Forest which is mostly screened by forest. This lower valley route is mostly out of the ZTV, there may be occasional views of the Site although these may be rare if any. Although this relatively short route between Cefn Gwyngul and Llanwonno is relatively close to the Site. The route is predominantly within forest and therefore there is limited visibility to the Site. The magnitude of impact is judged to be Negligible, if any. <i>Significance of Effect:</i> Negligible and not significant.
Taff Trail	<i>Sensitivity:</i> The sensitivity would be High. <i>Assessment:</i> This trail is in the Taff Valley and the route is mostly on converted railway lines, and forestry tracks within the lower elevations of the valley following, roughly, the line of the river. Being in the bottom of the valley, generally, within the study area, visibility to the Proposed Development is limited as demonstrated in the ZTV (figures 5.2.26). Where the route passes closest to the Site (approx. 3km east), although partially within the ZTV, in reality the Proposed Development would mostly be screened from view by built form and trees (particularly along the A4054). To the southeast of the Site, the route moves along the Taff valley along the former railway line. Trees lining the route would provide some screening to the Site and distance also mitigates views to the Site. The magnitude of impact would, overall, be Low for those sections of the route with visibility to the Site. There would

	be large parts of the route within the study area which would have a magnitude of impact judged to be Negligible to No Change. <i>Significance of Effect:</i> The overall resulting significance of effect is judged to be Minor and not significant.
Taff Ely Ridgeway Walk	<i>Sensitivity:</i> The sensitivity would be High. <i>Assessment:</i> This route is over 8km to the south of the Proposed Development and there is very limited intervisibility with the Site. Where there is theoretical visibility, it would be at a large separation distance and therefore the magnitude of impact on the route is assessed to be Negligible. <i>Significance of Effect:</i> The significance of effect would be Minor and not significant.
Rhymney Valley Ridgeway Footpath	<i>Sensitivity:</i> The sensitivity would be High. This circular walk is east of the Proposed Development and recreational would have views across the valley. See VPs 7 (figures 5.1.7.1-4) and 22 (figures 5.1.22.1-4). This circular route to the southeast of the Proposed Development lies mostly outside of the ZTV. The section of the route which is within the ZTV and closest to the Site (approx. 5.4km east) is represented by VP 22 (figures 5.1.22.1-4). Further north and east of this viewpoint, there may be views to the Site, but any impacts would be reduced by the separation distance. To the southeast of the Site, a short section of the route lies within the ZTV and this section is represented by VP7 (figures 5.1.7.1-4). The magnitude of impact would range from Negligible to Medium (at VP7, figure 5.1.7.1-4). Overall, the magnitude of impact on this long distance route would be Low. <i>Significance of Effect:</i> The overall resulting significance of effect is judged to be Minor and not significant.

5.10.15 Table 5.34 provides an assessment of Open Access Land and Common.

Table 5.34: Open Access Land and Common

Open Access Land and Common	Assessment
St Gwynno Forest	<i>Sensitivity:</i> Open space St Gwynno Forest mostly screened by forest. <i>Assessment:</i> Negligible, if any, magnitude of impacts. <i>Significance of Effect:</i> Negligible and not significant.

Open Access Land and Common	Assessment
Clydach Vale Forest Park	<i>Sensitivity:</i> This lower valley route is mostly out of the ZTV, there may be occasional views of Proposed wind turbines although these may be rare if any. There would not be an effect on recreational users of this route. <i>Assessment:</i> Magnitude of impact would be negligible, if any. <i>Significance of Effect:</i> Negligible and not significant.
Mynydd William Meyrick	<i>Sensitivity:</i> Although in the ZTV, unlikely to be views of the Proposed Development as this is a wooded location. <i>Assessment:</i> Any magnitude of impacts would be negligible. <i>Significance of Effect:</i> Negligible and not significant.
Glyncornel Grounds & Woodland Nature Reserve	<i>Sensitivity:</i> There is an outer walk east of this area, where there would be views across to the Proposed Development. <i>Assessment:</i> The magnitude of impact would be low, see VP26. <i>Significance of Effect:</i> Minor and not significant.
Barry Sidings Countryside Park	<i>Sensitivity:</i> This popular country park is within wooded areas, mostly screening views of the Proposed Development, although the area is within the ZTV. <i>Assessment:</i> Any magnitude of impacts would be negligible. <i>Significance of Effect:</i> Negligible and not significant.
Mynydd Eglwysilan	<i>Sensitivity:</i> This open access area is around 7 km east of the Proposed Development and recreational users would see the proposed turbines across valleys <i>Assessment:</i> The magnitude of impact would be low. <i>Significance of Effect:</i> Minor and not significant.
Craig-Evan-Leyshon Common	<i>Sensitivity:</i> This open access is over around 4.5 km from the Proposed Development. There would be views for recreational users who would see the proposed turbines. <i>Assessment:</i> The magnitude of impact would be low. <i>Significance of Effect:</i> Minor and not significant.

Open Access Land and Common	Assessment
Parc Penallta Country Park	<i>Sensitivity:</i> In this country park, views of the Proposed Development would be seen at a distance across valleys and urban areas. <i>Assessment:</i> The magnitude of impacts would be negligible. <i>Significance of Effect:</i> Negligible and not significant.
Caerphilly Common	<i>Sensitivity:</i> High – within SLA and popular view point. <i>Assessment:</i> Views of the Proposed Development would be seen at a distance across valleys and urban areas. The magnitude of impacts would be negligible. See VP 23 s 5.1.23.1 to 5.1.23.4. <i>Significance of Effect:</i> Negligible and not significant.
Parc Taf Bargoel	<i>Sensitivity:</i> <i>Assessment:</i> Out of ZTV and filtered out of assessment with no effect. <i>Significance of Effect:</i> No change and not significant.

5.10.16 Table 5.35 provides an assessment of Cycle Routes.

Table 5.35: Cycle Routes

Cycle Routes	Assessment
NCN 4	<i>Sensitivity:</i> Mostly out of the ZTV, maybe a small section of route near southwest of Tonyrefail, where there could be a glimpse of the Proposed wind turbines <i>Assessment:</i> Any magnitude of impacts would be negligible. <i>Significance of Effect:</i> Negligible and not significant.
NCN 8	<i>Sensitivity:</i> This lower valley route is within some of the ZTV, and there may be occasional views of proposed wind turbines. <i>Assessment:</i> Magnitude of impact would be negligible, if any. <i>Significance of Effect:</i> Negligible and not significant.
NCN 47	<i>Sensitivity:</i> Route along valley edge within the ZTV, there may be views of the proposed wind turbines. <i>Assessment:</i> Any magnitude of impacts would be negligible.

Cycle Routes	Assessment
	<i>Significance of Effect:</i> Negligible and not significant.
NCN 476	<i>Sensitivity:</i> Mostly out of the ZTV, maybe some glimpses of the proposed wind turbines. <i>Assessment:</i> Magnitude of impact would be negligible, if any. <i>Significance of Effect:</i> Negligible and not significant.
NCN 477	<i>Sensitivity:</i> Out of ZTV and there would be no view of the Proposed Development. <i>Assessment:</i> Magnitude of impact would be none. <i>Significance of Effect:</i> No Change and not significant.
NCN 478	<i>Sensitivity:</i> Out of ZTV and there would be no view of the Proposed Development. <i>Assessment:</i> Magnitude of impact would be none. <i>Significance of Effect:</i> No Change and not significant.
NCN 881	<i>Sensitivity:</i> Out of ZTV and there would be no view of the Proposed Development. Magnitude of impact would be none. <i>Assessment:</i> Magnitude of impact would be none. <i>Significance of Effect:</i> No Change and not significant.

5.10.17 Table 5.36 provides an assessment of Long Distance Routes.

Table 5.36: Long Distance Routes

Long Distance Route	Assessment
Cistercian Way	<i>Sensitivity:</i> Due to the wider interest of this route, the sensitivity would be High. <i>Assessment:</i> This route passes through the study area roughly southeast to west-northwest. At its closest point, it passes approximately 0.9km to the northeast of the Site. This route is represented by VPs 7 (figures 5.1.7.1-4), 11 (figures 5.1.9.1-4), and 19 (figures 5.1.19.1-4), which shows sequential views from southeast to northwest. VP 2 (figures 5.1.2.1-6) may also be counted as representative of the route as it is within 100m of the route. This route is within the ZTV of the Proposed Development for much of its route within the study area, however, in reality

Long Distance Route Assessment

views would often be screened by trees, particularly as it passes closest to (within approximately 2.5km) the Site.

From the southeast, on the slopes of Mynydd Eglwysilan there would be views (VP7, figures 5.1.7.1-4) to the Site, albeit these would be experienced with the constant presence of Pontypridd in the valley below which is a detractor within views. From the northwest, on the ridge between the Rhondda Fach and Fawr valley, there may also be views to the Site.

In the section which passes closest to the Site, between Glyncoch and Llanwonno, there would be intermittent views to the Proposed Development between stretches of the route which would be screened by trees and/or with an aspect that faces away from the Site. Where there are open views to the Site it would be a prominent feature in westwards views.

The magnitude of impact would range from Low in more distant views to Medium for parts of the route with direct views to the Site within approx. 6km. Within 2.5km, although there would be some views to the Site which would have a High magnitude of impact, due to the tree cover and general direction of the primary views lying in directions not towards the Site, the magnitude of impact would be Medium.

Overall, the magnitude of impact is judged to be Medium for the route within the study area.

Significance of Effect: The resulting significance of effect is judged to be overall Moderate and not significant.

Taff Trail

Sensitivity: Due to the wider interest of this route, the sensitivity would be High.

Assessment: This trail is in the Taff Valley and the route is mostly on converted railway lines, and forestry tracks within the lower elevations of the valley following, roughly, the line of the river. Being in the bottom of the valley, generally, within the study area, visibility to the Proposed Development is limited as demonstrated in the ZTV (figure 5.2.26).

Where the route passes closest to the Site (approx. 3km east), although partially within the ZTV, in reality the Proposed Development would mostly be screened from view by built form and trees (particularly along the A4054). To the southeast of the Site, the route moves along the Taff valley

Long Distance Route Assessment

along the former railway line. Trees lining the route would provide some screening to the Site and distance also mitigates views to the Site.

The magnitude of impact would, overall, be Low for those sections of the route with visibility to the Site. There would be large parts of the route within the study area which would have a magnitude of impact judged to be Negligible to No Change.

Significance of Effect: The overall resulting significance of effect is judged to be Minor and not significant.

Rhymney Valley Ridgeway Walk

Sensitivity: Due to the wider interest of this route, the sensitivity would be High.

Assessment: This circular route to the southeast of the Proposed Development lies mostly outside of the ZTV. The section of the route which is within the ZTV and closest to the Site (approx. 5.4km east) is represented by VP 22 (figures 5.1.22.1-4). Further north and east of this viewpoint, there may be views to the Site but any impacts would reduce with distance. To the southeast of the Site, a short section of the route lies within the ZTV and this section is represented by VP7 (figures 5.1.7.1-4).

The magnitude of impact would range from Negligible to Medium (at VP7, figures 5.1.7.1-4). Overall, the magnitude of impact on this long distance route would be Low.

Significance of Effect: The overall resulting significance of effect is judged to be Minor and not significant.

Coed Morgannwg Way

Sensitivity: Due to the wider interest of this route, the sensitivity would be High.

Assessment: This route, to the northwest of the Proposed Development is, at its nearest point, approximately 9km from the Site and the section of the route closest to the Site which is within the ZTV is 13.4km northwest. There is very limited intervisibility between the Site and this long distance route and as such, the magnitude of impact is judged to be Negligible.

Significance of Effect: The resulting significance of effect is judged to be Minor and not significant.

Long Distance Route Assessment

Penrhys Pilgrimage Way *Sensitivity:* Due to the wider interest of this route, the sensitivity would be High.

Assessment: This route traverses from Penrhys to Llandaff Cathedral in Cardiff. At the northern end of the route, there would be views southeast towards the Site as represented by VP2 (figures 5.1.2.1-4). The very northern stretch of the route (between Trebanog and Penrhys) is intermittently within the ZTV with the primary views to the site being from the upland areas. South of Trebanog, the route mostly passes out of the ZTV and any views to the Site would be too distant to have an impact.

The magnitude of impact is judged to be Medium at the northern end, and Negligible or No Change for the remainder.

Significance of Effect: Overall, the significance of effect is judged to be Minor and not significant.

Sky to Sea: Over the Bwlch

Sensitivity: Due to the wider interest of this route, the sensitivity would be High.

Assessment: This route travels roughly from Aberdare to Bridgend, and at its closest point to the site is over 8.5km to the west. There is very limited intervisibility between the route and the Site and therefore the magnitude of impact is judged to be Negligible.

Significance of Effect: There would be a Minor significance of effect and not significant.

PRoW within 1.5 km

5.10.18 The visual assessment of the representative viewpoints, as well as the other routes and group receptors has assessed a large proportion of possible views from wider, important visual receptor locations. The viewpoint assessment, presented in Volume 3, Appendix 5.3 identified no significant visual effects beyond 3.9 km from the Proposed Development. Therefore, the following assessment of Public Rights of Way has been limited to those routes which are likely to be affected by the Proposed Development at close range.

5.10.19 Views from PRoWs within 1.5 km would include a track to Blaenhenwysg, through Glog to Ynysybwyl, Through Lynsnant and on towards Buarth Capel, up and over from east of Porth to north of Ynysybwyl, between

Hafod Uchaf and into the south of St Gwynno Forest. Recreational users of these routes would experience large scale changes being in close proximity to the Proposed Development and shown in figure 5.2.1.

- 5.10.20 There would be Major adverse effect and **significant** on recreational users for a section of the Bridleway and footpath over Cefn Gwyngul and a short section of the 'Other Route with Public Access' to Blaenhenwysg, see VP10 (figures 5.1.10.1-4). The sensitivity of these PRoW would be medium. There would be some sections of the remainder of PRoWs where the effects on views for recreational users would be changed but not significantly as the landform lowers and starts to screen views.

Road User Visual Receptors

- 5.10.21 This section discusses potential effects on receptors using the local road and main transport routes in the area considered in the assessment. In order to focus on potentially significant effects, roads and lanes from which there is no theoretical visibility are not considered. Furthermore, transport routes with limited visibility from a longer distance; beyond 10 km from the Proposed Development are not considered further in this section of the assessment. The assessment focuses on roads where the ZTV has a high proportion of overlap. The Table 5.37 presents the assessment.

Table 5.37: Road Users

Road (section)	Assessment
A4233 – Porth to Maerdy	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> Although close to the Site near Porth, almost the entire route is out of the ZTV. Therefore, the magnitude of impact is Negligible. <i>Significance of Effect:</i> The resulting significance of effect is Negligible and not significant.
A4058 – Pontypridd to Tonypany	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> This road passes to the south of the Proposed Development. The viewpoint VP15 (figures 5.1.15.1-4) is representative of views which may be gained from this route. It is set in the valley bottom and either trees or built form generally lie between the route and the Site. Further to this, views to the Site are elevated well above the level of typical road users and at an angle not generally in line with travel. While there may be some views of the southernmost turbine particularly, overall, the magnitude of impact on this route is anticipated to be Low.

	<i>Significance of Effect:</i> The resulting significance of effect is Minor and not significant.
A4119 – Tonypandy	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> Only a short section of this route is within the ZTV. VP24 (figures 5.1.24.1-4) is close to this route, but the road itself is tree-lined and with very little wider outlook. The magnitude of impact on this route is anticipated to be Negligible. <i>Significance of Effect:</i> The resulting significance of effect is Negligible and not significant.
A470 – Nantgarw to Abercynon	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> Travelling north along this route, there are sections which move directly towards the Proposed Development. As this is a busy, fast-moving road, there is little opportunity to admire wider views. The turbines would be seen in the context of this major road. The magnitude of impact on this route is anticipated to be Low. <i>Significance of Effect:</i> The resulting significance of effect is Negligible and not significant.
A4093 – Tonyrefail to Hendreforgan	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> Almost entirely out of the ZTV, any views would be fleeting and at a distance. The magnitude of impact on this route is anticipated to be No Change. <i>Significance of Effect:</i> The resulting significance of effect is No Effect and not significant.
A4054 – Abercynon to Coedpenmaen	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> The northern part of this route is tree-lined with no views to the site. Around the village of Cilfynydd there may be some views to the site, but they are not in the direction of travel and would be glimpsed views of the upper portion of the turbines. The magnitude of impact on this route is anticipated to be Negligible. <i>Significance of Effect:</i> The resulting significance of effect is Negligible and not significant.

A472 – Abercynon to Nelson	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> Much of the area within the ZTV is tree-lined with no views to the Site. The magnitude of impact on this route is anticipated to be Negligible. <i>Significance of Effect:</i> The resulting significance of effect is Negligible and not significant.
B4273 – Pontypridd to Ynysyawl	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> The magnitude of impact on this route is anticipated to be Low. <i>Significance of Effect:</i> The resulting significance of effect is Negligible and not significant.
B4595 – Treforest	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> Travelling north along this road, there would be views which would be channelled towards the Site. For a short stretch of this road, therefore, the Proposed Development would be a perceptible new feature in distance views. The magnitude of impact on this route is anticipated to be Low. <i>Significance of Effect:</i> The resulting significance of effect is Minor and not significant.
B4278 – Trealaw to Porth	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> There may be some views towards the Site when travelling east. The majority of the turbines would be screened by intervening landform and therefore the magnitude of impact on this route is anticipated to be Low. <i>Significance of Effect:</i> The resulting significance of effect is Negligible and not significant.
B4254 – Nelson to Gelligaer	<i>Sensitivity:</i> The value of the view would be Low and the susceptibility of road users would be Low. Therefore the sensitivity would be Low. <i>Assessment:</i> This road is distant from the Site and is tree-lined in many parts. There may be some glimpses towards the Site but the magnitude of impact on this route is anticipated to be Negligible.

Significance of Effect: The resulting significance of effect is Negligible and not significant.

Sequential Views

5.10.22 Sequential assessment considers the effects on sequential views, within the ZTV, experienced by users travelling along and through the study area along specific routes close to the Site. Visual receptors may experience sequential visibility of the Proposed Development whilst moving through the landscape for example on roads, cycling and walking routes. They may experience a different view of the same installation or a view of a different installation.

5.10.23 The Proposed Development would introduce tall vertical elements into the landscape. From viewpoints close to the Site the Proposed wind turbines would be a prominent feature, but the scale of the development rapidly diminishes with distance to become assimilated into the large scale of the landscape. The channelling of views from the valleys where receptors are concentrated greatly reduces the number of viewpoints where the development is visible from, and the intensively developed nature of the viewpoint locations lowers the sensitivity of receptor values. From upland viewpoints the large scale of the landscape is a strong mitigating factor, and the numbers of visual receptors is greatly reduced.

The A4058 between Pontypridd and Porth from the south of the Proposed Development

5.10.24 The visual effects on the A4058 within the study area was assessed as part of the road user visual assessment (Section 5.10.21) with a resulting significance of effect judged to be Minor (sensitivity: Low, magnitude of impact: Low). This sequential assessment focusses more specifically on how the visual effects may change as a receptor travels along it close to the Site.

5.10.25 The road, at its closest to the Proposed Development, is 1.1km to the south, although owing to the nature of the steep sided valley between the road and the Site, there would not be visibility of the Site from the stretch of road closest to the Site.

5.10.26 Travelling east to west, from the A470 where the road begins, this busy main road leads through Pontypridd. Although the route is within the ZTV at this point, trees and buildings line the road and while there may be glimpses of the Proposed wind turbines when the road aligns with the Site, there would be very little effect on receptors within this built-up area.

5.10.27 As the road leads through Hopkinstown there may be some glimpsed views to the Proposed wind turbines above the hill to the northwest, but these would be short duration views and there would be very little visual impact on road users. When travelling in this east-west direction views would then cease after Hopkinstown as the Site would be behind the receptor.

5.10.28 Travelling west-east, the views most affected are likely to be on the section between where the Dyllas Road bridge passes over the road and the roundabout junction with Coedcae Road (adjacent to the Heritage Park Hotel). This section of road leads towards the Site which would be situated on the uplands above the steep valley sides to the north of the road. There would only be views to the hub of the southernmost Proposed wind turbine, with the blade tips of some other Proposed wind turbines potentially visible. The worst-case view from this stretch of road is demonstrated by VP15 (figures 5.1.15.1-4).

5.10.29 The maximum magnitude of impact on this route would be at VP15, therefore, a Minor effect which is not significant.

Local road between Pantygraigwen in the south to Llanwonno in the north

5.10.30 Travelling north to south (Llanwonno to Pantygraigwen), the views on the northern part of this route would mostly be screened by forest which lines the road. Where there are clearings, or changes in forest management, there would then be views to the Proposed wind turbines which would be a prominent feature. The character of the route opens just south of Llwynperdid Farm and the Proposed Development would be a dominant feature above the road on the hillside to the south and west. In this direction, the turbines would have a dominant presence despite not being in the direction of travel, until approximately the junction with the publicly accessible route to Blaenhenwysg. Views here are not of particular importance and are enclosed by the hillside which hosts the Site. There may also be views to the Proposed solar array and BESS from this route, although travelling south, the Proposed panels would be facing away, so the views would be of the underside of the Proposed panels which would form a dark element on the top of the hillside.

5.10.31 In the opposite direction, from Pantygraigwen to Llanwonno, the Proposed Development would be a prominent feature from the northern edge of Pantygraigwen, having travelled up the steep hill through the settlement to where the road levels and the views open up to the hillside. The turbines would be a dominant feature in the direction of travel and the Proposed solar array and BESS would also be likely to be visible. This high degree of visual impact would continue until the receptor passes the Site at the entrance to Llwynperdid Farm where the forest would then screen views. Once the receptor passes the junction with the local road which goes to Buarth Capel, adjacent to the Site, the dominance of the Proposed Development would recede slightly as the Proposed wind turbines would be above the road level and to the west of the road.

5.10.32 The existing Llwynceilyn wind turbines are visible from this route, albeit seen above the landform which rises immediately to the west of the road, and so, although they are an existing element in views, they do not dominate the view.

- 5.10.33 There would be a High magnitude of impact along most of this section of the road in both directions of travel. The sensitivity of the road users here would be Medium, which results in a significance of effect judged to be Moderate and **significant**.

PRoWs which pass to the west of the Proposed Development

- 5.10.34 Passing immediately west of the Proposed Development there is a Public Bridleway which links north and south between Porth and the local road just southwest of Buarth Capel. There is a stretch of this route on which the Proposed Development would be a dominant new feature. This section of the route is along the flatter upland landscape between the quarry and the forest.
- 5.10.35 The existing turbines at Llwynceilyn Farm are a mitigating factor as they are an existing vertical element in views, particularly when moving northwards along the route. The Proposed Development would add a further eight wind turbines to the east of the path and the Proposed solar arrays, although on a landform which mostly faces away from the receptor, would also be visible. This would extend the influence of the existing turbine development and for the length of the route between the quarry and the forest.
- 5.10.36 Moving from north to south, the views open up suddenly as the receptor exits the dense forest plantation, and views of the Proposed wind turbines and Proposed solar array and BESS would be immediate and dominant. The existing Llwynceilyn turbines are visible for the last stretch of this route within the forest, and are an existing detractor. As the receptor moves further south, past the existing turbines, the focus of the views extends southwards, where the views are more distant and across to Mynydd y Glyn and other upland areas beyond.
- 5.10.37 Travelling northwards on the route, the steep valley side between Porth and the quarry (approx. 303653,192315) mitigates views of the Proposed Development as they would be high above the receptor and the views are of the hillside and are short in nature. Once on the upland plateau beyond the quarry, the Proposed Development would be a dominant feature until the forest in the north.
- 5.10.38 In both directions of movement, there would be a High magnitude of impact on receptors on this recreational route.
- 5.10.39 There is another bridleway, southwest of the Site which traverses up the steep valley slope from Hafod Uchaf to the quarry on the top of the hill. Due to the steep nature of this route, even when travelling north, views to the Site would be High above the receptor and they would be largely unaffected. The magnitude of impact would be Low.
- 5.10.40 There is a public footpath which traverses from the quarry (approx. 303653,192315) to the local road north of the Site. It passes the trig point of the landform containing the existing Llwynceilyn Farm turbines. Similar to the Bridleway which passes over the top of this landform, the views would become dominated by the turbines in the north and east directions. The primary views of this route are generally further to the west and south

where there are longer distance views. The magnitude of impact would be High.

- 5.10.41 On these routes, there would be a High magnitude of impact which results in a Major significance of effects which is **significant**.

Assessment of Effects – Visual Summary

- 5.10.42 The visual assessment examined various locations around the vicinity of the Proposed Development. These locations were chosen at different distances and representing different visual receptors. The visual receptors were residential, recreational and road users. Each of these receptors were judged for their susceptibility against the value of the view. The sensitivities varied between Low and High. Next the magnitude of impact was assessed, and these are judged to be between Negligible and High. The resulting significance of effects has been judged to range between Negligible to Major with 8 judgements of **significant**.
- 5.10.43 The scale and size of the Proposed Development is a suitable fit within the landscape and in proportion to the large scale of the residing landform.
- 5.10.44 Inevitably the significance of effect would be Major and **significant** nearer to the Proposed Development, such as VP10, VP12, VP13m with sensitivities of Medium. There would also be Major significance of effects at from the south (VP6 with High sensitivity, VP16 with Medium sensitivity and VP29 with Medium sensitivity) and from the east (VP8 with Medium sensitivity, VP9 with Medium sensitivity).
- 5.10.45 The ZTV has shown that the visibility of the Proposed Development has constraints within the residing valley due to the large landforms and elsewhere beyond elevated locations.
- 5.10.46 A summary of significant effects on the representative viewpoints is provided in Table 5.38.

Table 5.38: Summary of Viewpoints which have significant level of effect

VP	Location	Receptor Type	Sensitivity	Magnitude of Impact	Significance of Effect	Level of Effect
VP6	Rhiwgarn Road, Trebanog	Residential	High	Medium	Major	Significant
		Recreational	High		Major	
VP8	Pontypridd Golf Club, Pontypridd	Recreational	Medium	Medium	Moderate	Significant
VP9	Brynderwen Road, Cilfynydd	Residential	Medium	Medium	Moderate	Significant
VP10	Publicly accessible route to Blaenhenwysg	Recreational	Medium	High	Major	Significant
VP12	Junction of local road and PRoW, southwest of Twyn y glog	Recreational	Medium	High	Major	Significant
		Road Users	Low		Moderate	
VP13	PRoW north of Twyn y glog	Recreational	Medium	High	Major	Significant
VP16	Mount Pleasant, Trehafod	Residential	Medium	Medium	Moderate	Significant
VP29	Darren Dyllas, Mynydd y Glyn	Recreational	Medium	High	Major	Significant

Group Receptors Assessment Summary

Settlement receptors

- 5.10.47 The effect of the Proposed Development on Settlements within 5 km has been assessed. The significance of effects assessed for the Settlements range between Negligible to Moderate. Notably, views from the settlements of Trebanog, Glynfach and Penrhys may experience significance of effects of Moderate that may be **significant**.

Recreational Users

Locally promoted trails

- 5.10.48 An assessment of the locally promoted trail where recreational users may have views of the Proposed Development. The significance of effects was judged to range from negligible to Minor.

Open Access land

- 5.10.49 An assessment of recreational receptors views within Open Access land was carried out. The significance of effects on these viewers as a result of the introduction of the Proposed Development was judged to range from No Change to Minor.

Cycle routes

- 5.10.50 The effect of the Proposed Development on recreational receptors views from National Cycle Routes has been assessed. The significance of effects assessed for the NCN routes range between No Change to Negligible.

Long Distance routes

- 5.10.51 An assessment of recreational receptors views from Long Distance Route within the study area of 15 km of the Proposed Development was carried out. The range of effects on these areas as a result of the introduction of the Proposed Development was judged to range from Minor to Moderate and not significant.

Public Rights of Way

- 5.10.52 An assessment of recreational receptors views using Public Rights of Way within 3.9 km of the Proposed Development was carried out. There would be a Major adverse effect which is **significant** on recreational users for a section of the Bridleway and footpath over Cefn Gwyngul and a short section of the 'Other Route with Public Access' to Blaenhenwysg.

Roads

- 5.10.53 The effect of the Proposed Development on dynamic views from roads within 15 km has been assessed. The significance of effects assessed for these routes' ranges between Negligible and Minor and not significant.

Sequential Views

- 5.10.54 An assessment of sequential views from important routes near to the Proposed Development has been completed. PRoWs which pass to the

west of the Proposed Development would have a Major adverse significance of effects which is **significant**.

5.11 Assessment of Effects – Cumulative

5.11.1 The assessment of cumulative effects for Landscape and Visual has followed the methodology set out in Volume 3, Appendix 5.1. The assessment of cumulative effects is essentially the same as for the assessment of the primary landscape and visual effects, in that the level of landscape and visual effect is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change. The cumulative assessment, however, considers the magnitude of change posed by multiple developments.

5.11.2 A cumulative landscape or visual effect simply means that more than one type of development is present or visible within the landscape. Other forms of existing development and land-use such as woodland and forestry, patterns of agriculture, built form, and settlements already have a cumulative effect on the existing landscape that is already accepted or taken for granted. These features often contribute strongly to the existing character, forming a positive or adverse component of the local landscape. Landscapes, however, will have a finite ability to accommodate cumulative developments, beyond which further new development would result in landscape character change and could result in the creation of a ‘wind farm landscape’ where wind farms have become the dominant characteristic.

5.11.3 Detailed guidance on the cumulative assessment of wind farm development is provided in the SNH document ‘Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments’ (2012). This assessment distinguishes between ‘additional’ cumulative effects that would result from adding the Proposed Development to other cumulative wind farm development and ‘combined’ cumulative effects that assess the total cumulative effect of the Proposed Development and other cumulative wind farm development. In the latter case a significant cumulative effect may result from the Proposed Development or one of more other existing, under-construction or consented wind farms, or other wind farm applications. In those cases, the main contributing wind farm(s) is identified in the assessment.

Types of cumulative effect are defined as follows:

5.11.4 *Cumulative Landscape Effects:* Where more than one wind development may have an effect on a landscape designation or particular area of landscape character as defined by LANDMAP Aspect Areas;

5.11.5 *Cumulative Visual Effects:* the cumulative or incremental visibility of similar types of development that may combine to have a cumulative visual effect. These can be further defined as follows;

5.11.6 *Simultaneous or combined:* where two or more developments may be viewed from a single fixed viewpoint simultaneously, within the viewer’s field of view and without requiring them to turn their head;

5.11.7 *Successive or repetitive*: where two or more developments may be viewed from a single viewpoint successively as the viewer turns their head or swivels through 360°; and

5.11.8 *Sequential*: where a number of developments may be viewed sequentially or repeatedly at increased frequency, from a range of locations when travelling along road, Sustrans national or regional cycle route or promoted long distance route within the LVIA Study Area.

Assessment Scenarios

5.11.9 The majority of the cumulative baseline is made up of wind farms that are already in operation. Existing windfarms appear in many of the views within the study area to a lesser or greater degree. The judgements on magnitude of impact in the preceding visual assessment have been made in light of the frequent occurrence of operational wind farms considered as part of the baseline.

5.11.10 **Scenario 1** is the cumulative assessment of the Proposed Development, operational schemes and consented schemes (which also include those in construction).

5.11.11 **Scenario 2** is the cumulative assessment of the Proposed Development, operational schemes, consented schemes and in planning schemes.

5.11.12 The cumulative landscape and visual assessment for both these scenarios can be found in Appendices 5.3.

Cumulative Landscape Effects

5.11.13 This section considers the cumulative landscape effects for scenarios 1 and 2. The 45 landscape units have been assessed previously in this chapter for the effect of the Proposed Development on the existing baseline condition i.e. with only existing renewable energy development. Of those 45 landscapes assessed, 6 areas are predicted to experience significant effects in parts where the tip height ZTV for the Proposed Development falls and there is potential for intervisibility between the landscape receptor and the Proposed Development.

5.11.14 The landscapes that have been assessed have been selected based on guidance provided in GN46. Detail of this filtering process can be found in Volume 3, Appendix 5.2. The focus for cumulative landscape assessment has been where the Proposed Development is predicted to result in a moderate or greater level of significance of effect.

5.11.15 See Volume 3, Appendix 5.2 for a detailed assessment of cumulative effects on each of the landscape units.

5.11.16 Definitions of types of cumulative effects:

- **Type 1**: a significant effect from the Proposed Development is predicted in addition or combination with another significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is a greater level of effect than assessed for either development individually;

- **Type 2:** a significant effect from the Proposed Development is predicted in addition or combination with another non-significant effect attributed to other development(s). The effect is still termed significant and cumulative, but is attributed to the Proposed Development Wind Farm and is a greater level of effect than for either development assessed individually;
- **Type 3:** a significant effect from the Proposed Development is predicted in addition or combination with another significant effect attributed to other wind energy development(s). The effect is still termed significant and cumulative, but is attributed to the other wind energy development(s) and is a greater level of effect than for either development individually; and
- **Type 4:** a non significant effect from the Proposed Development is assessed in addition or combination with another non-significant effect attributed to other development(s). The overall cumulative and is a greater level of effect than for either development individually; the combined effect, however, may be assessed as either significant or not significant.

5.11.17 The summary tables of the cumulative landscape assessment can be found below, Tables 5.38 - 5.42.

Scenario 1:

5.11.18 The consented wind energy developments of Mynydd y Glyn and Twyn Hywel are considered to be the greatest contributing schemes within Scenario 1 which would alter the cumulative baseline from the existing baseline scenario (i.e. existing operational renewable energy developments).

5.11.19 The Mynydd y Glyn wind farm consists of 7 wind turbines (up to 155m in height) and is located to the south and wholly within 4 km of the Proposed Development – it is the closest consented wind energy development to the Site. The Twyn Hywel development consists of 14 wind turbines (up to 200m in height) and is located to the east of the Proposed Development at a distance spread between approximately 5 km to 8.5 km.

5.11.20 Of those landscape units which are assessed to experience a significant level of effect, the cumulative effect predicted in Scenario 1 would be as follows:

Table 5.39: Cumulative Assessment – Landscape - Scenario 1 Rationale

Landscape Unit (VSAA)	Significance of Effect	Scenario 1	Rationale
CYNONVS142 - Ynysybwl	Minor to Major	Significant (Type 2)	The consented Mynydd y Glyn and Twyn Hywel schemes would introduce new renewable energy features into the cumulative baseline. These would be clearly visible from the uplands of this landscape unit. Although these other schemes would be imposing features within wider views, the addition of the Proposed Development would add a greater level of cumulative effect than that of the cumulative baseline in this scenario.
CYNONVS142 – Mynydd y Glyn	Minor to Major	Significant (Type 3)	The Mynydd y Glyn scheme would be more dominant feature within the landscape unit than the Proposed Development.
CYNONVS317 – Mynydd Eglwyslon & Mynydd Meio	Minor to Moderate	Significant (Type 3)	The Proposed Development would add another wind energy development at a similar separation distance to the Mynydd y Glyn scheme. The Twyn Hywel development would have a greater level of effect on the cumulative baseline in scenario 1.
CYNONVS143 – Llanfabon	Minor to Moderate	Significant (Type 3)	The Proposed Development would add another wind energy development at a similar separation distance to the Mynydd y Glyn scheme. The Twyn Hywel development would have a greater level of effect on the cumulative baseline in scenario 1.
CYNONVS738 – Cefn y Rhondda	Minor to Major	Significant (Type 1)	The effect of the Proposed Development would have a similar cumulative effect as the Mynydd y Glyn scheme.

Landscape Unit (VSAA)	Significance of Effect	Scenario 1	Rationale
CYNONVS903 – West of Mountain Ash	Moderate	Significant (Type 2)	The Proposed Development would have a greater level of cumulative effect than that of the Twyn Hywel scheme. This is due to the Proposed Developments proximity to the area.

- 5.11.21 A summary of the cumulative landscape effects can be found in Tables 5.40 - 5.44.

Scenario 2:

- 5.11.22 The In-Planning wind energy development at Mynydd y Gaer would be the largest contributing scheme to the Scenario 2 baseline. It is located approximately 10 km southwest of the Proposed Development and consists of 13 wind turbines (up to a height of 180m).
- 5.11.23 Of those landscape units which are assessed to experience a significant level of effect, the cumulative effect predicted in Scenario 2 would be as follows:

Table 5.40: Cumulative Assessment – Landscape - Scenario 2 Rationale

Landscape Unit (VSAA)	Significance of Effect	Scenario 2	Rationale
CYNONVS142 - Ynysybwl	Minor to Major	Significant (Type 2)	The in-planning Mynydd y Gaer wind farm would add a distant wind energy development to the existing cumulative baseline. The Proposed Development would add a greater level of cumulative effect than that of the cumulative baseline in this scenario.
CYNONVS142 – Mynydd y Glyn	Minor to Major	Significant (Type 3)	The in-planning Mynydd y Gaer wind farm would add a distant wind energy development to the existing cumulative baseline. Other wind energy developments would have a greater effect on the landscape unit than the Proposed Development.
CYNONVS317 – Mynydd Eglwyslon & Mynydd Meio	Minor to Moderate	Significant (Type 3)	There would be little change from the scenario 1 cumulative baseline due to the addition of in-planning schemes.
CYNONVS143 – Llanfabon	Minor to Moderate	Significant (Type 3)	There would be little change from the scenario 1 cumulative baseline due to the addition of in-planning schemes.
CYNONVS738 – Cefn y Rhondda	Minor to Major	Significant (Type 1)	The in-planning Mynydd y Gaer wind farm would add a distant wind energy development to the existing cumulative baseline. The Proposed Development would add a similar level of cumulative effect than that of the cumulative baseline in this scenario.
CYNONVS903 – West of Mountain Ash	Moderate	Significant (Type 2)	There would be little change from the scenario 1 cumulative baseline due to the addition of in-planning schemes.

- 5.11.24 The cumulative landscape assessment was considered using the same landscape units (based on the VSAA boundaries) as the landscape assessment (Volume 3, Appendix 5.2). The assessment was separated into directly (Table 5.39) and indirectly affected landscape units, and further to this, separated into those landscape units filtered-in during the VSAA filtering process (Table 5.40) and those landscape units filtered-out of the VSAA filtering process, but that overlap with 'filtered-in' Historic Landscape Aspect Areas evaluated as Outstanding overall (Table 5.41)
- 5.11.25 Tables 5.41 to 43 below summarise the findings of the cumulative landscape assessment. For further details, see the full assessment in Volume 3, Appendix 5.2.

Directly affected Landscape Units

Table 5.41: Cumulative Assessment – Directly affected Landscape Units Summary

Landscape Unit (VSAA)	Significance of Effect	Scenario 1 (The Proposed Development + Operational + Consented)	Scenario 2 (The Proposed Development + Operational + Consented + In Planning + Scoping)	Level of Effect
CYNONVS142 - Ynysybwl	Minor to Major	Type 2	Type 2	Significant

Indirectly affected Landscape Units

- 5.11.26 The cumulative assessment of those landscape units based on filtered-in VSAA's up to 30 km from the Proposed Development are summarised in Table 5.42.

Table 5.42: Cumulative Assessment – Indirectly affected Landscape Units Summary

Landscape Unit (VSAA)	Significance of Effect	Scenario 1 (The Proposed Development + Operational + Consented)	Scenario 2 (The Proposed Development + Operational + Consented + In Planning + Scoping)	Level of Effect
CRDFFVS002 – Tyn-y-Coed	Negligible	Type 4	Type 4	Not Significant
CRDFFVS003 – Garth-west	Minor	Type 4	Type 4	Not Significant
CRDFFVS004 – Garth Hill	Minor	Type 4	Type 4	Not Significant
CRDFFVS013 – St Fagans farmland	No change	n/a	n/a	Not Significant
CRDFFVS015 - River Ely valley sides	Negligible	Type 4	Type 4	Not Significant
CRDFFVS017– Tongwynlais Scarp slopes	No Change to Negligible	Type 4	Type 4	Not Significant
CYNONVS113 – Cwm dar	Negligible to Minor	Type 4	Type 4	Not Significant
CYNONVS129 – Mynydd Y Grug	Minor	Type 4	Type 4	Not Significant
CYNONVS142 – Mynydd y Glyn	Minor to Major	Type 3	Type 3	Significant

Landscape Unit (VSAA)	Significance of Effect	Scenario 1 (The Proposed Development + Operational + Consented)	Scenario 2 (The Proposed Development + Operational + Consented + In Planning + Scoping)	Level of Effect
CYNONVS317 – Mynydd Eglwyslon & Mynydd Meio	Minor to Moderate	Type 3	Type 3	Significant
CYNONVS361 – Rhoslas	Negligible	Type 4	Type 4	Not Significant
CYNONVS404 – Gelligaer Common	Minor	Type 4	Type 4	Not Significant
CYNONVS430 – Hirwaun Common	Negligible to Minor	Type 4	Type 4	Not Significant
CYNONVS436 – Mynydd Gaer	Negligible to Minor	Type 4	Type 4	Not Significant
CYNONVS496 – Mynydd Maes-teg	Minor	Type 4	Type 4	Not Significant
CYNONVS605 – Cefn Y Brithdir	Minor	Type 4	Type 4	Not Significant
CYNONVS622 – Mynydd Llangeinwyr	Negligible	Type 4	Type 4	Not Significant
CYNONVS735 – Cadair Fawr	Minor	Type 4	Type 4	Not Significant
CYNONVS854 – Mynydd Y Lan	Negligible	Type 4	Type 4	Not Significant

Landscape Unit (VSAA)	Significance of Effect	Scenario 1 (The Proposed Development + Operational + Consented)	Scenario 2 (The Proposed Development + Operational + Consented + In Planning + Scoping)	Level of Effect
MRTHRVS119 – Gelligaer Farmlands	Negligible to Minor	Type 4	Type 4	Not Significant
MRTHRVS767 – Taff/Bargoed Confluence	Negligible	Type 4	Type 4	Not Significant
MRTHRVS858 – Gelligaer Common	Minor	Type 4	Type 4	Not Significant
VLFGVLV002 – Hensol Park	Negligible	Type 4	Type 4	Not Significant
VLFGVLV406 – Ely Valley Flood plain	No Change	n/a	n/a	Not Significant
VLFGVLV683 – Ely Valley	Negligible	Type 4	Type 4	Not Significant
VLFGVLV913 – Hensol Forest	No Change	n/a	n/a	Not Significant
VLFGVLV962 – Ystradowen/Hensol Area	Negligible	Type 4	Type 4	Not Significant

Indirectly affected Landscape Units

5.11.27 The cumulative assessment of those landscape units based on filtered-out VSAA's that overlap with 'filtered-in' HLAA's evaluated as 'Outstanding' up to 30 km from the Proposed Development are summarised in Table 5.43:

Table 5.43: Cumulative Assessment – Indirectly affected Landscape Units that overlap with ‘filtered-in’ HLAA’s Summary

Landscape Unit (VSAA)	Significance of Effect	Scenario 1 (The Proposed Development + Operational + Consented)	Scenario 2 (The Proposed Development + Operational + Consented + In Planning + Scoping)	Level of Effect
BLNGWVS226 - St. Illtyd	Negligible	Type 4	Type 4	Not Significant
BLNGWVS688 - Hafod-y-dafel/Arail	Negligible	Type 4	Type 4	Not Significant
CYNONVS143 – Llanfabon	Minor to Moderate	Type 3	Type 3	Significant
CYNONVS260 – Valley slopes Machen	Minor	Type 4	Type 4	Not Significant
CYNONVS271 – Rhymney Valley South of Caerphilly	Minor	Type 4	Type 4	Not Significant
CYNONVS337 – Treherbert	Minor	Type 4	Type 4	Not Significant
CYNONVS357 – Mynydd Ton, Bwlfa	Minor	Type 4	Type 4	Not Significant
CYNONVS580 – St Gwynno	Minor	Type 4	Type 4	Not Significant
CYNONVS709 – Pontypridd	Negligible to Minor	Type 4	Type 4	Not Significant

Landscape Unit (VSAA)	Significance of Effect	Scenario 1 (The Proposed Development + Operational + Consented)	Scenario 2 (The Proposed Development + Operational + Consented + In Planning + Scoping)	Level of Effect
CYNONVS738 – Cefn y Rhondda	Minor to Major	Type 1	Type 1	Significant
CYNONVS903 – West of Mountain Ash	Moderate	Type 2	Type 2	Significant
MRTHRVS452 – Merthyr Common	Minor	Type 4	Type 4	Not Significant
MRTHRVS908 – Cwm Cothi Farmlands	Minor	Type 4	Type 4	Not Significant
TRFNVS024 – No name	No Change	n/a	n/a	Not Significant
VLFGVLV271 – St Nicholas and Bonvilston Ridge Crest	No Change	n/a	n/a	Not Significant
VLFGVLV596 – Cwrt yr Ala Valley	No Change	n/a	n/a	Not Significant
VLFGVLV614 – St Nicholas and Bolvilston Ridge slopes	Negligible	Type 4	Type 4	Not Significant

Cumulative Visual Effects

Viewpoint receptors

- 5.11.28 The cumulative assessment for the 31 Representative Viewpoints can be found at Volume 3, Appendix 5.3 where the combination views and succession views are examined.
- 5.11.29 Windfarms are an established and widespread land use in the study area. The effects of Proposed Development in the baseline context of operational windfarms within 90-degree views, where the Proposed Development is central to the view, has already been assessed. For 8 Representative Viewpoints there would be a significant effect. These viewpoints are within 4 km of the Proposed Development.
- 5.11.30 The dramatic landform of this landscape character with steep sided, narrow valleys and extensive undulating plateaux creates two distinct groups of viewpoint types. The first of these are visual receptors looking along or up from the valleys to the valley sides and ridgetops. The second are visual receptors looking from the extensive panoramic views from the ridgetops. The majority of visual receptors are concentrated in the valley bottoms where the landform channels views and prevents wide panoramic views where cumulative effects of developments on other ridges than those containing the valley can be seen. From the ridgetops the cumulative effects of other turbine sites and infrastructure is more apparent but to far fewer receptors and at greater distances in a very large scale landscape.

Scenario 1:

- 5.11.31 The consented wind energy developments of Mynydd y Glyn and Twyn Hywel are considered to be the greatest contributing schemes within Scenario 1 which would alter the cumulative visual baseline from the existing baseline scenario (i.e. existing operational renewable energy developments).
- 5.11.32 The Mynydd y Glyn wind farm consists of 7 wind turbines (up to 155m in height) and is located to the south and wholly within 4 km of the Proposed Development – it is the closest consented wind energy development to the Site. The Twyn Hywel development consists of 14 wind turbines (up to 200m in height) and is located to the east of the Proposed Development at a distance.
- 5.11.33 Of those representative viewpoints which have been assessed to have a significant level of effect, the cumulative visual effect predicted in Scenario 1 are shown in Table 5.44.

Table 5.44: Cumulative Assessment – Visual – Scenario 1 Rationale

Representative Viewpoint	Significance of Effect	Scenario 1	Rationale
VP6 - Rhiwgarn Road, Trebanog	Major	Significant (Type 1)	The sensitivity of the receptor is High and the cumulative magnitude of impact would be Medium. Mynydd y Glyn would have a prominent presence on the hillside to the east of this viewpoint. Therefore, the Proposed Development would have a similar cumulative effect as another scheme. A Type 1 significant effect is predicted.
VP8 - Pontypridd Golf Club, Pontypridd	Moderate	Significant (Type 1)	The sensitivity of the receptor is Medium and the cumulative magnitude of impact would be Medium. The Proposed Development would have a similar level of cumulative effect as the Mynydd y Glyn development. A Type 1 significant effect is predicted.
VP9 - Brynderwen Road, Cilfynydd	Moderate	Significant (Type 2)	The sensitivity of the receptor is Medium and the cumulative magnitude of impact would be Medium. The Proposed Development would be the most prominent wind energy development and is therefore anticipated to have a Type 2 significant effect .
VP10 - Publicly accessible route to Blaenhenwysg	Moderate or Major	Significant (Type 2)	The sensitivity of the receptor is Medium, and the cumulative magnitude of impact would be High. The Proposed Development would be the most prominent wind energy development and is therefore anticipated to have a Type 2 significant effect .
VP12 - Junction of local road and PRow, southwest of Twyn y glog	Major	Significant (Type 2)	The sensitivity of the receptor is Medium and the cumulative magnitude of impact would be High. The Proposed Development would be the most prominent wind energy development and is therefore anticipated to have a Type 2 significant effect .

Representative Viewpoint	Significance of Effect	Scenario 1	Rationale
VP13 - PRoW north of Twyn y glog	Major	Significant (Type 2)	The sensitivity of the receptor is Medium and the cumulative magnitude of impact would be High. The Proposed Development would be the most prominent wind energy development and is therefore anticipated to have a Type 2 significant effect .
VP16 - Mount Pleasant, Trehafod	Moderate	Significant (Type 2)	The sensitivity of the receptor is Medium and the cumulative magnitude of impact would be Low. The Proposed Development would be the most prominent wind energy development and is therefore anticipated to have a Type 2 significant effect .
VP29 - Darren Dyllas, Mynydd y Glyn	Major	Significant (Type 3)	The sensitivity of the receptor is Medium and the cumulative magnitude of impact would be Medium. The viewpoint location is sited close to the location of the consented Mynydd y Glyn scheme which would have a larger cumulative effect than the Proposed Development due to its proximity. Therefore, a Type 3 significant effect is predicted where another scheme would have a greater cumulative effect than the Proposed Development.

Scenario 2

- 5.11.34 The In-Planning wind energy development at Mynydd y Gaer would be the largest contributing scheme to the Scenario 2 visual baseline. It is located approximately 10 km southwest of the Proposed Development and consists of 13 wind turbines (up to a height of 180m).
- 5.11.35 Of those representative viewpoints which have been assessed to have a significant level of effect, the cumulative visual effect predicted in Scenario 2 are shown in Table 5.45.

Table 5.45: Cumulative Assessment – Visual – Scenario 2 Rationale

Representative Viewpoint	Significance of Effect	Scenario 2	Rationale
VP6 - Rhiwgarn Road, Trebanog	Major	Significant (Type 1)	The proposed Mynydd y Gaer would not be visible from this viewpoint, so there would be no additional cumulative effect on views. A type 1 significant effect is predicted.
VP8 - Pontypridd Golf Club, Pontypridd	Moderate	Significant (Type 1)	No additional in-planning schemes would be visible, therefore there is no change to the scenario 1 cumulative baseline. A type 1 significant effect is predicted.
VP9 - Brynderwen Road, Cilfynydd	Moderate	Significant (Type 2)	No additional in-planning schemes would be visible, therefore there is no change to the scenario 1 cumulative baseline. A type 2 significant effect is predicted.
VP10 - Publicly accessible route to Blaenhenwysg	Moderate or Major	Significant (Type 2)	The Proposed Development would be the most prominent renewable energy development within views from this location and therefore the assessment of a type 2 significant effect remains for scenario 2.
VP12 - Junction of local road and Major PRoW, southwest of Twyn y glog	Major	Significant (Type 2)	No additional in-planning schemes would be visible, therefore there is no change to the scenario 1 cumulative baseline. A type 2 significant effect is predicted.
VP13 - PRoW north of Twyn y glog	Major	Significant (Type 2)	No additional in-planning schemes would be visible, therefore there is no change to the scenario 1 cumulative baseline. A type 2 significant effect is predicted.
VP16 - Mount Pleasant, Trehafod	Moderate	Significant (Type 2)	No additional in-planning schemes would be visible, therefore there is no change to the scenario 1 cumulative baseline. A type 2 significant effect is predicted.

Representative Viewpoint	Significance of Effect	Scenario 2	Rationale
VP29 - Darren Dyllas, Mynydd y Glyn	Major	Significant (Type 3)	The Mynydd y Gaer wind farm would add to the cumulative baseline to the southwest, behind the view in this viewpoint. There would be no change to the judgement for scenario 1. A type 3 significant effect is anticipated.

Group Receptors

- 5.11.36 Sequential cumulative visual effects on public rights of way and roads or 'linear dynamic receptors' where visual receptors are likely to experience significant effects from the Proposed Development are assessed in this section. This is in order to predict how much of an influence the Proposed Development when compared to the cumulative scheme, will have on the visual effects on these receptors. The relevant viewpoints from the cumulative Representative Viewpoint assessment found in Volume 3, Appendix 5.3 is used to inform the judgements.

Cumulative Visual Effects

- 5.11.37 The cumulative visual effects have been assessed in detail and the assessment is contained in Volume 3, Appendix 5.3. As summary of these findings is included in Table 5.46.

Table 5.46: Cumulative Visual Effects Summary Table

VP	Location	Receptor	Significance of Effect	Scenario 1	Scenario 2
1	Maxwell Street, Ferndale	Residential / Road Users - Settlement	Negligible	Not significant (Type 4)	Not significant (Type 4)
2	Heol Mair, Penrhys	Residential - Settlement	Moderate	Not significant (Type 4)	Not significant (Type 4)
3	Junction of New Bryn Terrace, Wattstown	Residential - Settlement	Minor	Not significant (Type 4)	Not significant (Type 4)
4	Gilfach Road, Penygraig	Residential - Settlement	Moderate	Not significant (Type 4)	Not significant (Type 4)
5	Pleasant Heights, Porth	Residential / Recreational Users - Settlement	Minor	Not significant (Type 4)	Not significant (Type 4)
6	Rhiwgarn Road, Trebanog	Residential / Recreational Users - Settlement	Major	Significant (Type 1)	Significant (Type 1)
7	Eglwysilan Road, Pontypridd	Recreational / Road Users- Settlement	Moderate	Not Significant (Type 4)	Not Significant (Type 4)

VP	Location	Receptor	Significance of Effect	Scenario 1	Scenario 2
8	Pontypridd Golf Club, Pontypridd	Recreational Users	Moderate	Significant (Type 1)	Significant (Type 1)
9	Brynderwen Road, Cilfynydd	Residential - Settlement	Moderate	Significant (Type 2)	Significant (Type 2)
10	Publicly accessible route to Blaenhenwysg	Recreational Users / Road Users	Moderate to Major	Significant (Type 2)	Significant (Type 2)
11	Daren-Ddu Road, West of Cefn, Glyncoch	Residential / Road Users - Settlement	Moderate	Not significant (Type 4)	Not significant (Type 4)
12	Junction of local road and PRow, southwest of Twyn y glog	Recreational Users / Road Users	Major	Significant (Type 2)	Significant (Type 2)
13	PRow north of Twyn y glog	Recreational / Road Users - Settlement	Major	Significant (Type 2)	Significant (Type 2)
14	NCN 47, Ynysybwl	Recreational Users - Settlement	Moderate	Not significant (Type 4)	Not significant (Type 4)
15	Roundabout on Llwyncelyn Road	Road Users - Settlement	Minor	Not significant (Type 4)	Not significant (Type 4)

VP	Location	Receptor	Significance of Effect	Scenario 1	Scenario 2
16	Mount Pleasant, Trehafod	Residential - Settlement	Moderate	Significant (Type 2)	Significant (Type 2)
17	Bethany English Baptist Church, Ford Road, Pontypridd	Residential - Settlement	Moderate	Not significant (Type 4)	Not significant (Type 4)
18	Cefn Sychbant, BBNP	Recreational Users	Minor	Not significant (Type 4)	Not significant (Type 4)
19	PRoW, Llanwonno	Recreational Users	Moderate	Not significant (Type 4)	Not significant (Type 4)
20	Informal Car Park, Cefn Gelligaer	Recreational Users	Minor	Not significant (Type 4)	Not significant (Type 4)
21	Heol Islwyn, Nelson	Residential – Settlement	Minor	Not significant (Type 4)	Not significant (Type 4)
22	Rhymney Valley Ridgeway Walk	Recreational User	Moderate	Not Significant (Type 4)	Not Significant (Type 4)
23	Trigpoint Caerphilly Common	Recreational Users	Minor	Not significant (Type 4)	Not significant (Type 4)

VP	Location	Receptor	Significance of Effect	Scenario 1	Scenario 2
24	The Rhondda Heritage Trail - Station 4 - Rhondda's Fair Play	Recreational Users	Minor	Not significant (Type 4)	Not significant (Type 4)
25	Marian Street, Clydach Vale	Residential - Settlement	Minor	Not significant (Type 4)	Not significant (Type 4)
26	Recreational Route, Llwnypia	Recreational Users	Negligible	Not significant (Type 4)	Not significant (Type 4)
27	Coedpenmaen Common, Pontypridd	Recreational Users	Minor	Not significant (Type 4)	Not significant (Type 4)
28	Recreational Route, Cwar-y-Wningen	Recreational Users	Minor	Not significant (Type 4)	Not significant (Type 4)
29	Darren Dyllas, Mynydd y Glyn	Recreational Users	Major	Significant (Type 3)	Significant (Type 3)
30	Llantrisant Road, Pontypridd	Residential - Settlement	Minor	Not significant (Type 4)	Not significant (Type 4)
31	Recreational Route on Mynydd Troed-y-rhiw (BOAT)	Recreational Users	Minor	Not significant (Type 4)	Not significant (Type 4)

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 6: Transport

March 2025

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Figures (See Volume 2: Figures)

Figure number	Figure title
6.1	Study Area

Appendices (See Volume 3: Appendices)

Annex number	Annex title
6.1	Transport Statement
6.2	Traffic Management Plan

Glossary

Term	Meaning
The Applicant	Cenin Renewables Ltd.
The Project	Proposed wind farm and associated ancillary development known as 'Llanwonno' or 'Llanwonno Energy Project'.
Abnormal Indivisible Loads	Loads or vehicles that exceed maximum vehicle weight, axle weight or dimensions as set out in the Road Vehicles (Construction and Use) Regulations 1986 as amended.
Severance	Severance refers to the perceived division within a community caused by transport infrastructure, such as heavily trafficked roads or physical barriers. This division separates people from places or each other.
Non-motorised user amenity	Non-motorised user amenity refers to the relative pleasantness of a journey for pedestrians, cyclists, and other non-motorised users. It is influenced by factors such as traffic flow, traffic composition, and the width or separation of pavements from traffic.
Fear and Intimidation	Fear and intimidation refer to the feelings of unease and threat experienced by pedestrians due to traffic conditions. These feelings are influenced by factors such as the volume of traffic, the proportion of heavy goods vehicles (HGVs), the proximity of traffic to pedestrians, and the lack of protective measures like wide pavements.

Abbreviations/ Acronyms [examples below]

Abbreviation	Meaning
AADT	Annual Average Daily Traffic
AIL	Abnormal Indivisible Load
ATC	Automatic Traffic Count
AV	All Vehicle
DfT	Department for Transport
DMRB	Design Manual for Roads and Bridges
HGV	Heavy Goods Vehicle
HV	Heavy Vehicle (used by some guidance in place of HGV)
PRoW	Public Right of Way
TMP	Traffic Management Plan
TS	Transport Statement

Abbreviation	Meaning
TEMPro	Trip End Model Presentation Program

Units

Unit	Description
mph	Miles per Hour
m ³	Metres cubed
t	tonnes

6 Transport

6.1 Introduction

6.1.1 This section of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, Sep 2024) and subsequent EIA Scoping Direction (PEDW, Feb 2025). In addition, this section of the ES has been informed by the following documents submitted with the application for the DNS:

ES Appendices

- Appendix 6.1: Transport Statement (TS)
- Appendix 6.2: Traffic Management Plan (TMP)

6.1.2 This section presents an assessment of the likely significant effects on traffic associated with the construction, operation and decommissioning of Llanwonno Energy Project. Consideration is given within the section to changes to traffic flows on the local highway network, and the associated implications for highway users in the vicinity of the site.

6.1.3 The assessments and section have been prepared by arcitrans.

6.1.4 The objectives of the section are to:

- Provide a summary of the relevant legislation, planning policy and guidance.
- Detail the assessment methodology and significance criteria used in completing the assessment.
- Describe the baseline conditions.
- Describe the potential effects of development.
- Identify mitigation measures, where appropriate, to avoid, reduce or offset any adverse effects; and,
- Assess the residual effects of the development following the implementation of mitigation.

6.2 Legislation and Policy

6.2.1 The legislation and planning policy relevant to the assessment of Transport for the Proposed Development are summarised in Table 6.1 below.

Table 6.1: Summary of legislation and policy relevant to this chapter of the ES

Summary of provision	How and where considered in the ES
Future Wales: The National Plan 2040 (2021)	
Policy 18: Renewable and Low Carbon Energy Developments of National Significance will be permitted subject to Policy 17 and that there are no unacceptable adverse impacts on the transport network through construction and/or operation.	Assessed throughout this chapter, with the resulting environmental effects, mitigation and monitoring detailed at section 6.10 and summarised in Table 6.25.
Planning Policy Wales Edition 12	
Paragraph 5.9.20: Proposals should avoid, mitigate or compensate the effects of renewable energy development on the transport network.	Assessed throughout this chapter, with the resulting environmental effects, mitigation and monitoring detailed at section 6.10 and summarised in Table 6.25.
TAN 18 Transport	
Paragraph 2.3: Ensure that transport improvements for new developments maintain the functionality of existing transport networks.	Refer to Appendix 6.2 TMP, which details any transport improvements required.
Paragraph 8.11: Wherever possible, promote carriage of freight by rail, water or pipeline rather than road.	Refer to Appendix 6.2 TMP, the chosen delivery route utilises the Port of Swansea, the closest port with significant renewables experience, minimising carriage distance on the road network.
Paragraph 9.2: A Transport Assessment (TA) is required for developments that are likely to result in significant trip generation.	Detailed in Section 6.3, consultation confirmed that a standalone TS is required, which is provided at ES Volume 6, Appendix 6.1: TS.
Paragraph 9.3: Early discussions with authorities required to ensure agreement on the Transport Assessment scope.	Detailed in Section 6.3, consultation confirmed that a standalone TS is required, which is provided at ES Volume 6, Appendix 6.1: TS.
Paragraph 9.8: EIA is required where a development is likely to have significant environmental effects.	EIA results detailed within this ES Chapter. Refer to section 6.10 and Table 6.25.
Paragraph 9.9: TAs should be incorporated into an ES where the transport impacts of an application are significant.	Detailed in Section 6.3, consultation confirmed that a standalone TS is required, which is provided at ES Volume 6, Appendix 6.1: TS.
Paragraph 9.16: The type of site access should be suitable for the type of road and expected traffic volume.	Refer to Appendix 6.2 TMP, which details the specification of vehicles required to route through the site access, and this ES Chapter for the volume of development traffic anticipated (Table 6.20).
Paragraph 9.17: Any works to a trunk road to be constructed to Government standards.	Refer to Appendix 6.2 TMP, no mitigation is required on the trunk road network.
Paragraph 9.19: Any necessary transport improvements can be conditioned through the planning process, or via the S278 process.	Refer to Appendix 6.2 TMP, which details any transport improvements required.

Summary of provision	How and where considered in the ES
Rhondda Cynon Taf County Borough Council (RCTCBC) Rhondda Cynon Taf Revised Local Development Plan 2006-2021	
Policy AW 12 supports the provision of renewable energy from sources such as biomass, hydro-electricity, anaerobic digestion, and wind turbines, provided they do not have an unacceptable impact on the environment, wildlife, and public health.	Assessed throughout this chapter, with the resulting environmental effects, mitigation and monitoring detailed at section 6.10 and summarised in Table 6.25.
Policy AW13: Large Wind Farm Development states that proposals for wind farm developments of 25MW and over will be permitted where they meet criteria such as ensuring no loss of public accessibility to the countryside.	Assessed throughout this chapter, with the resulting environmental effects, mitigation and monitoring detailed at section 6.10 and summarised in Table 6.25.
Rhondda Cynon Taf Supplementary Planning Guidance: Delivering Design and Placemaking: Access, Circulation & Parking Requirements (2021)	
Policy AW5: Developments will ensure safe access, mitigate impacts, and demonstrate acceptable effects on the road network. Where a development could have significant transport implications, a Transport Assessment and Transport Implementation Strategy should be prepared.	Assessed throughout this chapter, with the resulting environmental effects, mitigation and monitoring detailed at section 6.10 and summarised in Table 6.25. Full information provided in ES Volume 6, Appendix 6.1: TS.

6.3 Consultation and Engagement

Scoping

- 6.3.1 In September 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 6.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 14 February 2025. Key issues raised by statutory bodies specific to Transport are listed in Table 6.2, including how and where these have been considered in the ES.
- 6.3.3 In addition, consultation and engagement with interested parties specific to Transport has continued. These included discussions with RCTCBC regarding their scoping response that the TMP should provide evidence of a trial run. It was confirmed that this is not required at the Application Stage. It was agreed that the TMP should demonstrate the adequacy of the access for AILs.

Table 6.2: Summary of key scoping responses relevant to Transport

Comment	How and where considered in the ES
PEDW	
ID.28: Transport Division of WG detail further information required in relation to ‘parts of the highway network to be used as part of the proposed development’.	Refer to Volume 6, Appendix 6.2: TMP.
ID.29: Transport Division of WG detail further information required, set out within the ‘Pulling Together’ document, liaising with WG Transport Directorate.	Refer to Volume 6, Appendix 6.2: TMP.
ID.30: Transport Division of WG advise it would be beneficial to include a TS and TMP, liaising with WG Transport Directorate and Highways Authority.	A TS and TMP is provided in support of this application, refer to ES Volume 6, Appendix 6.1 TS and 6.2 TMP.
RCT	
RCT advises it would be beneficial to include a TS and TMP, with operational traffic, access design, vision splays, contractors’ compound and wheel wash facilities to be scoped in.	A TS and TMP is provided in support of this application, detailing the items listed by RCT. Refer to ES Volume 6, Appendix 6.1 TS and 6.2 TMP.
WG Transport Division	
Provide detailed evidence that transporting Abnormal Indivisible Loads (AILs) is feasible, minimising impacts on trunk road traffic. Include weights, dimensions, swept path analysis for junctions.	Refer to Volume 6, Appendix 6.2: TMP, which details that AILs can access the site, subject to the delivery of suitable mitigation. Weights and dimensions are set out for reference.
A draft abnormal load notifications with route, vehicle weight, and dimensions would be helpful.	Refer to Volume 6, Appendix 6.2: TMP, which details the draft ESDAL responses received to date.
Refer to the draft ‘Pulling Together’ document for best practice for transporting AILs in Wales.	Refer to Volume 6, Appendix 6.2: TMP, which details the suitability of the TMP against the ‘Pulling Together’ best practice guidance.

6.4 Assessment Methodology

Relevant Guidance

- 6.4.1 The assessment of transport has been undertaken in accordance with the methodology set out in Volume 1, Section 4: Approach to environmental assessment of the ES in addition to the following guidance, where appropriate:
- Institute of Environmental Management and Assessment (IEMA) Guidelines: Environmental Assessment of Traffic and Movement (2023).
 - The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 do not prescribe specific environmental factors to be considered for road traffic and transport. As a result, the assessment of transport impacts refers to the IEMA guidance, which identifies that the study area

should include links where traffic flows will increase by 30% (vehicles or HGVs), or by 10% in sensitive areas (vehicles or HGVs).

- The guidelines emphasise that traffic's environmental effects depend on existing conditions, adjacent land uses, and changes in traffic levels. Assessments should focus on periods with the greatest effects or changes, noting that peak environmental impacts may not align with peak traffic hours. Different development phases may require separate assessments.
- Design Manual for Roads and Bridges (DMRB), LA 104 Environmental assessment and monitoring: this document provides terms used to define magnitude and sensitivity, described in further detail in Volume 1, Section 4: Approach to Environmental Assessment.
- Design Manual for Roads and Bridges (DMRB), LA 112 Population and Human Health: this document provides guidance on the assessment of walking, cycling and horse-riding severance within communities.

Scope of the Assessment

6.4.2 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Table 6.2.

6.4.3 Taking into account the scoping and other consultation, Table 6.3 summarises the issues considered as part of this assessment.

Table 6.3: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Construction traffic	Impact of construction traffic on road users in the study area, as well as on the residents and other users of areas along these routes.

6.4.4 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in Table 6.4.

Table 6.4: Issues scoped out of the assessment

Issue	Justification
Operational traffic	On the basis that the vehicle movements generated by the project when it is operational are irregular, infrequent and very low (typically a 4x4 or panel van once per fortnight / once per month), no assessment is necessary during this phase.
Decommissioning traffic	The traffic generated during the decommissioning phase will be lower than that of the construction phase. Consequently, the construction phase represents the worst-case scenario for assessing the impact on the study area.

Study area

- 6.4.5 The Transport study area (hereafter referred to as the study area) comprises the A470, A4058, A4223, B4273, Heol-Y-Mynach, Pleasant View, Rhondda Road, Graigwen Road and Pen-y-Wal Road, as set out in the Scoping Report. These are local roads in the area immediately surrounding the site which may be impacted by construction traffic.
- 6.4.6 It also includes Public Rights of Way (PRoWs) around the site and delivery route which may be impacted by construction traffic.
- 6.4.7 The location and geographic extent of the study area is presented in Volume 2, Figures, Figure 6.1 of the ES.

6.5 Assessment Criteria and Assignment of Significance

- 6.5.1 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts.
- 6.5.2 The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England *et al.*, 2020).
- 6.5.3 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.
- 6.5.4 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Section 4: Approach to Environmental Assessment.

Receptor Value and Sensitivity

- 6.5.5 Sensitivity has been established using the IEMA guidance which highlights key items which should be considered when defining sensitivity, such as people at home, retail areas, the provision of

adequate pedestrian facilities, and collision clusters. These guidelines aim to steer professional judgement, enabling trained assessors to assign a sensitivity level to each highway link in the study area.

6.5.6 For Transport, receptors are highway users within the study area, alongside the people at home, education or work in locations through which the study area passes.

6.5.7 The criteria for defining sensitivity in this chapter of the ES are outlined in Table 6.5 below.

Table 6.5: Sensitivity criteria

Sensitivity/Value	Definition
Very High	Very high importance and rarity, international scale, very limited potential for substitution. This sensitivity is assigned to the most sensitive receptors. It includes minor rural roads, not designed for HGV use. This includes single-track roads with passing places, rural roads which form on-road cycle routes. It also includes locations where road features are listed structures (e.g. bridges), or locations which were not previously trafficked.
High	High importance and rarity, national scale and limited potential for substitution. This sensitivity is assigned to receptors with a higher level of sensitivity to traffic flows. This includes more rural B roads or, unclassified rural roads, not typically intended to accommodate regular HGV use. This can include traffic calmed roads, traffic signal-controlled roads, or roads with restricted use. For settlements in more rural areas, this includes larger settlements with many local facilities. For other receptors it includes highly sensitive sites such as schools, playgrounds, retirement homes etc.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution. This sensitivity is assigned receptors with a level of sensitivity to traffic flows. This includes more local A roads, and B roads intended to connect different areas, these roads are suitable for regular HGV use. For settlements in more rural areas, it includes settlements with a level of local facilities. For other receptors, it includes traffic sensitive receptors such as hospitals, community facilities, and recreational facilities.
Low	Low or medium importance and rarity, local scale. This sensitivity is assigned to receptors with lower sensitivity to traffic flows. This includes trunk roads or A roads intended to provide major transport links within or between areas and designed to accommodate HGVs. For settlements in more rural areas, this includes small settlements with few local facilities. For other receptors, it includes sites with some sensitivity to traffic flows, such as open space, conservation areas or residential areas with an existing footway provision.

Negligible	Very low importance and rarity, local scale. This sensitivity is assigned to receptors with low sensitivity to traffic flows, and those distant from impacted parts of the highway network. This includes roads without nearby settlements, including the strategic road network and junctions which are minimally impacted by additional traffic and capable of accommodating abnormal loads. Routes identified by National Highways as “Heavy and High Load Routes” fall within this category. For settlements in more rural areas, it includes locations with isolated dwellings / scattered settlement that lack local facilities. For other receptors, it includes those sufficient distant from impacted highway links and junctions.

Duration of impacts

The criteria for describing the duration of impacts in this chapter of the ES are outlined in Table 6.6.

Table 6.6: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year.
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years.
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development.

Magnitude of impact

6.5.8 The IEMA guidance sets out criteria for the magnitude of change required for the highway links to be included within the study area, these are:

- **Rule 1:** Include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%)
- **Rule 2:** Include highway links of high sensitivity where traffic flows have increased by 10% or more.

6.5.9 The IEMA guidance sets out the broad principles of how to assess the magnitude of change for each of the following categories.

- Severance.
- Driver Delay.
- Pedestrian Delay (including all non-motorised users).
- Non-motorised user amenity.
- Fear and Intimidation; and,
- Road Safety.

- 6.5.10 The assessment principles as set out above are summarised in remaining parts of this section.

Severance

- 6.5.11 Severance refers to the perceived division within a community caused by major transport infrastructure, which separates people from places or each other. It can arise from heavily trafficked roads or physical barriers and is challenging to measure due to the lack of clear relationships between traffic factors and severance levels. Factors to assess include road width, traffic flow, speed, crossing facilities, and the number of affected movements.
- 6.5.12 The guidance acknowledges that the measurement and prediction of severance is extremely difficult. The assessment of severance pays full regard to specific local conditions, in particular the location of pedestrian routes to key local facilities and whether crossing facilities are provided.
- 6.5.13 It highlights that the Department for Transport previously established severance significance thresholds based on traffic flow changes: 30% for 'slight,' 60% for 'moderate,' and 90% for 'substantial' severance. While no longer formal guidance, these thresholds remain valid through planning case law. However, their application requires caution, especially with low baseline traffic flows, where significant percentage increases may not cause severance. Given the rural siting of windfarms, this concern is particularly relevant to this application. These thresholds serve as starting points, derived from studies on major traffic changes, and must consider local factors like land use sensitivity, vulnerable populations, and pedestrian crossing facilities.
- 6.5.14 LA 112 of the DMRB 'Population and Human Health' provides further guidance on walking, cycling and horse-riding severance within a community, offering guidance against which the magnitude of change shall be reported, shown in Table 6.7.

Table 6.7: Severance Magnitude of Impact criteria

Magnitude of Impact (change)	Typical Description
High	>500m increase (adverse) / decrease (beneficial) in journey length.
Medium	>250m - 500m increase (adverse) or decrease (beneficial) in journey length.
Low	>50m - 250m increase (adverse) or decrease (beneficial) in journey length.
Negligible	<50m increase (adverse) or decrease (beneficial) in journey length.
No change	No loss or alteration of characteristics, features, elements, or accessibility;

Driver Delay

- 6.5.15 The IEMA guidance highlights that the Driver Delay is only likely to be significant when the traffic on the network surrounding the Development is already at, or close to, the capacity of the system. Driver delay is a result of the net impact generated by the development when compared to the baseline.

Pedestrian Delay (including all non-motorised users)

- 6.5.16 Pedestrian delay assesses how traffic conditions affect the ability of pedestrians and other non-motorised users to crossroads. It is closely linked to severance and influenced by factors such as traffic volume, speed, pedestrian activity levels, and site conditions.
- 6.5.17 The guidance highlights that the delay to pedestrians is only likely to be major when the traffic on the network surrounding the Development is already at, or close to, the capacity of the system.

Non-motorised user amenity

- 6.5.18 Non-motorised user amenity is broadly defined as the relative pleasantness of a journey. It is affected by traffic flow, traffic composition and pavement width / separation from traffic.
- 6.5.19 The 1993 IEMA Guidelines outline that significant changes in pedestrian amenity may occur when traffic flow or the HGV component is halved or doubled. While these thresholds are no longer included in DfT guidance, they remain valid through planning case law. They serve as a starting point for assessments, allowing assessors use their judgement to determine whether change to pedestrian amenity is a significant effect.

Fear and Intimidation

- 6.5.20 Fear and intimidation are dependent upon the volume of traffic, the level of HGV's, the proximity of traffic to people and the lack of protection caused by such factors as narrow pavement widths.
- 6.5.21 The guidelines outline a weighting system that can be used in the assessment of pedestrian fear and intimidation, offering scores for different highway conditions.

6.5.22 The scoring system is outlined in Tables 6.8, 6.9 and 6.10.

Table 6.8: Fear and intimidation degree of hazard

Average traffic flow over 18-hour day – all vehicles/hour 2-way (a)	Total 18-hour heavy vehicle flow (b)	Average vehicle speed (c)	Degree of hazard score
+1,800	+3,000	->40	30
1,200–1,800	2,000–3,000	30–40	20
600–1,200	1,000–2,000	20–30	10
<600	<1,000	<20	0

Table 6.9: Level of fear and intimidation

Level of fear and intimidation	Total hazard score (a) + (b) + (c)
Extreme	71+
Great	41–70
Moderate	21–40
Small	0–20

Table 6.10: Fear and intimidation magnitude of impact

Magnitude of impact	Change in step/traffic flows (AADT) from baseline conditions
High	Two step changes in level.
Medium	One step change in level, but with >400 vehicle increase in average 18hr AV two-way all vehicle flow; and/or >500 HV increase in total 18hr HV flow.
Low	One step change in level, with <400 vehicle increase in average 18hr AV two-way all vehicle flow; and/or <500 HV increase in total 18hr HV flow.
Negligible	No change in step changes.

Road Safety

6.5.23 Professional judgement has been utilised to assess collision data, reviewing accident clusters over the most recently available 5-year period to identify patterns or contributing factors that could be influenced by the development's traffic generation.

Significance of effect

6.5.24 The significance of the effect upon transport has been determined by taking into account the sensitivity of the receptor and the magnitude of

the impact. The method employed for this assessment is presented in Table 6.11. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

6.5.25 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

6.5.26 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 6.11: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible	Minor	Minor or Moderate	Moderate or Major	Major

6.5.27 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described as follows

- **Major:** These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed this level of significance.
- **Moderate:** These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
- **Minor:** These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development.
- **Negligible:** No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- **No change:** No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assumptions and limitations of the assessment

- 6.5.28 This assessment utilises traffic flow data derived from the DfT and supplemented with surveys obtained via a third-party traffic surveying consultancy which completes independent traffic surveys to best practice industry standards.
- 6.5.29 The information contained within this chapter is based on several industry standard assumptions which are considered appropriate for forecasting the operation of the local and wider road network.

6.6 Baseline Environment Conditions

Desk studies

- 6.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment for Transport. The existing studies and datasets referred to as part of the desk-based review for Transport are summarised in Table 6.12 below.

Table 6.12: Summary of desk study sources

Title/Organisation	Data Source/ Year	Data Used
Construction Programme	arcitrans and Cenin (2025)	Schedule of construction activities
Crashmap	DfT (2019-2023)	Personal Injury Accident Data
DfT Traffic Data	DfT (2019-2023)	Traffic count data
Sensitive Locations	OS Raster Mapping, OS Sites Layer, Google Maps, Open Street Map (2025)	Location of residences, employment, schools, hospitals and other sensitive locations.
AIL Constraints	OS MasterMap, Google Streetview, ESDAL Portal (2025)	Known structure constraints, highway geometry measurements, road signage.
Committed Development	TEMPro (2025)	TEMPro traffic growth factors.
Cumulative Development	RCTCBC and neighbouring LPA Planning Application register	Information on cumulative development schemes to consider.

Construction Programme

- 6.6.2 arcitrans has derived a forecast 24-month construction programme, based upon information from Cenin on the proposed build out and industry knowledge. Refer to ES Volume 6, Appendix 6.1: TS for the monthly breakdown of construction traffic across the construction period.

Personal Injury Accident Data

- 6.6.3 Personal Injury Accident data has been sourced from ‘Crashmap’ for the latest five-year period, covering 2019 to 2023, representing the most recent information publicly available from the DfT.
- 6.6.4 A full Highway Safety Audit is provided in ES Volume 6, Appendix 6.1: TS, which concludes that there appear to be no issues with the local highway network within the study area that would need addressing or would be worsened by the proposed development.

DfT Traffic Data

- 6.6.5 Observed Traffic Flows have been obtained from the DfT to inform the transport assessments in support of the project.
- 6.6.6 Full information is provided in ES Volume 6, Appendix 6.1: TS, with the observed DfT Traffic Data summarised in Table 6.13.

Table 6.13:24-hour Average Daily Observed Traffic Flows (Two-Way)

Location	Light Vehicles	HGVs	Total	Year
A470 between the M4 and Taff's Well	59,286	3,527	62,813	2022
A470 between Taff's Well and Nantgarw	59,899	2,922	62,821	2023
A470 between Nantgarw and Hawthorn	50,150	2,260	52,410	2023
A470 south of Pontypridd	45,221	1,950	47,171	2022
A4058 bridge over River Taff	19,705	676	20,381	2018
A4058 north of A470 junction	16,064	452	16,516	2022
A4058 west of B4595	21,570	741	22,311	2021
Graigwen Road	657	7	664	2023
Heol-Y-Mynach north of Ynysybwl	1,005	16	1,021	2019

Sensitive Locations

- 6.6.7 Sensitive locations have been identified, which are considered further Section 6.8: Assessment of effects.

AIL Constraints

- 6.6.8 AIL constraints were identified from a review of the listed materials, with 24 Points of Interest noted. Refer to Volume 6, Appendix 6.2: TMP for full information on the identified constraints.

Committed Development

- 6.6.9 Committed Development growth rates have been obtained from the DfT TEMPro v8.1, refer to ES Volume 6, Appendix 6.1: TS for full information.
- 6.6.10 Table 6.14 provides a summary of the resultant growth rates outputted by TEMPro v8.1.

Table 6.14: TEMPro Growth Rates

Time Period	Average Day
2018 – 2025	1.04856241
2019 – 2025	1.041533899
2021 – 2025	1.027644445
2022 – 2025	1.020579907
2023 – 2025	1.013574179
2025 – 2029	1.049861157

Cumulative Development

- 6.6.11 In line with the Scoping Report, only nearby consented developments are included in future baseline traffic assessments. Two minor residential developments, not related to energy and already accounted for in TEMPro growth rates, were identified. Other energy-related projects only interact with the Transport Study area via the strategic A470 corridor, where additional impacts would not be significant. Including these projects would increase baseline traffic, thereby reducing the relative impact of construction traffic from the Llanwonno Energy Project. Consequently, these energy-related projects have not been included in the cumulative transport assessment.

Site-specific surveys

- 6.6.12 Site specific surveys were undertaken to inform the baseline assessment for Transport. A summary of the site-specific surveys undertaken to inform this chapter of the ES are provided in Table 6.15.

Table 6.15: Summary of site-specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
Route Drive Through Survey	Review potential AIL and construction traffic routes, identify constraints for the passage of AILs.	February 2025
ATC Surveys	Record 2025 observed traffic flows at locations where DfT data is not available.	March 2025

Route Drive Through Survey

- 6.6.13 A Route Drive Through Survey was completed to review potential construction traffic delivery routes and identify any key constraints to the passage of AILs. The survey was utilised to inform detailed technical Swept Path Assessments. Refer to Volume 6, Appendix 6.2: TMP for full information on the identified delivery route and constraints.

ATC Surveys

- 6.6.14 ATC surveys were completed at locations where DfT data was unavailable. Refer to ES Volume 6, Appendix 6.1: TS for full information, with the results of the surveys summarised in Table 6.16.

Table 6.16: 24-hour Average Daily Observed Traffic Flows (Two-Way)

Location	Light Vehicles	HGVs	Total	Year
A4223 Bridge Street, Pontypridd	14,198	1,956	16,154	2025
B4273 Ynysybwl Road between Glyncoch and Ynysybwl	2,121	444	2,565	2025
Bryn Ffynon east of Llanwonno	648	134	782	2025
Pen-y-Wal Road south of Llanwonno	77	18	95	2025

Future baseline conditions

- 6.6.15 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that ‘an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge’ is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.

Future Baseline Traffic Flows

- 6.6.16 Cenin have advised that they anticipate an operation date of 2030, with a two-year construction programme. Construction traffic is likely to peak circa 15 months into development (during 2029), so to provide a robust worse-case assessment of baseline traffic flows anticipated during the two-year construction period, observed traffic flows have been growthed

to 2029. Refer to ES Volume 6, Appendix 6.1: TS and Table 6.14 for full information on the growth rates used.

6.6.17 Table 6.17 provides a summary of the 2029 Future Baseline Traffic Flows.

Table 6.17:2029 Future Baseline Average Daily Traffic Flows (Two-Way)

Location	Light Vehicles	HGVs	Total
A4223 Bridge Street, Pontypridd	14,906	2,054	16,959
B4273 Ynysybwl Road between Glyncoch and Ynysybwl	4,522	865	5,388
Bryn Ffynon east of Llanwonno	680	141	821
Pen-y-Wal Road south of Llanwonno	81	19	100
A470 between the M4 and Taff's Well	63,523	3,779	67,302
A470 between Taff's Well and Nantgarw	64,624	3,152	67,777
A470 between Nantgarw and Hawthorn	54,106	2,438	56,544
A470 south of Pontypridd	48,453	2,089	50,542
A4058 bridge over River Taff	21,692	744	22,436
A4058 north of A470 junction	17,212	484	17,696
A4058 west of B4595	23,272	799	24,071
Graigwen Road	734	8	742
Heol-Y-Mynach north of Ynysybwl	1,099	17	1,116

Future Active Travel Network

6.6.18 A review of the future Active Travel Network within the study area has been completed, informed by aspirations published by RCTCBC. Refer to ES Volume 6, Appendix 6.1: TS for full information.

6.6.19 This has identified an aspiration to develop 3 walking routes and 9 walking and cycling routes, comprising:

- Future Walking Routes: RCT INM W3, RCT INM N51a, and RCTAT21c.
- Future Walking and Cycling Routes: RCTAT19b, RCT INM N81, RCT INM N52, RCT INM N51, RCT INM W8, RCT INM SL, RCT INM S2, RCT INM S25, and RCTAT21b.

6.6.20 It should be noted that these routes form aspirations only, ideally to be delivered by 2039. At present, RCTCBC are not consulting on the delivery on any of the routes within the Study Area, with recently completed consultation focussing on the Rhondda Fach Active Travel Route. It is therefore unlikely that these are in place by the time of construction of Llanwonno Energy Project.

Receptor Sensitivity

6.6.21 A review of receptors within the study area has been completed, with the results outlined in Table 6.18. Table 6.18 assigns each receptor a sensitivity level, based upon the criteria detailed in Table 6.5.

Table 6.18: Receptor Sensitivity Review

Location	Sensitivity	Comments
Users of the A470 between the M4 and Taff's Well	Low	A trunk road intended to provide major transport links between areas and designed to accommodate HGVs.
Users of the A470 between Taff's Well and Nantgarw	Low	A trunk road intended to provide major transport links between areas and designed to accommodate HGVs.
Users of the A470 between Nantgarw and Hawthorn	Low	A trunk road intended to provide major transport links between areas and designed to accommodate HGVs.
Users of the A470 south of Pontypridd	Low	A trunk road intended to provide major transport links between areas and designed to accommodate HGVs.
Users of the A4058 bridge over River Taff	Low	An A-road intended to provide major transport links between areas and designed to accommodate HGVs and featuring a level of traffic calming.
Users of the A4058 north of A470 junction	Low	An A-road intended to provide major transport links between areas and designed to accommodate HGVs and featuring a level of traffic calming.
Users of the A4058 west of B4595	Low	An A-road intended to provide major transport links between areas and designed to accommodate HGVs and featuring a level of traffic calming.
Users of Graigwen Road and Pen-y-Wal Road to the site	High	Unclassified road not intended to accommodate regular HGV use, with an element of traffic calming. PRoW crossing Graigwen Road.
Users of the A4223 Bridge Street, Pontypridd	Medium	An A-road intended to provide major transport links between areas and designed to accommodate HGVs and featuring a level of traffic calming.
Users of the B4273 Ynysybwl Road between Glynnoch and Ynysybwl	Medium	A B-road intended to connect different areas, suitable for regular HGV use.
Users of Heol-Y-Mynach north of Ynysybwl	High	Unclassified road not intended to accommodate regular HGV use, with an element of traffic calming. Several PRoWs crossing the road.
Users of Bryn Ffynon east of Llanwonno	High	Unclassified road not intended to accommodate regular HGV use. Several PRoWs crossing the road.

Location	Sensitivity	Comments
Users of Pen-y-Wal Road south of Llanwonno	High	Unclassified road not intended to accommodate regular HGV use. Several PRowS crossing the road.
Residents of Pontypridd in vicinity of A4058, Rhondda Road, Graigwen Road, A4223 and the B4273.	High	A larger settlement with many local facilities.
Residents of Glyncoch in vicinity of the B4273.	Low	A small settlement with few local facilities.
Residents of Ynysybwl in vicinity of the B4273.	Medium	A small settlement with few local facilities.
Students at Craig-yr-Hesg Primary School	High	An educational facility, located adjacent to the B4273, which contains a level of traffic calming.
Students at Trerobart Primary School	High	An educational facility, located within proximity to the B4273 which contains a level of traffic calming / management such as signalised crossing points.

6.6.22 Based upon the assessment detailed in Table 6.5 and in accordance with the IEMA guidelines, users of Graigwen Road, Heol-Y-Mynach, Bryn Ffynon and Pen-y-Wal, residents of Pontypridd, students of Craig-yr-Hesg Primary School and Trerobart Primary School and Public Rights of Way users have been identified as a sensitive receptors and are subject to 'Rule 2' of IEMA guidelines, meaning a full assessment will be completed if traffic flows have increased by 10% or more.

6.6.23 All other receptors will be subject to 'Rule 1' of the IEMA guidelines and assessed if traffic flows have increased by 30% or more.

Development Construction Traffic Net Impact Assessment

6.6.24 To confirm magnitude of change forecast along the delivery route, and the subsequent study area for the formal EIA, the construction trip generation has been estimated, refer to ES Volume 6, Appendix 6.1: TS for full information on the forecast trip generation.

6.6.25 The trip generation is summarised Table 6.19.

Table 6.19:Forecast Trip Generation

Activity	Month																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Site Mobilisation	100	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	100
General Site Delivery Vehicles	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44
Staff	187	374	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748	748
Turbine Component Delivery	0	0	0	0	0	0	0	0	0	0	0	0	82	82	82	0	0	0	0	0	0	0	0	0
AIL Escorts	0	0	0	0	0	0	0	0	0	0	0	0	86	86	86	0	0	0	0	0	0	0	0	0
Access Tracks, Hardstanding and Construction Areas	24	48	48	48	48	48	48	48	48	48	48	48	24	0	0	0	0	0	0	0	0	0	0	0
Geotextile Membrane	3	0	0	3	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cabling deliveries and sand	0	0	0	60	60	60	60	60	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Concrete and Reinforcement	0	0	0	0	0	0	0	214	214	214	214	214	214	214	214	214	0	0	0	0	0	0	0	0
Delivery of HV Electrical Items	0	0	0	0	0	0	0	8	8	8	8	8	8	8	8	8	0	0	0	0	0	0	0	0
Cranage and related vehicles	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	30	0	0	0
Solar PV Panels	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	55	55	55	55	55	55	0	0	0
Solar Frames	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	17	17	17	17	17	0	0	0
Solar Cabling	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	8	8	8	8	8	0	0	0
Solar Inverter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	25	0	0	0	0
BESS Deliveries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	120	120	120	60
Total Estimated Movements	358	566	840	903	900	900	903	1,122	1,122	1,065	1,062	1,092	1,206	1,182	1,237	1,094	872	872	897	957	942	912	1,012	952
Working Days	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
Daily Average Vehicles	17	26	39	42	41	41	42	51	51	49	49	50	55	54	57	50	40	40	41	44	43	42	46	44
Daily Light Vehicles	9	17	34	34	34	34	34	34	34	34	34	34	38	38	38	34	34	34	34	34	34	34	34	34
Daily Heavy Vehicles	8	9	5	8	7	7	8	17	17	15	15	16	17	16	19	16	6	6	7	10	9	8	12	10

*Figures rounded up to ensure that daily forecasts by vehicle classification returned a whole number

6.6.26 The resultant peak development trip generation has been assigned to the local highway network, refer to ES Volume 6, Appendix 6.1: TS for full information, with assignment summarised in Table 6.20.

Table 6.20: Peak Construction Development Traffic

Location	Light Vehicles	HGVs	Total Two-Way Trips
A4223 Bridge Street, Pontypridd	36	17	53
B4273 Ynysybwl Road between Glyncoch and Ynysybwl	36	17	53
Bryn Ffynon east of Llanwonno	36	17	53
Pen-y-Wal Road south of Llanwonno	36	17	53
A470 between the M4 and Taff's Well	28	15	42
A470 between Taff's Well and Nantgarw	28	15	42
A470 between Nantgarw and Hawthorn	28	15	42
A470 south of Pontypridd	28	15	42
A4058 bridge over River Taff	2	2	4
A4058 north of A470 junction	12	5	17
A4058 west of B4595	2	2	4
Graigwen Road	2	2	4
Heol-Y-Mynach north of Ynysybwl	36	17	53

6.6.27 To confirm the highway receptors taken forward into the assessment for transport, a net impact assessment has been completed. This comprises a comparison between the 2029 future year traffic flows, and the 2029 with development traffic flows, shown in Table 6.21.

Table 6.21: Net Impact Assessment Summary

Location	2029 Baseline			2029 with Development Traffic			Net Impact		
	Light Vehicles	HGVs	Total	Light Vehicles	HGVs	Total	Light Vehicles	HGVs	Total
A4223 Bridge Street, Pontypridd	14,906	2,054	16,959	14,942	2,071	17,012	0%	1%	0%
B4273 Ynysybwl Road between Glyncoch and Ynysybwl	4,522	865	5,388	4,558	882	5,441	1%	2%	1%
Bryn Ffynon east of Llanwonno	680	141	821	716	158	874	5%	12%	6%
Pen-y-Wal Road south of Llanwonno	81	19	100	117	36	153	45%	88%	53%
A470 between the M4 and Taff's Well	63,523	3,779	67,302	63,551	3,794	67,344	0%	0%	0%
A470 between Taff's Well and Nantgarw	64,624	3,152	67,777	64,652	3,167	67,819	0%	0%	0%
A470 between Nantgarw and Hawthorn	54,106	2,438	56,544	54,134	2,453	56,587	0%	1%	0%
A470 south of Pontypridd	48,453	2,089	50,542	48,481	2,104	50,584	0%	1%	0%
A4058 bridge over River Taff	21,692	744	22,436	21,694	746	22,440	0%	0%	0%
A4058 north of A470 junction	17,212	484	17,696	17,224	490	17,714	0%	1%	0%
A0458 west of B4058	23,272	799	24,071	23,274	801	24,075	0%	0%	0%
Graigwen Road	734	8	742	736	10	746	0%	26%	1%
Heol-Y-Mynach north of Ynysybwl	1,099	17	1,116	1,135	34	1,169	3%	97%	5%

- 6.6.28 Table 6.21 highlights that the only highway links forecast to experience a net impact of 30% or more (total traffic or HGVs) include:
- Pen-y-Wal Road, located to the south of Llanwonno, which is forecast to experience a 53% increase in total traffic during peak construction, comprising a 45% growth in light vehicles and an 88% growth in heavy vehicles.
 - Heol-Y-Mynach north of Ynysybwl, which is forecast to experience a 97% growth in heavy vehicles. Due to the relatively lightly trafficked nature of this road, this corresponds to only a 5% increase in total traffic during peak construction.
- 6.6.29 The highway links link forecast to experience a net impact of 10% or more are:
- Graigwen Road, which is forecast to experience a 26% growth in heavy vehicles during peak construction. Due to the relatively lightly trafficked nature of this road, this corresponds to only a 1% increase in total traffic during peak construction.
 - Bryn Ffynon, located to the east of Llanwonno, which is forecast to experience a 12% growth in heavy goods vehicles during peak construction.
- 6.6.30 These increases are largely due to the very low existing traffic volumes along the links exhibiting a significant increase in traffic / heavy vehicle volumes.

Key receptors

- 6.6.31 Table 6.22 identifies the receptors taken forward for the assessment.

Table 6.22:Key receptors taken forward for assessment

Receptor	Description and Reason for Consideration
Users of Bryn Ffynon east of Llanwonno	This sensitive receptor is forecast to experience a net impact of greater than 10%, meeting Rule 2 of the IEMA guidance for inclusion within the EIA study area.
Users of Pen-y-Wal Road south of Llanwonno	This sensitive receptor is forecast to experience a net impact of greater than 10%, meeting Rule 2 of the IEMA guidance for inclusion within the EIA study area.
Users of Graigwen Road and Pen-y-Wal Road to the site	This sensitive receptor is forecast to experience a net impact of greater than 10%, meeting Rule 2 of the IEMA guidance for inclusion within the EIA study area.
Users of Heol-Y-Mynach north of Ynysybwl	This sensitive receptor is forecast to experience a net impact of greater than 10%, meeting Rule 2 of the IEMA guidance for inclusion within the EIA study area.
Residents of Pontypridd in vicinity of Graigwen Road	This sensitive receptor is forecast to experience a net impact of greater than 10%, meeting Rule 2 of the IEMA guidance for inclusion within the EIA study area.

6.7 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

- 6.7.1 Both embedded and additional mitigation measures relevant to the assessment of Transport are summarised in
- 6.7.2 Table 6.23 below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 6.23: Mitigation measures to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
On-site Borrow Pits	On-site borrow pits are proposed to reduce the level of traffic associated with the import of aggregate from off-site locations. This could be secured as part of any consent.
Further mitigation	
Traffic Management Plan (TMP)	A TMP has been prepared to manage construction traffic and further mitigate against any impact construction traffic may have. This document can be secured as part of any consent and should be agreed with the required Highway Authorities prior to commencement on site.
Transport Statement (TS)	A TS has been prepared to assess and manage the impact of the delivery of abnormal loads associated with the development. This can be secured as part of any consented and agreed with the required Highway Authorities prior to commencement on site.
Staff Travel Plan	A Staff Travel Plan could be prepared and secured through any consent. This will set out a series of measures to encourage construction staff to travel to site by more sustainable methods, further mitigating against any transport impacts of construction traffic.
Public Information	To assist the public and minimise potential conflicts, information regarding abnormal load convoy movements could be shared with local media outlets, social media and the project website. This may include providing details to local newspapers and radio stations about the expected timing and route of vehicle movements. Proactively sharing this information will help ensure residents are aware of convoy operations and can plan accordingly. This could be secured as part of the TMP.

6.8 Assessment of effects

- 6.8.1 The impacts of the construction of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development are listed in Table 6.3. A description of the potential effect on receptors caused by each identified impact is given below.

Construction Traffic – Users of Bryn Ffynon east of Llanwonno

- 6.8.2 An assessment has been completed regarding the impact of construction traffic on users of Bryn Ffynon east of Llanwonno, as a net impact increase in HGV traffic levels of 12% is forecast, as detailed in Table 6.21.

Sensitivity of the receptor

- 6.8.3 As detailed in Table 6.18, the sensitivity of the receptor is high.

Magnitude of impact

- 6.8.4 The magnitude of the impact meets Rule 2 of the IEMA guidance for the users of Bryn Ffynon east of Llanwonno and has therefore been included in the assessment.

Severance

- 6.8.5 Traffic volumes are forecast to increase during peak construction by 6% (all vehicles) and 12% (HGVs). While part of the link could be avoided by utilising RCT walking and cycling routes, there is no simple alternative route to wholly avoid this section of Bryn Ffynon. Therefore, the increase in journey length for any walkers, cyclists or horse riders wishing to use this link would be greater than 500m.
- 6.8.6 However, the change in overall traffic flow along the link falls below the previously established DfT severance significance thresholds and would be considered as negligible.
- 6.8.7 Considering both the DfT severance thresholds, and LA 112 of the DMRB,
- 6.8.8 The magnitude of the effect is therefore considered to be medium.

Driver Delay

- 6.8.9 Bryn Ffynon in the 2029 with Development scenario is forecast to experience an average daily traffic volume of 874 vehicles per day (circa 36 vehicles per hour, or 1 vehicle every 99 seconds). This is significantly within accepted thresholds for theoretical highway capacity. Therefore, this link is not operating at, or close to, capacity.
- 6.8.10 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

- 6.8.11 As detailed under Driver Delay, Bryn Ffynon is not operating at, or close to capacity.
- 6.8.12 The magnitude of the effect is therefore considered to be negligible.

Non-motorised user amenity

- 6.8.13 The HGV traffic flows on Bryn Ffynon are expected to increase by 12%, equivalent to an increase in 17 HGVs per day, from 141 to 158. This corresponds to an average increase from 6 HGVs per hour to 7 HGVs per hour.
- 6.8.14 The magnitude of the effect is therefore considered to be low.

Fear and Intimidation

- 6.8.15 The average traffic flow per hour over an 18-hour day along Bryn Ffynon during both the 2029 Future Baseline and 2029 with development is less than 600, the degree of hazard score is 0.
- 6.8.16 The total 18-hour heavy vehicle flow along Bryn Ffynon during both the 2029 Future Baseline and 2029 with development is less than 1,000, the degree of hazards score is 0.
- 6.8.17 The average recorded vehicle speed along Bryn Ffynon is 29.6 mph, the degree of hazards score is 10. It is expected that the average speed will remain the same or lower with the addition of construction traffic.
- 6.8.18 The level of fear and intimidation is therefore small (0-20) in the 2029 Future Baseline. In the 2029 with Development scenario, the level of fear and intimidation is also small (0-20).
- 6.8.19 There is no step change in the level of fear and intimidation.
- 6.8.20 The magnitude of the effect is therefore considered to be negligible.

Road Safety

- 6.8.21 Two personal injury accidents have been recorded along Bryn Ffynon in the last five years. It is considered that the current alignment of Bryn Ffynon does not present any undue highway safety concerns for road users.
- 6.8.22 The magnitude of the effect is therefore considered to be negligible.

Significance of the effect

Severance

- 6.8.23 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is medium, it is assessed that there will be a short term moderate adverse effect, which is significant.

Driver Delay

- 6.8.24 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Pedestrian Delay (including all non-motorised users)

- 6.8.25 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Non-motorised user amenity

- 6.8.26 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is low, it is assessed that there will be a short term minor adverse effect, which is not significant.

Fear and Intimidation

- 6.8.27 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Road Safety

- 6.8.28 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Additional mitigation and residual effect

- 6.8.29 IEMA guidelines note that severance is largely influenced by the level of increase in traffic flows and the additional journey length required to take an alternative route.
- 6.8.30 Bryn Ffynon east of Llanwonno is a rural road, routing east from Llanwonno towards Perthcelyn and Ynysybwll, facilitating access to leisure facilities such as Brynffynon Hotel, Saint Gwynno Church, St Gwynno Forestry and Bwl Mx.
- 6.8.31 As a result, it is considered that it is largely used for leisure purposes.
- 6.8.32 While it is not feasible to provide a short alternative route or provide a separated non-motorised user link, it is feasible to limit the impact that construction will have during typical 'leisure-use' periods, such as at the weekend and weekday evenings.
- 6.8.33 A TMP, secured via planning consent, can mitigate severance through:
- Limiting site working hours to minimise the impact on leisure users.
 - Ensuring that through the detailed design process, proposals are refined to minimise the volume of construction traffic, such as reducing off-site material imports.
 - Providing a public information campaign to inform receptor users of expected abnormal load movements, enabling users to plan their leisure activities outside of these periods.
- 6.8.34 Additionally, a Staff Travel Plan, also secured via planning consent, can further reduce severance and impacts on non-motorised user amenity by encouraging sustainable staff travel through measures such as:
- Appointment of a Travel Plan Co-ordinator.
 - Provision of information on active travel modes.
 - Provision of information regarding access by public transport.
 - Implementation and promotion of a Car Sharing scheme.
 - Implementation and promotion of staff minibus service.
 - Car park management, such as preferential spaces for car-sharers.
- 6.8.35 Together, these mitigation measures will limit the volume of construction traffic, thereby minimising severance on Bryn Ffynon east of Llanwonno.

- 6.8.36 They will also seek to limit the impact of construction traffic during leisure hours where Bryn Ffynon east of Llanwonno is often used to access recreational facilities, thereby minimising severance.
- 6.8.37 It is also important to note that the impact of construction traffic is in part driven by the very low baseline HGV flows along Bryn Ffynon east of Llanwonno. The addition of temporary peak construction traffic is forecast to increase the daily HGV flow along Bryn Ffynon east of Llanwonno from 141 HGVs per day to 158 vehicles per day.
- 6.8.38 This corresponds to an average increase from 6 HGVs per hour to 7 HGVs per hour.
- 6.8.39 This means that along the short section of Bryn Ffynon, there will on average still be significant portions of the day where there are no HGV movements along the receptor, further helping to reduce any perception of severance.
- 6.8.40 Taking the additional mitigation into account, it is assessed that there will be a short-term minor adverse residual effect, which is not significant.

Construction Traffic – Users of Pen-y-Wal Road south of Llanwonno

- 6.8.41 An assessment has been completed regarding the impact of construction traffic on users of Pen-y-Wal Road south of Llanwonno, as a net impact increase in traffic levels of 53% is forecast, with a 45% increase in light vehicles and an 88% increase in HGV traffic levels, as detailed in Table 6.21.

Sensitivity of the receptor

- 6.8.42 As detailed in Table 6.18, the sensitivity of the receptor is high.

Magnitude of impact

- 6.8.43 The magnitude of the impact meets Rule 1 of the IEMA guidance for the users of Pen-y-Wal Road south of Llanwonno and has therefore been included in the assessment.

Severance

- 6.8.44 Traffic volumes are forecast to increase during peak construction by 53% (all vehicles) and 88% (HGVs). With no simple alternative route to avoid this section of Pen-y-Wal Road, the increase in journey length for any walkers, cyclists or horse riders wishing to use this link would be greater than 500m.
- 6.8.45 The magnitude of the effect is therefore considered to be high.

Driver Delay

- 6.8.46 Pen-y-Wal Road in the 2029 with Development scenario is forecast to experience an average daily traffic volume of 153 vehicles per day (circa 6 vehicles per hour, or 1 vehicle every 9 minutes). This is significantly within accepted thresholds for theoretical highway capacity. Therefore, this link is not operating at, or close to, capacity.
- 6.8.47 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

- 6.8.48 As detailed under Driver Delay, Pen-y-Wal Road is not operating at, or close to capacity.
- 6.8.49 The magnitude of the effect is therefore considered to be negligible.

Non-motorised user amenity

- 6.8.50 The HGV traffic flows on Pen-y-Wal Road are expected to increase by 88%, equivalent to an increase in 17 HGVs per day, from 19 to 36. This corresponds to an average increase from 1 HGV per hour to 1 HGV per 40 minutes. This represents a near doubling in HGV levels for the short-term construction peak period.
- 6.8.51 The magnitude of the effect is therefore considered to be high.

Fear and Intimidation

- 6.8.52 The average traffic flow per hour over an 18-hour day along Pen-y-Wal Road during both the 2029 Future Baseline and 2029 with development is less than 600, the degree of hazard score is 0.
- 6.8.53 The total 18-hour heavy vehicle flow along Pen-y-Wal Road during both the 2029 Future Baseline and 2029 with development is less than 1,000, the degree of hazards score is 0.
- 6.8.54 The average recorded vehicle speed along Pen-y-Wal Road is 30.9 mph, the degree of hazards score is 20. It is expected that the average speed will remain the same or lower with the addition of construction traffic.
- 6.8.55 The level of fear and intimidation is therefore small (0-20) in the 2029 Future Baseline. In the 2029 with Development scenario, the level of fear and intimidation is also small (0-20).
- 6.8.56 There is no step change in the level of fear and intimidation.
- 6.8.57 The magnitude of the effect is therefore considered to be negligible.

Road Safety

- 6.8.58 Two personal injury accidents have been recorded along this section of Pen-y-Wal Road in the last five years. It is considered that the current alignment of Pen-y-Wal Road does not present any undue highway safety concerns for road users.
- 6.8.59 The magnitude of the effect is therefore considered to be negligible.

Significance of the effect

Severance

- 6.8.60 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is high, it is assessed that there will be a short term major adverse effect, which is significant.

Driver Delay

- 6.8.61 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Pedestrian Delay (including all non-motorised users)

- 6.8.62 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Non-motorised user amenity

- 6.8.63 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is high, it is assessed that there will be a short term major adverse effect, which is significant.

Fear and Intimidation

- 6.8.64 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Road Safety

- 6.8.65 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Additional mitigation and residual effect

- 6.8.66 IEMA guidelines note that severance is largely influenced by the level of increase in traffic flows and the additional journey length required to take an alternative route. Non-motorised user amenity is largely affected by traffic flow, traffic composition and separation from traffic.
- 6.8.67 Pen-y-Wal Road is a rural road, routing south from Llanwonno towards Pontypridd, facilitating access to leisure facilities such as Hendre-Rhys, Brynffynon Hotel, Saint Gwynno Church, St Gwynno Forestry and Bwl Mx.
- 6.8.68 As a result, it is considered that it is largely used for leisure purposes.
- 6.8.69 While it is not feasible to provide a short alternative route or provide a separated non-motorised user link, it is feasible to limit the impact that construction will have during typical 'leisure-use' periods, such as at the weekend and weekday evenings.
- 6.8.70 A TMP, secured via planning consent, can mitigate severance and impacts on non-motorised user amenity through:
- Limiting site working hours to minimise the impact on leisure users.

- Ensuring that through the detailed design process, proposals are refined to minimise the volume of construction traffic, such as reducing off-site material imports.
- Providing a public information campaign to inform receptor users of expected abnormal load movements, enabling users to plan their leisure activities outside of these periods.

6.8.71 Additionally, a Staff Travel Plan, also secured via planning consent, can further reduce severance and impacts on non-motorised user amenity by encouraging sustainable staff travel through measures such as:

- Appointment of a Travel Plan Co-ordinator.
- Provision of information on active travel modes.
- Provision of information regarding access by public transport.
- Implementation and promotion of a Car Sharing scheme.
- Implementation and promotion of staff minibus service.
- Car park management, such as preferential spaces for car-sharers.

6.8.72 Together, these mitigation measures will limit the volume of construction traffic, thereby minimising severance and any impact on non-motorised user amenity.

6.8.73 They will also seek to limit the impact of construction traffic during leisure hours where Pen-y-Wal Road south of Llanwonno is often used to access recreational facilities, thereby minimising severance and any impact on non-motorised user amenity.

6.8.74 It is also important to note that the impact of construction traffic is in part driven by the very low baseline traffic flows along Pen-y-Wal Road south of Llanwonno. The addition of temporary peak construction traffic is forecast to increase the daily traffic flow from 100 vehicles per day to 153 vehicles per day.

6.8.75 This increase translates to an average rise in vehicle frequency from one vehicle every fourteen minutes to one every nine minutes.

6.8.76 This means that along the short section of Pen-y-Wal Road south of Llanwonno, there will on average still be significant portions of the day where there are no traffic movements along the receptor, further helping to reduce any perception of severance or loss of non-motorised user amenity.

6.8.77 Taking the additional mitigation into account, it is assessed that the residual impact of severance will be a short term minor adverse residual effect, which is not significant.

6.8.78 Taking the additional mitigation into account, it is assessed that the residual impact of non-motorised user amenity will be a short term minor adverse residual effect, which is not significant.

Construction Traffic – Users of Graigwen Road and Pen-y-Wal Road to the site

6.8.79 An assessment has been completed regarding the impact of construction traffic on users of Graigwen Road and Pen-y-Wal Road to the site, as a net

impact increase in HGV traffic levels of 26% is forecast, as detailed in Table 6.21.

Sensitivity of the receptor

6.8.80 As detailed in Table 6.18, the sensitivity of the receptor is high.

Magnitude of impact

6.8.81 The magnitude of the impact meets Rule 2 of the IEMA guidance for the users of Graigwen Road and Pen-y-Wal Road to the site and has therefore been included in the assessment.

Severance

6.8.82 HGV traffic volumes are forecast to increase during peak construction by 26%. With no simple alternative route to avoid this section of Graigwen Road and Pen-y-Wal Road to the site, the increase in journey length for any walkers, cyclists or horse riders wishing to use this link would be greater than 500m.

6.8.83 However, the change in overall traffic flow along the link is forecast to be just 1% overall considering all vehicles, with only a 26% change in HGV volumes. This falls below the previously established DfT severance significance thresholds and would be considered as negligible.

6.8.84 Considering both the DfT severance thresholds, and LA 112 of the DMRB, the magnitude of the effect is therefore considered to be medium.

Driver Delay

6.8.85 Graigwen Road and Pen-y-Wal Road to the site in the 2029 with Development scenario is forecast to experience an average daily traffic volume of 746 vehicles per day (circa 31 vehicles per hour, or 1 vehicle every 2 minutes). This is significantly within accepted thresholds for theoretical highway capacity. Therefore, this link is not operating at, or close to, capacity.

6.8.86 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

6.8.87 As detailed under Driver Delay, Graigwen Road and Pen-y-Wal Road to the site is not operating at, or close to capacity.

6.8.88 The magnitude of the effect is therefore considered to be negligible.

Non-motorised user amenity

6.8.89 The HGV traffic flows on Graigwen Road and Pen-y-Wal Road to the site are expected to increase by 26%, equivalent to an increase of 2 HGVs per day, from 8 to 10. This corresponds to an average increase from 1 HGV every 3 hours to 1 HGV every 2 hours 24 minutes.

6.8.90 The magnitude of the effect is therefore considered to be low.

Fear and Intimidation

- 6.8.91 The average traffic flow per hour over an 18-hour day along Graigwen Road and Pen-y-Wal Road to the site during both the 2029 Future Baseline and 2029 with development is less than 600, the degree of hazard score is 0.
- 6.8.92 The total 18-hour heavy vehicle flow along Graigwen Road and Pen-y-Wal Road to the site during both the 2029 Future Baseline and 2029 with development is less than 1,000, the degree of hazards score is 0.
- 6.8.93 Graigwen Road is subject to a 20 mph speed limit, with Pen-y-Wal Road to the site subject to the national speed limit. Recorded vehicle speeds along Pen-y-Wal Road are shown to operate in accordance with expected speeds for a narrow country lane, with an ATC recording an average speed of 30.9 mph. Therefore, the degree of hazards score is 20. It is expected that the average speed will remain the same or lower with the addition of construction traffic.
- 6.8.94 The level of fear and intimidation is therefore small (0-20) in the 2029 Future Baseline. In the 2029 with Development scenario, the level of fear and intimidation is also small (0-20).
- 6.8.95 There is no step change in the level of fear and intimidation.
- 6.8.96 The magnitude of the effect is therefore considered to be negligible.

Road Safety

- 6.8.97 One personal injury accident has been recorded along Graigwen Road and Pen-y-Wal Road to the site in the last five years, with one fatality. Refer to ES Volume 6, Appendix 6.1: TS for full information.
- 6.8.98 This notes that the fatal collision occurred in 2023 near the site access on Pen-y-Wal Road. Since then, improvement works associated with the Llwynycelyn Wind Project - including road widening and enhanced visibility - have been implemented in the area. The highway safety audit concludes that the current road alignment does not raise any undue safety concerns.
- 6.8.99 The magnitude of the effect is therefore considered to be negligible.

Significance of the effect

Severance

- 6.8.100 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is medium, it is assessed that there will be a short term moderate adverse effect, which is significant.

Driver Delay

- 6.8.101 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Pedestrian Delay (including all non-motorised users)

- 6.8.102 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Non-motorised user amenity

- 6.8.103 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is low, it is assessed that there will be a short term minor adverse effect, which is not significant.

Fear and Intimidation

- 6.8.104 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Road Safety

- 6.8.105 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Additional mitigation and residual effect

- 6.8.106 IEMA guidelines note that severance is largely influenced by the level of increase in traffic flows and the additional journey length required to take an alternative route.
- 6.8.107 Graigwen Road and Pen-y-Wal Road to the site, routes north from the centre of Pontypridd towards Llanwonno and facilitates access to residential areas and leisure facilities such as Brynffynon Hotel, Saint Gwynno Church, St Gwynno Forestry and Bwl Mx.
- 6.8.108 As a result, it is considered that it is largely used for residential (e.g. commuting, school pick up and drop off) and leisure purposes.
- 6.8.109 While it is not feasible to provide a short alternative route or provide a separated non-motorised user link, it is feasible to limit the impact that construction will have during typical residential and leisure periods, such as at the weekend and weekday evenings.
- 6.8.110 It is noted that Graigwen Road and Pen-y-Wal Road to the site will only experience construction traffic associated with the deliveries of AILs, with a temporary closure while delivery is made.
- 6.8.111 As a result of this, the delivery timings will be strictly controlled, agreed with local highway authorities and South Wales Police, and widely advertised, as per the approach taken for the neighbouring Llwyncelyn Wind Project.
- 6.8.112 This will limit the perception of severance, as users will be able to plan their use of Graigwen Road and Pen-y-Wal Road accordingly, to avoid the widely advertised AIL deliveries.

6.8.113 As this link will only be used for AIL deliveries, there will also be significant portions of the day where there will be no development traffic movements along the receptor, further helping to reduce any perception of severance.

6.8.114 Taking the additional mitigation into account, it is assessed that there will be a short-term minor adverse residual effect, which is not significant.

Construction Traffic – Users of Heol-Y-Mynach north of Ynysybwl

6.8.115 An assessment has been completed regarding the impact of construction traffic on users of Heol-Y-Mynach north of Ynysybwl, as a net impact increase in HGV traffic levels of 97% is forecast, as detailed in Table 6.21.

Sensitivity of the receptor

6.8.116 As detailed in Table 6.18, the sensitivity of the receptor is high.

Magnitude of impact

6.8.117 The magnitude of the impact meets Rule 2 of the IEMA guidance for the users of Heol-Y-Mynach north of Ynysybwl and has therefore been included in the assessment.

Severance

6.8.118 Traffic volumes are forecast to increase during peak construction by 6% (all vehicles) and 97% (HGVs). While part of the link could be avoided by utilising RCT walking and cycling routes, there is no simple alternative route to wholly avoid this section of Heol-Y-Mynach. Therefore, the increase in journey length for any walkers, cyclists or horse riders wishing to use this link would be greater than 500m.

6.8.119 However, the change in overall traffic flow along the link falls below the previously established DfT severance significance thresholds and would be considered as negligible.

6.8.120 Considering both the DfT severance thresholds, and LA 112 of the DMRB, the magnitude of the effect is therefore considered to be medium.

Driver Delay

6.8.121 Heol-Y-Mynach north of Ynysybwl in the 2029 with Development scenario is forecast to experience an average daily traffic volume of 1,169 vehicles per day (circa 1 vehicle every 74 seconds). This is significantly within accepted thresholds for theoretical highway capacity. Therefore, this link is not operating at, or close to, capacity.

6.8.122 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

6.8.123 As detailed under Driver Delay, Heol-Y-Mynach north of Ynysybwl is not operating at, or close to capacity.

6.8.124 The magnitude of the effect is therefore considered to be negligible.

Non-motorised user amenity

- 6.8.125 The HGV traffic flows on Heol-Y-Mynach north of Ynysybwl are expected to increase by 97%, representing an increase in 17 HGVs per day, from 17 to 34. This corresponds to an average increase from 1 HGV per 85 minutes to 1 HGV per 42 minutes.
- 6.8.126 The magnitude of the effect is therefore considered to be high.

Fear and Intimidation

- 6.8.127 The average traffic flow per hour over an 18-hour day along Heol-Y-Mynach north of Ynysybwl during both the 2029 Future Baseline and 2029 with development is less than 600, the degree of hazard score is 0.
- 6.8.128 The total 18-hour heavy vehicle flow along Heol-Y-Mynach north of Ynysybwl during both the 2029 Future Baseline and 2029 with development is less than 1,000, the degree of hazards score is 0.
- 6.8.129 Heol-Y-Mynach is initially subject to a 30-mph speed limit, increasing to 40 mph and then the national speed limit to the north of Llechwen. To provide a robust worse-case assessment, it is assumed that average speeds are greater than 40 mph and so the degree of hazards score is 30. It is expected that the average speed will remain the same or lower with the addition of construction traffic.
- 6.8.130 The level of fear and intimidation is therefore moderate (21-40) in the 2029 Future Baseline. In the 2029 with Development scenario, the level of fear and intimidation is also moderate (21-40).
- 6.8.131 There is no step change in the level of fear and intimidation.
- 6.8.132 The magnitude of the effect is therefore considered to be negligible.

Road Safety

- 6.8.133 No personal injury accidents have been recorded along Heol-Y-Mynach north of Ynysybwl in the last five years. It is considered that the current alignment of Heol-Y-Mynach north of Ynysybwl does not present any undue highway safety concerns for road users.
- 6.8.134 The magnitude of the effect is therefore considered to be negligible.

Significance of the effect

Severance

- 6.8.135 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is medium, it is assessed that there will be a short term moderate adverse effect, which is significant.

Driver Delay

- 6.8.136 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Pedestrian Delay (including all non-motorised users)

- 6.8.137 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Non-motorised user amenity

- 6.8.138 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is high, it is assessed that there will be a short term major adverse effect, which is significant.

Fear and Intimidation

- 6.8.139 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Road Safety

- 6.8.140 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Additional mitigation and residual effect

- 6.8.141 IEMA guidelines note that severance is largely influenced by the level of increase in traffic flows and the additional journey length required to take an alternative route. Non-motorised user amenity is largely affected by traffic flow, traffic composition and separation from traffic.
- 6.8.142 Heol-Y-Mynach north of Ynysybwl is a rural road, routing north from Ynysybwl towards Perthcelyn and Llanwonno, facilitating access to farms and leisure facilities such as Perthcelyn Reservoir, Hendre-Rhys, Brynffynon Hotel, Saint Gwynno Church, St Gwynno Forestry and Bwl Mx.
- 6.8.143 As a result, it is considered that it is largely used for leisure purposes.
- 6.8.144 While it is not feasible to provide a short alternative route or provide a separated non-motorised user link, it is feasible to limit the impact that construction will have during typical 'leisure-use' periods, such as at the weekend and weekday evenings.
- 6.8.145 A TMP, secured via planning consent, can mitigate severance and impacts on non-motorised user amenity through:
- Limiting site working hours to minimise the impact on leisure users.

- Ensuring that through the detailed design process, proposals are refined to minimise the volume of construction traffic, such as reducing off-site material imports.
- Providing a public information campaign to inform receptor users of expected abnormal load movements, enabling users to plan their leisure activities outside of these periods.

6.8.146 Additionally, a Staff Travel Plan, also secured via planning consent, can further reduce severance and impacts on non-motorised user amenity by encouraging sustainable staff travel through measures such as:

- Appointment of a Travel Plan Co-ordinator.
- Provision of information on active travel modes.
- Provision of information regarding access by public transport.
- Implementation and promotion of a Car Sharing scheme.
- Implementation and promotion of staff minibus service.
- Car park management, such as preferential spaces for car-sharers.

6.8.147 Together, these mitigation measures will limit the volume of construction traffic, thereby minimising severance and any impact on non-motorised user amenity.

6.8.148 They will also seek to limit the impact of construction traffic during leisure hours where Heol-Y-Mynach north of Ynysybwl is often used to access recreational facilities, thereby minimising severance and any impact on non-motorised user amenity.

6.8.149 It is also important to note that the impact of construction traffic is in part driven by the very low baseline HGV flows along Heol-Y-Mynach north of Ynysybwl. The addition of temporary peak HGV construction traffic is forecast to increase the daily HGV flow from 17 HGVs per day to 34 HGVs per day.

6.8.150 This corresponds to an average increase from 1 HGV per 85 minutes to 1 HGV per 42 minutes.

6.8.151 This means that along the section of Heol-Y-Mynach north of Ynysybwl, there will on average still be significant portions of the day where there are no HGV movements along the receptor, further helping to reduce any perception of severance or loss of non-motorised user amenity.

6.8.152 Taking the additional mitigation into account, it is assessed that the residual impact of severance will be a short term minor adverse residual effect, which is not significant.

6.8.153 Taking the additional mitigation into account, it is assessed that the residual impact of non-motorised user amenity will be a short term minor adverse residual effect, which is not significant.

Construction Traffic – Residents of Pontypridd in vicinity of Graigwen Road

6.8.154 An assessment has been completed regarding the impact of construction traffic on residents of Pontypridd in vicinity of Graigwen Road, as a net impact increase in HGV traffic levels of 26% is forecast, as detailed in Table 6.21.

Sensitivity of the receptor

- 6.8.155 As detailed in Table 6.18, the sensitivity of the receptor is high.

Magnitude of impact

- 6.8.156 The magnitude of the impact meets Rule 2 of the IEMA guidance for the residents of Pontypridd in vicinity of Graigwen Road and has therefore been included in the assessment.

Severance

- 6.8.157 HGV traffic volumes are forecast to increase during peak construction by 26%. With no simple alternative route to avoid this section of Graigwen Road, the increase in journey length for any walkers, cyclists or horse riders wishing to use this link would be greater than 500m.
- 6.8.158 However, the change in overall traffic flow along the link is forecast to be just 1% overall considering all vehicles, with only a 26% change in HGV volumes. This falls below the previously established DfT severance significance thresholds and would be considered as negligible.
- 6.8.159 Considering both the DfT severance thresholds, and LA 112 of the DMRB, the magnitude of the effect is therefore considered to be medium.

Driver Delay

- 6.8.160 Graigwen Road in the 2029 with Development scenario is forecast to experience an average daily traffic volume of 746 vehicles per day (circa 31 vehicles per hour, or 1 vehicle every 2 minutes). This is significantly within accepted thresholds for theoretical highway capacity. Therefore, this link is not operating at, or close to, capacity.
- 6.8.161 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

- 6.8.162 As detailed under Driver Delay, Graigwen Road and Pen-y-Wal Road to the site is not operating at, or close to capacity.
- 6.8.163 The magnitude of the effect on residents is therefore considered to be negligible.

Non-motorised user amenity

- 6.8.164 The HGV traffic flows on Graigwen Road are expected to increase by 26%, equivalent to an increase of 2 HGVs per day, from 8 to 10. This corresponds to an average increase from 1 HGV every 3 hours to 1 HGV every 2 hours 24 minutes.

The magnitude of the effect is therefore considered to be low.

Fear and Intimidation

- 6.8.165 The average traffic flow per hour over an 18-hour day along Graigwen Road and Pen-y-Wal Road to the site during both the 2029 Future Baseline and 2029 with development is less than 600, the degree of hazard score is 0.
- 6.8.166 The total 18-hour heavy vehicle flow along Graigwen Road and Pen-y-Wal Road to the site during both the 2029 Future Baseline and 2029 with development is less than 1,000, the degree of hazards score is 0.
- 6.8.167 Graigwen Road is subject to a 20 mph speed limit, with Pen-y-Wal Road to the site subject to the national speed limit. Recorded vehicle speeds along Pen-y-Wal Road are shown to operate in accordance with expected speeds for a narrow country lane, with an ATC recording an average speed of 30.9 mph. Therefore, the degree of hazards score is 20. It is expected that the average speed will remain the same or lower with the addition of construction traffic.
- 6.8.168 The level of fear and intimidation is therefore small (0-20) in the 2029 Future Baseline. In the 2029 with Development scenario, the level of fear and intimidation is also small (0-20).
- 6.8.169 There is no step change in the level of fear and intimidation.
- 6.8.170 The magnitude of the effect is therefore considered to be negligible.

Road Safety

- 6.8.171 No personal injury accidents have been recorded along Graigwen Road in the last five years.
- 6.8.172 The magnitude of the effect is therefore considered to be negligible.

Significance of the effect

Severance

- 6.8.173 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is medium, it is assessed that there will be a short term moderate adverse effect, which is significant.

Driver Delay

- 6.8.174 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Pedestrian Delay (including all non-motorised users)

- 6.8.175 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Non-motorised user amenity

- 6.8.176 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is low, it is assessed that there will be a short term minor adverse effect, which is not significant.

Fear and Intimidation

- 6.8.177 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Road Safety

- 6.8.178 On the basis that the sensitivity of the receptor is high, and the magnitude of the impact is negligible, it is assessed that there will be a short-term minor effect, which is not significant.

Additional mitigation and residual effect

- 6.8.179 IEMA guidelines note that severance is largely influenced by the level of increase in traffic flows and the additional journey length required to take an alternative route.
- 6.8.180 Graigwen Road, routes north from the centre of Pontypridd towards Llanwonno and facilitates access to residential areas and leisure facilities such as Brynffynon Hotel, Saint Gwynno Church, St Gwynno Forestry and Bwl Mx.
- 6.8.181 As a result, it is considered that it is largely used for residential (e.g. commuting, school pick up and drop off) and leisure purposes.
- 6.8.182 While it is not feasible to provide a short alternative route or provide a separated non-motorised user link, it is feasible to limit the impact that construction will have during typical residential and leisure periods, such as at the weekend and weekday evenings.
- 6.8.183 It is noted that Graigwen Road will only experience construction traffic associated with the deliveries of AILs, with a temporary closure while delivery is made.
- 6.8.184 As a result of this, the delivery timings will be strictly controlled, agreed with local highway authorities and South Wales Police, and widely advertised, as per the approach taken for the neighbouring Llwyncelyn Wind Project.
- 6.8.185 This will limit the perception of severance, as users will be able to plan their use of Graigwen Road accordingly, to avoid the widely advertised AIL deliveries.
- 6.8.186 As this link will only be used for AIL deliveries, there will also be significant portions of the day where there will be no development traffic movements along the receptor, further helping to reduce any perception of severance.
- 6.8.187 Taking the additional mitigation into account, it is assessed that there will be a short-term minor adverse residual effect, which is not significant.

Operation and maintenance

- 6.8.188 Operational traffic is not scoped into the Transport EIA as operational traffic levels are minimal.

Decommissioning

- 6.8.189 Decommissioning traffic is not scoped into the Transport EIA as traffic volumes will be lower than the construction phase.

6.9 Cumulative Effects

- 6.9.1 The assessment of cumulative effects for Transport has followed the methodology set out in Volume 1, Section 4: Approach to Environmental Assessment. As part of the assessment, all projects and plans considered alongside the Proposed Development have been allocated into 'tiers' reflecting their current stage within the planning and development process.
- 6.9.2 Volume 1, Section 4: Approach to Environmental Assessment lists the cumulative projects considered as part of this ES.
- 6.9.3 In line with the Scoping Report, only nearby consented developments will be included in future baseline year traffic flows.
- 6.9.4 This review has identified two consented developments which are not energy-related projects. Both developments involve not-significant scale residential schemes, each with a likely traffic impact below 10%. Their anticipated development traffic volumes have already been accounted for within the TEMPro growth rates that underpin the 2029 Future Baseline traffic flows.
- 6.9.5 Although several other consented energy projects have been identified, the only shared interaction with the Transport Study area would likely occur along the A470 corridor. Given that the A470 is a strategic component of the Trunk Road Network, designed to accommodate substantial traffic volumes, any additional impact from these projects would not be significant within the context of the study area.
- 6.9.6 Moreover, including these energy schemes as cumulative developments would result in an increase in baseline traffic volumes. This elevated baseline would effectively reduce the relative impact of development traffic associated with Llanwonno Energy Project, thereby diminishing the minor effects anticipated from short-term construction traffic linked to this application.
- 6.9.7 Therefore, these additional energy-related projects have not been included as cumulative developments for Transport purposes.
- 6.9.8 Any potential effects arising from simultaneous construction at multiple sites would be effectively managed through a comprehensive TMP, supported by a phased delivery schedule agreed upon by local highway authorities, SWTRA, and South Wales Police.
- 6.9.9 Accordingly, no residual cumulative transport effects are anticipated during the construction phase of the proposed development.

6.10 Summary of environmental effects, mitigation measures and monitoring

- 6.10.1 Table 6.24 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 6.24: Summary of potential environmental effects, mitigation and monitoring

Receptor	Description of impact	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Users of Bryn Ffynon east of Llanwonno	Severance	Medium	High	Short-term moderate adverse, significant	TMP Staff Travel Plan	Short-term minor, not significant	n/a
	Driver Delay	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Pedestrian Delay (including all non-motorised users)	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Non-motorised user amenity	Low	High	Short-term minor, not significant	n/a	n/a	n/a
	Fear and Intimidation	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Road Safety	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
Users of Pen-y-Wal Road south of Llanwonno	Severance	High	High	Short-term major adverse, significant	TMP Staff Travel Plan	Short-term minor, not significant	n/a
	Driver Delay	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Pedestrian Delay (including all non-motorised users)	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Non-motorised user amenity	High	High	Short-term major adverse, significant	TMP Staff Travel Plan	Short-term minor, not significant	n/a
	Fear and Intimidation	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Road Safety	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
Users of Graigwen Road and Pen-y-Wal Road to the site	Severance	Medium	High	Short-term moderate adverse, significant	CTMP Staff Travel Plan AIL Publicity	Short-term minor, not significant	n/a
	Driver Delay	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a

Receptor	Description of impact	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	Pedestrian Delay (including all non-motorised users)	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Non-motorised user amenity	Low	High	Short-term minor, not significant	n/a	n/a	n/a
	Fear and Intimidation	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Road Safety	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
Users of Heol-Y-Mynach north of Ynysybwl	Severance	Medium	High	Short-term moderate adverse, significant	TMP Staff Travel Plan	Short-term minor, not significant	n/a
	Driver Delay	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Pedestrian Delay (including all non-motorised users)	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Non-motorised user amenity	High	High	Short-term major adverse, significant	TMP Staff Travel Plan	Short-term minor, not significant	n/a
	Fear and Intimidation	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Road Safety	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
Residents of Pontypridd in vicinity of Graigwen Road	Severance	Medium	High	Short-term moderate adverse, significant	CTMP Staff Travel Plan AIL Publicity	Short-term minor, not significant	n/a
	Driver Delay	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Pedestrian Delay (including all non-motorised users)	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a

Receptor	Description of impact	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	Non-motorised user amenity	Low	High	Short-term minor, not significant	n/a	n/a	n/a
	Fear and Intimidation	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a
	Road Safety	Negligible	High	Short-term minor, not significant	n/a	n/a	n/a

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 7: Hydrology and Flood Risk

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7.2	Conceptual Drainage Strategy

Glossary

Term	Meaning
Applicant	Cenin Renewables Ltd
Aquifer	A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater
Baseline	The status of the landscape without the development in place.
Catchment	An area of land drained by a watercourse and defined by a watershed.
CIRIA	The Construction Industry Research and Information Association. It is an independent, not-for-profit, member-based research organisation that exists to champion performance improvement in construction.
Cumulative Effects	The combined effect of the Llanwonno Energy Project in combination with the effects from other proposed developments, on the same receptor or resource.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
Greenfield Runoff Rate	Rates of surface water runoff from a site that is undeveloped (greenfield).
Groundwater	All water which is below the surface of the ground in the saturated zone and in direct contact with the ground or subsoil.
Llanwonno Energy Project (the "Proposed Development")	The energy project located south of Llanwonno, which comprises wind turbines and solar photovoltaic array with a combined installed generation capacity of approximately 61 MW, Battery Energy Storage System (BESS), cable route and ancillary development (referred to as the "Proposed Development").
Lead Local Flood Authority	Authorities that have responsibility for developing a Local Flood Risk Management Strategy for their area identifying local sources of flooding. The local strategy produced must be consistent with the national strategy. It will set out the local organisations with responsibility for flood risk in the area, partnership arrangements to ensure co-ordination between these organisations, an assessment of the flood risk, and plans and actions for managing the risk.

Term	Meaning
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils.
Main Rivers	The term used to describe a watercourse designated as a Main River under the Water Resources Act 1991 and shown on the Main River Map.
Ordinary Watercourse	Watercourses (such as a river, stream, ditch, cut, sluice, dyke or non-public sewer) that are not designated a Main River under the Water Resources Act (1991). Responsibility for management lies with the Lead Local Flood Authority, or Internal Drainage Board for some watercourses where there is an Internal Drainage District.
Secondary A Aquifer	Secondary A Aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers.
Source Protection Zone	These zones identify areas of land through which water infiltrates into a groundwater borehole, well or spring that is used for public drinking water supply and provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction.
Special Protection Area (SPA)	A site designation specified in the Conservation of Habitats and Species Regulations 2017, classified for rare and vulnerable birds, and for regularly occurring migratory species. Special Protection Areas contribute to the national site network.
Strategic Flood Risk Assessment	An assessment that provides information on areas at risk from all sources of flooding.
Study Area	This is an area which is defined for each environmental topic which includes the Site as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Surface Water Runoff	Surface water runoff is flow of water that occurs when excess stormwater, meltwater, or other sources of water flows over a surface
Sustainable Drainage Systems	A sequence of management practices and control measures designed to mimic natural drainage processes by allowing rainfall to infiltrate, and by attenuating and conveying surface water runoff slowly at peak times.
Undifferentiated Aquifers	Undifferentiated or unproductive strata, reflecting the distribution of superficial deposits with low permeability.

Term	Meaning
Water Framework Directive	Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. The Water Framework Directive promotes water management through river basin planning. It covers inland surface waters, estuarine waters, coastal waters and groundwater.
Water Quality	The physical, chemical and biological characteristics of water.
Zone of Influence	Water bodies that are within, intersect or which are hydrologically connected to the development.

Abbreviations/ Acronyms

Abbreviation	Meaning
AOD	Above Ordnance Datum
CEA	Cumulative Effects Assessment
CIRIA	Construction Industry Research and Information Association
ES	Environmental Statement
FCA	Flood Consequence Assessment
LPA	Local Planning Authority
PPW	Planning Policy Wales
RCTCBC	Rhondda Cynon Taf County Borough Council
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Urban Drainage System
WFD	Water Framework Directive

Units

Unit	Description
%	Percentage
ha	Hectare
km	Kilometre

Unit	Description
kV	Kilovolt
m	Metre
m ²	Square Metre

7 Hydrology and Flood Risk

7.1 Introduction

7.1.1 The chapter of the Environmental Statement (ES) considers the likely impacts and effects of the proposed Llanwonno Energy Project (referred to as the “Proposed Development”) on hydrology and flood risk during the construction, operation and maintenance, and decommissioning phases.

7.1.2 This chapter describes the assessment methodology; the baseline conditions currently existing at the Proposed Development Site (referred to hereafter as the “Site”) and in the surrounding area; the mitigation measures implemented as part of the Proposed Development to prevent, reduce or offset any significant adverse effects; and the likely effects on the water environment after these measures have been employed. The need for any further mitigation or monitoring requirements is identified.

7.1.3 This chapter of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, 2024) and subsequent EIA Scoping Direction (PEDW, 2025). In addition, this chapter of the ES has been informed by the following documents submitted with the application for the DNS:

ES Chapters

- Volume 1, Chapter 9: Ecology; and
- Volume 1, Chapter 15: Geology and Hydrogeology.

ES Appendices

- Volume 3, Appendix 7.1: Flood Consequence Assessment
- Volume 3, Appendix 7.2: Conceptual Drainage Strategy

7.2 Legislation and Policy

Legislation

7.2.1 Legislation relevant to hydrology and flood risk is as follows:

- Water Resources Act 1991;
- The Environmental Permitting (England and Wales) Regulations 2016;
- Land Drainage Act 1991;
- The Flood and Water Management Act 2010; and
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

National and Local Policy

7.2.2 The planning policy relevant to the assessment of hydrology and flood risk for the Proposed Development are summarised in Table 7.1 below.

Table 7.1: Summary of policy relevant to this chapter of the ES

Summary of provision	How and where considered in the ES
Future Wales: The National Plan 2040 (2021)	
Policy 8 - Flooding Opportunities for multiple social, economic and environmental benefits must be maximised when investing in flood risk management infrastructure. It must be ensured that projects do not have adverse impacts on international and national statutory designated sites for nature conservation and the features for which they have been designated. [Page 74 of Future Wales: The National Plan 2040]	Flood risk at the Site is summarised in Section 7.6 of this ES chapter. A full Flood Consequence Assessment (FCA) has been prepared for submission within the DNS application and is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment. The FCA concludes that the majority of the study area is located within DAM Zone A, Fluvial and Tidal Flood Zone 1 and has a low risk of flooding from all sources. There is a small portion of Zone B, C2 and C1 towards the southern extent of the study area. Mitigation measures to be adopted as part of the development are discussed in Section 7.7.
Planning Policy Wales Edition 12	
Chapter 6: Distinctive and Natural Places Outlines the Welsh Government's objectives in terms of addressing water and flood risk. Section 6.6. of PPW Edition 12 highlights the planning system should: • protect and improve water resources and quality by promoting and encouraging increased efficiency and demand management of water as part of new developments; • ensure that the infrastructure networks, including nature based solutions on which communities and businesses depend is adequate to accommodate proposed development, and takes into	A Drainage Strategy has been prepared for submission within the DNS application and is presented within Volume 3, Appendix 7.2: Conceptual Drainage Strategy, which includes pollution mitigation measures and allowances for climate change. Sustainable Drainage Systems (SuDS) have been proposed to provide surface water treatment and attenuation prior to the discharge of surface water flows off-site. Furthermore, mitigation measures ensure the protection of the quantity and quality of water supplies is proposed as part of the Proposed Development are detailed within Table 7.16.

Summary of provision	How and where considered in the ES
consideration the impacts of climate change, so as to minimise risk to human health and the environment and prevent pollution at source; • ensure sustainable drainage systems are an integral part of design approaches for new development; and • ensure the protection of the quantity and quality of surface and ground water supplies is taken into account as part of development proposals.	
TAN15: Development and Flood Risk	
The following information should be considered for proposed developments: • The consequences of flooding on the development, the consequences of the development on flood risk elsewhere and if appropriate mitigation measures can be incorporated into the design. • Mechanisms of flooding, including sources of floodwater, how floodwater enters and flows across a site, height, and speed of floodwaters. • Uncertainties in estimating flood events including use of historical records and forecasting. • Security of proposed developments over their lifetime and ensuring those using the development have an awareness of the potential risks from flooding. • Description of consequences under a range of extreme events including mechanisms, sources, depths, speed, rate of rise, overland flood routes, velocity, access and egress, impacts on natural heritage, and impact on flood risk in surrounding areas.	Flood risk at the Site is summarised in Section 7.6 of this ES chapter. A full FCA has been prepared for submission within the DNS application and is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment. The FCA concludes that the majority of the study area is located within DAM Zone A, Fluvial and Tidal Flood Zone 1 and has a low risk of flooding from all sources. As such, the Proposed Development is understood to pass the Justification Test. While there is a small portion of Zone B, C2 and C1 towards the southern extent of the 1 km buffer zone of the Site. As this is outside the Site boundaries, no further assessment has been made. Flood risk at the Site is summarised in Section 7.6. Mitigation measures have been proposed, where required, to ensure flood risk from all sources and vulnerability of site users are managed throughout the construction, operation and maintenance, and decommissioning of the Proposed Development (see Table 7.16).

Summary of provision	How and where considered in the ES
- Structural adequacy of defences to contain flows and withstand overtopping and if required the suitability of implementing a buffer zone adjacent to defences. - Measures required to ensure flooding is managed to acceptable levels and ensure that the impact upon flood risk elsewhere in the flood plain is managed.	
Rhondda Cynon Taf County Borough Council (RCTCBC) Local Plan	
Policy AW 2 - Sustainable Locations In order to ensure that development proposals on non-allocated sites support the objectives of the plan, development proposals will only be supported in sustainable locations. Do not permit highly vulnerable development and Emergency Services within Zone C2 floodplain. Within Zone C development will be permitted where it can be justified that: - It is necessary to assist the regeneration of a Principal Town or Key Settlement including the key employment objectives, or where development involves a large brownfield site. - The potential consequences of a flooding event have been considered and found to be acceptable in accordance with national guidance and meet the definition of previously developed land.	Flood risk at the Site is summarised in Section 7.6 of this ES chapter. A full FCA has been prepared for submission within the DNS application and is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment. The FCA concludes that the majority of the study area is located within DAM Zone A, Fluvial and Tidal Flood Zone 1 and has a low risk of flooding from all sources. There is a small portion of Zone B, C2 and C1 towards the southern extent of the study area. Hardstanding development is located outside of the flood zones in line with Policy AW 2.
Policy AW 10 - Environmental Protection and Public Health Climate change will affect the amount of rain that falls, it will impact upon river flows, replenishing of groundwater, the quality of water available and incidents of flooding, particularly localised flash flooding. The demands and pressures on water resources will also change.	Flood risk at the Site is summarised in Section 7.6 of this ES chapter. A full FCA has been prepared for submission within the DNS application and is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment and includes an assessment from surface water flooding as a result of rainfall events.

Summary of provision	How and where considered in the ES
The approach to the protection of the water environment will need to take into account the quality and quantity of the local water resource and how both will impact upon the wider environment.	The Site is predominantly located within the Natural Resources Wales (NRW) Small watercourses and Surface Water Flood Zone 1, with marginal, isolated areas of surface water ponding on-site classified as Flood Zone 2. It is noted this mapping accounts for the impacts of climate change on peak rainfall intensities. The impacts on water resources and water quality are considered in Section 7.8 of this ES chapter.

7.3 Consultation and Engagement

Scoping

- 7.3.1 In September 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 7.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 14 February 2025. Key issues raised by statutory bodies specific to hydrology and flood risk are listed in Table 7.2, including how and where these have been considered in the ES.
- 7.3.3 In addition, consultation and engagement with interested parties specific to hydrology and flood risk has continued. These included discussions with RCTCBC and NRW regarding specific requirements relevant to flood risk. Further detail regarding key items discussed and how these have been addressed is provided in Table 7.2 below.

Table 7.2: Summary of key scoping responses relevant to hydrology and flood risk

Comment	How and where considered in the ES
PEDW	
[ID.31] The applicant's attention is drawn to comments from RCTCBC regarding drainage requirements, highlighting the site is a Greenfield area and therefore a key element required under TAN15 will be the site's surface water discharge rates. PEDW welcomes the SR states that a Flood Consequence Assessment (FCA) will be prepared. PEDW recommends the	A Drainage Strategy has been prepared and is presented within Volume 3, Appendix 7.2: Conceptual Drainage Strategy which includes SuDS features, pollution mitigation measures and allowances for climate change. A full FCA has been prepared for submission within the DNS application and is presented within Volume 3,

Comment	How and where considered in the ES
FCA is included as a technical appendix to the ES.	Appendix 7.1: Flood Consequence Assessment.
[ID.32] The applicant's attention is drawn to comments from NRW highlighting cable trenches can behave as preferential pathways for stormwater and shallow subsurface flows. NRW advises that current natural drainage pathways must be maintained as much as possible. NRW states further information is required to confirm what provisions are in place to ensure that cable trenches as well as access tracks do not act as a potential pathway for the movement of shallow water / stormwater. PEDW recommends the applicant liaises directly with NRW to discuss these concerns, ensuring this matter is appropriately addressed in the ES.	Cable trenches are to be installed adjacent to access tracks. The potential for cable trenching to be used as a preferential pathway for surface water runoff is assessed within Section 7.8 (see 'The impact of increased flood risk arising from additional surface water runoff'). Mitigation measures proposed as part of the Proposed Development are detailed in Table 7.16, including a Construction Environmental Management Plan (CEMP) to ensure flood risk and water quality is adequately managed during construction and is to be submitted as part of the DNS. Consultation with NRW will be undertaken as part of the DNS to ensure the appropriate cable crossing are used at watercourses within the study area.
[ID.33] NRW states that due to the size of the site, and the topography of the land, there is the potential for the water quality to be affected during the construction phase, caused by surface runoff. NRW notes a CEMP will be prepared and the applicant's attention is drawn to their comments on the details that should be included. The applicant's attention is also drawn to comments from NRW highlighting that drainage and stormwater management provisions have not been considered. NRW advises the nature of the ground and groundwater conditions at each of the proposed turbine locations should be used to inform the risk profile for construction and operation, adding that some degree of dewatering may be required, which can affect the local water environment. The applicant's attention is also drawn to NRW's comments highlighting general	In regards to surface water runoff during operation and maintenance, a Drainage Strategy has been prepared and is presented within Volume 3, Appendix 7.2: Conceptual Drainage Strategy and includes attenuation of surface water up to and including the 1 in 100-year + 40% climate change rainfall event and pollution prevention measures in-line with CIRIA guidance. A CEMP will look to ensure flood risk and water quality is adequately managed during construction and is to be submitted as part of the DNS. Consultation with NRW will be undertaken as part of the DNS to ensure the appropriate cable crossing are used at watercourses within the study area.

Comment	How and where considered in the ES
pollution prevention guidance available around working in or near water. PEDW recommends the applicant liaises directly with NRW to discuss these matters, ensuring they are appropriately addressed in the ES. PEDW also recommends the CEMP is included as a technical appendix to the ES.	
[ID.34] PEDW notes the SR proposes to scope out the impact of the deterioration of water quality of waterbodies (surface water and groundwater) during the operation phase. The applicant's attention is drawn to comments from NRW regarding operational contamination risks. NRW highlights the potential for pollution of the water environment as a result of infrastructure catastrophic failure, including the release of hazardous chemicals from wind turbines from leakage, explosion or fire. NRW advises that as likely significant effects from such infrastructure failure upon the water environment cannot be ruled out, this matter should be scoped into the ES and that an operational risk assessment on pollution prevention should be prepared. Given these concerns, the impact on water quality of waterbodies (surface water and groundwater) during the operation phase is scoped into the ES. PEDW recommends the operational risk assessment on pollution prevention is included as a technical appendix to the ES. PEDW further recommends the applicant liaises directly with NRW on these matters, ensuring they are adequately addressed in the ES. Any departure from the advice provided by NRW should be supported by a robust rationale in the ES.	The impact on water quality of waterbodies (surface water and groundwater) during the operation and maintenance phase has been scoped in to the ES. This is assessed within Section 7.8 of this ES chapter. In regards to surface water runoff during operation and maintenance, a Drainage Strategy has been prepared and is presented Volume 3, Appendix 7.2: Conceptual Drainage Strategy and includes attenuation of surface water up to and including the 1 in 100-year + 40% climate change rainfall event and pollution prevention measures in-line with CIRIA guidance. An Outline Operational Surface Water Drainage Strategy will be developed as part of the DNS application and will include SuDS and pollution mitigation measures to be implemented during the operation of the development. In case of catastrophic failure, response measures, such as a penstock valve, will be included in the strategy to prevent impacts on water quality. Consultation with NRW will be undertaken as part of the DNS to ensure the appropriate cable crossing are used at watercourses within the study area.
[ID.35] PEDW notes the SR proposes to scope out the impact of increased flood risk arising from additional surface water runoff and the deterioration of water	Future flood risk has been assessed within the FCA, with a summary of findings presented within Section 7.6. A full FCA has been prepared for

Comment	How and where considered in the ES
quality of waterbodies (surface water and groundwater) during the decommissioning phase, as activities are to be similar to the construction phase. Environmental and operating conditions are subject to change over the operational life and as such decommissioning is not simply a reverse of construction. The SR states that a Decommissioning Plan will be produced and will outline how risks can be removed or mitigated, including details of how surface water drainage should be managed during the decommissioning, and measures to prevent pollution. Therefore, the impact of increased flood risk arising from additional surface water runoff and the deterioration of water quality of waterbodies (surface water and groundwater) during the decommissioning phase is scoped into the ES in a proportionate manner. Given that the applicant will be relying on a Decommissioning Plan to mitigate any potential impacts, a draft Decommissioning Plan should be included as a technical appendix to the ES.	submission within the DNS application and is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment. Furthermore, Section 7.6 has taken into account how climate change is expected to impact the hydrology and flood risk study area. The impact of increased flood risk arising from additional surface water runoff and the deterioration of water quality of waterbodies (surface water and groundwater) during the decommissioning phase has been scoped into the assessment in a proportionate manner. Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction). Reference to the Decommissioning Plan is provided within the Project Description (see Volume 1, Chapter 2 of the ES).
Natural Resource Wales CAS-265979-K0V6	
The site is surrounded by multiple tributaries and ordinary watercourses, consisting of, but not limited to Nant Hafod, Nant Blaenhenwysg, Llys Nant, and a tributary of the Nant Clydach (Moderate Water Framework Directive (WFD)). We advise that the local water environment has the potential to be impacted during the construction and operational phases.	To assess potential impacts relating to hydrology and flood risk, the impact of increased flood risk arising from additional surface water runoff and the deterioration of water quality of waterbodies (surface water and groundwater) have been scoped in during construction, operation and maintenance phase and decommissioning. The baseline environment is discussed within Section 7.6 which summarises the existing environment including surrounding watercourses and tributaries. Impacts on these receptors are then assessed within Section 7.8.

Comment	How and where considered in the ES
Due to the size of the site, and the topography of the land, there is the potential for the water quality to be affected during the construction phase of this infrastructure project, caused by surface runoff. We note that a Construction Environmental Management Plan will be prepared. We recommend this includes the following details: • Construction methods: details of materials, how waste generated will be managed • General Site Management: details of the construction programme including timetable, details of site clearance; details of site construction drainage, containments areas, appropriately sized buffer zones between storage areas (of spoil, oils, fuels, concrete mixing and washing areas) and any watercourse or surface drain • Soil Management: details of topsoil strip, storage and amelioration for re-use • Resource Management: details of fuel and chemical storage and containment • Traffic Management: details of site deliveries, plant on site, wheel wash facilities • Pollution Prevention: demonstrate how relevant Guidelines for Pollution Prevention and best practice will be implemented, including details of emergency spill procedures and incident response plan • Details of the persons and bodies responsible for activities associated with the CEMP and emergency contact details • Construction Surface Water Management Plan (CSWMP): details of the management of surface water quality and quantity throughout the	To assess potential impacts relating to hydrology and flood risk, the impact of increased flood risk arising from additional surface water runoff and the deterioration of water quality of waterbodies (surface water and groundwater) have been scoped in during construction, operation and maintenance phase and decommissioning. Cable trenches are to be located adjacent to access tracks. The potential for cable trenching to be used as a preferential pathway for surface water runoff is assessed within Section 7.8 'The impact of increased flood risk arising from additional surface water runoff'. A CEMP will be prepared for the DNS application and will look to ensure flood risk and water quality is adequately managed during construction and is to be submitted as part of the DNS.

Comment	How and where considered in the ES
construction process to mitigate impacts off site General pollution prevention guidance around working in or near water can be found in <i>Guidance for Pollution Prevention (GPP) 5: Works and maintenance in or near water</i>, and <i>GPP 6: Working on construction and demolition sites</i>, which are available on the NetRegs website. We note that the cable trenches will run alongside the tracks. It is recognised that typical cable trenches are often partially filled with a sand layer which will likely possess a higher hydraulic conductivity in comparison to natural ground materials. These sands can therefore behave as a preferential pathway, notably for stormwater and shallow subsurface flows. We advise that current natural drainage pathways must be maintained as much as possible. Further information is needed to confirm what provisions are in place to ensure that cable trenches do not act as a potential pathway for the movement of shallow water/stormwater.	
We advise that there is potential for pollution of the water environment as a result of infrastructure catastrophic failure, which may include the release of hazardous chemicals from one or more of the wind turbines from leakage, explosion or fire. We advise that the likely significant effects from such infrastructure failure upon the water environment cannot be ruled out, and as such this matter should be scoped into the ES. We advise that an operational risk assessment on pollution prevention should be prepared.	To assess potential impacts relating to water quality during operation and maintenance arising from catastrophic failure, the impact of deterioration of water quality of waterbodies (surface water and groundwater) has been scoped in during the operation and maintenance phase. Impacts are assessed within Section 7.8. Operational mitigation measures are listed within Table 7.16 and include a surface water drainage strategy.
It is possible that one or more private water supplies may be relied upon and the location and nature of these supplies should be scoped in to the ES. We note that drainage and stormwater management provisions have not been considered. The nature of the ground and	To assess potential impacts relating to the impacts to private water supplies, the impact of deterioration of water quality of waterbodies (surface water and groundwater) has been scoped in during construction, operation and

Comment	How and where considered in the ES
groundwater conditions at each of the proposed turbine locations should be used to inform the risk profile for construction and operation. Sometimes turbine foundation excavations require some degree of dewatering, and these activities can affect the local water environment.	maintenance phase and decommissioning. Impacts are assessed within Section 7.8. Operational mitigation measures are listed within Table 7.16 and include a surface water drainage strategy and outline maintenance plan.
All freshwater surface waterbodies (excluding foul) are covered by the WFD and are therefore protected from pollution, modification and abstraction. This application should consider measures to protect, and where possible, improve them to the extent needed to achieve the objectives for water bodies to which they are directly or indirectly connected A Resilient Wales, one of the seven well-being goals outlined in the Well-being of Future Generations (Wales) Act 2015, is defined as “A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change.” For this reason, a clear-span bridge would always be the preferred option when a watercourse crossing is required and failing that a bottomless arch culvert. If this is not feasible, we would suggest that an assessment be carried out to outline why a different type of culvert was chosen over the other methods.	Cable trenches are to be located adjacent to access tracks. The potential for cable trenching to be used as a preferential pathway for surface water runoff is assessed within Section 7.8 ‘The impact of increased flood risk arising from additional surface water runoff’
Rhondda Cynon Taf County Borough Council CAS-02125-Q0T5P0	
The Council’s Flood Risk Management team advise that the site is a Greenfield area as such the key element required to satisfy TAN15 will be the site’s surface water discharge rates, both pre and post catchment discharge. The applicant should note that where the site is proposed on a Greenfield area, a like for like discharge rate will be required to	The impact on water quality of waterbodies (surface water and groundwater) during the operation phase has been scoped into the ES. A Drainage Strategy has been prepared for submission within the DNS application and is presented within Volume 3, Appendix 7.2: Conceptual Drainage Strategy.

Comment	How and where considered in the ES
reduce the inherent surface water. Further, the applicant should be made aware of the requirement of Schedule 3 of the Flood and Water Management Act 2010, notably that the development will also be subject to the requirements of Part H of the Building Regulations and a separate SuDS application to the SAB.	The report details the attenuation of surface water up to and including the 1 in 100-year + 40% climate change rainfall event and pollution prevention measures in-line with CIRIA guidance. A SAB application will be submitted for submission to include details of surface water management during the operation of the development.
Welsh Water	
[Welsh Water] reviewed the application and [Welsh Water] can confirm there is no Welsh Water assets in the location specified that rely on 'point to point' communications that would be effected by the proposed development	The absence of Welsh Water assets has been noted within the FCA which is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment and the Drainage Strategy which is presented within Volume 3, Appendix 7.2: Conceptual Drainage Strategy.
South Wales Fire and Rescue Service	
The climate emergency is likely to increase the risk of flooding as a result of sea level rises, more frequent severe weather systems and more intense rainfall. Planning authorities should adopt a precautionary approach of positive avoidance of building development in areas of flooding from the sea or from rivers. Surface water flooding will affect the choice of location and the layout and design of scheme and these factors should be considered at an early stage in formulating any development proposals.	Flood risk at the site is summarised in Section 7.6. A full FCA has been prepared for submission within the DNS application and is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment. The FCA concludes that the Site is located entirely within fluvial and tidal Flood Zone 1 and has a low risk of flooding from all assessed sources, including fluvial, tidal and surface water sources. The assessment has incorporated an analysis for climate change.
Fires involving the installations detailed above can be very difficult to extinguish. Conditions can cause a thermal runaway within battery cells, which is a highly exothermic reaction creating toxic, flammable, and/or explosive chemical atmospheres. The developer of such sites should ensure they have suitable safety measures to contain and restrict the spread of fire, using fire-resistant materials and	A Drainage Strategy has been prepared for submission within the DNS application and is presented within Appendix 7.2: Conceptual Drainage Strategy. The Drainage Strategy includes an assessment for the storage of fire water within the BESS development, in line with National Fire Chiefs Council guidance.

Comment	How and where considered in the ES
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 Authority recognises that the charging of electric vehicles and the use of batteries (including lithium-ion) as Energy Storage Systems (ESS) is a new and emerging practice in the global renewable energy sector. As with all new and emerging practices within UK industry, developers should consider the risks associated with such systems early in the design stage of the project.	
High Risk Industrial - Two to three hectares 50 litres per second - Minimum Main Size 150mm. - Over three hectares, 75 litres per second. In rural areas it may not be possible to provide sufficient mains water. To overcome this, static or river supplies would be considered on site at the above flow rates for at least one hour. The Fire and Rescue Authority should be consulted at the outline planning stage of any proposed projects to ascertain the exact requirements, as high risk units may require a greater flow.	A Drainage Strategy has been prepared for submission within the DNS application and is presented within Appendix 7.2: Conceptual Drainage Strategy. The Drainage Strategy includes an assessment for the storage of fire water within the BESS development, in line with National Fire Chiefs Council guidance.

7.4 Assessment Methodology

Relevant Guidance

- 7.4.1 The assessment of hydrology and flood risk has been undertaken in accordance with the methodology set out in Volume 1, Chapter 4: Environmental Assessment Methodology of the ES in addition to the following guidance, where appropriate:
- Design Manual for Roads and Bridges (DMRB) Volume 11, LA104: Environmental assessment and monitoring (Highways England et al., Revision 1 2020), and

- DMRB Volume 11, LA113: Road drainage and the water environment (Highways England et al., Revision 1 2020a).

Scope of the Assessment

- 7.4.2 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Table 7.2.
- 7.4.3 Taking into account the scoping and other consultation, Table 7.3 summarises the issues considered as part of this assessment.

Table 7.3: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
The impact of increased flood risk arising from additional surface water runoff	Activities required to facilitate the construction of the Proposed Development (e.g. temporary construction compounds haul roads, construction access, removal of surface vegetation, compaction of soils, excavations) may alter drainage patterns and surface water runoff rates onsite, increasing the risk of flooding posed to the surrounding area.
The impact of the deterioration of water quality of waterbodies (surface water and groundwater)	Activities required to facilitate the construction of the Proposed Development (e.g. temporary construction compounds, removal of surface vegetation, compaction of soils, excavations, dewatering) may cause direct impacts to water quality via accidental spillages / contaminant release.
Operation and maintenance	
The impact of the deterioration of water quality of waterbodies (surface water and groundwater)	During the operation of the Project pollutants may be present as a result of normal operations, traffic and accidental spillage which may give rise to water quality effects on the surrounding surface watercourses and groundwater. There is also a potential for catastrophic failure of permanent development which may also give rise to water quality effects.
The impact of increased flood risk arising from additional surface water runoff	During the operation and maintenance phase there is the potential for an increase in flood risk due to additional surface water runoff as a result of increased hardstanding associated with permanent development.
Decommissioning	
The impact of increased flood risk arising from additional surface water runoff	Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).

Activity	Impacts scoped into the assessment
The impact of the deterioration of water quality of waterbodies (surface water and groundwater)	Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).

Study Area

- 7.4.4 The hydrology and flood risk study area (hereafter referred to as the study area) comprises a 250 m buffer around temporary works and a 1 kilometre (km) buffer around the permanent development. Temporary construction will take place within this 1 km buffer.
- 7.4.5 The 1 km buffer is considered appropriate for data collection taking into account the nature of the development and likely zone of influence on hydrological receptors. Given the landscape surrounding local land use activities, it would be difficult to ascertain the exact source of any impacts on water quality beyond 1 km.
- 7.4.6 This study area was proposed within the EIA Scoping Report and no objections were raised by PEDW, NRW or Rhondda Cynon Taf County Borough Council (RCTBC) within the Scoping Direction.
- 7.4.7 The location and geographic extent of the study area is presented below within Volume 2, Figure 7.1: Hydrology and Flood Risk Study Area.

7.5 Assessment Criteria and Assignment of Significance

- 7.5.1 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts
- 7.5.2 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor.
- 7.5.3 The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England *et al.*, 2020).
- 7.5.4 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Environmental Assessment Methodology.

Receptor Value and Sensitivity

- 7.5.5 The criteria for defining sensitivity in this chapter of the ES are outlined in Table 7.4 below.

Table 7.4: Sensitivity criteria

Sensitivity/Value	Definition
Very High	Very high importance and rarity, international scale, very limited potential for substitution or recoverability. Surface water bodies: WFD current or with an aim to have an overall status of high. The surface water body supports sensitive aquatic ecological receptors and is extensively used for public water supply and large-scale agricultural use. Groundwater bodies: Groundwater body supports public and/or large-scale industrial water supply and/or is a highly productive aquifer. Flood risk: Land with a high risk of flooding or more than one hundred properties protected from flooding by flood defence infrastructure or by natural floodplain storage.
High	High importance and rarity, national scale and limited potential for substitution. Surface water bodies: WFD current or with an aim to have an overall status of good. Surface water body may support sensitive aquatic ecological receptors and is used for public water supply/medium scale industrial or agricultural use. Groundwater bodies: WFD current or with an aim to have an overall status of good, groundwater body supports public water and/or large-scale industrial water supply and/or is a high productive aquifer. Flood risk: Land with a high to medium risk of flooding or between one and one hundred properties protected from flooding by flood defence infrastructure or by natural floodplain storage.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution. Surface water bodies: watercourses within catchments with an aim to have an overall status of moderate. The surface water features may be locally important for spawning of salmonid species. Surface water body is used for private water supply or small scale industrial/agricultural use. Ground water bodies: WFD current or with an aim to have an overall status of moderate, moderately productive aquifer and/or a groundwater body which supports private water supply or medium scale agricultural/industrial abstractions. To ensure no surface waterbody catchment is prevented from achieving a 'good' status under the WFD by the proposed development, all water bodies are classified to have a high sensitivity. Flood risk: Land with a medium to low risk of flooding or limited constraints and a low risk of flooding of property.
Low	Low or medium importance and rarity, local scale.

Sensitivity/Value	Definition
	Surface water bodies: WFD current or with an aim to have an overall status of poor. Surface water bodies are not significant in terms of sensitive ecological receptors or fish spawning. Small scale (single residential or commercial use) abstraction licences are present in close proximity. Ground water bodies: WFD current or with an aim to have an overall status of poor, low productive aquifer with no abstraction licences. Flood risk: Land with a medium to low risk of flooding or limited constraints and a very low risk of flooding of property.
Negligible	Very low importance and rarity, local scale. Surface water bodies: WFD current or with an aim to have an overall status of bad, no sensitive ecological receptors or fish spawning are present within the surface water bodies. No abstraction licences present within the area. Ground water bodies: WFD current or with an aim to have an overall status of bad, unproductive strata with no abstraction licences. To ensure no surface waterbody catchment is prevented from achieving a 'good' status under the WFD by the proposed development, all water bodies are classified to have a high sensitivity. Flood risk: Land with a low risk of flooding or limited constraints with a very low risk of flooding of property.

Magnitude of impact

7.5.6 The criteria for defining magnitude in this chapter of the ES are outlined in Table 7.5 below.

Table 7.5: Impact magnitude criteria

Magnitude of impact		Definition
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements
	Beneficial	Large scale or major improvement or resource quality; extensive restoration or enhancement; major improvement of attribute quality
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality

Magnitude of impact		Definition
Low	Adverse	Some measurable change in attributes, quality or vulnerability, minor loss or, or alteration to, one (maybe more) key characteristics, features or elements
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements
	Beneficial	Very minor benefit to, or positive addition of one or more characteristics, features or elements
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Duration of impacts

7.5.7 The criteria for describing the duration of impacts in this ES are outlined in Table 7.6 below.

Table 7.6: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year.
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years.
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development.

Significance of effect

7.5.8 The method employed significance of the effect is presented in Table 7.7. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

7.5.9 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 7.7: Assessment matrix

Sensitivity of Receptor		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
Very High	No Change	Minor	Moderate or Major	Major	substantial

7.5.10 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described in Table 7.8 below.

Table 7.8: Definitions of significance

Significance	Definition
Major	These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed this level of significance.
Moderate	These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
Minor	These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development.

Significance	Definition
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assumptions and limitations of the assessment

- 7.5.11 The report is based on publicly available hydrological and flood risk data extracted from the NRW website (Lle A Geo-Portal for Wales) and data provided by RCTCBC.
- 7.5.12 The information collected through publicly available searches and through consultation with the relevant stakeholders is considered sufficient to characterise the baseline environment.
- 7.5.13 The characterisation of the baseline environment could benefit from further detailed information on the following:
- As watercourse flow monitoring has not been undertaken, flow data for surrounding watercourses and drainage channels; and
 - As no ground investigation reports have been provided, detailed site specific ground investigation data is unable to be assessed.
- 7.5.14 Overall, there is a high level of certainty associated with details of the baseline environment and with the findings of the assessment presented in this chapter. The available information is considered sufficient to establish baseline within the hydrological and geological study areas for the purposes of EIA. Therefore, there are no data limitations that affect the robustness of the conclusions of this assessment.

7.6 Baseline Environment Conditions

Desk Studies

- 7.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment for hydrology and flood risk. The existing studies and datasets referred to as part of the desk-based review for hydrology and flood risk are summarised in Table 7.9 below.

Table 7.9: Summary of desk study sources

Title/Organisation	Data Source / Year	Data Used
British Geological Society Geology of Britain Viewer 1:50,000 Geological Mapping	https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/ (2025)	Geology conditions in study area.

Title/Organisation	Data Source / Year	Data Used
Climate change allowances and flood consequence assessments	https://www.gov.wales/climate-change-allowances-and-flood-consequence-assessments (2021)	Appropriate Climate Change Allowances to consider.
Data Map Wales	https://datamap.gov.wales/ (2025)	NRW Flood Mapping
Development Advice Map (DAM)	https://gisgeoext.cyfoethnaturiolcymru.gov.uk/Geocortex/Viewers/Html5Viewer_4145/index.html?viewer=FloodRisk (2022)	NRW Flood Mapping
Flood Risk Management Plan	https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/FloodRiskManagementPlanFinal.pdf (2015)	RCTCBC overview on flood risk within the study area
Local Flood Risk Management Strategy	https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/localfloodriskmanagementstrategyv1.pdf (2013)	RCTCBC overview on flood risk management within the study area
NRW Flood Map for Planning	https://flood-map-for-planning.naturalresources.wales/ (2024)	NRW Flood Mapping
OS Mapping	https://maps.the-hug.net/ (2025)	Surrounding area of the site
Strategic Flood Consequence Assessment	https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/LDPEvidenceBaseLibraryandAnnualMonitoringRe/RelateddocumentsEvidenceBase/EB59a.pdf (2008)	Flood history and modelled flood outlines from RCTCBC
Welsh part of the Severn River Basin Management Plan	https://nrwcmsv13-a3hwekacajb3frbw.a02.azurefd.net/695983/severn-rbmp-2021_2027-summary.pdf	Details regarding the Severn River Basin District

Overview of Baseline Environment

Hydrological Setting

7.6.2 NRW River Basin District Mapping indicates that the study area is within the Severn River Basin District.

- 7.6.3 Published NRW data shows that the Afon Rhodda, an NRW designated Main River flows east within the southern portion of the study area, approximately 830 m to the south of the Site.
- 7.6.4 OS Mapping shows there are several ordinary watercourses within the study area:
- Nant Hafod flows south across the south western extent of the study area;
 - Nant Blaenhenwysg flows south across the south eastern extent of the study area;
 - Llys Nant flows east across the northern extent of the study area; and
 - A tributary to the Nant Clydach flowing north in the northern extent of the study area.
- 7.6.5 The hydrology site walkover also identified numerous small watercourses and drainage ditches plus two ponds not shown on online mapping. Further information on the site walkover is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment

Surface Water Body Status

- 7.6.6 Under the Water Framework Directive (WFD), hydrological features often contribute either directly or indirectly to the overall framework designation. Hydrological designations within the study area are provided in Table 7.10 below.
- 7.6.7 All WFD Catchments are tasked with the aim of achieving an overall 'Good' status.

Table 7.10: WFD Surface Water Bodies

Management Catchment	Name	Waterbody ID	Classification (2021)
South East Valleys	Nant Clydach – source to confluence R Taff	GB1090570272 50	Overall – Moderate
	Rhondda R – conf Afon Rhondda Fach to conf R Taff	GB1090570272 30	Overall - Good
	Afon Rhondda Fach – source to conf Rhondda R	GB1090570272 10	Overall - Moderate

- 7.6.8 The hydrological setting within the study area is presented within Volume 2, Figure 7.2: Surface Water Bodies within the Study Area.

Geology and Hydrogeology

- 7.6.9 A summary of the geological and hydrogeological setting within the study area is provided below. For more information, see Volume 1, Chapter 15: Geology and Hydrogeology.

Bedrock Geology

- 7.6.10 The following bedrock strata is present within the study area:
- Brithdir Member comprised of Sandstone;
 - Hughes Member comprised of Sandstone;
 - Rhondda Member comprised of Mudstone, siltstone and sandstone; and
 - Hughes Member comprised of mudstone, siltstone and sandstone.

Superficial Deposits

- 7.6.11 There are no records of superficial deposits within the central extent of the study area. Only Turbine T4 is shown to be located upon extents of superficial deposits (Devensian Till (Diamicton)). The following superficial deposits are present within the remainder of the study area:
- Devensian Till (Diamicton);
 - Devensian Glaciofluvial Deposits comprised of sand and gravel;
 - Alluvium comprised of clay, silt, sand and gravel; and
 - Peat.

Groundwater Body Status

- 7.6.12 BGS Aquifer Designation mapping shows bedrock deposits are categorised as a Secondary A Aquifer which generally support water supply and base river flow on a more local scale. The underlying superficial geology deposits are classified as Secondary A Aquifers and Secondary Undifferentiated. Secondary Undifferentiated Aquifers have varying characteristics in different locations.
- 7.6.13 NRW Interactive Map Viewer shows the Site is located within an area of medium to high groundwater vulnerability and is not located within a Source Protection Zone

Table 7.11: Groundwater bodies

Name (NRW ID)	Water body ID	Classification (2019)
SE Valleys Carboniferous Coal Measures	GB40902G201900	Overall – Poor

Designated Sites

- 7.6.14 No sites designated as Sites of Specific Scientific Interest (SSSI), Special Protection Areas (SPA) or Special Areas of Conservation (SAC) are located within the study area.

Flood Risk

- 7.6.15 The FCA is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment. A summary of flood risk is presented below.

Development Advice Map

- 7.6.16 The Development Advice Map (DAM)¹ indicates that the entirety of the Site and the majority of the study area is located within Zone A. Zone A is described in TAN15 as those areas '*considered to be at little or no risk of fluvial or coastal/tidal flooding.*'
- 7.6.17 Land in the southern extent of the study area associated with the Afon Rhondda and Nant Hafod, in addition to an isolated parcel of land in the east associated with the Llys Nant, appear to be located in Zone B. Zone B is described in TAN 15 as areas '*known to have been flooded in the past evidenced by sedimentary deposits.*'
- 7.6.18 Furthermore, there is a small portion of Zone C1 and C2 towards the southern extent of the study area associated with Afon Rhondda. Zone C1 and Zone C2 are defined as '*areas of the floodplain which are developed and served by significant infrastructure, including flood defences*' and '*areas of the floodplain without significant flood defence infrastructure*' respectively within the TAN15.
- 7.6.19 The DAM Zone mapping is presented within Volume, Appendix 7.1: Flood Consequence Assessment.

Emerging TAN15 Flood Map for Planning

- 7.6.20 The emerging NRW Flood Map for Planning² classifies areas into the following zones:
- Flood Zone 1 is defined as areas with an annual probability of flooding of up to 0.1% (1 in 1,000), including the effects of climate change.
 - Flood Zone 2 is defined as areas with an annual probability of flooding of between 0.1% to 1% (1 in 1,000 to 1 in 100), including the effects of climate change.

¹ [Geocortex Viewer for HTML5 \(cyfoethnaturiolcymru.gov.uk\)](https://geocortex-viewer.html5.cyfoethnaturiolcymru.gov.uk/)

² <https://flood-map-for-planning.naturalresources.wales/>

- Flood Zone 3 is defined as areas with an annual probability of flooding of over 1% (1 in 100), including the effects of climate change.

7.6.21 The emerging TAN15 mapping is presented within Volume 3, Appendix 7.1: Flood Consequence Assessment.

Rivers and Sea Flooding

7.6.22 The emerging NRW Flood Map for Planning for Rivers and Sea shows that there is a small portion of land in the southern extent of the study area located within Flood Zone 2 and Flood Zone 3, associated with fluvial flooding from Afon Rhondda. The remainder of the study area, including the Site, is located within Flood Zone 1. Due to the distance inland of the study area, the study area is not considered to be at risk of flooding from the sea.

7.6.23 In summary, the proposed location for development is located entirely within Flood Zone 1.

Surface Water and Small Watercourses

7.6.24 The emerging NRW Flood Map for Planning for Surface Water and Small Watercourses shows areas of Flood Zone 2 and Flood Zone 3 associated with overland flow routes / ordinary watercourses across the study area. Within the Site itself, areas of Flood Zone 2 associated with surface water ponding are present within areas where permanent development is proposed.

Groundwater Flood Risk

7.6.25 BGS Aquifer Designation mapping³ shows bedrock deposits are categorised as a Secondary A Aquifer and Secondary (Undifferentiated). The NRW natural environment mapping shows that the Site is located within an area of Medium – High groundwater vulnerability.

7.6.26 The RCTCBC SFCA (2009)⁴ Flood risk from Groundwater map shows that the entirety of the Site is within an area where ‘*groundwater levels are at least 5 m below the ground surface*’.

³ <https://mapapps2.bgs.ac.uk/geoindex/home.html>

⁴

<https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/LDPEvidenceBaseLibraryandAnnualMonitoringRe/RelateddocumentsEvidenceBase/EB59a.pdf>

Reservoir Flood Risk

- 7.6.27 The NRW Flood and Coastal Erosion Risk⁵, available online, shows the site is located outside the mapped extent of being at risk of flooding from this reservoirs.

Water Resources

- 7.6.28 Water abstractions and discharge consents within the study area are presented within Volume 2, Figure 7.3: Water Abstractions and Discharge Consents within the Study Area.

Water Supplies and Abstraction

- 7.6.29 NRW provided abstraction data for the study area, it shows 4no. abstractions from Llys Nant and tributaries in the east of the study area. All four abstractions are registered to Mr B Davies under reference 21/57/25/0073 and are used to support 'agriculture/aquaculture' in the form of a fish farm.

Pollution Incidents

- 7.6.30 NRW recorded pollution incidents show no records of incidents within the study area.

Discharge Consents

- 7.6.31 From NRW records, there are three recorded permitted discharges to controlled waters within the study area. Permitted discharges are presented within Table 7.12.

Table 7.12: Permitted Discharge Consents

Operator	Permit type	Description	Discharge location	NGR
Dwr cymru cyfyngedig / welsh water	Bespoke	Trehafod football ground sewerage network pumping station emergency overflow	River Rhondda	ST 04118 91237
Dwr cymru cyfyngedig / welsh water	Bespoke	Colliery street sewerage network - pumping station	River Rhondda	ST 04884 90937

⁵ <https://flood-risk-maps.naturalresources.wales/?locale=en>

Operator	Permit type	Description	Discharge location	NGR
Dwr cymru cyfyngedig / welsh water	Bespoke	Gyfeillon road sewerage network combined sewer overflow	River Rhondda	ST 05125 91015

Site-specific Surveys

- 7.6.32 Site specific surveys were undertaken to inform the baseline assessment for hydrology and flood risk.
- 7.6.33 A hydrology site walkover was undertaken on the 7 March 2025 by RPS to support the baseline classification of the FCA and Hydrology and Flood Risk Chapter.
- 7.6.34 The Site contains a number of drainage ditches. The majority of these drain to the northeast, towards the Llys-Nant watercourse, which rises at the northwestern border of the Site. However, a section of the Site to the south of the access road drains to the south, towards the Nant Blaenhenwysg watercourse.
- 7.6.35 Further information is presented within the walkover notes, included within Volume 3, Appendix 7.1: Flood Consequence Assessment.

Future Baseline Conditions

- 7.6.36 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that ‘*an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*’ is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.
- 7.6.37 The main change to the hydrology and flood risk baseline in future is likely to be associated with the potential effects of climate change, which may impact on future peak river flow rates and rainfall intensity. The Welsh Government has considered the likely future changes and provides climate change allowances for flood consequence in land use planning (Welsh Government, 2021).
- 7.6.38 A summary of the relevant climate change considerations for the Site are provided below. Due to the Site being located inland, sea level rise has not been considered as the Site is not at tidal risk.

Peak River Flow

- 7.6.39 Peak river flow allowances show the anticipated changes to peak flows within rivers as a result of climate change. A predicted increase in peak river flow rates and rainfall intensity, as outlined within the Welsh

Government 2021 guidance is likely to affect Wales and the Severn catchment.

7.6.40 The projected peak river flow change is a range, with the highest estimate equally likely to occur as the lowest estimate. For this reason, it is recommended that the central estimate, or change factor, for the 2080s for the relevant river basin district is used to assess the potential impact of climate change as part of an FCA and to inform design levels.

7.6.41 Table 7.13 below contains the anticipated increase in river flows for the Severn River Basin District.

Table 7.13: Peak River Flow Increases for the Severn River Basin District

Severn	Total potential change anticipated for '2020s' (2015- 39)	Total potential change anticipated for '2050s' (2040-2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper Estimate	25%	40%	70%
Central Estimate	10%	20%	25%
Lower estimate	0%	5%	5%

7.6.42 In regards to peak river flow, the Welsh Government (2021) guidance recommends that the central estimate, or change factor, for the 2080s epoch should be used to assess the potential impact of climate change as part of a flood consequence assessment. As such the 25% allowance should be applied to Flood Zones 2 and 3. Therefore, a 25% uplift is considered within Volume 3, Appendix 7.1: Flood Consequence Assessment.

Peak Rainfall Intensity

7.6.43 Increases in rainfall intensity due to climate change are likely to affect river levels, particularly within smaller catchments (less than 5 km²) and on land and urban drainage systems. Rainfall allowances should be used to better understand the impacts of climate change on smaller watercourses, which may see their channel capacity reduced as a result of increased run-off.

7.6.44 Both the central and upper end allowances should be assessed to understand the range of impact. As a minimum, proposals should be assessed against the central allowance to inform design levels.

7.6.45 Rainfall allowances should also be applied when considering surface water flooding and drainage assessments. Drainage systems should be designed to ensure there is no increase in site run-off when assessed against the upper estimate.

7.6.46 Table 7.14 below indicates the change to extreme rainfall intensity to be applied across all of Wales.

Table 7.14: Changes in Peak Rainfall Intensity

Applies across all of Wales	Total potential change anticipated for '2020s' (2015- 39)	Total potential change anticipated for '2050s' (2040-2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper Estimate	10%	20%	40%
Central Estimate	5%	10%	20%

7.6.47 As the development lifetime is set to have a lifetime of 50 years, the 2080's central estimate is considered appropriate, however a more conservative approach has been taken and a 40% increase has been considered within Volume 3, Appendix 7.1: Flood Consequence Assessment and Volume 3, Appendix 7.2 Conceptual Drainage Strategy.

Key receptors

7.6.48 Table 7.15 identifies the receptors taken forward for the assessment.

Table 7.15: Key receptors taken forward for assessment

Receptor	Description and Reason for Consideration
Waterbodies (including surface water and ground water bodies)	OS Mapping shows there are several ordinary watercourses within the study area, including the Nant Haford, Nant Blaenhenwysg, Llys Nant and a tributary to the Nant Clydach. These watercourses form part of three surface water body catchments: • Nant Clydach – source to confluence R Taff; • Rhondda R – conf Afon Rhondda Fach to conf R Taff; and • Afon Rhondda Fach – source to conf Rhondda R. The study area is underlain by the SE Valleys Carboniferous Coal Measures groundwater body, which is also classified by the BGS Aquifer Designation mapping as a Secondary A Aquifer which generally support water supply and base river flow on a more local scale. Taking a precautionary approach in assuming surrounding water bodies have achieved/maintained 'Good' status at the time when construction begins, the surface water bodies and ground water bodies within the study area have been assessed with a WFD status of 'Good'. Groundwater is shown to have a medium to high vulnerability in both the bedrock and superficial deposits.
Water supplies	Water abstractions and Private Water Supplies within the study area

Receptor	Description and Reason for Consideration
Adjacent Land	The land surrounding the study area comprises agricultural fields, small farming settlements, connecting roads and areas of dense vegetation. To the south of the study area is Pontypridd town, made up of residential dwellings, shops, a train station and connecting roads.
Site users	Construction workers and site operatives present as part of the development

7.7 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

7.7.1 Both embedded and additional mitigation measures relevant to the assessment of hydrology and flood risk are summarised in Table 7.16 below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 7.16: Mitigation measures to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
The undertaking of an FCA.	As the Site is over 1 ha, a FCA will be submitted as part of the DNS application. The assessment will propose site-specific mitigation measures where necessary in regards to flood risk.
The undertaking and implementation of a Drainage Strategy and SAB application for new impermeable areas arising from permanent development.	In line with SAB requirements, as the development has a construction area of over 100 m ² , a Drainage Strategy will be submitted as part of the DNS application. The SAB application will enable consultation with NRW and Rhondda Cynon Taf Council to be undertaken in regards to drainage as part of the DNS application process.
Implementation of a Construction Environment Management Plan (CEMP)	The CEMP will look to ensure flood risk and water quality is adequately managed during construction and is to be submitted as part of the DNS.
Implementation of an Operational Surface Water Drainage Strategy	An outline operational surface water drainage strategy will be produced as part of the DNS.

Mitigation measure	How the measure will be secured
Measures during decommissioning	A Decommissioning Plan would be produced and agreed with the relevant authorities prior to decommissioning works and will be in line with the latest relevant available guidance.
Watercourse buffers / approval of land drainage consents where applicable	8 m buffers to be maintained from the banks of ordinary watercourses. Where this cannot be achieved, relevant consents will be obtained from NRW and RCTCBC in relation to land drainage prior to be obtained prior to construction. These 8 m buffers would be secured via the CEMP.

7.8 Assessment of Effects

7.8.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development are listed in Table 7.3. A description of the potential effect on receptors caused by each identified impact is given below.

The impact of the deterioration of water quality of waterbodies (surface water and ground water)

Construction Phase

7.8.2 During construction, there is a potential risk of accidental discharges of untreated runoff containing contaminants. It is anticipated that any untreated runoff will eventually outfall to watercourses (main rivers and ordinary watercourses) located downstream. Untreated runoff also has the potential to infiltrate *in-situ* to superficial deposits and solid geology underlying the study area.

7.8.3 There are a number of potential pollutants which could arise during construction, and hence which may affect the water quality of receiving watercourses. These are outlined below:

- fine particulate materials (e.g. silts and clays);
- cement;
- oil and chemicals (from plant machinery and processes); and
- other wastes such as wood, plastics, sewage and rubble.

7.8.4 These pollutants may be present as a result of normal construction activities, such as excavation, incorrect storage of oils and chemicals

and/or accidental spillage. The significance of the incident is dependent on the nature of the pollutant, on the mitigation measures adopted and their timing and effectiveness, and on the sensitivity of the receiving waterbody.

Sensitivity of the Receptor

- 7.8.5 The Site is located in the headwaters of the Nant Clydach, Rhondda R and the Afon Rhondda Fach surface water body catchments. Flows from the Site can also discharge to the ground and contribute to groundwater. The study area is underlain by the SE Valleys Carboniferous Coal Measures groundwater body catchment.
- 7.8.6 Water bodies (ground water and surface water) within the study area are currently assessed to have 'good', 'moderate' and 'poor' status. The default objective of the Severn River Basin Management Plan is for water bodies to achieve 'good' status or potential by 2027. As such, water bodies within the study area are assessed have a 'good' a WFD to ensure no detriment to water body status occurs as a result of development. The watercourses and groundwater bodies are therefore considered to be highly vulnerable in relation to WFD classification status, and moderate value in relation to the local economy. The sensitivity of the receptor is therefore, considered to be **high**.
- 7.8.7 Surface water abstractions within the study area are a receptor that may be impacted by the deterioration of quarter quality. There are four surface water abstractions present within the study area and are considered to be of high vulnerability, low recoverability and high value. The sensitivity of the receptor is therefore, considered **high**.

Magnitude of Impact

- 7.8.8 Activities associated with machinery during construction could lead to an increase in turbid run-off and spillages/leaks of fuel, oil etc. that could affect nearby watercourses and groundwater bodies. There is the potential for this to impact on water quality and therefore cause a reduction in the WFD classification.
- 7.8.9 Activities involved in the construction process would follow the measures set out in the CEMP to intercept run-off and ensure that discharges from the Site are controlled in quality and volume causing no degradation in WFD classification. In addition, water quality monitoring would be carried out throughout the construction phase to ensure no discharge of pollutants or increase in suspended sediment occurs.
- 7.8.10 Appropriate buffers will be maintained between the banks of the watercourses present within the study area and temporary construction areas. Where relevant, land drainage consents will also be applied for prior to the commencement of construction to ensure construction works within proximity to ordinary watercourses are consented by RCTCBC and/or NRW.

- 7.8.11 Considering the above mitigation measures, the impact is predicted to be direct, of local spatial extent, short term duration, intermittent and medium reversibility. The magnitude is therefore, considered to be **negligible adverse**.

Significance of the Effect

- 7.8.12 On the basis that the sensitivity of the receptor is **high** and the magnitude of the impact is **negligible adverse** with mitigation measures, it is assessed that there will be a **minor adverse** effect, which not significant in EIA terms.

Additional Mitigation and Residual Effect

- 7.8.13 Suitable mitigation measures have been adopted as part of the proposed development and would be implemented through the CEMP and land drainage consents will be applied where required. The assessment has demonstrated that the overall effect on hydrology and flood risk during construction would be 'not significant'. It is, therefore, not considered necessary to propose further mitigation measures for this Proposed Development.

Operation and Maintenance

- 7.8.14 During the operation and maintenance phase of the Proposed Development, pollutants may be present as a result of normal operations, traffic and accidental spillage which may give rise to water quality effects on the surrounding surface watercourses and groundwater. There is also a potential for catastrophic failure of permanent development which may also give rise to water quality effects. These include:
- fine particulate materials (e.g. silts and clays); and
 - oils and chemicals (from plant machinery and processes).

Sensitivity of the Receptor

- 7.8.15 During the operation and maintenance phase, it is expected the receptors will remain as identified during construction, please refer to paragraphs 7.8.5 to 7.8.7.

Magnitude of Impact

- 7.8.16 The Proposed Development has been subject to an FCA (see Volume 3, Appendix 7.1: Flood Consequence Assessment) and a conceptual drainage strategy (see Volume 3, Appendix 7.2: Conceptual Drainage Strategy), to be approved by RCTCBC via a SAB application in order to meet the requirements of national and local planning policy and best practice.
- 7.8.17 Pollutants may be present as a result of normal operations, traffic and accidental spillage. Catastrophic failure of the Proposed Development

elements may also give rise to pollutants. These activities could lead to an increase in turbid run-off and spillages/leaks of fuel, oil and chemicals associated with the BESS that could runoff to watercourses and infiltrate to underlying ground within the study area.

- 7.8.18 The conceptual drainage strategy (Volume 3, Appendix 7.2: Conceptual Drainage Strategy) prepared for the Site includes the provision of SuDS to mitigate pollutants. Filter strips are expected to provide sufficient treatment to the run-off from impermeable areas associated with solar PV arrays and onshore wind turbines.
- 7.8.19 Within the BESS and Substation Compound, infrastructure will be underlain by a 300 mm gravel base with a 30% porosity which can be used for surface water attenuation. It is proposed that surface water from the BESS and substation compound will be collected via percolation through the granular surface, and will be laid at a gradient of 1:500 to enable appropriate conveyance of collected surface water to the discharge point. The subbase will be lined to prevent the seepage of groundwater into the storage and prevent the infiltration of potentially contaminated water.
- 7.8.20 Following discharge from the gravel subbase, surface water will pass through a petrol/silt interceptor to filter out pollutants and suspended sediments. Surface water will then be conveyed to an attenuation basin, also to be lined, within in the southeast corner of the site which will provide further surface water treatment. A surface water outfall is proposed to the watercourse along the eastern site boundary. Surface water is to be restricted to the 1 in 1 greenfield runoff rate prior to discharge via a suitable flow control device. A penstock valve is also proposed, which can be operated in an emergency situation (e.g., fire) to prevent contaminated water from entering the watercourse. The containment solution will be finalised at the detailed design stage.
- 7.8.21 The 300mm gravel subbase and attenuation basin have a sufficient surface water capacity to accommodate up to the 1 in 100 year +40% climate change storm event, plus an additional 228m³ of firewater storage provision, in line with National Fire Chief Council national guidance '*Grid Scale Battery Energy Storage System planning – Guidance for FRS*'.
- 7.8.22 It is expected operational procedures detailed within the Operational Surface Water Drainage Strategy will prevent any increase in pollutants to the surrounding environment will be implemented during the operation and maintenance phase. Measures will be included within the Operational Surface Water Drainage Strategy to ensure that site operatives will be fully debriefed of operational procedures on-site, including pollution prevention and response procedures.
- 7.8.23 With the provision of operational measures and on-site drainage networks, the impact is predicted to be direct, of local spatial extent, long term duration, intermittent and medium reversibility. The magnitude is therefore, considered to be **negligible adverse**.

Significance of the Effect

- 7.8.24 On the basis that the sensitivity of the receptor is high and the magnitude of the impact is negligible adverse with mitigation measures, it is assessed that there will be a **minor adverse** effect, which not significant in EIA terms.

Additional Mitigation and Residual Effect

- 7.8.25 The drainage strategy prepared for the Site will include suitable pollution mitigation prevent the decline of water quality in both surface and groundwater receptors in the study area. Furthermore, the Operational Surface Water Drainage Strategy will provide guidelines for dealing with accidental spills and leaks which could occur on-site as a result of routine operations or catastrophic failure. It is, therefore, not considered necessary to propose further mitigation measures for this Proposed Development.

Decommissioning

- 7.8.26 Decommissioning is likely to operate within the parameters identified for construction (i.e. any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction). A decommissioning plan will be implemented to minimise any potential effects.
- 7.8.27 Therefore, the effects during the decommissioning phase of the Proposed Development would be no worse than that during construction.

Additional Mitigation and Residual Effect

- 7.8.28 Taking into account the embedded mitigation measures produced as part of the decommissioning stage (i.e. decommissioning plan), additional mitigation measures are not considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

The impact of increased flood risk arising from additional surface water runoff

Construction Phase

- 7.8.29 During construction of the Proposed Development, there is a potential for increased surface water flood risk as a result of greater rates of surface water runoff from additional impermeable areas associated with construction activity.
- 7.8.30 Measures will be implemented to ensure that the risk of flooding is not increased during the construction phase. The temporary construction compound(s), haul roads and construction accesses will be constructed using permeable material underlain by a permeable geotextile membrane. Surface water runoff will be intercepted via a temporary

drainage system. The system will manage surface runoff from the construction compound in terms of both flow rate and water quality in accordance with local policies.

- 7.8.31 Access tracks and cable trenches require the construction of temporary crossings over watercourses. Inappropriate design of these crossings could increase flood risk and result in hydro-geomorphological changes to watercourses.

Sensitivity of the Receptor

- 7.8.32 Several small tributaries of Nant Blaenhenwysg and Llyd Nant present within the Site are proposed to be crossed by access tracks and cable trenches. Flows from these, including the aforementioned small tributaries contribute to the upland catchments of the Nant Clydach, Rhondda R and the Afon Rhondda Fach have a limited ability to absorb any changes in hydrological regime from temporary construction activities. The watercourse receptor is considered to be of a high vulnerability and, moderate value. The sensitivity of the receptor is therefore classified as **high**.
- 7.8.33 Surface water flows at the Site can also infiltrate to ground and contribute to groundwater. The study area is underlain by the SE Valleys Carboniferous Coal Measures groundwater body catchment. Increasing discharges into groundwater may increase the risk of groundwater flooding. The groundwater bodies are therefore considered to be highly vulnerable, and moderate value in relation to the local economy. The sensitivity of the receptor is therefore, considered to be **high**.
- 7.8.34 Within the study area, adjacent land to the Proposed Development comprises mostly agricultural and rural land alongside areas of urban settlements of Trehafod and Pantygraigwen in the south. Adjacent land is of high vulnerability, and high value. The sensitivity of the receptor is therefore, considered to be **high**.
- 7.8.35 An increase in flood risk during the construction phase may increase the vulnerability of site users to flooding. Site users such as construction workers have a high vulnerability and high value. The sensitivity of the receptor is therefore considered to be **high**.

Magnitude of Impact

- 7.8.36 Impacts on flood risk would arise from any temporary change in runoff over the areas affected during construction, such as construction compounds, haul road and construction accesses. However, as construction is not anticipated to result in a significant change of the amount of existing impermeable areas within the Site, site run-off rates and hydrological characteristics are not expected to deviate from baseline conditions.
- 7.8.37 Inappropriate design and construction of watercourse crossings could act to restrict flows, increase in flood risk upstream of the crossing and as a result lead to variations in flow rates and rates of erosion and

sedimentation. To prevent these impacts, watercourse crossings will be appropriately designed prior to construction to ensure current flow conveyance is maintained, with further information to be provided within the CEMP.

- 7.8.38 The CEMP will include measures regarding surface water drainage during construction to ensure surface water runoff is intercepted and attenuated on-site, and that surface water discharges are controlled in quality and volume and cause no increase in flood risk.
- 7.8.39 The impacts on flood risk from the temporary change in runoff are only likely to affect the surrounding local receptors and, assuming that designed in and construction measures are implemented, there is unlikely to be any observable degradation in flood risk.
- 7.8.40 Appropriate buffers will be maintained between the banks of the watercourses present within the study area and temporary construction areas. Where relevant, land drainage consents will also be applied for prior to the commencement of construction to ensure construction works within proximity to ordinary watercourses are consented by RCTCBC and/or NRW.
- 7.8.41 With the embedded and construction measures in place, there is unlikely to be any observable change in flood risk to receptors. The impact magnitude is predicted to be of direct local spatial extent, continuous and short term in duration and is therefore considered to be **negligible adverse**.

Significance of the Effect

- 7.8.42 On the basis that the sensitivity of the receptor is high and the magnitude of the impact is negligible adverse with mitigation measures, it is assessed that there will be a **minor adverse** effect, which not significant in EIA terms.

Additional Mitigation and Residual Effect

- 7.8.43 Suitable mitigation measures have been adopted as part of the proposed development and would be implemented through the CEMP and land drainage consents will be applied where required. The assessment has demonstrated that the overall effect on hydrology and flood risk during construction would be 'not significant'. It is, therefore, not considered necessary to propose further mitigation measures for this Proposed Development

Operation and Maintenance

- 7.8.44 During operation and maintenance of the Proposed Development, there is a potential for increased surface water flood risk as a result of higher rates of surface water runoff arising from additional impermeable areas from permanent above-ground infrastructure within the Site.

Sensitivity of the Receptor

- 7.8.45 During operation and maintenance, it is expected the receptors will remain as identified during construction, please refer to paragraphs 7.8.32 to 7.8.35.

Magnitude of Impact

- 7.8.46 The Proposed Development has been subject to an FCA (see Volume 3, Appendix 7.1: Flood Consequence Assessment) and a conceptual drainage strategy (see Volume 3, Appendix 7.2: Conceptual Drainage Strategy), to be approved by RCTCBC via a SAB application in order to meet the requirements of national and local planning policy and best practice.
- 7.8.47 The potential for increased runoff rates to occur is to be appropriately mitigated by features of the solar arrays themselves. As detailed within Volume 1, Chapter 2: Project Description of the ES, the solar PV modules are to have an approximate 15 degree pitch on the horizontal plane which will reduce the flow velocity of run-off landing on the solar PV modules. Furthermore, typical solar PV modules are constructed with approximate 20 mm gaps between each individual panel which allows surface water to drip to the vegetated ground beneath. This reduces the risk of water sheeting and runoff only occurring from the leeward edge of the modules.
- 7.8.48 Filter strip SuDS comprising of appropriately seeded vegetation below and between rows of solar PV modules and around the base of the onshore wind turbines are proposed to dissipate kinetic energy of surface water and promote low erosivity sheet flow during operation of the Project. Vegetation will be year-round organically managed vegetated ground cover and is expected to will promote a betterment of interception and infiltration of precipitation compared to existing intensive arable or livestock grazing use. Research undertaken by Cook and McCuen (2013) found that provided full vegetation cover beneath the solar PV modules is maintained, the change in run-off characteristics from solar PV module areas is likely to be insignificant and that ground cover has a much more important control over runoff.
- 7.8.49 Ditches will be provided along the upslope edge of access tracks to intercept and convey overland flows routes to a strategic point where flow is piped under the track and redistributed on the downslope of the track. Redistribution trenches installed along the contour of the hillside ensures even redistribution of overland flows and restoration pre-development greenfield characteristics of the hillside hydrology at source.
- 7.8.50 A drainage strategy has been prepared for impermeable areas associated with the BESS and substation compound, to be agreed with the LLFA, it has been determined flows from the compound will be restricted to the 1 in 1-year greenfield runoff rate for up to the 1 in 100-year plus climate change event and thus slightly reduce the risk of flooding to areas downstream. When compared to the baseline, this slight

reduction in flood risk to areas downstream introduces a slight beneficial effect.

- 7.8.51 In regards to additional surface water volumes arising from the use of firewater, the 300mm gravel subbase and attenuation basin serving the BESS and substation compound have a sufficient surface water capacity to accommodate the critical storm event plus an 228m³ of additional storage required for firewater.
- 7.8.52 The impact is predicted to be of local direct spatial extent, long term duration, continuous and medium reversibility. The magnitude is therefore considered to be **low beneficial**.

Significance of the Effect

- 7.8.53 On the basis that the sensitivity of the receptor is high and the magnitude of the impact is low beneficial, it is assessed that there will be a **minor beneficial** effect, which not significant.

Additional Mitigation and Residual Effect

- 7.8.54 The FCA (Volume 3, Appendix 7.1: Flood Consequence Assessment) and a conceptual drainage strategy (Volume 3, Appendix 7.2: Conceptual Drainage Strategy) prepared for the Proposed Development indicates increases in surface water management can be managed appropriately. It is, therefore, not considered necessary to propose further mitigation measures for the development.

Decommissioning

- 7.8.55 Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction). A decommissioning plan will be implemented to minimise any potential effects.
- 7.8.56 Therefore, the effects during the decommissioning phase of the Proposed Development would be no worse than that during construction.

Additional Mitigation and Residual Effect

- 7.8.57 Taking into account the embedded mitigation measures produced as part of the decommissioning stage (i.e. decommissioning plan), additional mitigation measures are not considered necessary because the likely effect in the absence of mitigation is not significant in EIA terms.

Future monitoring

- 7.8.58 No future monitoring is required as a consequence of the assessment of Hydrology and Flood Risk.

7.9 Cumulative Effects

- 7.9.1 The assessment of cumulative effects for Hydrology and Flood Risk has followed the methodology set out in Volume 1, Chapter 4: Environmental Assessment Methodology. The specific projects, plans and activities scoped into the assessment of cumulative effects are set out in Table 7.17.
- 7.9.2 The other projects have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the information provided in Volume 1, Chapter 2: Project Description, of the ES as well as the information available on other projects.
- 7.9.3 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 on hydrological receptors. Given the landscape surrounding the Site, current and ongoing activities, as well natural baseline fluctuations, it would be difficult to ascertain the exact source of any impacts on flood risk and / or water quality beyond 1 km.

Table 7.17: List of other projects considered within the CEA.

Other projects	Status	Distance (km)	Description
Llwynceilyn/ 15/1635/FUL	Consented	<0.5	Erection of two wind turbines with a tip maximum height of 125 m, associated infrastructure, transformer cabin and access track, including access via the public highway and across Cribin Ddu Farm and Llwynceilyn Farm.

Cumulative Effects Assessment

- 7.9.4 A description of the cumulative effects between the Proposed Development and other developments identified in Table 7.17 upon Hydrology and Flood Risk receptors is provided below.

The impact of the deterioration of water quality of waterbodies (surface water and ground water)

Construction Phase

Sensitivity of the Receptor

- 7.9.5 The sensitivity of the receptor to cumulative impacts during the construction phase will remain as identified previously, refer to paragraphs 7.8.5, 7.8.6 and 7.8.7.
- 7.9.6 The sensitivity of the receptor is **high**.

Magnitude of Impact

- 7.9.7 It is assumed, where relevant, in accordance with the NPPF and local design policy, all developments listed within Table 7.17 would be required to implement a series of construction mitigation measures to provide appropriate management techniques. These management techniques will treat potentially contaminated runoff prior to discharge into the local surface water environment or sewer network, thus reducing the potential for cumulative impacts to occur.
- 7.9.8 The cumulative impact is predicted to be of direct local spatial extent, short term duration, intermittent and low reversibility. It is predicted that the impact will affect the receptor directly. The magnitude is therefore considered to be **negligible adverse**.

Significance of the Effect

- 7.9.9 On the basis that the sensitivity of the receptor is high and the magnitude of the cumulative impact is negligible adverse, it is assessed that there will be a **minor adverse** cumulative effect, which is not significant.

Operation and Maintenance Phase

Sensitivity of the Receptor

- 7.9.10 The sensitivity of the receptor to cumulative impacts during the operation phase will remain as identified previously, please refer to paragraphs 7.8.5, 7.8.6 and 7.8.7.
- 7.9.11 The sensitivity of the receptor is **high**.

Magnitude of Impact

- 7.9.12 It is assumed, where relevant, in accordance with the PPW and local design policy, all developments listed within Table 7.17 would be required to demonstrate that the operation and maintenance phases have a limited effect on water quality.
- 7.9.13 Under these policies, the developments would be required to demonstrate that the operational phase has a limited effect on water quality to the site or the surrounding area. Without this, the above developments would not achieve planning permission and therefore never be in operation, thus reducing the potential for cumulative impacts to occur.
- 7.9.14 The developments would therefore have a series of operational mitigation and management measures in the form of the operational drainage strategy which would limit any adverse cumulative effects. This would therefore result in a residual effect of the operational phase which is classified as not significant.
- 7.9.15 With these measures in place, there is unlikely to be any observable change in flood risk to receptors. The cumulative impact is predicted to be of direct local spatial extent, continuous and short term in duration and is therefore considered to be **negligible adverse**.

Significance of the Effect

- 7.9.16 On the basis that the sensitivity of the receptor is high and the magnitude of the cumulative impact is negligible adverse, it is assessed that there will be a **minor adverse** cumulative effect, which is not significant.

Decommissioning

- 7.9.17 Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).

The impact of increased flood risk arising from additional surface water runoff

Construction Phase

Sensitivity of the Receptor

- 7.9.18 During the construction phase it is expected the receptors will remain as identified previously, please refer to paragraphs 7.8.32 to 7.8.35.
- 7.9.19 The sensitivity of the receptor is **high**.

Magnitude of Impact

- 7.9.20 It is anticipated the potential for greater impermeable areas and higher rates of runoff as a result of the project within Table 7.17. The potential for

cumulative impacts on increased flood risk arising from additional surface water runoff are also more likely to occur where development limits coincide.

7.9.21 It is assumed, where relevant, in accordance with the PPW and local design policies, all developments would be required to demonstrate that the construction phase has a limited effect on water quality and would not increase flood risk elsewhere. This includes the production of an FCA where applicable and production of surface water management strategies. Without this, the above developments would not achieve planning permission and therefore never be in operation, thus reducing the potential for cumulative impacts to occur.

7.9.22 With the designed in and construction measures in place, there is unlikely to be any observable change in flood risk to receptors. The cumulative impact is predicted to be of direct local spatial extent, continuous and short term in duration and is therefore considered to be **negligible adverse**.

Significance of the Effect

7.9.23 On the basis that the sensitivity of the receptor is high and the magnitude of the cumulative impact is negligible adverse, it is assessed that there will be a **minor adverse** cumulative effect, which is not significant.

Operation and Maintenance Phase

Sensitivity of the Receptor

7.9.24 During operation and maintenance it is expected the receptors will remain as identified previously, please refer to paragraphs 7.8.32, 7.8.33, 7.8.34 and 7.8.35.

7.9.25 The sensitivity of the receptor is **high**.

Magnitude of Impact

7.9.26 It is assumed, where relevant, in accordance with the PPW and local design policy, all developments listed would be required to demonstrate that the maintenance and operational phases have a limited effect on water quality, would not increase flood risk elsewhere and would produce a marginal reduction on flood risk downstream of other proposed developments. This includes the production of an FCA (where applicable) and surface water management strategies. Without this, the above developments would not achieve planning permission and therefore never be in operation, thus reducing the potential for cumulative impacts to occur.

7.9.27 With these measures in place, there is unlikely to be any observable change in flood risk to receptors. The cumulative impact is predicted to be of direct local spatial extent, continuous and long term in duration and is therefore considered to be **negligible beneficial**.

Significance of the Effect

- 7.9.28 On the basis that the sensitivity of the receptor is high and the magnitude of the cumulative impact is negligible beneficial, it is assessed that there will be a **minor beneficial** cumulative effect, which is not significant.

Decommissioning

- 7.9.29 Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within construction working areas and to require no greater amount or duration of activity than assessed for construction).

7.10 Inter-related Effects

- 7.10.1 Inter-relationships are the impacts and associated effects of different aspects of the Proposed Development on the same receptor. The assessment has included the inter-relationships between Hydrology and Flood Risk with other topics considered as part of the ES. The assessment considered the following types of inter-related effects:

- **Project lifetime effects:** Assessment of the effects that may occur across multiple phases of the Proposed Development (i.e. construction, operation and maintenance, and decommissioning) and result in a more significant effect on a receptor than if each phase were assessed in isolation; and
- **Receptor led effects:** Assessment of the effects that may occur via the combined interaction between different environmental impacts, either spatially or temporally, on a single receptor and result in a more significant effect than if each environmental impact were assessed in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

- 7.10.2 Table 7.18 lists the project lifetime effects that are predicted to arise during the construction, operation and maintenance and decommissioning phases of the Proposed Development. A description of the receptor-led effects that are predicted to arise is also provided.

Table 7.18: Summary of likely significant inter-related effects

Description of impact	Phase			Likely significant inter-related effects	Significance
	C	O	D		
Project Lifetime Effects					
The impact of the deterioration of water quality of surface water bodies	✓	✓	✓	Contaminated surface water associated with construction, operation and maintenance, and decommissioning activities has the potential to enter and contaminate groundwater receptors. Due to embedded measures included as part of the project design required to meet legislative requirements, it is unlikely that receptors would experience increase significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore there is no change result from the inter-related assessment.	Not significant
The impact of the deterioration of water quality of ground water bodies	✓	✓	✓	Contaminated groundwater associated with construction, operation and maintenance and decommissioning activities has the potential to enter and contaminate surface water receptors. Due to embedded measures included as part of the project design required to meet legislative requirements, it is unlikely that receptors would experience increase significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore there is no change result from the inter-related assessment.	Not significant
Contamination of habitats and detrimental effects to ecology from polluted surface waters	✓	✓	✓	Contaminated runoff associated with construction, operation and maintenance and decommissioning activities has the potential to enter and contaminate surface water receptors which can serve as a habitat for species. Due to embedded measures included as part of the project design required to meet legislative requirements, it is unlikely that	Not significant

Description of impact	Phase			Likely significant inter-related effects	Significance
	C	O	D		
				receptors would experience increase significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore there is no change result from the inter-related assessment.	

Receptor-led effects

There is a potential for receptor led effects between hydrology and flood risk and surface water bodies (quality and flow). Contaminated surface water runoff associated with construction and decommissioning activities has the potential to enter and contaminate groundwater, including aquifers. Due to embedded mitigation measures included as part of the Proposed Development design and to meet legislative requirements, it is unlikely that receptors would experience an increase in significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.

Contaminated surface water runoff associated with construction and decommissioning activities has the potential to enter and contaminate habitats downstream of contamination and detrimentally effect species. Due to embedded mitigation measures included as part of the Proposed Development design and to meet legislative requirements, it is unlikely that receptors would experience an increase in significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.

There is also potential for the Proposed Development to increase flood risk during construction, operation and maintenance and decommissioning via a change in surfacing. An increase in flood risk could increase the hazard posed to human populations. Due to embedded mitigation measures included as part of the Proposed Development design and to meet legislative requirements, it is unlikely that receptors would experience an increase in significance of inter-related effects that which has already been reported in the individual chapters for the identified receptors. Therefore, there is no change resulting from the inter-related assessment.

- 7.10.3 Taking the above information into account, it is concluded that inter-related effects between hydrology and flood risk and other environmental topics on identified receptors would not result in effects of greater significance than those already assessed within this chapter of the ES.

7.11 Summary of environmental effects, mitigation measures and monitoring

- 7.11.1 Table 7.19 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.
- 7.11.2 Table 7.20 presents a summary of the potential cumulative environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 7.19: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a			Mitigation measures	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect
	C	O	D						
The impact of the deterioration of water quality of waterbodies (surface water and ground water)	✓	✓	✓	Drainage Strategy CEMP OMP Watercourse buffers / land drainage consents	C: negligible adverse O: negligible adverse D: negligible adverse	C: High O: High D: High	C: minor adverse O: minor adverse D: minor adverse	None	C: minor adverse O: minor adverse D: minor adverse
The impact of increased flood risk arising from additional surface water runoff	✓	✓	✓	FCA Drainage Strategy CEMP OMP Watercourse buffers / land drainage consents	C: negligible adverse O: low beneficial D: negligible adverse	C: High O: High D: High	C: minor adverse O: minor beneficial D: minor adverse	None	C: minor adverse O: minor beneficial D: minor adverse

^a C=construction, O=operational and maintenance, D=decommissioning

Table 7.20: Summary of potential cumulative environmental effects, mitigation and monitoring

Description of impact	Phase ^a			Mitigation measures	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect
	C	O	D						
The impact of the deterioration of water quality of waterbodies (surface water and ground water)	✓	✓	✓	Drainage Strategy CEMP Watercourse buffers / land drainage consents	C: negligible adverse O: negligible adverse D: negligible adverse	C: high O: high D: high	C: minor adverse O: minor adverse D: minor adverse	None	C: minor adverse O: minor adverse D: minor adverse
The impact of increased flood risk arising from additional surface water runoff	✓	✓	✓	FCA Drainage Strategy CEMP Watercourse buffers / land drainage consents	C: negligible adverse O: negligible beneficial D: negligible adverse	C: high O: high D: high	C: minor adverse O: minor beneficial D: minor adverse	None	C: minor adverse O: minor beneficial D: minor adverse

^a C=construction, O=operational and maintenance, D=decommissioning

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 8: Historic Environment

MARCH 2025

Document status					
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Glossary

Term	Meaning
Asset	Broad definition of a feature, site, structure or other form of heritage element that is deemed to have heritage value.
Cadw	The Welsh government agency charged with the protection of the monuments and heritage resources of Wales
Environmental Archaeology	The study of the interface between the environment of an area and the human activity within, typically this is through the study of soils, plant and animal remains.

Term	Meaning
Evaluation	A programme of non-intrusive and/or intrusive fieldwork, which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area. This may take the form of a trenched investigation of a percentage of the site, geophysical or topographical survey. The results of this investigation will usual aid in determining the requirements for any further work.
Listed Building	Listing is the way that a building or structure of special architectural or historic interest is recognised by law through the Historic Environment Wales Act (2023). These can include any type of structure such as bridges, milestones, walls etc
Registered Historic Landscape	The Historic Landscape Register currently comprises 58 landscapes deemed either 'Outstanding' or 'Special'. The purpose of this is to provides information for decision makers and landscape managers to help ensure that the historic character of the landscape is sustained, and that where change is contemplated, it is well-informed.
Registered Historic Park and Garden	These are recognised parks and gardens of special historic interest in Wales. They include a wide range of places – rural parks around country houses, deer parks, town gardens, hospital grounds and public parks, for example
Scheduled Monument	A site designated by the Welsh Ministers as nationally important, protected under the Historic Environment Wales Act (2023)
Conservation Area	These are areas of special architectural or historic interest, designated by local planning authorities, where the character, appearance, or setting is considered worthy of preservation or enhancement.
Setting	The setting of an asset describes the surroundings in which your asset is understood, experienced and appreciated, including present and past relationships to the surrounding landscape. This can include numerous factors such as the visual, audible and functional appreciation.
Setting Assessment	A report which defines the impact of a development on the setting of assets through a stages approach. Stage 1. Identification, Stage 2. Define the setting, Stage 3. Evaluate the impact, Stage 4. Mitigate.
Watching Brief	A programme of archaeological monitoring and recording during non-archaeological groundworks where there is the potential for archaeological remains to be disturbed or destroyed.

Abbreviations/ Acronyms

Abbreviation	Meaning
DBA	Desk-based Assessment – A programme of study within a defined geographical region in order to identify potential heritage assets, their value, significance, and survival, that could be impacted during proposed development.
HER	The Historic Environment Record – these provide detailed information about the historic environment of a given area. The historic environment records in Wales have been created as a result of decades of research and investigation.
NMRW	The National Monuments Records of Wales – similar to the HER data these provide detailed information about the historic environment of a given area and are curated by the Royal Commission on the Ancient and Historical Monuments of Wales.
HLCA	Historic Landscape Characterisation Area – The characterisation process divides each Registered Historic Landscape into smaller, more discrete, geographical areas of broadly consistent historic character called ‘Historic Character Areas’. These areas are defined according to their key historic elements or characteristics.
LB	Listed Building – See Glossary above
RHL	Registered Historic Landscape – See Glossary above
RHPG	Registered Historic Park and Garden – See Glossary above
SM	Scheduled Monument – See Glossary above
CA	Conservation Area – See Glossary above

Units

Unit	Description
Km	Kilometre

8 Historic Environment

8.1 Introduction

8.1.1 This Chapter reports the likely significant effects of the Proposed Development in terms of the Historic Environment in the context of the Site and surrounding area. The assessment of the direct impact is largely focused on the known and potential remains within the site boundary but also assessed the impact to the setting of those assets not directly physically impacted by the proposals.

8.1.2 This chapter of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, Sep 2024) and subsequent EIA Scoping Direction (PEDW, Feb 2025). In addition, this chapter of the ES has been informed by the following documents submitted with the application for the DNS:

ES Chapters

- Historic Environment;

ES Appendices

- Appendix 8.1: Historic Environment Desk-based Assessment;
- Appendix 8.2: Setting Assessment

8.2 Legislation and Policy

8.2.1 The legislation and planning policy relevant to the assessment of [Historic Environment] for the Proposed Development are summarised in Table 8.1 below.

Table 8.1: Summary of legislation and policy relevant to this chapter of the ES

Summary of provision	How and where considered in the ES
Future Wales: The National Plan 2040 (2021)	
The Future of Wales Outcomes Number 6	This objective within the National Plan states that people will live in places where ' <i>prosperity, innovation and culture are promoted</i> '. This outcome states that the heritage of Wales should play a role in the economy of the country and attract the ' <i>interest and expenditure of tourists</i> '.
Planning Policy Wales Edition 12	
Chapter 6, Distinctive and Natural Places, Paragraph 6.1.2	This paragraph identifies the historic environment as comprising individual historic features, such as archaeological sites, historic buildings and historic parks, gardens, townscapes and landscapes, collectively known as ' <i>historic assets</i> '.

Summary of provision	How and where considered in the ES
Chapter 6, Distinctive and Natural Places, Paragraph 6.1.6	This paragraph outlines the Welsh Government's objectives for the historic environment. These seek to ' <i>... conserve archaeological remains, both for their own sake and for their role in education, leisure and the economy</i> ' and ' <i>safeguard the character of historic buildings and manage change so that their special architectural and historic interest is preserved</i> '.
Chapter 6, Distinctive and Natural Places, Paragraph 6.1.7	Paragraph 6.1.7 states that ' <i>it is important that the planning system looks to protect, conserve and enhance the significance of historic assets. This will include consideration of the setting of an historic asset which might extend beyond its curtilage. Any change that impacts on an historic asset or its setting should be managed in a sensitive and sustainable way</i> '.
Rhondda Cynon Taf County Borough Council (RCTCBC)	
Rhondda Cynon Taf Local Development Plan up to 2021 (adopted March 2011)	The LDP does not include any policies that solely relate to archaeology or heritage, however, protecting historic built heritage assets is included within ' <i>Policy CS 1 - Development in the North</i> ' and ' <i>Policy CS 2 - Development in the South</i> '.

8.3 Consultation and Engagement

Scoping

- 8.3.1 In September 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 8.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 14 February 2025. Key issues raised by statutory bodies specific to Historic Environment are listed in **Table 8.2**, including how and where these have been considered in the ES.

Table 8.2: Summary of key scoping responses relevant to Historic Environment

Comment	How and where considered in the ES
PEDW	

Comment	How and where considered in the ES
Paragraph 13.2	PEDW have welcomed the fact that the Scoping Request states that Archaeological Planning – Heneb Glamorgan Gwent Archaeology (APHGGA) will be consulted
Paragraph 13.25	PEDW recommended that the applicant should liaise directly with Cadw to ensure that the impact on the peat deposits and palaeoenvironmental evidence is appropriately addressed.
Cadw	
Paragraph 13.2	Cadw recommended that a 5km study area be used for assessing the designated assets within the DBA and Settings Assessment due to the height of the proposed turbines.
Paragraph 13.3	As the proposed scheme impacts the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5) Cadw confirmed that an ASIDOHL2 would be required.
Paragraph 13.16 – 21	Cadw approved the methodology proposed in the Scoping Request for determining the significance of effects on the historic environment. They stated that the LiDAR 1 metre DTM and DSM datasets should be consulted for the DBA to look for any previously unrecorded sites within the redline boundary of the scheme. This would assist in the site walkover, with any newly identified sites being assessed by the walkover survey.
Paragraph 13.25	Cadw stated that the proposed mitigation within the Scoping Request should form part of the assessment phase. The identification of clusters of monuments would require further investigations for example. They state that Heneb should be consulted on the requirement for a geophysical survey after the completion of the DBA and walkover survey.
Paragraph 13.25	Cadw draw attention to potential impacts on intact peat deposits, which can contain important palaeoenvironmental evidence and artefacts of prehistoric date. It would be the preferred option for the turbines and infrastructure on site to avoid the peat deposits but where this cannot be achieved a scheme of investigation would need to be carried out. This should include the sampling, analysis, dating and reporting of the deposits.

Comment	How and where considered in the ES
Paragraph 13.26	Cadw noted that the topography can be used to screen the proposed development although given the turbine heights this will unlikely have any considerable effect. They recommend that the ES considers appropriate offsetting measures that could be incorporated to compensate for the impact of the turbines of historic assets.

8.4 Assessment Methodology

Relevant Guidance

8.4.1 The assessment of the Historic Environment has been undertaken in accordance with the methodology set out in Volume 1, Chapter 4: Approach to environmental assessment of the ES in addition to the following guidance, where appropriate:

- Design Manual for Roads and Bridges (DMRB) Volume 11 Environmental Assessment: Section 2 Environmental Impact Assessment. (Highways England et al., 2008).
- Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeology, 2020).
- Setting of Historic Assets in Wales (Cadw, 2017).

Scope of the Assessment

8.4.2 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 8.2**.

8.4.3 Taking into account the scoping and other consultation, **Table 8.3** summarises the issues considered as part of this assessment.

Table 8.3: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Excavation for turbine and solar array bases, BESS foundations, access tracks, cable runs etc	Excavation across the site for the construction of the scheme has the potential to disturb and/or destroy previously unknown buried archaeological remains and deposits that may survive below ground, as well as previously unknown earthworks that survive above ground.
Removal of sections of the historic drystone wall boundaries across the site for construction of the turbine and solar array foundations and access tracks	The proposed development plans show that sections of the historic field boundaries will be removed to allow the construction of the turbines and solar arrays as well as the construction of the access tracks across the site.

Impact on the setting of designated historic assets	The construction of the proposed scheme has the potential to impact on the setting of designated historic assets within the 5km study area applied to the scheme.
Operation and maintenance	
Impact on the setting of designated historic assets	The operation of the proposed scheme has the potential to impact on the setting of designated historic assets within the 5km study area applied to the scheme.

Study area

- 8.4.4 The Historic Environment study area (hereafter referred to as the study area) comprises a 1km radius study area, which was applied to the known non-designated historic assets held by the regional HER and the NMRW. A 5km radius study area was applied to the designated historic assets, the data for which is held by Cadw.
- 8.4.5 The location and geographic extent of the study area is presented in Appendix 8.1: Historic Environment Desk-based Assessment Figures 2 and 3 and within Appendix 8.2: Setting Assessment, Figure 2.

8.5 Assessment Criteria and Assignment of Significance

- 8.5.1 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts.
- 8.5.2 The approach to determining the significance of effects is a two-stage process that involves defining both the magnitude of the impact and the sensitivity of the receptor.
- 8.5.3 The terms used to define magnitude and sensitivity are based on those described in further detail in Volume 1, Chapter 4: Approach to Environmental Assessment.

Receptor Value and Sensitivity

- 8.5.4 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 8.4** below.

Table 8.4: Sensitivity criteria

Sensitivity/Value	Definition
Very High	Very high importance and rarity, international scale, very limited potential for substitution.
High	High importance and rarity, national scale and limited potential for substitution.

Sensitivity/Value	Definition
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

Magnitude of impact

8.5.5 The criteria for defining magnitude in this chapter of the ES are outlined in **Table 8.5** below.

Table 8.5: Impact magnitude criteria

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

Duration of impacts

The criteria for describing the duration of impacts in this chapter of the ES are outlined in **Table 8.6** below.

Table 8.6: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year.
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years.
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development.

Significance of effect

- 8.5.6 The method employed to assess significance of the effect is presented in **Table 8.7**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 8.5.7 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 8.7: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Negligible	Minor	Moderate or Major	Major	substantial

8.5.8 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described in Table 8.8 below.

Table 8.8: Definitions of significance

Significance	Definition
Major	These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed this level of significance.
Moderate	These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
Minor	These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assumptions and limitations of the assessment

8.5.9 It has been assumed that the data held by the regional HER, the NMRW and by Cadw is up to date.

8.5.10 It was not possible to access the central area of the site during the site walkover survey as it is under woodland with heavy scrub beneath the trees. The LiDAR data had suggested possible archaeological remains within this area of the site but it was not possible to confirm the presence or absence of these sites due to access limitation.

8.6 Baseline Environment Conditions

Desk studies

- 8.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment for Historic Environment. The existing studies and datasets referred to as part of the desk-based review for Historic Environment are summarised in **Table 8.9** below.

Table 8.9: Summary of desk study sources

Title/Organisation	Data Source/ Year	Data Used
Archaeology Wales: Llanwonno, Rhondda Cynon Taf: Desk-Based Assessment	2025	Cadw data for designated sites; Regional HER and NMRW data for non-designated sites; LiDAR 1m DTM and DSM datasets; Aerial photographs; Historic map sheets

- 8.6.2 The DBA findings showed that the site had historically been enclosed agricultural land, with a series of field boundaries noted across the site that likely originated in the later medieval or early post-medieval periods. The map regression and aerial photographic evidence indicate that there have been very few alterations to the site during the past three centuries. The field systems appear to have remained unchanged, bar the amalgamation of the four fields at the south-eastern edge of the site and the addition of a barn in this area.
- 8.6.3 There were 33 recorded heritage assets within the 1km study area, including the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5) and a Listed Building. Only the Registered Historic Landscape is partially within the site boundary. As the RHL is nationally significant its value is deemed to be high. Although there will be no direct impacts upon the key characteristics of the HLCAs that make up the Registered Historic Landscape, the overall impact is considered to be moderate.
- 8.6.4 The wider 5km study area contains fourteen Scheduled Monuments, 149 Listed Buildings, eight Conservation Areas and a Registered Historic Park and Garden. The development of the site would have a negligible impact upon the Conservation Areas and the Registered Historic Park and Garden Ynysangharad (Park PGW(Gm)3(RCT)).
- 8.6.5 Only one of the Scheduled Monuments will be impacted by the development, which is Carn-y-Wiwer Cairnfield and Platform Houses (GM323) located just over 1km to the north-west of the site. The value of this monument is deemed to be high as it is of national importance. It is

considered that the development will have a moderate impact on the Scheduled Monument.

8.6.6 There will be a negligible visual impact on the remaining thirteen Scheduled Monuments and all of the 150 Listed Buildings in the search areas.

8.6.7 The LiDAR data indicated the presence of a small number of potential surface quarries across the site, as well a small earthwork enclosure, which may have been a sheepfold.

Site-specific surveys

8.6.8 Site specific surveys were undertaken to inform the baseline assessment for Historic Environment. A summary of the site-specific surveys undertaken to inform this chapter of the ES are provided in **Table 8.10**.

Table 8.10: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
Walkover survey across the proposed development site	To record any previously unknown archaeological remains within the bounds of the site	18 th March 2025

8.6.9 The site walkover survey confirmed the presence of the potential surface quarries, within the north-western area of the site. These corresponded to two bedrock outcrops which may have been exploited in the past. The potential sheepfold evident on the LiDAR was not seen.

8.6.10 The site walkover confirmed the presence of the historic field boundaries, which were high drystone walls. A boundary marker stone was recorded within the north-western area of the site. The stone was carved with the letter M.

Future baseline conditions

8.6.11 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that ‘an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge’ is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.

8.6.12 The baseline conditions are unlikely to alter in the future.

Key receptors

8.6.13 **Table 8.11** identifies the receptors taken forward for the assessment.

Table 8.11: Key receptors taken forward for assessment

Receptor	Description and Reason for Consideration
Non-designated assets	There are 31 non-designated assets within the 1km study area. These are considered as it is possible that some may be of Medium value. They can also inform on the nature of potential buried archaeological remains and deposits within the site boundary.
Scheduled Monuments	There are 14 SMs within the 5km study area. These are considered as they are sites of national importance that contribute to regional and national research objectives.
Listed Buildings	There are 150 LBs within the 5km study area, with one of these being within the 1km study area. These are considered as they are deemed to be assets of regional importance that can contribute to regional research objectives.
Registered Historic Landscape of Outstanding Interest	The site partially lies within the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5). The Rhondda represents a rare and important historic landscape and as such is included in the national register.
Conservation Areas	There are eight Conservation Areas within the 5km study area. These are designated in order to protect key characteristics of the built environment. These can contribute to both regional and local research objectives.
Registered Historic Park and Gardens	There is one RHPG within the 5km study area. Cadw state that <i>'Historic parks and gardens are part of Wales's national identity. They enrich the texture and pattern of our landscapes and form a valuable record of social, cultural and economic change.'</i>

8.7 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

8.7.1 Both embedded and additional mitigation measures relevant to the assessment of Historic Environment are summarised in

8.7.2 **Table 8.12** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 8.12: Mitigation measures to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	

Mitigation measure	How the measure will be secured
The site is currently enclosed by historic drystone wall field boundaries. Where possible these should be retained and repaired. The walls stand at least 1.5m in height which would help screen certain elements of the proposed development from view, lessening the impact on some of the historic assets surrounding the site.	The measure is currently unsecured.
Further mitigation	
Sections of the historic drystone walls will need to be removed in order to construct some of the turbines bases, solar arrays and the associated access tracks. Before this is undertaken a photographic survey of the drystone walls should be conducted, which should include the boundary marker identified during the site walkover.	The measure is currently unsecured.
There is thought to be a low potential for archaeological features and deposits below ground across the site. However the presence of the surface quarries, and the two Bronze Age findspots located in close proximity to the site would suggest that a watching brief should be maintained during groundworks on site throughout the construction phase.	The measure is currently unsecured.

8.8 Assessment of effects

- 8.8.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development are listed in **Table 8.3**. A description of the potential effect on receptors caused by each identified impact is given below.
- 8.8.2 The DBA and Settings Assessment undertaken for the proposed development have concluded that there will be an impact upon three elements that make up the Historic Environment. The DBA concluded that there would be impacts to the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5) and the historic field boundaries identified within the site during construction phase.

- 8.8.3 The DBA also concluded that there would be an impact to the Scheduled Monument of Carn-y-Wiwer Cairnfield and Platform Houses (GM323) to the north-west of the site during construction phase. The DBA and Settings Assessment further concluded that the development would impact the setting of this monument during its operational phase.

Construction phase

Sensitivity of the receptor

- 8.8.4 The sensitivity of the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5) is High. The western and north-western edge of the site lies within the RHL. The north-western corner of the proposed site falls within the Rhondda Uplands HLCA030, with part of the western area of the site within the Rhondda fach: East Enclosed Valley Sides HLCA023.
- 8.8.5 The sensitivity of the Scheduled Monument of Carn-y-Wiwer Cairnfield and Platform Houses (GM323) is High. The monument comprises several round cairns, which are all likely of Bronze Age date, and measure between 3m to 6m in diameter, surviving up to a height of 0.5m. To the west of the cairns are the remains of four rectangular Platform Houses, which were constructed in two pairs. The Platform Houses are of unknown date. The setting of the monument will be impacted by the construction of the turbines, solar arrays and associated infrastructure.
- 8.8.6 The historic drystone wall field boundaries within the site are deemed to have a low value but these have the potential to add to local research objectives as they may have originated in the later medieval period. Sections of the walls are to be removed as part of the development which is the permanent loss of part of the historic asset.

Magnitude of impact

- 8.8.7 Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5) - the development proposals will have a direct impact on two of the HLCAs within the RHL. However, this will not include a direct impact upon any of the key characteristic features of the HLCAs. Even so, the cumulative effect of the scheme is considered to be of medium adverse impact on the Registered Historic Landscape, which will last during the entire lifespan of the scheme.
- 8.8.8 Carn-y-Wiwer Cairnfield and Platform Houses (GM323) – the development proposals will not have a direct impact upon the monument itself but will affect the setting of the monument. The magnitude of the impact is medium adverse.
- 8.8.9 The historic drystone wall field boundaries – the loss of sections of the field system will result in a medium adverse impact upon the asset, which will be permanent.

Significance of the effect

- 8.8.10 On the basis that the sensitivity of the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5) is high and the magnitude of the impact is medium adverse, it is assessed that there will be a moderate effect, which is significant.
- 8.8.11 On the basis that the sensitivity of the Carn-y-Wiwer Cairnfield and Platform Houses (GM323) is high, and the magnitude of the impact is medium adverse, it is assessed that there will be a moderate effect, which is significant.
- 8.8.12 On the basis that the sensitivity of the historic field boundaries is low, and the magnitude of the impact is medium adverse, it is assessed that there will be a minor effect, which is not significant.

Operation and maintenance

Sensitivity of the receptor

- 8.8.13 The setting of the Carn-y-Wiwer Cairnfield and Platform Houses (GM323), will also be impacted throughout the life of the Llanwonno Energy Scheme and so is also included here. The sensitivity of the site is High.

Magnitude of impact

- 8.8.14 Carn-y-Wiwer Cairnfield and Platform Houses (GM323) – the development proposals will not have a direct impact upon the monument itself but will affect the setting of the monument. This impact will be present throughout the life of the scheme. The magnitude of the impact is medium adverse.

Significance of the effect

- 8.8.15 On the basis that the sensitivity of the Carn-y-Wiwer Cairnfield and Platform Houses (GM323) is high, and the magnitude of the impact is high adverse, it is assessed that there will be a moderate effect, which is significant.

Future monitoring

- 8.8.16 No future monitoring is required as a consequence of the assessment of the Historic Environment.

8.9 Cumulative Effects

- 8.9.1 The assessment of cumulative effects for Historic Environment has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. The specific projects, plans and activities scoped into the assessment of cumulative effects are set out in **Table 8.13**.

- 8.9.2 The other projects have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the information provided in Volume 1, Chapter 2: Project Description, of the ES as well as the information available on other projects.
- 8.9.3 A grid connection for the turbines would be a 33kV substation at Upper Boat and will be subject to a separate planning application and does not form part of the Proposed Development for the purposes DNS application. However, the grid connection has been considered as part of the assessment of cumulative effects within this chapter of the Environmental Statement.
- 8.9.4 Without further details the cumulative effects of this are currently unknown.

Table 8.13: List of other projects considered within the CEA.

Other projects	Status	Distance (km)	Description
Llwyncelyn	Consented	0.2 km (adjacent to Proposed Development)	Erection of two wind turbines with a tip maximum height of 125m, associated infrastructure, transformer cabin and access track, including access via the public highway and across Cribin Ddu Farm and Llwynceelyn Farm.

Cumulative effects assessment

- 8.9.5 A description of the cumulative effects between the Proposed Development and other developments identified in **Table 8.13** upon Historic Environment receptors is provided below.

Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5)

- 8.9.6 The Llwynycelyn wind farm is located 200m to the west of the Llanwonno scheme. The wind farm is comprised of two operational turbines that measure 125m in height. The wind farm is located in the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5), within the Rhondda Uplands HLCA030. This HLCA is characterised as a multi-period and multi-functional landscape. It includes prehistoric settlement and funerary landscape; Roman and medieval military structures; early medieval administrative boundaries; medieval upland settlement; post-medieval industrial landscape and relict upland agricultural landscape. The Llwynycelyn turbines have had a direct impact upon this HLCA, although they have not impacted any of these key characteristics with the main impact being an indirect visual impact. This HLCA will be directly impacted by the Llanwonno scheme.
- 8.9.7 The Llanwonno scheme will also impact a further characterisation area within the RHL, HLCA023. This HLCA is characterised as a relict agricultural landscape that has to an extent been modified by industrial development. It includes distinctive field boundaries; documentary evidence of medieval/post-medieval agricultural practice and settlement; post-medieval upland settlement (longhouses); industrial landscape associated with mineral extraction; ancient woodland and modern forestation.
- 8.9.8 There will be a direct impact upon both the HLCAs, with turbines 1 and 2 and some of the solar arrays being constructed within the boundary of the RHL. However, only a small percentage of the overall area of both HLCAs will be directly affected. The construction will not directly impact or remove any of the key characteristics of the HLCA, with the impacts being a largely indirect visual one. Steps to reduce the visual impact of the solar arrays have been suggested within this chapter, namely the retention, and where necessary rebuilding, of the drystone walls as these will help screen the solar panels from view. This will help limit the main impacts to the turbines, which will themselves only be visible from a few areas within the RHL due to the topography and urban developments across the landscape.
- 8.9.9 Taking the above information into account, construction, operation and maintenance of the Proposed Development will result in a moderate adverse cumulative effect on Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5), which is significant.

Carn-y-Wiwer Cairnfield and Platform Houses (GM323)

- 8.9.10 The Llwynneclyn wind farm is located 950m to the south-east of the Carn-y-Wiwer Cairnfield and Platform Houses (GM323), with these two turbines sitting between the SM and the Llanwonno scheme. The setting of the monument has already been altered by the installation of the two Llwynneclyn turbines.
- 8.9.11 The Cairnfield includes the remains of several Bronze Age round cairns, which range in size from 3m in diameter and 0.3m in height to 6m in diameter and 0.5m in height, although they likely stood higher when originally constructed, having weathered and spread over the course of time (Cadw). In South Wales these monuments were often positioned in upland areas along ridges (Evans and Lewis 2003), which would have allowed them to be viewed from both the lower contours and when moving along the ridges. This is true of the Carn-y-Wiwer Cairnfield. The cairns have been constructed on a small plateau above a very steep slope, with the ground then continuing to gently rise behind them. This would have made the cairns visible from certain points along the valley below, the hills opposite and when crossing the ridge on which they are located.
- 8.9.12 The monument also includes two pairs of platform houses which are likely medieval or post-medieval in date. These are located just to the west of the cairns on the edge of the ridge. These would have been used in the summer grazing season, when the sheep were moved up the valley sides.
- 8.9.13 Although set in a relatively untouched upland zone, the landscape has not escaped change entirely. Large areas of the lower valley slopes were enclosed in the later medieval and post-medieval periods. This includes the area of the proposed development, which is enclosed by large drystone walls. The landscape was then further altered in the later post-medieval period with the rise in industry within the valleys. Further alterations have taken place in the last few decades with the higher ground along the hill behind the monument being used as forestry plantation.
- 8.9.14 The setting of the monument has also been altered by the installation of the two Llwynneclyn turbines, which have a visual impact upon the monument, which will be further impacted by the installation of the Llanwonno turbines. Steps to reduce the visual impact of the solar arrays have been suggested within this chapter, namely the retention, and where necessary rebuilding, of the drystone walls as these will help screen the solar panels from view.
- 8.9.15 Taking the above information into account, construction, operation and maintenance of the Proposed Development will result in a moderate adverse cumulative effect on Carn-y-Wiwer Cairnfield and Platform Houses (GM323), which is significant.

8.10 Inter-related effects

Receptor led effects

8.10.1 There are no predicted inter related effects.

8.11 Summary of environmental effects, mitigation measures and monitoring

8.11.1 **Table** 8.14 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 8.14: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a			Mitigation measures	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect
	C	O	D						
Excavation for turbine and solar array bases, BESS foundations, access tracks, cable runs etc and the possibility of disturbing buried archaeology	✓				C: Low O: N/A D: N/A	C: Low O: N/A D: N/A	C: Minor O: N/A D: N/A	Watching brief on all ground disturbance across the scheme	C: Negligible O: D:
Removal of sections of the historic drystone wall boundaries across the site for construction of the turbine and solar array foundations and access tracks	✓			Where possible the drystone walls should be retained and repaired as they would help screen elements of the proposed development from view.	C: Medium O: N/A D: N/A	C: Low O: N/A D: N/A	C: Minor O: N/A D: N/A	Before removal of necessary sections of the walls (for access tracks etc) a photographic survey of the walls should be conducted.	C: Minor O: N/A D: N/A

Description of impact	Phase ^a			Mitigation measures	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect
	C	O	D						
Impact on the Rhondda Registered Historic Landscape of Outstanding Interest (HLW (MGI) 5)	✓	✓		Where possible the drystone walls should be retained and repaired as they would help screen elements of the proposed development from view.	C: Medium O: Medium D: N/A	C: High O: High D: N/A	C: Moderate O: Moderate D: N/A		C: Moderate O: Moderate D:
Impact on the Scheduled Monument of Carn-y-Wiwer Cairnfield and Platform Houses (GM323)	✓	✓		Where possible the drystone walls should be retained and repaired as they would help screen elements of the proposed development from view.	C: Medium O: Medium D: N/A	C: High O: High D: N/A	C: Moderate O: Moderate D: N/A		C: Moderate O: Moderate D:

^a C=construction, O=operational and maintenance, D=decommissioning

8.12 References

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LLANWONNO ENERGY PROJECT

ENVIRONMENTAL STATEMENT

Volume 1

Chapter 9: Ecology

March 2025

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Annex number	Annex title
9.1	Planning Policy and Legislation
9.2	Consultation – Scoping Responses and Meeting Records
9.3	Bat Survey Data and Data Analysis Methods
9.4	Key Survey Personnel

Glossary

Term	Meaning
Barotrauma	Injury that occurs when a bat (or other animal) encounters sudden and extreme changes in atmospheric pressure. The rapid pressure fluctuations can rupture air-containing structures in the bodies of mammals which causes internal bleeding and can lead to death.
Environmental Impact Assessment (EIA)	EIA is a means of carrying out, in a systematic way, an assessment of the potential environmental effects from a development.
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations.
Geological	Physical structure and composition of the earth.
Latrine	Protected mammals. A dunging site, often with a territorial function.
Maternity Roost	A breeding roost for bats.
Proposed Development	Llanwonno Energy Project
Site boundary	The full extent of the land available for, and being investigated for, potential development.
The Applicant	Cenin Renewables Ltd.
The Project	Proposed wind farm and associated ancillary development known as 'Llanwonno' or 'Llanwonno Energy Project'

Abbreviations

Abbreviation	Meaning
ASNW	Ancient Semi-Natural Woodland
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
ECOW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EclA	Ecological Impact Assessment
ES	Environmental Statement
JNCC	Joint Nature Conservation Committee
NRW	Natural Resources Wales
NVC	National Vegetation Classification
OHMP	Outline Habitat Management Plan

Abbreviation	Meaning
PAWS	Plantation on Ancient Woodland Site
PEDW	Planning and Environment Decisions Wales
RCT	Rhondda Cynon Taf
RCTCBC	Rhondda Cynon Taf County Borough Council
RAWS	Restored Ancient Woodland Site
SAC	Special Area of Conservation
SEPA	Scottish Environmental Protection Agency
SEWBRcC	South-east Wales Biological Records Centre
SINC	Sites of Importance for Nature Conservation
SNH	Scottish Natural Heritage
SSSI	Site of Special Scientific Interest

Units

Unit	Description
dB	Decibels
Km	Kilometres
m	Metres
ms	Milliseconds
P	Pass (bat pass)
P/h	Bat passes per hour

9 Ecology

9.1 Introduction

9.1.1 This chapter of the Environmental Statement (ES) considers the likely impacts and effects of the proposed Llanwonno Energy Project (referred to as the “Proposed Development”) on habitats and protected species during the construction, operation and maintenance, and decommissioning phases.

9.1.2 This chapter of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, September 2024) and subsequent EIA Scoping Direction (PEDW, Feb 2025). In addition, this chapter of the ES has been informed by the following documents submitted with the application for the DNS.

ES Chapters

- Volume 1, Chapter 10: Ornithology.

ES Appendices

- Volume 3, Appendix 9.1: Ecology Planning Policy and Legislation.
- Volume 3, Appendix 9.2: Ecology Consultation – Scoping Responses and Meeting Records.
- Volume 3, Appendix 9.3: Bat Survey Data and Data Analysis Methods.
- Volume 3, Appendix 9.4: Key Survey Personnel.

9.1.3 The assessment has been undertaken by BSG Ecology Ltd.

9.2 Legislative and Policy

Legislation

9.2.1 Legislation relevant to ecology for the Proposed Development is as follows:

- The Environment (Wales) Act (2016);
- The Conservation of Habitats and Species Regulations (2017); and
- The Wildlife and Countryside Act (1981).

Policy

9.2.2 The key national planning policy documents relevant to the assessment of ecology for the Proposed Development are as follows:

- National Planning Policy:
 - Planning Policy Wales Edition 12 (Welsh Government, 2024), including relevant supplementary Technical Advice Notes (TANs), Circulars and Policy Clarification Letters (PCLs); and
 - TAN 5 (Nature Conservation and Planning, 2009).

9.2.3 **Error! Reference source not found.** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of ecology, including how and where these have been considered in the ES.

Table 9.1: Summary of national planning policies relevant to this chapter of the ES

Summary of policy	How and where considered in the ES
Planning Policy Wales Edition 12	
Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is periodically revised. The latest iteration is PPW version 12 (February 2024)¹. Chapter 6 (Distinctive and Natural Places) sets out how the planning system in Wales meets the challenges set out in the Global Biodiversity Framework², the Biodiversity Deep Dive recommendations developed in response to this (Welsh Government, 2022³), and the Duty, under Section 6 of the Environment (Wales) Act 2016, to maintain and enhance biodiversity and ecosystem resilience in Wales. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015⁴, the Well-being of Future Generations (Wales) Act 2015⁵ and other key legislation and resultant duties.	Outline measures to achieve biodiversity net benefit are set out in this chapter. [Section 9.7 of this chapter] A Green Infrastructure Statement will be included in the submission. This will detail how the step-wise approach was followed in the design evolution of the scheme.
TAN 5 Nature Conservation and Planning	
Technical Advice Note (TAN) 5⁶ supplements Planning Policy Wales and provides advice about how the land use planning system in Wales <i>"should contribute to protecting and enhancing biodiversity and geological conservation."</i> The TAN provides guidance to local planning authorities on: 'the key principles of positive planning for nature conservation; nature conservation and Local Development Plans; nature conservation in development management procedures; development affecting protected internationally and nationally designated sites and habitats; and, development affecting protected and priority habitats and species.'	Outline measures to achieve biodiversity net benefit are set out in this chapter. [Section 9.7 of this chapter]

¹ Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> [Accessed: 17 February 2025].

² Available at: <https://www.cbd.int/qbfi/> [Accessed: 17 February 2025].

³ Available at: <https://www.gov.wales/biodiversity-deep-dive-recommendations-html> [Accessed: 17 February 2025].

⁴ Available at: <https://www.legislation.gov.uk/anaw/2015/4/contents/enacted> [Accessed: 17 February 2025].

⁵ Available at: <https://www.legislation.gov.uk/anaw/2015/2/contents/enacted>. [Accessed: 17 February 2025].

⁶ Available at: <https://www.gov.wales/technical-advice-note-tan-5-nature-conservation-and-planning> [Accessed: 17 February 2025].

Local Planning Policy Context

- 9.2.4 The Proposed Development is located within Rhondda Cynon Taf County Borough Council (RCTCBC). The local planning policy documents relevant to the assessment of ecology for the Proposed Development are:
- The Rhondda Cynon Taff Biodiversity Action Plan (Rhondda Cynon Taf County Borough Council, 2000); and
 - Rhondda Cynon Taff Local Development Plan (2006 – 2021).
- 9.2.5 RCTCBC are preparing a Revised Local Development Plan for the period 2022 - 2037. This process formally began in April 2022. This will replace the current LDP for Rhondda Cynon Taf (2006 – 2021). The current LDP will remain in force until the Revised LDP is adopted (adoption is anticipated in May 2026).
- 9.2.6 Table 9.23 provides a summary of the provisions contained within the local plan relevant to the assessment of ecology, including how and where these have been considered in the ES.

Table 9.23: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
The Rhondda Cynon Taf Biodiversity Action Plan (Rhondda Cynon Taff County Borough Council, 2000)	The RCT Biodiversity Action Plan (BAP) sets a framework for nature conservation within RCT. The aim of the RCT BAP is to focus on conserving habitats in order to maintain and enhance biodiversity. It provides action plans for habitats of national and/or international importance, those that support Section 7 species, are of local importance (habitats that are rare, in decline and/or under threat) species of national and/or international importance, Section 7 species and species listed in the Birds of Conservation Concern/IUCN red lists) or of particular local importance.	A detailed assessment of the likely impacts and significance of those impacts on receptors (including Section 7 habitats and species) is presented in this chapter. [Sections 9.8 of this chapter]
Rhondda Cynon Taf Local Development Plan (2006 – 2021)	Policy AW 8 of the RCT Local Development Plan (LDP) (2011) states <i>“Rhondda Cynon Taf’s distinctive natural heritage will be preserved and enhanced by protecting it from inappropriate development. Development proposals will only be permitted where:</i> <i>1. They would not cause harm to the features of a Site of Importance for Nature Conservation (SINC) or Regionally Important Geological Site (RIGS) or other locally designated sites, unless it can be demonstrated that:</i> <i>a) The proposal is directly necessary for the positive management of the site; or</i> <i>b) The proposal would not unacceptably impact on the features of the site for which it has been designated; or</i> <i>c) The development could not reasonably be located elsewhere and the benefits of the Proposed Development clearly outweigh the nature conservation value of the site.</i> <i>2. There would be no unacceptable impact upon features of importance to landscape or nature conservation, including</i>	Impacts of the Proposed Development upon SINCs and outline management measured proposed at the Proposed Development are set out within this chapter. [Sections 9.6.2 – 9.6.3, 9.6.52 – 9.6.56, 9.7 and 9.8.38 – 9.8.49 of this chapter]

Policy	Summary of policy	How and where considered in the ES
	<i>ecological networks, the quality of natural resources such as air, water and soil, and the natural drainage of surface water.</i> <i>All development proposals, including those in built up areas, that may affect protected and priority species will be required to demonstrate what measures are proposed for the protection and management of the species and the mitigation and compensation of potential impacts.</i> <i>Development proposals must be accompanied by appropriate ecological surveys and appraisals, as requested by the Council. Development proposals that contribute to the management or development of Ecological Networks will be supported.”</i>	

9.3 Consultation and Engagement

Scoping

- 9.3.1 In March 2023, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 9.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 12 and 26 November 2024. Key issues raised by statutory bodies specific to ecology are listed in Table 9.45, including how and where these have been considered in the ES.

Table 9.45: Summary of scoping responses relevant to ecology

Comment	How and where considered in the ES
Planning and Environment Decisions Wales (PEDW) / (Natural Resources Wales (NRW)) (Letter Ref: CAS-02125-Q0T5P0)	
<i>"The EIA must include a description of all the existing natural resources and wildlife interests within and in the vicinity of the Proposed Development, together with a detailed assessment of the likely impacts and significance of those impacts."</i>	This comment is noted and agreed. [Sections 9.6 and 9.8 of this chapter]
<i>"Any habitat surveys should accord with the NCC Phase 1 survey guidelines (NCC (1990) Handbook for Phase 1 habitat survey. NCC, Peterborough). We advise that Phase 1 surveys are undertaken and completed during the summer to ensure the best chance of identifying the habitats present."</i>	The original and update Phase 1 habitat surveys of the Study Area have been completed in accordance with the JNCC Phase 1 survey guidelines. [Sections 9.5.23 – 9.5.26 of this chapter]
<i>"The Phase 1 survey results should be presented alongside details of the current annual management of the site, including changes which may influence use of the site by protected species."</i>	The Phase 1 survey results will include detailed descriptions of the habitat and its apparent management (where management could be ascertained based on condition at the time of survey). [Sections 9.6.7 – 9.6.68 of this chapter]
<i>"We have concerns regarding the development and the location of Turbine (T) 4, the associated road network and infrastructure which is proposed to be located within priority habitat marshy grassland due to the potential areas of peat and the subsequent losses of these habitats. However, we note that potential impacts on peat are to be scoped in to the hydrology, hydrogeology, geology and soils chapter(s) of the ES."</i>	One turbine, (now numbered T8) plus its access track and the access track for T7, are to be located within marshy grassland in the eastern part of the Study Area. The marshy grassland at that location does not meet priority habitat criteria. [Sections 9.6.19 – 9.6.24 of this chapter] Impacts on peat will be assessed within the hydrology chapter of the ES.

Comment	How and where considered in the ES
<i>"We advise that the site and, where necessary, land adjacent to the site is subject to assessment to determine the likelihood of protected species being present and affected by the proposals. Targeted species surveys should be undertaken for all species scoped in which; are undertaken by qualified, experienced and where necessary, licensed ecologist(s) and, comply with current best practice guidelines. In the event that the surveys deviate from published guidance, or there are good reasons for deviation, full justification for this should be included within the EIA"</i>	Appropriate targeted species surveys have been undertaken in accordance with industry standard guidance (by suitably experienced and licensed (where necessary) ecologists) for all species scoped into assessment, except for reptiles, for which surveys have been scoped out given that much of the development footprint is proposed within closely grazed grassland and arable land, which is of low to negligible suitability for reptiles. The mosaic of habitats (including marshy grassland and drystone walls) within the remainder of the development footprint are of higher suitability for reptiles, and presence has been assumed in these habitats. [Sections 9.5.22 – 9.5.49 of this chapter]
<i>"We advise that the application is supported by bat surveys of the full application site in accordance with" SNH and BCT industry standard guidance.</i>	Bat activity survey was completed using automated detectors in 2023 (in accordance with the SNH guidance), and ground-level tree assessment has been completed in 2024 (in accordance with BCT guidance). [Sections 9.5.27 – 9.5.38 of this chapter]
<i>"For all trees with potential to support roosting bats within the stated buffer of each turbine, and those needing to be felled or pruned to facilitate development, we advise that they are subject to both ground-based assessments and further surveys in accordance with the published best practice survey guidance (E.g., climbed, endoscope surveys)."</i>	Mature oak and birch trees with features suitable to support multiple bats (PRF - M) were identified on the southern edge of the mixed plantation woodland (Perry's Wood), within 250 m of proposed turbine locations (including possible micro-siting distance). Climbed tree inspection surveys will be completed in 2025.
<i>"With no further details of the (dormouse) survey methodology, it is unclear when the (dormouse) boxes in particular were deployed in relation to the commencement of box checks in June 2023 and the justification for their distribution within the wood. Ideally, for the most reliable results, the boxes would be deployed in the year ahead of the box checks commencing and deployment of the tubes/boxes would be in a grid across all of the woodland. We advise that a justification is included in the application for an alternative approach."</i>	Dormouse nest tubes and boxes were deployed during March 2023. For giving a reliable population density estimate, the dormouse conservation guidance (produced by English Nature (2006)) states that boxes should be deployed "spaced about 20 m apart", however the guidance goes on to say that "putting clusters of boxes in good places will enhance occupancy rates and increase the probability of detecting the presence of dormouse". Boxes were deployed on trees of suitable size associated with the best habitat for the species, determined by an experienced licenced surveyor in the field. This approach was considered most appropriate, given that the aims of the survey were to determine presence or likely absence. In addition to using 40 boxes, 50 tubes were deployed. For tubes, the guidance indicates that deployment in April may get early results, but recommends that tubes are deployed in March. The survey method was in accordance with industry standard guidance, further survey for dormouse is not required. [Sections 9.5.39 – 9.5.41 of this chapter]

Comment	How and where considered in the ES
<i>"We advise that not only are watercourses/waterbodies and their immediate surroundings considered in regard to their use by otters, but also; any potential overland routes used by otters through the application site for dispersal/movement through the landscape; and habitats such as dense scrub, particularly within 200 m of the Proposed Development works, which may offer suitable places for a breeding holt. Surveys should be undertaken across the year to establish any seasonal pattern of use."</i>	No evidence of overland routes used by otter across the Study Area were recorded during the survey work (including extended Phase 1 and riparian mammal survey). Scrub within 200 m of watercourses has been searched for resting sites during the riparian mammal survey. [Sections 9.5.42 – 9.5.46 of this chapter]
<i>"Should protected species be confirmed, information must be provided identifying the species specific impacts in the short, medium and long term, together with any mitigation and compensation measures proposed to offset the impacts identified. We advise comprehensive descriptions of the habitats affected are included to support robust conclusions about their significance for the species."</i> <i>We advise that EIA considers significance (both alone and in combination) and where applicable conservation status. In respect of conservation status, we advise consideration be given to the current conservation status of the relevant species. The EIA must demonstrate that there will be no detriment to maintenance of favourable conservation status of the species during construction, operation and where relevant decommissioning phases of the scheme."</i> <i>Where proposals implicate protected species which are also notified features of designated sites we advise that the EIA considers the impacts on those species from both perspectives."</i> <i>We advise that the EIA sets out how the long term site security of any mitigation or compensation will be assured, including management and monitoring information and long term financial and management responsibility. Where the potential for significant impacts on protected species is identified, we advocate that a Conservation Plan is prepared for the relevant species and included as an Annex to the EIA."</i>	Likely impacts of the proposals on all features scoped into assessment will be appropriately described and assessed (in terms of significance, taking into account conservation status) both alone and cumulatively across the phases of the scheme. Appropriate mitigation / compensation will be detailed in a management plan for the scheme (including long-term financial and management responsibilities). [Sections 9.6 – 9.9 of this chapter]

Comment	How and where considered in the ES
<i>"We advise that the impacts of the proposals on bats are assessed using the Ecobat tool (currently hosted by the Mammal Society (MS) and applicants may have to ask the MS for access). The assessment should include weather monitoring data at the time of bat activity surveys and assess the proportion of recorded bat activity in relation to the generating speed of the proposed turbines."</i>	The EcoBat tool was offline for a period of approximately 2 years, but has recently become available for use again and has been used to inform this EclA. If it remains available and supported / maintained, it will be used for the assessment. If it becomes unavailable again, a categorisation of bat activity will instead be derived through comparison with bat activity data collected by BSG Ecology at a large number other sites across England, Wales and Scotland. The assessment will include weather monitoring data and assess the proportion of recorded bat activity in relation to the generating speed of the proposed turbines. [Sections 9.5.18 – 9.5.20 and Sections 9.6.81 – 9.6.82 of this chapter]
<i>"Where a European Protected Species (EPS) is identified and the development proposal will contravene the legal protection they are afforded, a licence should be sought from NRW."</i>	This comment is noted and agreed.
<i>"We recommend that the Applicant consults the Local Authority Ecologist on the scope of the work to ensure that regional and local biodiversity issues are adequately considered."</i>	A consultation meeting with Rhondda Cynon Taf's ecologist will be sought in early 2025. [Sections 9.3.3 – 9.3.4 of this chapter]
<i>"NRW would expect the developer to contact other relevant people/organisations for biological information/records relevant to the site and its surrounds. These include the relevant local records centre and any local ecological interest groups."</i>	Ecological records for the Study Area and surrounding land have been obtained from SEWBrEC (the local environmental records centre). During the meeting in early 2025 we will ask the RCT ecologist if there are groups or individuals that might hold additional data. [Sections 9.3.4 and 9.5.21 of this chapter]
<i>"We advise that the development incorporates robust green infrastructure that will remain unlit to allow protected species (particularly bats and otters) to continue to inhabit the site and move through it. Developments should be designed to incorporate robust green infrastructure corridors."</i>	A Green Infrastructure Statement will be included in the submission. This will detail retained and enhanced green infrastructure within the Study Area.
Rhondda Cynon Taf (RCT) (Letter Ref: 24/5095/PRE)	
<i>"The site includes parts of SINC 53 - Llys Nant and Twyn-y-Glog Woodlands, and that turbines are already located within the SINC."</i>	The Proposed Development includes two turbines and sections of associated access track within the Llys Nant and Twyn-y-Glog Woodlands SINC. There are currently no turbines in the SINC, based on aerial imagery and the list of schemes for cumulative assessment. Impacts of the scheme in combination with other wind turbines locally will be considered in the cumulative assessment. [Section 9.9 of this chapter]

Comment	How and where considered in the ES
<i>"it is considered that further habitat survey / assessment is needed. In particular, a Phase II National Vegetation Classification assessment is required, as is a Grassland Fungi Assessment (including potential for eDNA work). Permanent pasture habitat in RCT is proving to be important grassland fungi habitat and there is no information in this respect."</i>	Data obtained during the Phase 1 surveys (which were completed by experienced botanists) included species lists and is sufficiently detailed to assign key habitats (such as the marshy grassland) on Study Area to NVC categories. The feasibility of completing a grassland fungi assessment in 2025 is being explored. [Sections 9.5.24 of this chapter]
<i>"Given reference in the hydrology section of the scoping report to the presence of peat within the study area, an understanding of whether peat bog (in whatever degraded form) would be affected will also need to be included."</i>	The hydrology chapter of the ES will assess the likely impacts of the proposals on peat. No peatland habitats have been recorded.
<i>"It is noted that further water vole and otter surveys are on-going. The applicant is advised that the former should not only be watercourse focused, given the species use of upland rush pasture in this area."</i>	The riparian mammal Study Area takes in all suitable areas of habitat for water vole (including rush pasture away from the watercourse margins). [Sections 9.5.42 – 9.5.47 of this chapter]
<i>"The ES would also need to discuss and review whether specific reptile / amphibian surveying is needed. The scoping report makes reference to grass snake and adder as common reptiles, but both have, at least in RCT, significant ecological value which would elicit a more focused mitigation approach."</i>	Much of the development footprint is proposed within closely grazed grassland and arable land, which is of low to negligible suitability for reptiles. The mosaic of habitats (including marshy grassland and drystone walls) within the remainder of the development footprint are of higher suitability for reptiles, and are likely to support them. Given the likely absence of great crested newt <i>Triturus cristatus</i> from the Study Area (as agreed by NRW), common amphibians have been scoped out of further assessment. Suitable safe working practices and mitigation measures for reptiles and common amphibians will be recommended. Given the footprint of the proposals, and the habitats within which much of the footprint lies, this approach is considered proportionate. [Sections 9.6.154 – 9.6.162 of this chapter]
<i>"The supporting information sets out that dormouse evidence was not recorded in surveys to date. However, dormouse has recently been found in the locality for the first time, which raises the potential for the species to be using woodland and scrub habitat in the upland fringe. Further investigation in this respect is suggested."</i>	Dormouse survey of all suitable habitat in the Study Area (in accordance with industry standard guidance) for the species within the development footprint was completed in 2023. No evidence of dormouse presence was recorded - it is therefore reasonable to conclude hazel dormice are absent from the Study Area. It follows that the species has been scoped out of further assessment. Suitable sensitive working practices will be employed when working in suitable dormouse habitat. [Sections 9.5.39 – 9.5.41 and 9.6.135 – 9.6.139 of this chapter]

Comment	How and where considered in the ES
<i>"A clear understanding of the habitat and species impacts of grid connection and site access/ infrastructure requirements will be essential to the EIA ecology assessment process."</i>	Impacts of construction / operation of the access track will be assessed within the EIA and OIA. The scheme will utilise the existing grid connection for the adjacent Llwynceilyn scheme, so no additional impacts on ecological / ornithological features above the existing baseline (extant cabling) are anticipated.
<i>"Ecological mitigation/ enhancement should be on-site. It should focus on better land management of the windfarm site and adjacent areas. The evidence would suggest potential for ecological betterment on site through Habitat Management Plan delivery for the lifetime of the scheme, via a S106 Agreement, with conservation grazing, cut and collect management, removal of herbicide/ fertiliser input, SINC management / mitigation and pro-active lapwing mitigation etc. Measures to avoid bird and bat fatality and habitat loss will be important. Providing effective mitigation for grid and access infrastructure will need to be addressed. Setting out the mechanics of mitigation/ enhancement delivery and evidencing that landowner 'buy-in' into the ecology mitigation/ enhancement commitments has been properly addressed and incorporated into a 'scheme lifetime' species and habitat management and monitoring proposal, will be key requirements that need to be addressed."</i>	Mitigation / enhancement within the Study Area will be prioritised, and will focus on improving the habitat management of the Study Area. Mitigation / enhancement proposals will be detailed in a Habitat Management Plan. [Sections 9.7 of this chapter]

Other consultation

- 9.3.3 Following scoping, consultation and engagement with interested parties specific to ecology has continued. These included a meeting with RCTCBC regarding ecology and ornithology, and a meeting with Natural Resources Wales (NRW) protected species ecologists (requested via the Discretionary Planning Advice service).
- 9.3.4 Further detail regarding key items discussed and how these have been addressed is provided in Table 9.4 of this ES chapter below.

Table 9.67: Summary of other consultation relevant to ecology

Comment	How and where considered in the ES
NRW DPAS Meeting – 11 March 2025 (held with Sandra Wells [Ecologist] and Annabelle Evans [Casework Officer])	
NRW indicated (following an overview of survey methods and results being provided to them) that the scope and approach to the ecological survey work seemed reasonable, as reflected in their scoping response, but that they would reserve further comments until the EclA was received.	Not applicable.

Comment	How and where considered in the ES
Upland sites are important to maintaining landscape permeability for otter. Surveys need to extend outside of watercourses and establish whether there are other features / dispersal routes across the site. Site needs to be designed to allow otter to move through it freely.	The approach to otter survey and the results of the work are set out within this chapter. [Sections 9.5.42 – 9.5.46 and Sections 9.6.140 – 9.6.144 of this chapter] Mitigation to ensure the Site remains permeable to otter is detailed in Table 9.17 (in Section 9.7 of this chapter).
Details of dormouse box / tube deployment and subsequent survey visits needs to be provided in the EcIA. NRW noted that dormouse can take some time to start using boxes and tubes.	The dormouse survey work and results are summarised within this (EcIA) chapter of the ES. [Sections 9.5.39 – 9.5.41 and 9.6.135 – 9.6.139 of this chapter]
NRW indicated that any departures from guidance with regard to bat survey (reflecting the evolution of the scheme) needed to be detailed and justified in the EcIA.	The approach to bat survey work is set out in this chapter. [Sections 9.5.18 – 9.5.20 and Sections 9.6.81 – 9.6.82 of this chapter]
With regard to delivering biodiversity net benefit (in line with policy) SW encouraged local community involvement in habitat management and monitoring initiatives. NRW would be particularly concerned to see measures for the species that are within their remit and which may be impacted by the development (principally otter and bats)	Outline measures to achieve biodiversity net benefit are set out in this chapter. [Section 9.7 of this chapter]
RCT Consultation Meeting – 24 February 2025 (held with Richard Wistow and Kate Stock, Council Ecologists)	
RCT noted that, although the area of SINC within the site may not necessarily meet the designation criteria in its own right, SINC are large, continuous areas of habitat providing landscape-scale connectivity.	Potential impacts of the Proposed Development on SINC are considered within this (EcIA) chapter of the ES. [Sections 9.6.2 – 9.6.3, 9.6.52 – 9.6.56 and 9.8.38 – 9.8.49 of this chapter]
RCT noted that a poorly understood autumn movement of horseshoe bat sp. had been recorded within RCT (with bats apparently moving from maternity roosts to unknown areas elsewhere), and asked whether either species had been recorded on site in any numbers?	The survey work included the autumn period (with detectors deployed for ten nights in mid-late September), and no movement of horseshoe bat sp. was recorded. Greater horseshoe bat were not recorded during the work, and two lesser horseshoe bat passes were recorded during the autumn. [Sections 9.6.122 – 9.6.124 of this chapter]

Comment	How and where considered in the ES
RCT confirmed that records of water vole at the Site were notable, but clarified that – though the species remains scarce in the county – they are more widespread than records (such as those held by NBN) would suggest, with animals being recorded at Maerdy and Bwllfa wind farms (in addition to the publicised population at Pen y Cymoedd). He stated that it is likely that the species is present along watercourses and in wet grasslands elsewhere in the uplands of RCT, and that animals may move between the populations through connecting habitat.	The known distribution of water vole within the county is summarised under ‘Baseline Environmental Conditions’ within this (EcIA) chapter of the ES. [Sections 9.5.42 – 9.5.47 of this chapter]
RCT stated with regard to dormouse, that based on the habitat descriptions, the likelihood of dormouse in the habitats on Site is low, and agreed that there is no need for additional dormouse survey.	The dormouse survey work and results are summarised within this (EcIA) chapter of the ES. [Sections 9.5.39 – 9.5.41 and 9.6.135 – 9.6.139 of this chapter]
RCT asked whether the solar scheme will be located within habitats suitable for common lizard, slow worm or adder?	The solar array is to be located within improved grassland (with a short sward) and arable land (and a small area of heavily grazed semi-improved grassland), and is therefore located entirely within habitats of low or negligible suitability for those species. [Sections 9.6.154 – 9.6.158 of this chapter]
RCT confirmed that RCT are satisfied with the scope of the ecological survey work.	Not applicable

9.4 Assessment Methodology

Relevant Guidance

9.4.1 The assessment of ecology has been based principally on relevant parts of the CIEEM (2018, updated 2022) guidelines:

- Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom developed by the Chartered Institute of Ecology and Environmental Management (CIEEM).

Scope of the Assessment

9.4.2 Taking into account the scoping responses and further consultation completed, Table 9.89 summarises the issues considered as part of this assessment.

Table 9.89: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	

Activity	Impacts scoped into the assessment
Impacts on non-statutory designated sites – Llys Nant y Graig Twyn-y-glog Woodlands SINC (mixed plantation woodland)	Direct and indirect habitat loss. Changes to habitats through environmental impacts, i.e. pollution and sedimentation of watercourses, dust mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on priority habitats – M25 marshy grassland (Ground-Water Dependent Terrestrial Ecosystems (GWDTEs))	Direct and indirect habitat loss. Changes to habitats through environmental impacts, i.e. pollution and sedimentation of watercourses, dust mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on priority habitats – lowland heath	Indirect habitat loss. Changes to habitats through environmental impacts, i.e. pollution and sedimentation of watercourses, dust mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on priority habitats – headwaters (watercourses)	Direct and indirect habitat loss. Changes to habitats through environmental impacts, i.e. pollution and sedimentation of watercourses, dust mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on priority habitats – hedgerow	Indirect habitat loss. Changes to habitats through environmental impacts, i.e. pollution and sedimentation of watercourses, dust mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on protected species – bats	Direct and indirect habitat loss. Disturbance to / loss of breeding sites, resting places, etc. Displacement / disruption to movement within / through the Study Area.
Impacts on protected species – water vole	Direct and indirect habitat loss. Disturbance to / loss of breeding sites, resting places, etc. Displacement / disruption to movement within / through the Study Area.
Impacts on protected species – badger	Direct and indirect habitat loss. Disturbance to / loss of breeding sites, resting places, etc.
Impacts on protected species – reptiles	Direct and indirect habitat loss.
Operation and maintenance	
Impacts on non-statutory designated sites – Llys Nant y Graig Twyn-y-glog Woodlands SINC (mixed plantation woodland)	Changes to habitats through environmental impacts, i.e. pollution and sedimentation of watercourses, dust mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.

Activity	Impacts scoped into the assessment
Impacts on priority habitats – M25 marshy grassland (GWDTEs)	Changes to habitats through environmental impacts, i.e. pollution, run-off, dust or silt mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on priority habitats – lowland heath	Changes to habitats through environmental impacts, i.e. pollution, run-off, dust or silt mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on priority habitats – headwaters (watercourses)	Changes to habitats through environmental impacts, i.e. pollution, run-off, dust or silt mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on priority habitats – hedgerow	Changes to habitats through environmental impacts, i.e. pollution, run-off, dust or silt mobilisation, vibration, etc. Changes to habitat composition through land-use change, increased human presence, etc.
Impacts on protected species – bats (high and medium risk species in accordance with NatureScot <i>et al.</i> , 2021 guidance) (the assessment will include risk of collision fatality)	Collision related fatality. Indirect habitat loss, i.e. lighting of habitat. Displacement / disruption to movement within / through the Study Area.
Impacts on protected species – water vole	Indirect habitat loss, i.e. disturbance along watercourses. Disturbance to / loss of breeding sites, resting places, etc. Displacement / disruption to movement within / through the Study Area.
Decommissioning	
The effects of decommissioning have the potential to be similar to those during the construction phase, but are likely to occur over a shorter time period.	There are unlikely to be any significant ecological effects on statutory protected sites and habitats as a result of decommissioning. Any temporary localised effects on priority habitats around the Proposed Development are likely to regenerate to a condition representative of the baseline over time. Turbine foundations may be left in situ but are likely to be covered with topsoil to allow colonisation of species present within the surrounding sward. Species most likely to be disturbed and displaced from the Proposed Development during decommissioning are those that breed, shelter or forage within it at that time.

9.4.3 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in Table 9.1011.

Table 9.1011: Issues scoped out of the assessment

Issue	Justification

Impacts on habitats of low ecological value (for which the Study Area of low or negligible importance); improved and semi-improved pasture, former MG10 marshy grassland (non-GWDTE / priority habitat), arable, continuous bracken, scrub, scattered trees, coniferous plantation, quarry, hardstanding and drystone walls.	Significant effects are considered unlikely to occur on these habitats, given their low ecological value and abundance at all geographic scales. No scoping opinion related to habitats of low ecological value was provided by PEDW.
Impacts on protected species – bats (infrequently recorded low risk species as categorized by NatureScot <i>et al.</i> , 2021 guidance)	Significant effects are considered unlikely to occur on these species, given that their ecology (particularly their flight style and habitat preference) mean that they are unlikely to collide with turbines. The bat survey work found that they do not frequently occur in the Study Area and are unlikely to roost locally. They are therefore scoped out of further assessment.
Impacts on protected species – dormouse	Survey work in the suitable habitat in the Study Area (which accorded with industry standard guidance) did not record evidence of dormouse – the species is likely to be absent. It is therefore scoped out of further assessment.
Impacts on protected species – great crested newt	There is an absence of suitable waterbodies on or within 250 m of the Proposed Development (and a lack of local records within the last 10 years), so the species is assumed to be absent and is scoped out of further assessment.

Study area

- 9.4.4 Initially the study area covered 82.08 ha of the ridgeline at Llanwonno (including the western spur above Ynyshir) and part of the eastern slope. This area was presented in the EIA Scoping Report (as it was the extant study area at that stage). As feasibility has evolved, the developable area was adjusted, with the western spur removed from the boundary, and the eastern boundary extended (downslope to the minor road) and the southern boundary extended approximately 370 m (towards Bryngoleu).
- 9.4.5 The ecological study area within which all turbines, solar panels, access tracks and other infrastructure (the Proposed Development) are to be located (hereafter referred to as the Study Area), now comprises 132.14 ha of the ridgeline and eastern slope. Contextual ecological survey data, particularly data on habitats have been collected for wider perimeter areas to allow for adjustments to the Study Area. More recent survey work (in 2024 and 2025) has been focussed on the current Study Area boundary.
- 9.4.6 The Proposed Development access route falls within the Study Area, and a large proportion of it will utilise the existing access route for the adjacent Llwynceyllyn Scheme.
- 9.4.7 The location and geographic extent of the study area is presented in Volume 2, Figures, Figure 9.1 of the ES.

Establishing the Zone of Influence

9.4.8 The Ecological Zone of Influence (EZoI) is defined as the area within which there may be ecological features subject to effects from the Proposed Development. Such effects could be direct, e.g., habitat loss resulting from land-take, or indirect, e.g., noise or visual disturbance causing a species to move out of the Ezol. The Ezol was determined through:

- Review of the existing baseline conditions based on desk study results, field surveys and information supplied by consultees;
- Identification of sensitivities of ecological features, where known;
- The outline design of the Proposed Development and approach to construction; and
- Through liaison with other technical specialists involved in the assessment, including the project hydrologists.

9.4.9 For bats, the area around a bat roost in which habitat availability and quality will have an influence on the resilience and conservation status of that roost (the core sustenance zone) is of particular importance. For UK bat species, core sustenance zones range from approximately 1 to 4 km (Collins, 2016), although individual flights can be longer. Given the long distances that can be travelled by bats, a zone of influence of 10 km for bat species is considered appropriate for the Proposed Development. This distance is supported by current guidance on assessing impacts of wind farms on bats (NatureScot et al., 2021), which suggests that relevant bat information within 10 km of a proposed wind farm is obtained as well as the location, number and size of turbines in other wind energy developments within the surrounding 10 km.

9.4.10 A 10 km Ezol is considered to be precautionary as the identified impact mechanisms are unlikely to extend this far. Any impacts arising because of pollution events are unlikely to extend beyond 10 km of the Proposed Development (due to increased dispersion of pollutants over greater distance). The typical ranging distance of all protected species considered in this assessment, with the exception of otter *Lutra lutra*, for which the Proposed Development is not considered of particular importance, is less than 10 km.

9.5 Assessment Criteria and Assignment of Importance and Significance

Receptor Value and Importance

9.5.1 The criteria for defining importance in this chapter of the ES are outlined in Table 9.12 below.

Table 9.1213 : Importance criteria

Sensitivity/Value	Definition
International and European – Very High	Of importance at the International / European level.
National – High	Of importance at the national (UK) level.
Regional – Medium / High	Of importance at the regional level (Wales).
County – Medium	Of importance at the county level (Rhondda Cynon Taf).
Local – Low / Medium	Of importance at the local level (Llanwonno Mountain and St Gwynno Forest).
Site – Low	Of importance at the level of the Proposed Development Study Area boundary.
Negligible	Receptors valued below the Proposed Development (site) level of importance.

9.5.2 The CIEEM guidance indicates that features of less than local importance are generally considered unlikely to trigger a mitigation or policy response in EIA terms (and it follows effects on these features are unlikely to be significant at EIA level). For significant residual effects on features of greater geographical importance (based on the CIEEM assessment method), professional judgement is applied to determine whether the conservation status of that feature is likely to be affected, and national and local policy considered in drawing a conclusion as to whether it is significant in EIA terms.

Significance Criteria

9.5.3 The CIEEM (2018) guidance states that ecological effects or impacts should be characterised in terms of ecosystem structure and function and reference should be made to:

- Beneficial, adverse or neutral effects;
- Extent;
- Magnitude⁷;
- Duration;
- Reversibility⁸;
- Timing and frequency; and

⁷ Magnitude refers to size, amount, intensity and volume. It is quantified where possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area or the percentage decline in a species population.

⁸ This relates to the inherent fragility/the degree of sensitivity of habitats, communities and species to environmental change.

- Cumulative effects.

9.5.4 The CIEEM guidance provides a list of ‘*aspects of ecological structure and function to consider when predicting impacts and effects*’ (Box 16). The terms ‘impact’ and ‘effect’ are used within this chapter in accordance with the following definitions (as provided by the guidelines):

- Impact: Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow; and
- Effect: Outcome to an ecological feature from an impact. For example, the effects on a hazel dormouse population from loss of a hedgerow.

9.5.5 Following the characterisation of effects, an assessment of their ecological significance is made. The guidelines promote a transparent approach in which a beneficial or adverse effect is determined to be significant or not, in ecological terms, in relation to the integrity of the defined site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area, which relates to the level at which it has been valued. The decision about whether an effect is significant or not, is independent of the importance of the ecological feature; the importance of any feature that will be significantly affected is then used to determine the implications, in terms of legislation and/or policy.

9.5.6 Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of this assessment, ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’. A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. CIEEM (2018) state that ‘*A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant adverse ecological effects can be lawfully permitted following EIA procedures*’. The assessment of significance is based on professional judgement.

Mitigation

9.5.7 Where significant effects have been identified, the mitigation hierarchy has been taken into account, as suggested by CIEEM (2018), who set 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 national level.

- 9.5.8 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).

Method of Evaluating Operational Collision Risk to Bats

- 9.5.9 One of the main considerations of wind farm EclA is potential collision fatality of bats.

- 9.5.10 In order to be able to determine which features of the bat community of an operational wind farm require detailed assessment (i.e. to interpret data and evaluate resources), the following factors need to be taken into account based on industry standard guidance (NatureScot et al., 2021):

- Susceptibility of bat species to fatality
- Population vulnerability of bat species to fatality
- Relative level of bat activity (by species in relation to other sites)
- How to rank the Proposed Development based on these factors (also taking into account wind farm size).

Categorising Risk to Bats

- 9.5.11 Operational wind farms can affect bats through:

- Collision mortality, barotrauma and other injuries (although it is important to consider these in the context of other forms of anthropogenic mortality).
- Displacement of individuals or populations (due to wind farm construction or because bats avoid the wind farm area).

- 9.5.12 To ensure that bats are protected by minimising the risk of collision, an assessment of impact at a site requires a detailed appraisal of:

- The risk of turbine-related mortality for all bat species recorded at a site during bat activity surveys;
- The effect on the species' population status if predicted impacts are not mitigated;
- The level of activity of all bat species recorded at a site assessed both spatially and temporally.

- 9.5.13 The above information should be interpreted in the context of likely impacts on local populations. Relevant factors that should be considered include whether populations are at the edge of their range, cumulative effects, presence of protected areas designated for their bat interest and proximity to maternity roosts, key foraging areas or key flight routes, including possible migration routes.

9.5.14 The risk of bat fatality at wind farms was categorised by Natural England (2014) as high, medium and low by species. This categorisation was based on mortality data from monitoring studies at wind farms as well as habitat preferences, echolocation characteristics, weight, wing-shape, flight speed and height, hunting techniques, flight behaviour, and use of the landscape. SNH *et al.* (2019) adopted this categorisation system, but re-classified common pipistrelle and soprano pipistrelle as “High Risk” based on evidence from a Defra-commissioned study (Mathews *et al.*, 2016).

9.5.15 Table 9.814 assigns species of bats a likely level of risk of death through interaction with operational wind turbines based on current industry standard guidance (NatureScot *et al.*, 2021).

Table 9.814: Likelihood of bat species being killed by wind turbines (based on Table 2 in NatureScot *et al.*, 2021)

High Risk	Medium Risk	Low Risk
Nathusius' pipistrelle	Serotine	<i>Myotis</i> sp.
Common pipistrelle	Barbastelle	Long-eared bats
Soprano pipistrelle		Horseshoe bats
Noctule		
Leisler's bat		

9.5.16 NatureScot *et al.* (2021) also assess the vulnerability of bat populations to fatality caused by wind turbines. This is broken down on a regional basis and vulnerability information for Wales is presented in Table 9.915 below.

Table 9.915: Vulnerability of bat populations in Wales to additional fatality (based on Table 2 in NatureScot *et al.*, 2021)

High Vulnerability	Medium Vulnerability	Low Vulnerability
Barbastelle	Common pipistrelle	Brown long-eared bat
Nathusius' pipistrelle	Soprano pipistrelle	Daubenton's bat
Serotine	Alcathoe bat	Natterer's bat
Noctule	Bechstein's bat	Lesser Horseshoe bat

Leisler's bat	Brandt's bat	
	Whiskered bat	
	Grey long-eared bat	
	Greater horseshoe bat	

Site risk level for bats

9.5.17 Table 3a in NatureScot *et al.* (2021) sets out a matrix to derive an indicative risk category (to bats) for sites based on the habitats present at a proposed wind farm and the scale of a proposed scheme. This matrix needs to be interpreted and applied with a degree of judgement, as most sites have features that fall into more than one risk category. A view therefore needs to be taken as to which category the Study Area boundary is more representative of, and the decision-making process in reaching this categorisation set out.

Assessing Bat Activity

9.5.18 The NatureScot *et al.* (2021) assessment of potential risk involves consideration of habitat and development related features, the relative vulnerability of each species of bat potentially at risk, and the bat activity output from the online EcoBat tool.

9.5.19 A measure of relative bat activity was obtained using the secure online tool EcoBat⁹, accessed February 2025). The available data for all species within the reference range for comparison of bat activity is above the level recommended by EcoBat for meaningful analysis (the recommended minimum comparison data set size is 2000+ survey nights).

9.5.20 In addition, the assessment also refers to the online database "Fledermausverluste an Windenergieanlagen / bat fatalities at wind farms in Europe" maintained by Tobias Dürr (Dürr, 2022)¹⁰ to provide context for collision risk in Europe.

Desk studies

9.5.21 A detailed desk-based review was undertaken to inform the baseline assessment for ecology. The existing studies and datasets referred to as part of the desk-based review for ecology are summarised in Table 9.1617 below.

⁹ Available at <https://mammal.org.uk/current-research/bat-recording-tools> [Accessed: 14 February 2025]

¹⁰ Available at fu.brandenburg.de. Most recently updated on 09 August 2023. [Accessed: 11 February 2025]

Table 9.1617: Summary of desk study sources

Title	Source	Year published	Details
Habitat characteristics and connectivity	Current and historical aerial imagery.	Ongoing publication (imagery was accessed prior to survey work commencing and revisited regularly throughout)	Online sources of information were interrogated to understand altitude and landform, the characteristics of the vegetation on and close to the Proposed Development, the presence of features (such as watercourses) and landscape-scale habitat connectivity. This was completed prior to survey work commencing, with aerial imagery and maps revisited regularly to inform the scope of each element of survey work.
Statutory designated site data	The UK Government's Magic website, the Joint Nature Conservation Committee (JNCC) website and the NRW website were interrogated for information on the locations of statutory designated sites and their interest features.	Ongoing publication	Information on the locations and interest features of SACs, Ramsar Sites and SSSIs was reviewed to determine their locations in relation to the Proposed Development, and whether species associated with them might range as far as the Proposed Development (resulting in effects on these designated sites needing to be addressed).
Non-statutory site data	Data held by Rhondda Cynon Taf County Borough Council.	Ongoing publication. Data are requested from RCT, and once provided are held on BSG Ecology's internal GIS system.	Data were requested for non-statutory designated sites for an area extending to 2 km from the Study Area boundary. Non-statutory designated sites have some planning policy protection, are of biological interest, and can be an important element in local landscape-scale connectivity.

Title	Source	Year published	Details
Ancient woodland data	South-East Wales Biodiversity Records Centre (SEWBRc).	Data were initially requested from SEWBRc in May 2022, to inform the scope of the baseline survey work. A second data request was submitted in October 2024 to ensure that any relevant records / information submitted to the records centre in the intervening period was captured to inform the DNS application.	Data were requested for ancient woodland sites for an area extending 2 km from the Study Area boundary ¹¹ .
Biological records (protected, priority and non-native invasive species)	SEWBRc.		Data were requested for bats for an area extending to 10 km ¹² and for protected and priority species to 2 km from the Study Area boundary.

Site-specific surveys

9.5.22 Site specific surveys were undertaken to inform the baseline ecological assessment. A summary of the site specific surveys undertaken to inform this chapter of the ES are provided in Table 9..

Table 9.11: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
Phase 1 Habitat survey	To characterise the baseline habitat types (in accordance with JNCC, 2010) and condition on and adjacent to the Study Area, and to identify ecological constraints.	Phase 1 habitat survey was completed in April 2022 and updated in August 2024.
Bat survey	To characterise the bat species assemblage and the levels of bat activity across the Study Area during the active period in 2023. To review weather data for the period and identify any apparent relationships between bat activity and weather conditions. To identify suitable roost sites (during 2024).	Bat activity survey was completed during the period April to September 2023. Ground-Level Tree Assessment (GLTA) of the mixed plantation woodland in the central – eastern part of the Study Area (Perry's Wood) was completed in December 2024.

¹¹ As it was at the time of each search.

¹² During the update data search in October 2024 only. This distance reflects the recommendations of industry standard guidance (SNH *et al.*, 2021) for bat assessments for onshore wind farms.

Dormouse survey	To determine presence / likely absence of dormouse within suitable habitat in the Study Area.	Dormouse survey work was completed during the period March to November 2023.
Otter and Water Vole survey	To determine presence / likely absence of otter and water vole within suitable habitat in the Study Area.	Otter and water vole survey was completed in October 2024 (and will be repeated in April 2025).

Phase 1 Habitat Survey

- 9.5.23 An extended Phase 1 habitat survey of the majority¹³ of the Study Area was completed on 27 April 2022. The survey was updated on 27 and 28 August 2024 (following amendments to the Study Area boundary).
- 9.5.24 During the 2022 Phase 1 survey, and 2024 update Phase 1 survey, plant communities were assigned to broad NVC categories in the field based on the experience of the surveyor.
- 9.5.25 The survey method was based on industry standard guidance (JNCC, 2010). Habitats present within the Study 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 Study Area to support protected or otherwise notable species (IEA, 1995) e.g., badger and hazel dormouse.
- 9.5.26 The area surveyed is shown on **Figure 9.1**.

Bat Survey

- 9.5.27 Bat survey methods were derived with reference to guidance documents for onshore wind farms produced by NatureScot (NatureScot *et al.*, 2021). The guidance is endorsed by NRW, who formed part of the steering group that developed it. The deployment of detectors at proposed turbine locations provides ample data for the area of the proposed solar array (which would require the use of fewer detectors in isolation).

Data collection

- 9.5.28 SNH *et al.* (2021) guidance recommends that for proposed wind farms of up to ten turbines all turbine locations should be sampled for a total of ten consecutive nights in each of spring, summer and autumn.
- 9.5.29 Survey work was completed in 2023. At the time of survey, six (as opposed to eight) turbines were proposed, and detectors placed at each of the indicative locations of these. Review of the locations of detectors with regard to the final turbine layout indicates that five detector locations corresponded well with the proposed turbines (being within 110 m of

¹³ The whole of the Study Area as it was at the time of survey, was surveyed. The boundary was subsequently updated.

proposed turbine locations). Static detector locations are shown on **Figure 9.2**.

9.5.30 Song Meter (SM4) bat detectors with external microphone were deployed at each location. The detectors were configured to record above the level of ambient noise, such as from wind or rain, using an adaptive trigger set to 6 decibels (dB). They were set to define a bat pass (P) as a call note of >2 ms separated from another by more than one second. An external microphone was connected via a cable to the logger, and attached to a pole or tree approximately 2.5 - 3 m above ground level.

9.5.31 The static detectors were set to record for 10 nights for each deployment, from half an hour before sunset to half an hour after sunrise (the period during which bats are usually active away from their roosts). The duration of recording per night varied throughout the survey period according to night length.

Analysis of bat data

9.5.32 Bat call data were run through Wildlife Acoustics Kaleidoscope Pro auto-identification software, with each file then checked manually by an experienced ecologist using AnalookW software (produced by Titley Scientific) and Kaleidoscope Viewer. The species analysis followed the call parameters described in Russ (2012).

Meteorological data

9.5.33 Simultaneous meteorological data were collected to identify the relationship between weather and bat activity at the Proposed Development. Data were collected on wind speed, temperature, and rainfall. Weather variables (including temperature, rainfall and wind speed) were recorded at three-hour intervals for the duration of the survey period.

9.5.34 For analysis, individual bat calls were allocated to one of the aforementioned time slots. This allowed the weather conditions to be paired with bat calls and statistical analysis (correlation coefficients) to be run on the relationship between bat activity and weather.

Ground-Level Tree Assessment Survey

9.5.35 A preliminary bat roost survey was conducted on 21 June 2023, to make a high-level assessment of the suitability of each plantation / coupe / treeline on or immediately adjacent to the Study Area to support roosting bats (based on tree species composition, maturity and condition).

9.5.36 Based on the findings of the preliminary survey, GLTA of all deciduous trees within the Proposed Development footprint, or within 263.1 m (200 m plus 63.1 m rotor radius) of proposed turbines (as recommended by NatureScot *et al.* (2021)), was completed during on 03 and 04 December 2024 and 27 February 2025. In the mixed plantation woodland in the central – eastern part of the Study Area (Perry's Wood), the survey was

extended to include all trees within the Study Area (including those outside the Proposed Development footprint, and greater than 263.1 m from proposed turbines).

- 9.5.37 Trees were surveyed from ground level using binoculars and Clulite high-powered torches. The location of trees with features was recorded using a GPS and aerial imagery on an iPad. Notes on the feature type, size and likely suitability for bats was recorded.
- 9.5.38 The potential of identified PRFs in trees to support roosting bats was evaluated according to the criteria in Table 9.1218 (based on Collins, 2024). Each tree is categorised according to the highest value of any potential bat roost features it supports.

Table 9.1218: Evaluation criteria for bat roost features in trees

Suitability	Description
PRF-I	PRF is only suitable for individual or very small numbers of bats either due to size or lack of suitable surrounding habitats.
PRF-M	PRF is suitable for multiple bats and may therefore be used by a maternity colony.

Dormouse Survey

- 9.5.39 Survey work to establish the presence or likely absence of dormice in the Study Area was completed in 2023. The survey work was based on survey guidance set out in English Nature's Dormouse Conservation Handbook (English Nature, 2006). The guidance recommends that to determine the presence / likely absence of dormouse within a site, a minimum of 50 nest tubes at a spacing of 15 – 20 m intervals need to be put out in suitable habitats for several months, and these should be checked periodically for indications of use by dormouse. Surveys completed during each month receive a score (points) based on the probability of dormouse occupying nest tubes in that month. For a survey to be considered valid, 20 or more points are required (English Nature, 2006).
- 9.5.40 A total of 90 nest tubes and boxes (50 tubes and 40 boxes) were deployed within the woodland present in the centre of the Study Area. Tubes were typically spaced approximately 15 – 20 m apart, though in areas of more suitable habitat tubes / boxes were 'clustered' (the distance between tubes / boxes was reduced) to increase the probability of detection. The tubes and boxes were placed in locations and at heights that allowed them to be checked easily. The tube and box locations are shown on **Figure 9.3**.
- 9.5.41 Nest tubes and boxes were deployed on 17 March 2023. These were checked monthly between June and November 2023 for occupation or evidence of use (by dormice), resulting in 6 months of survey. A total of 20 points was therefore achieved in accordance with industry standard guidance (English Nature, 2006). Evidence of the presence of dormouse

may include observations of animals using the tubes during survey work, and nests characteristic of the species. Dormouse typically make neat nests comprising tightly woven honeysuckle bark (or similar), along with green leaves, normally hazel (although other species are used) and differ from the nest of other small mammals which typically lack a distinct structure.

Otter and Water Vole Survey

- 9.5.42 The Study Area for otter and water vole included all watercourses / suitable habitats in the Study Area. The riparian mammal Study Area is shown on **Figure 9.4**.
- 9.5.43 One visit to survey for both species was completed on 03 October 2024. Weather conditions during the survey were mild (13-11°C) and dry with a light south-easterly wind (Bf 1).
- 9.5.44 A second visit to survey for water vole (in accordance with industry standard guidance (Dean *et al.*, 2016)) will be completed in April 2025.

Otter survey

- 9.5.45 Survey work was undertaken in accordance with industry standard guidance (Chanin, 2003) and involved searching for evidence of otter along the watercourses, their margins and other suitable habitat. Such evidence may include spraints (droppings), footprints, runs (paths worn through vegetation adjacent to the water), couches (areas used by otters to rest and feed), slides (areas of steep bank showing signs of regular use by otters to access the water) and holts (burrows).
- 9.5.46 Otters often use conspicuous features as sprainting sites (Lampa *et al.*, 2015). Therefore, particular attention was paid to prominent bankside or in-stream features such as tree trunks, branches, rocks, areas of bare ground, culverts and inflowing ditches or pipes.

Water vole survey

- 9.5.47 The water vole survey was conducted during the same visits as the otter survey, taking into account industry standard guidance (Dean *et al.*, 2016). Water margins and other suitable habitats were searched for evidence of water vole, including entrances to burrows, droppings, latrine sites, footprints, runs and feeding stations. The habitats present were also assessed for their suitability to support the species (being classed as suitable or not suitable based on characteristics of the watercourse shoreline and vegetation cover).

Assumptions and limitations of the assessment

- 9.5.48 There were no significant limitations identified to the baseline work and there is no reliance on any assumptions in this chapter (that reflect a limitation to data collection).

- 9.5.49 Survey was completed in accordance with guidance. Equipment failure, weather and physical access to complete the work did not present issues or affect outcomes, and the assessment is not considered to be limited.

9.6 Baseline Environment Conditions

Statutory Designated Sites

- 9.6.1 No statutory designated sites exist within 2 km of the Study Area.

Non-Statutory Designated Sites

- 9.6.2 SEWBrEC returned 19 records of non-statutory designated sites within the search radius; these are all Sites of Interest for Nature Conservation (SINC). Of those returned, one falls within the Study Area boundary and a further four are within 500 m, these are listed along with their reason for designation in Table 9.1319 below. Their locations are shown on **Figure 9.5**.

Table 9.1319: Summary of non-statutory designated sites within 2 km of the Study Area boundary

Designated Site	Description	Approximate distance and location relative to Study Area
Llys Nant & Graig Twyn-y-glog Woodlands SINC	<i>"A complex mosaic of habitats, which lie within the catchment of the Llys Nant Valley, and which includes the visually prominent hill of Twyn y Glog, as well as large areas of associated conifer plantation.</i> <i>The upland stream valley of the Llys Nant supports a typical clean, fast flowing stream, which cuts through the sandstone bedrock in a series of mini-cascades and a steep sided gorge. Dipper and grey wagtail occur and there is suitable nesting habitat. The stream will support a variety of aquatic microinvertebrates and as part of the Nant Clydach catchment supports brown trout and salmon habitat. It is highly suitable otter habitat. The valley is wooded with a species rich mix, which includes oak, alder, sycamore, ash, birch, holly and hazel. There is a strong ancient woodland flora with bluebell, enchanter's nightshade, dog violets, male fern and broad buckler fern. Part of the woodland is mapped as ancient woodland.</i> <i>The SINC extends beyond the valley of the Llys Nant to include the distinctive steep sided slopes of Twyn Y Glog. These slopes are partially wooded with sessile oak, birch, rowan and hazel woodland with bluebells (again part mapped as ancient woodland) and open bracken and acid grassland ffridd with sheep's fescue, common bent, tormentil, bluebell, and gorse. The SINC also includes a large connecting area of conifer plantation (mainly larch and sitka spruce) much of which has been recently felled and supports dense willow, birch and rowan scrub. The standing plantations have potential as conifer bird habitat including goshawk, crossbill and siskin, the clear felled areas are suitable nightjar habitat, and the secondary young woodland is ideal songbird (warbler) habitat."</i>	Partially within Study Area.
Coed-yr-Hafod Woodland Complex SINC	<i>"A large block of ancient semi-natural sessile oak, willow, holly, alder and birch woodland on the hillside above Trehafod. The SINC includes areas of acid grassland (National Vegetation Classification of U4 acid grassland), wet flushes and bracken slopes. Purple hairstreak, holly blue and small copper butterflies and common lizards have been recorded. The site represents good woodland bird habitat with potential wood warbler habitat."</i>	Immediately adjacent to the Study Area.

Designated Site	Description	Approximate distance and location relative to Study Area
St Gwynno Forest SINC	<i>"An extensive area of Forestry Commission plantation, which runs across the ridge of Coetgate, Aberaman down to the St.Gwynno Forestry. The SINC is an expanse of mixed conifer plantation (with small broadleaved components), which occurs in varying stages of maturity. The main tree species are sitka spruce, larch, and lodgepole pine. Recent years has seen major clear fells.</i> <i>The plantations have numerous open areas, which support bracken, open regenerating woodland / scrub, dry heath (bilberry, heather, bell heath and wavy-hair grass), acid grassland (National Vegetation Classification U2 and U4) and marshy grassland (rank purple moor-grass M25). The SINC includes small areas of relic ancient woodland (Coed Aberaman) with oak, birch, ash, alder and hazel, and areas of scrub and bracken on the slopes of Coetgate Aberaman.</i> <i>The SINC is a renowned 'hot-spot' for nightjar, which occur in large numbers within the clear-fell and recently replanted areas. The site is also breeding habitat for goshawk, crossbill, siskin and redpoll and great grey shrike have been recorded in the winter. There are also unconfirmed reports of pine martin."</i>	7 m west of the Study Area
Cwm Hafod Woodland SINC	<i>"The SINC includes a mosaic of habitats associated with the steep hanging valley of the Nant Hafod. The stream is a steep flowing channel, partially engineered in places, with a small waterfall. The valley supports ancient, semi-natural oak, birch, beech, holly, willow and alder woodland. The SINC includes areas of adjacent heath (heather, bilberry, sheep's sorrel, and sheep's bit scabious) and dense bracken slopes with acid grassland. Grayling, wall brown, large skipper, small skipper and holly blue butterflies have been recorded. The Sites represents good woodland bird habitat with potential wood warbler habitat. The Cwm Hafod circular walk runs through the SINC."</i>	174 m south of the Study Area
Birch Grove Slopes SINC	<i>"The southern extension of SINC 44, Birch Grove Slopes incorporates a complex mosaic of ffridd habitats. These include good areas of heather and bilberry heath with acid grassland (National Vegetation Classification communities of U2 and U4) some of the heath is within old spoil. There are large areas of bracken with acid grassland (National Vegetation Classification communities of U4) and additional areas of marshy grassland (National Vegetation Classification communities of M23). The SINC includes the mature wooded escarpment of Craig Rhiw-gwyn with its mature oak, and birch semi-natural woodland (identified as ancient woodland in the Glamorgan Ancient Woodland Inventory).</i> <i>There are numerous small quarries and potential for breeding peregrine. The site supports common lizard, slowworm and palmate newt. Grayling butterflies have been recorded."</i>	335 m west of the Study Area

- 9.6.3 The remaining SINC's are >500 m from the Proposed Development boundary. Given the distance and / or separation by existing development and road infrastructure, these sites are unlikely to be affected by the proposals. These sites are not considered further in this report.

Ancient Semi Natural Woodland Site (ASNW)

- 9.6.4 ASNW is defined as 'any area that's been wooded continuously since at least 1600 AD' (Gov.uk, 2022). The data search identified 51 ASNW, distributed throughout the 2 km radius search area, none of which are in the Study Area. There are two areas of ASNW immediately outside the Study Area (to the east, <5 m from the Study Area boundary) associated with Llys Nant & Graig Twyn-y-glog Woodlands SINC. There are also five Plantation on Ancient Woodland Sites (PAWS) and three Ancient Woodland Sites of Unknown Category within this SINC boundary / proximity of the Study Area.
- 9.6.5 In the wider surrounding area, there are a further nine Restored Ancient Woodland Sites (RAWS), six PAWS and three Ancient Woodland Sites of Unknown Category. These are largely associated with the slopes of the Rhondda Fach and Clydach Valleys.

Habitats

- 9.6.6 The habitats present on or immediately adjacent to the Proposed Development are:
- Acid grassland – semi-improved (B1.2)¹⁴
 - Improved grassland (B4)
 - Marshy grassland (B5)
 - Cultivated / disturbed land – arable (J1.1)
 - Bracken – continuous (C1.1) and scattered (C1.2)
 - Dry dwarf shrub heath – acid (D1.1)
 - Running water (G2)
 - Hedgerows with trees (J2.3)
 - Scrub – dense / continuous (A2.1) and scattered (A2.2)
 - Broadleaved (A3.1) and coniferous (A3.2) scattered trees
 - Mixed woodland – plantation (A1.3.2)
 - Coniferous woodland – plantation (A1.2.2)
 - Broadleaved woodland – semi-natural (A1.1.1)

¹⁴ For each habitat, the JNCC habitat code is provided (in parentheses).

- Other rock exposures – acid / neutral (I1.4.1)
- Quarry (I2.1)
- Hardstanding (J3), bare ground (J4), fencing (J2.4) and dry-stone walls (J2.5)

Habitat Descriptions

9.6.7 Habitats within the Proposed Development are described in the Sections below and shown on **Figure 9.1**.

Acid grassland – semi-improved (B1.2)

- 9.6.8 Semi-improved acid grassland is present within fields in the northern part of the Study Area and outside the Study Area to the west (within the Phase 1 Habitat Study Area), and varies from parcel to parcel.
- 9.6.9 The parcel in the western part of the Study Area, comprises an enclosed, sheep grazed field with a short uniform sward and several rocky outcrops. The vegetation is dominated by herbaceous plants including frequent field woodrush *Luzula campestre*, as well as red fescue *Festuca rubra*, Yorkshire fog *Holcus lanatus*, common bent *Agrostis capillaris* and sweet vernal grass *Anthoxanthum odoratum*. Scattered clumps of soft rush *Juncus effusus* are present. Common and sheep's sorrel *Rumex acetosa* and *R. acetosella* and tormentil *Potentilla erecta* are also rarely present.
- 9.6.10 The semi-improved grassland in the northern part of the Study Area notably also contains marshy grassland attributes, with a locally frequent paths of soft rush, with associated marsh thistle *Cirsium palustre* and creeping bent *Agrostis stolonifera*.
- 9.6.11 The grassland in the southern part of the Study Area has a short sheep-grazed sward, that gives way to improved grassland on the higher slopes. More acid features include tormentil, woodrush *Luzula sp.*, Yorkshire fog, common bent, marsh thistle, red fescue, sweet-vernal grass, and white clover *Trifolium repens*. Marshy grassland features (which match the description of the National Vegetation Classification (NVC) community M25) are also present in the lower levels of the field and around the edges. Species present include purple moor-grass *Molinia caerulea* with locally abundant soft rush *Juncus effusus*, mat grass *Nardus stricta* and marsh thistle.
- 9.6.12 The sward at TN1 is unmown and un-grazed resulting in localised tussocks of purple moor-grass that form a dense thatch. Other species present include red fescue, Yorkshire fog, cock's foot and common bent grasses. Whilst associated acid grassland species including sheep's sorrel, heather *Calluna vulgare*, wavy hair-grass *Deschampsia flexuosa*, marsh thistle, tormentil and bracken are also occasionally present throughout the sward. Springy turf moss *Rhytidiadelphus squarrosus* is abundant across the field.

- 9.6.13 A small area of semi-improved acid grassland is also present at TN3. Species including mat grass, bilberry *Vaccinium myrtillus* and water-blinks *Montia fontana* are present in the damper areas.
- 9.6.14 The majority of this habitat corresponds most with *Festuca – Agrostis - Gallium* grassland, *Holcus-Trifolium* sub-community (U4b). The grassland at TN1, however, contains many similar constants, despite the purple moor-grass (which this community lacks), and includes associated species such as wavy hairgrass, bracken, and heather. Therefore, this community more closely corresponds with the *Vaccinium myrtillus – Deschampsia flexuosa* sub-community (U4e) despite lacking a constant cover of bilberry. These are widespread grassland types and do not conform to any priority habitat descriptions or not meet the local designation guidelines (Gwent Wildlife Trust (2004)).
- 9.6.15 Given the low ecological value and abundance of this habitat at all geographic levels, it is considered to be of negligible importance and is not considered further in this assessment.

Improved grassland (B4)

- 9.6.16 Large areas of improved grassland are present across the Study Area, these are sheep-grazed and featureless (TN6), containing >50 % white clover and perennial rye-grass *Lolium perenne* cover. Associated species include frequent sweet vernal grass and Yorkshire fog and occasional soft rush. Spear thistle and common nettle are frequent in locally enriched areas (close to livestock shelters). The improved grassland field in the north of the Study Area also includes scattered bracken and common gorse *Ulex europaeus*.
- 9.6.17 This grassland corresponds with the *Lolium perenne* leys (MG7) NVC community. This is a widespread grassland type and does not meet the definition of any priority habitat (Maddock, 2011) or local designation (Gwent Wildlife Trust, 2004).
- 9.6.18 Given the low ecological value and abundance of this habitat at all geographic levels, this habitat is considered to be of **negligible** importance and is **not considered further** in this assessment.

Marshy grassland (B5)

- 9.6.19 Marshy grassland is present in the eastern part of the Study Area associated with drainage ditches and streams.
- 9.6.20 In 2022, marshy grassland at TN 11 and 12 was described as “*grassland that matches the description of NVC community MG10. Species recorded include continuous soft rush with occasional lawns of velvet bent Agrostis canina. Other species occasionally present across the fields are lesser spearwort Ranunculus flammula, toad rush Juncus bufonius, thyme-leaved speedwell Veronica serpyllifolia, glaucous sedge Carex flacca, creeping buttercup, jointed rush Juncus articulatus, purple moor-grass, sheep’s sorrel, dog bent Agrostis canina and foxglove Digitalis purpurea*”.

- 9.6.21 During the 2024 survey, the grassland was found to have undergone a significant change in management. Several new drainage ditches had been created across the field (the ground was still significantly wet underfoot) and the sward had been cut.
- 9.6.22 To the south-west (TN 12) the grassland was largely drier comprising a grass rich sward of dominant Yorkshire fog, with frequent soft rush and crested dog's-tail and occasional meadow foxtail *Alopecurus pratensis* and sweet vernal grass. In wetter areas species favouring inundated soils including creeping buttercup, lesser spearwort, round-leaved crowfoot *Ranunculus omiophyllus*, cuckoo flower *Cardamine pratensis* and ivy-leaved bellflower *Whalenbergia hederacea* were still locally frequent. Following the change in management / hydrology the vegetation community is in transition and did not fit within the MG10 community, nor within any other NVC community at the time of survey.
- 9.6.23 The former MG10 marshy grassland in the Study Area is not considered to be priority habitat under Section 7 of the Environment (Wales) Act 2016. Local designation guidelines only recognised species rich marshy grassland (containing 12 indicator species) as good candidates for designation (Gwent Wildlife Trust, 2004).
- 9.6.24 The former MG10 grassland in the Study Area contains fewer than 12 indicator species therefore does not meet designation guidelines, and is assessed as important at the **Site** level.
- 9.6.25 The vegetation within the north-eastern section (TN 11) was more consistent with the 2022 description and MG10 community, containing a higher proportion of acid and marshy species, including abundant jointed rush, frequent purple-moor grass and soft rush. Yorkshire fog and creeping soft-grass *Holcus mollis* were frequently present and other species recorded include carnation sedge, marsh thistle *Cirsium palustre*, broad buckler-fern, marsh pennywort *Hydrocotyle vulgaris*, and greater bird's-foot trefoil *Lotus pedunculatus*.
- 9.6.26 A further area of marshy grassland matching the description of NVC community M25 is present at TN5 in the north of the Study Area. This area is dominated by purple moor-grass with a few other species present at the edges of the area, including marsh thistle, cuckoo flower, tormentil, carnation sedge *Carex panicea* and sphagnum mosses.
- 9.6.27 Purple moor grass-tormentil mire (M25) is considered a priority habitat under Section 7 of the Environment (Wales) Act 2016. Local designation guidelines only recognised species rich marshy grassland (containing 12 indicator species) as good candidates for designation (Gwent Wildlife Trust, 2004). The M25 grassland in the Study Area is contains four indicator species therefore does not meet designation guidelines.
- 9.6.28 The M25 marshy grassland in the Study Area whilst not meeting local designation guidelines does contain a moderately diverse species assemblage which is uncommon in agricultural landscapes including the wider surrounding area, therefore is habitat is assessed as important at the **County** level.

Cultivated / disturbed land – arable (J1.1)

- 9.6.29 A large area of arable, cultivating *Lolium sp.*, is present in the eastern part of the Study Area. This habitat was lightly sheep grazed at the time of survey (in 2024) but also had evidence of mowing. Other species recorded included common agricultural species, such as occasional smaller cat's-tail *Phleum bertolonii* and Timothy grass *Phleum bertolonii* or common species of disturbed habitat (potentially resulting from the fields being used in an arable / ley rotation), such as rarely occurring scarlet pimpernel *Anagallis arvensis* and annual meadow grass *Poa annua*.
- 9.6.30 This habitat does not meet the definition of any priority habitat (Maddock, 2011) or local designation (Gwent Wildlife Trust, 2004), being intensively managed and species poor. Historically it has been sprayed (as described in 2022) to reduce 'arable weeds'.
- 9.6.31 Given the low ecological value and abundance of this habitat at all geographic levels, it is considered to be of **negligible** importance, and is **not considered further** in this assessment.
- 9.6.32 Although this habitat is considered to be of negligible ecological importance, it does support breeding lapwing. The impacts of loss of cultivated / disturbed arable land on lapwing are considered in the Volume 1, Chapter 10: Ornithology.

Bracken – continuous (C1.1) and scattered (C1.2)

- 9.6.33 Areas of continuous dominant bracken are present in the western and southern parts of the Study Area. Associated species are limited to occasional rosebay willowherb, foxglove and hawthorn scrub.
- 9.6.34 Scattered bracken is frequent along habitat boundaries, including the sheep grazed enclosures and woodland parcels.
- 9.6.35 This habitat does not meet the definition of any priority habitat (Maddock, 2011) or local designation (Gwent Wildlife Trust, 2004). Given the low ecological value and abundance of this habitat at all geographic levels, it is considered to be of **negligible** importance, and is **not considered further** in this assessment.

Dry dwarf shrub heath – acid (D1.1)

- 9.6.36 An isolated patch of acid dry dwarf shrub heath is present at the western edge of the woodland in the Study Area (TN7) and forms the edge of Llys Nant & Graig Twyn-y-glog Woodlands SINC. This habitat is enclosed by fencing and dry-stone walls and is undisturbed by livestock.
- 9.6.37 Acid dry heath is classified by the presence of more than 25 % ericoid cover, in this case frequent ling and bilberry *Vaccinium myrtillus*. Other commonly associated species such as wavy hair grass, purple-moor grass, heath bedstraw *Galium saxatile* occurred occasionally. Scattered

scrub was frequently present / encroaching from the adjacent woodland, including silver birch, bramble, holly, rowan, Sitka spruce and grey willow.

- 9.6.38 Dry heath in the Study Area broadly meets the definition of lowland heathland HPI¹⁵ (Maddock, 2016). Additionally, heath meets the definition within the guidance for local designation (Gwent Wildlife Trust, 2004). This habitat is small and isolated from similar unmanaged dry heath habitats in the wider area. Given the ecological value of this habitat, and its scarcity in the Study Area and locally, it is assessed as of **Local** importance.

Running water (G2)

- 9.6.39 There are several small flowing ditches present throughout the eastern part of the Study Area, largely man-made to drain the surrounding grazing pasture and fringed by soft rush dominated marshy grassland.
- 9.6.40 One larger canalised stream is present in the central – eastern part of the Study Area (at TN 13), which flows out of the Study Area into / through Llys Nant & Graig Twyn-y-glog Woodlands SINC. The watercourse is fenced along both sides and at the time of survey (in 2024) had been recently dredged and reprofiled. There were no associated aquatic flora species within or adjacent to the channel. Bankside vegetation comprises dense marshy grassland with scattered scrub establishing along much of the channel length.
- 9.6.41 Further south, a network of small drainage ditches flow east out of the Study Area into Nant Blaenhenwysg (TN 14). Small patches of acid flush vegetation have established around slower flowing areas, with locally frequent patches of purple-moor grass and lesser spearwort, occasional marsh violet *Viola palustris*, and jointed rush, tormentil and rarely occurring marsh St John's-wort *Hypericum elodes*.
- 9.6.42 The majority of streams / wet ditches in the Study Area do not meet the definition for priority habitat – Rivers, as they are largely manmade, with limited species diversity. The larger canalised stream at TN 13 does fit the definition however, by supporting a priority species (water vole, see protected species below). None of the streams / wet ditches in the Study Area meet the guidelines for local designation (Gwent Wildlife Trust, 2004), which only consider features which are semi-natural or unmodified as candidates for local designation.
- 9.6.43 The acid flush habitat does not meet the definition of priority habitat as it sits “*below the limit of agricultural enclosures*” (Maddock, 2011). This habitat may meet the guidelines for local designation, however, which is defined as “*individual [...] acid flushes of any size, providing they are not grossly modified by agricultural improvement*” (Gwent Wildlife Trust, 2004). Whilst the surrounding habitats are agriculturally modified, the

¹⁵ In this case, the habitat is a small, enclosed area rather than a ‘a broadly open landscape’ as described in the priority habitat description.

flush itself contains vegetation commonly associated with nutrient poor soils i.e., marsh St Johns wort, and is not considered 'grossly modified'.

- 9.6.44 Running water is frequent within the surrounding landscape and provides connectivity across, and outside of the Study Area, this habitat is assessed as of **Local** importance overall.

Hedgerows with trees (J2.3)

- 9.6.45 Hedgerows with trees are present in three isolated sections on the eastern edge of the Study Area. These habitats are unmanaged, containing mature tree stands and an outgrown understory.

- A small native species-poor hedgerow with trees forms part of the northern survey boundary, comprising a line of semi-mature Scots pine.
- Further south, a species rich hedgerow with trees borders a small stream at TN4. The hedgerow comprises silver birch, willow *Salix* sp., ash, hawthorn and oak, with locally dense patches of bramble throughout the understory.
- The southern most hedgerow is a species poor hawthorn dominant hedgerow with occasional bramble and bracken and mature beech and ash, and semi-mature rowan trees. The northernmost edge of this hedgerow had recently been replanted.

- 9.6.46 All native hedgerows meet the definition for priority habitat hedgerows (Maddock, 2011)¹⁶ but do not meet guidelines to for qualify for local designation under hedgerows (Gwent Wildlife Trust, 2004). The hedgerows in the Study Area border adjacent woodland habitat or form isolated short stretches, therefore do not provide significant connectivity to other habitats outside the Study Area / the wider surrounding area, and are assessed as of **Local** importance.

Scrub – dense / continuous (A2.1) and scattered (A2.2)

- 9.6.47 Dense scrub habitat is infrequent within the Study Area, comprising small areas of dense willow *Salix* sp. and dense bramble scrub along the eastern boundary (TN 13) of the Study Area and an area of willow dominated scrub over a small stream in the southeastern corner of the Study Area.

- 9.6.48 Occasional scattered scrub is present across the Study Area, in areas of infrequently grazed / managed grassland (and a small area of dry dwarf shrub heath) in the northern, central and western parts of the Study Area, or associated with dense bracken patches in the south-east. Scattered

¹⁶ "Any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide" including "all hedgerows consisting predominantly (i.e., 80% or more cover) of at least one woody UK native species are covered by this priority habitat".

scrub is largely made up of bramble, hawthorn and immature silver birch and rowan trees.

- 9.6.49 Scrub does not meet the definition of any priority habitat (Maddock, 2011) or guidelines for local designation¹⁷ (Gwent Wildlife Trust, 2004). This habitat is infrequent across the Study Area but is relatively species poor, and is assessed as of **Site** level importance.

Broadleaved (A3.1) and coniferous (A3.2) scattered trees

- 9.6.50 Scattered trees are infrequent in the Study Area restricted largely to field and woodland boundaries. Where present isolated trees comprise mature to over-mature sessile oak trees or Scots pine *Pinus sylvestris* and Sitka spruce. A small group of Scots pine and Sitka spruce are present in the northern part of the Study Area, used by livestock as a shelter (TN17).
- 9.6.51 This habitat does not meet the definition for a priority habitat (Maddock, 2011) or local designation guidelines (Gwent Wildlife Trust, 2004) lacking the age (>200 years old) and historical management associated with parkland habitats. Whilst scattered trees are infrequent across the Study Area, they do comprise mature to over-mature stands, and scattered broadleaved trees (mature to over-mature sessile oak) are assessed as being of **Site** importance.

Mixed woodland – plantation (A1.3.2)

- 9.6.52 Mixed plantation woodland is present in the central – eastern part of the Study Area (and extends outside the Study Area to the east) and is part of the Llys Nant & Graig Twyn-y-glog Woodlands SINC (TN10). The area of the mixed plantation woodland within the Study Area (known as Perry's Wood, and referred to as such hereafter) is semi-mature (planted circa 2000¹⁸) with most stands of a similar age and little structural diversity. The woodland has been planted over historic conifer plantation with large stumps still present throughout the understory and occasional mature trees scattered within. The species present (both in the canopy and ground flora) are characteristic of acidic conditions.
- 9.6.53 The canopy is closed and dense, consisting mainly of slim semi-mature rowan and birch with occasional hazel *Corylus avellana*, larch *Larix decidua*, Norway spruce *Picea abies* and goat willow *Salix caprea* trees. The shrub layer is open, comprising frequent low-lying bramble and occasional holly and semi-mature hawthorn *Crataegus monogyna*.
- 9.6.54 The ground flora is dense, made up of a 60:40 split of bryophytes and higher plant species (respectively). Species present include frequent male fern *Dryopteris filix-mas* and broad buckler fern *D. dilatata* (both

¹⁷ 'Mixed scrub' habitats considered for selection should normally contain at least 6 native woody species and that there is good structural diversity" (Gwent Wildlife Trust, 2004).

¹⁸ Visible on historic aerial imagery courtesy of Google Earth Pro 7.3.6.9796 (64-bit).

referenced within the SINC designation). Common sorrel *Rumex acetosa*, red-stemmed feather moss, common haircap *Polytrichum commune* and fringed bog-moss *Sphagnum fimbriatum* are occasionally present. Smooth haircap *Artichum undulatum* and spikey bog-moss *Sphagnum squarrosum* occur rarely.

9.6.55 A small stand of Japanese knotweed *Fallopia japonica* (an invasive non-native species (INNS)) is present within the woodland (TN17).

9.6.56 Mixed woodland does not meet the definition of priority habitat (Maddock, 2011). Whilst the woodland falls within Llys Nant & Graig Twyn-y-glog Woodlands SINC, and is relatively species rich in terms of canopy and woodland ground flora, it does not meet the guidelines for local designation (Gwent Wildlife Trust, 2004). Given the relative scarcity of the habitat locally, the woodland is assessed as being of **Local** importance.

Coniferous woodland – plantation (A1.2.2)

9.6.57 An area of plantation coniferous woodland is present in the south-eastern part of the Study Area, adjacent to Perry's Wood (below). The woodland canopy consists primarily of even-aged mature Sitka spruce *Picea sitchensis*.

9.6.58 The understory is open with areas of dead wood from wind-blown trees and is dominated by semi-improved grassland species (see below) bracken and low-level bramble.

9.6.59 This habitat does not meet the definition of a priority habitat (Maddock, 2011) or guidelines for local designation (Gwent Wildlife Trust, 2004). It has very little structural or species diversity and is widely represented locally and in the wider area, it is therefore assessed as of **negligible** importance, and is **not considered further** in this assessment.

Broadleaved woodland – semi-natural (A1.1.1)

9.6.60 A small area (approximately 0.38 ha) of broadleaved semi-natural woodland is present in the south-eastern part of the Study Area. The area comprises part of a mature sessile oak *Quercus petraea* woodland that has established over a steep valley side following the course of Nant Blaenhenwysg. It appears largely unmanaged, and is fenced / dry stone walled, preventing livestock access.

9.6.61 The canopy is closed, comprising dominant sessile oak with occasional rowan *Sorbus aucuparia* and silver birch *Betula pendula*. The shrub layer is largely open with scattered occasional holly *Ilex aquifolium* and frequent low-level bramble *Rubus fruticosus* agg and bracken *Pteridium aquilinum*.

9.6.62 The understory is relatively diverse, with no clear dominant species and a 50:50 split of higher plants and bryophyte species. Ground flora comprises frequent Cypress-leaved plait-moss *Hypnum cupressiforme*, bank haircap *Polytrichum formosum* and hair-pointed feather moss

Cirriphyllum piliferum. Occasional sweet vernal grass *Anthroxanthum odoratum*, hart's tongue fern *Asplenium scolopendrium*, broad buckler-fern *Dryopteris dilatata*, ling *Calluna vulgares* red-stemmed feather-moss *Pleurozium schreberi*, springy turf-moss *Rhytidiadelphus squarrosus* and broom fork-moss *Dicranium scoparium* are also present. Tufted hair-grass *Deschampsia cespitosa* and wood sorrel *Oxalis acetosella* occur rarely.

9.6.63 Broadleaved woodland corresponds to the Section 7 Habitat of Principal Importance (HPI) for Upland Oakwood, characterised by “a predominance of oak (most commonly sessile) and birch in the canopy, with varying amounts of holly, rowan and hazel as the main understorey species” (Maddock, 2011). This habitat also meets local designation criteria for semi-natural upland woodlands (Gwent Wildlife Trust, 2004).

9.6.64 Given its small size and that it does not provide connectivity between other areas of woodland habitat, the semi-natural broad-leaved woodland in the Study Area is considered to be of no greater than **Local** importance.

Other rock exposures – acid / neutral (I1.4.1)

9.6.65 Several areas of acid rock exposures are present within the Study Area. These are largely confined to field enclosures and are associated with grassland and scattered scrub (as described above) (TN16). This habitat is of low ecological value, so is considered to be of **negligible** importance, and is **not considered further** in this assessment.

Quarry (I2.1)

9.6.66 An area of newly dug quarry is present outside the Study Area (in the west of the Phase 1 Study Area), providing material for a track along the western boundary. This habitat has no ecological value. This habitat is considered to be of **negligible** importance, and is **not considered further** in this assessment.

Dry-stone walls (J2.5)

9.6.67 Field enclosures are defined by dry-stone walls or post and wire fencing (see below). There is no vegetation directly associated with the walls. Dry-stone walls have some ecological function (such as for hibernating reptiles). They are therefore assessed as being of **Site** importance.

Hardstanding (J3), bare ground (J4) and fencing (J2.4)

9.6.68 A recently created hardstanding access track is present across the Study Area (created as part of the neighbouring Llwyncelyn Wind Farm scheme, TN8). Field enclosures are defined by post and wire fencing or dry-stone walls (see above). There is no vegetation directly associated with these features. The hardstanding, bare ground and fences are

considered to be of **negligible** importance, and are **not considered further** in this assessment.

Bats

- 9.6.69 All bats are afforded full protection under the Conservation of Habitats and Species Regulations 2017 (making them European Protected Species). Barbastelle *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, common pipistrelle, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros* are all priority species in Wales. Noctule *Nyctalus noctula*, barbastelle, soprano pipistrelle, brown long-eared bat and lesser horseshoe bat are Local Biodiversity Action Plan 'priority species' in RCT.

Desk Study Data

- 9.6.70 There are 12 Sites of Special Scientific Interest (SSSI) within 10 km of the Study Area, the closest of which is the Nant Gelliwion Woodland, located approximately 2.5 km south of the Study Area. This is one of the largest remaining broadleaved woodlands in the South Wales coalfield. None of the SSSIs are notified for their assemblage of bats; however, most contain high quality semi-natural habitats and are likely to comprise good foraging areas for bats.
- 9.6.71 The data search returned 635 records of bats within 10 km of the Study Area which comprised records of at least 11 species: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle, Nathusius' pipistrelle, brown long-eared bat, Daubenton's bat *Myotis daubentonii*, whiskered bat *Myotis mystacinus*, Natterer's bat *Myotis nattereri*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus*, lesser horseshoe bat and greater horseshoe bat. There were 151 records that were not named to species level.
- 9.6.72 No records were from within the Study Area boundary. The closest record is of an unnamed bat species approximately 544 m northwest of the Study Area boundary, within St Gwynno Forest recorded in 2021. The closest record of a bat roost is ~1.5 km north-east of the Study Area boundary where a peak count of 70 common pipistrelles were recorded emerging from a primary school in 2013.
- 9.6.73 There are no buildings in the Study Area, roosting potential is limited to trees within Perry's Wood.

Ground-Level Tree Assessment Results

- 9.6.74 The GLTA of the Study Area found five trees with PRF-M features. These comprise mature oak and beech trees along a short section of the south-eastern edge of Perry's Wood (between OSGRs ST 04895 92727 and ST 04950 92752). No trees with PRF-M features are located within the

bat buffers¹⁹ around proposed turbines. A total of 82 trees with PRF-I features were recorded in the Study Area, 54 of which were within Perry's Wood. Of the total five trees with PRF-I features are located within areas likely to be cleared for the Proposed Development, two within the bat buffer for T6, and three in an area that is likely to be cleared to accommodate the access track to T7.

- 9.6.75 **Appendix 9.3** provides a description of all recorded PRFs, along with supporting photographs, and an assessment of the suitability of each to support roosting bats (with reference to the criteria presented in **Table 9.12**).

Overview of bat activity

- 9.6.76 Static bat detectors recorded for a total of 179 nights, equating to 1,639 hours and 52 minutes of survey time during spring, summer and autumn 2023.
- 9.6.77 A total of 19,314 passes from a minimum of nine species of bat were recorded. These species were: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle *Pipistrellus nathusii*, (one or more) *Myotis* species²⁰, noctule, Leisler's bat *Nyctalus leisleri*, serotine *Eptesicus serotinus*, long-eared bat species *Plecotus species*²¹, and lesser horseshoe bat. Relative bat activity at each detector is provided on **Figure 9.2**.
- 9.6.78 The number of bat passes (P) and the bat activity (bat passes per hour P/h) for each species recorded during the survey period is shown in Table 9.1420.

Table 9.1420: Bat Passes (P) and Bat Activity per Hour (P/h) during the 2023 baseline survey

Species	Number of Passes (P)	Activity (P/h)
Nathusius' pipistrelle	4	<0.1
Common / Nathusius' pipistrelle	205	0.1
Common pipistrelle	12,051	7.7
Common / soprano pipistrelle	864	0.6

¹⁹ Bat buffers are calculated in accordance with the method of calculation prescribed by NatureScot *et al.* (2021). This calculation uses the hub height, blade length and feature height (the estimated height of the linear feature – i.e. woodland edge) to calculate the distance to which woodland should be cleared, such that its edge is greater than 50 m from blade tip.

²⁰ Species of the genus *Myotis* were grouped together as all UK species have overlapping call parameters, making species identification problematic (Hundt, 2012).

²¹ All long-eared bat species records were likely to be brown long-eared bat. Grey long-eared bat is very rare in Wales (Russ, 2012).

Species	Number of Passes (P)	Activity (P/h)
Soprano pipistrelle	4,495	2.9
<i>Myotis</i> species'	381	0.2
Noctule	940	0.6
Noctule / Leisler's bat	11	<0.1
Leisler's bat	5	<0.1
Serotine / Leisler's bat	4	<0.1
Serotine	10	<0.1
Long-eared bat species	342	0.2
Lesser horseshoe bat	2	<0.1
All bats	19,314	12.3

9.6.79 The assemblage of bats recorded in the Study Area is similar to the assemblage of bats known from the wider area (based on the results of the desk study). The species for which passes were most frequently recorded for common pipistrelle (7.7 P/h) followed by soprano pipistrelle (2.9 P/h); 91.2 % of all the recorded passes were identified as pipistrelle bat species²². Noctule was the third most frequently recorded species (0.6 P/h). Long-eared bat and *Myotis* species had a rate of 0.2 P/h and low numbers of passes were recorded for all other species (less than 0.1 P/h).

9.6.80 Guidance produced by NatureScot *et al.* (2021), and outlined in the methodology section of this chapter, categorises bat species by collision risk with operational wind turbines²³ and then by the vulnerability of bat species populations to individual fatalities. Bat species accounts below are presented in order of their population vulnerability. Noctule, Leisler's bat, serotine and Nathusius' pipistrelle are classed as high vulnerability species, common and soprano pipistrelles and horseshoe bats as medium vulnerability species, and other bats as low / medium sensitivity.

9.6.81 The relative activity of bats recorded in the Study Area as analysed by the EcoBat tool is presented in Table 9.1521. The table also presents the

²² There were 205 passes which fell within the (overlapping) call parameters for both common and Nathusius' pipistrelle and 864 passes which fell within the call parameters for soprano and common pipistrelle.

²³ This categorisation takes account of how bat species forage (whether they tend to forage in open spaces, along edge features or in cluttered habitat), typical flight height and speed, their maneuverability, feeding strategy and what is known about dispersal/migration).

overall bat activity recorded during the survey work in 2023 in bat passes per hour (P/h). Note: the analysis undertaken by EcoBat for each species does not include nights in which no passes were recorded.

Table 9.1521: Relative activity (and reference range for comparative analysis) reported by Ecobat

Species / species groups	Activity (P/h)	Median Percentile	Reference range ²⁴
Nathusius' pipistrelle	<0.1	11	3,149
Common pipistrelle	7.7	9	1,545,295
Soprano pipistrelle	2.9	13	408,821
<i>Myotis</i> species'	0.2	11	84,317
Noctule	0.6	17	68,895
Leisler's bat	<0.1	0	58,966
Serotine	<0.1	3	8,121
Long-eared bat species	0.2	77	2,019
Lesser horseshoe bat	<0.1	2	3,763

9.6.82 The data and analysis undertaken by EcoBat indicate a low activity of bats throughout the sampling period. For all species except *Plecotus* sp., activity was in a median percentile range considered to represent a low level of activity. For *Plecotus* sp., the reference range is small (as in most cases reference data for *Plecotus* sp. is submitted under '*Plecotus auritus*' (brown-long-eared bat)). As for this project data was entered under '*Plecotus*', the small reference range has resulted in a higher than expected median percentile. In reality, the activity level for long-eared bat sp. of 0.2 passes per hour is unlikely to represent more than low activity given that the recorded species is likely to be the common and widespread brown long-eared bat (and not the rarer grey-long-eared bat).

Noctule

9.6.83 Noctule bats are considered to be at high risk of collision with wind turbine blades due to their high flight, hawking feeding strategy and preference for using open habitats (SNH *et al.*, 2021). At the population level, noctule has been classed as a high vulnerability species to wind farm development, given their relatively uncommon and widespread status and their longevity (relatively long life expectancy), which suggest that

²⁴ The size of the EcoBat database (in nights) against which the relative activity recorded for each species has been compared.

recruitment to the breeding population is low (Bat Conservation Trust, 2021; The Wildlife Trusts, 2021; SNH *et al.*, 2021).

- 9.6.84 A total of 940 noctule passes were recorded during the survey period (0.6 P/h). Noctule was recorded at all bat detector locations and was the third most frequently recorded species during all survey periods. The species was most frequently recorded in summer (417 P, 1.0 P/h), followed by spring (327 P, 0.6 P/h) and then autumn (196 P, 0.3 P/h). Passes were most frequently recorded at D6 (marshy grassland) (360 P, 1.8 P/h) and were least frequently recorded at D3 (improved grassland) (60 P, 0.2 P/h).
- 9.6.85 Peaks in noctule activity (4.7 P/h) were recorded between 20 and 40 minutes after sunset (4.7 P/h) and between 40 and 20 minutes before sunrise (3.4 P/h). The earliest noctule pass was recorded 17 minutes before sunset. There were five noctule passes recorded before sunset and 51 passes recorded between sunset and 20 minutes after. Recordings were made across all detectors in the Study Area, with the majority being recorded at D6 (marshy grassland) (36 passes) and the least number of recordings at D2 and D3 (both: improved grasslands, 2 P). Early passes occurred as follows: 21 passes in spring at D4 (mixed plantation woodland (Perry's Wood)) and D6 during six nights; 25 passes in summer at D1 (arable land), D3 (improved grassland) and D6 during seven nights; and 10 passes in autumn at D2 (improved grassland), D4 (mixed plantation woodland (Perry's Wood)) and D5 (arable land) during four nights.
- 9.6.86 The latest pass was recorded 20 minutes after sunrise. There were 106 late passes for noctule (105 passes 20 minutes before sunrise and one pass 20 minutes after sunrise). These recordings were made at D2, D4, D5 and D6, with the majority being recorded at D4 (65 passes) and the least number of recordings in D5 (1 pass). These occurred as follows: four passes in spring at D6 during two nights; 101 passes in summer at D2, D4 and D6 during seven nights; one pass in autumn at D5 during one night.
- 9.6.87 Early and late passes and the timings of the peaks in noctule activity indicate that the species may roost locally in summer and occasionally in spring and autumn.
- 9.6.88 Eleven passes were recorded that could have either been noctule or Leisler's bat but could not be determined to species level due to overlapping call parameters. Five of these passes occurred in autumn, with four passes in summer and two passes in spring. The overlapping calls match the activity patterns for both species.
- 9.6.89 The level of flight activity by noctule over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool), and there is no indication that the Study Area is of more than **Site** value to the species as a foraging resource.

Leisler's bat

- 9.6.90 Leisler's bats are considered to be at high risk of collision with wind turbine blades due to their high flight, hawking feeding strategy and preference for using open habitats (SNH *et al.*, 2021). At the population level, Leisler's bat has been classed as a high vulnerability species to wind farm development, given their relatively uncommon and widespread status and their longevity, which suggest that recruitment to the breeding population is low (Bat Conservation Trust, 2020; The Wildlife Trusts, 2021; SNH *et al.*, 2021).
- 9.6.91 A total of five Leisler's bat passes were recorded during the survey period (<0.1 P/h). Leisler's bat was recorded at D3 (improved grassland), D5 (arable land) and D6 (marshy grassland). All five passes occurred on separate nights, with two passes recorded in each of spring and autumn, and one pass in summer.
- 9.6.92 The earliest Leisler's bat pass was recorded 42 minutes after sunset and the latest pass was recorded 47 minutes before sunrise.
- 9.6.93 Given the timings and seasonality of the Leisler's bat passes and the lack of records from the desk study, it is unlikely that the bats recorded roost near to the Study Area. It is possible that the passes recorded in spring and autumn relate to migratory bats passing through the area.
- 9.6.94 Four further passes were recorded that could have either been Leisler's bat or serotine but could not be determined to species level due to overlapping call parameters. These passes occurred at D1 and D6 in autumn 100-120 minutes after sunset, in the middle of the night and 100-20 minutes before sunrise. The overlapping calls match the activity patterns for both species.
- 9.6.95 The survey data indicates that Leisler's bat use the Proposed Development infrequently. The level of flight activity by Leisler's bat over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool). The Study Area is therefore considered to be of no more than **Site** importance for the species.

Serotine

- 9.6.96 Serotine bats are considered to be at medium risk of collision with wind turbine blades due to their high flight, hawking feeding strategy and preference for using open habitats (SNH *et al.*, 2021). At the population level, serotine has been classed as a high vulnerability species to wind farm development, as it is relatively scarce in Wales (SNH *et al.*, 2021).
- 9.6.97 A total of ten serotine bat passes were recorded during the survey period (<0.1 P/h). Serotine bat was recorded at all detectors except for D5 (arable land). Seven passes were recorded in autumn (<0.1 P/h), three in summer (<0.1 P/h) and none in spring. Four passes, attributed likely to

three bats²⁵, were recorded at D6 (marshy grassland), and one pass was recorded at each of D2 (improved grassland), D3 (improved grassland) and D4 (mixed plantation woodland (Perry's Wood)).

- 9.6.98 The earliest serotine bat pass was recorded 46 minutes after sunset and the latest pass was recorded 34 minutes before sunrise. A small peak in serotine bat activity (0.1 P/h) was recorded between 40 to 20 minutes before sunrise.
- 9.6.99 Given the timings and seasonality of the serotine bat passes and the small number of records from the desk study (seven records from 2011 to 2017), there are unlikely to be any roosts within the vicinity of the Study Area. It is possible that the passes recorded in autumn and summer relate to migratory bats passing through the area.
- 9.6.100 The survey data indicates that serotine use the Study Area infrequently or are absent during spring and summer, but occur more frequently (albeit still on an occasional basis) in autumn. The level of flight activity by serotine over the Study Area falls within the low category (when compared to reference data using the Ecobat tool). The Study Area is therefore considered to be of no more than **Site** importance for the species as a foraging resource (only).

Nathusius' pipistrelle

- 9.6.101 *Nathusius' pipistrelle* is considered a high collision risk species due to its fast flight and hawking feeding strategy, and has also been classed as a high vulnerability species to wind farm development at population level, as it is relatively scarce in Wales (and the rest of the UK) (SNH *et al.*, 2021).
- 9.6.102 Four passes (<0.1 P/h) for this species were recorded. Two passes, likely to be attributable to one bat, were recorded at D1 (arable land) in autumn, and one pass at each of D4 (mixed plantation woodland (Perry's Wood)) in spring and D5 (arable land) in autumn.
- 9.6.103 The earliest pass was recorded 43 minutes after sunset and the latest pass three hours before sunrise (middle of the night).
- 9.6.104 Given the timings and seasonality of the *Nathusius' pipistrelle* passes and the small number of records from the desk study (13 records from 2011 to 2019), it is unlikely that the bats recorded roost near to the Study Area. It is possible that the passes recorded relate to migratory bats passing through the area.
- 9.6.105 A further 205 passes were recorded that could have been either *Nathusius' pipistrelle* or common pipistrelle but could not be determined to species level due to overlapping call parameters. The species was most frequently recorded in autumn (179 passes), with 16 passes in summer and ten passes in spring. Passes were most frequently recorded

²⁵ Numbers of bats estimated by clustered number of calls (<1 min between each call).

at D4 (mixed plantation woodland (Perry's Wood)) (138 P, 0.5 P/h) followed by D1 (arable land) (25 P, 0.1 P/h). There was a peak in activity (0.9 P/h) between 60 to 80 minutes after sunset. Given that the pattern of activity is similar to that of common pipistrelle, it is likely that a high proportion of these passes refer to common pipistrelle.

- 9.6.106 The use of the airspace over the Study Area by Nathusius' pipistrelle is very infrequent, suggesting the Study Area is of **negligible** importance to the species. Nathusius' pipistrelle is **not considered further** in this assessment.

Common pipistrelle

- 9.6.107 Common pipistrelles are considered to be at high risk of collision with wind turbines (SNH *et al.*, 2021). This assessment is based on evidence from the National Bats & Wind Turbines study (Mathews *et al.*, 2016) and Eurobats data, and the physical and behavioural characteristics of this species. However, this species is common and widespread in the UK (Wray *et al.*, 2010). SNH (2021) guidance therefore considers common pipistrelle to be of medium vulnerability to population level effects.
- 9.6.108 Common pipistrelle was recorded at all static detector locations and was the most frequently recorded species during the survey period.
- 9.6.109 A total of 12,051 common pipistrelle passes (7.7 P/h) were recorded during the survey period. The species was most frequently recorded in autumn (13.0 P/h), followed by spring (4.8 P/h) and then summer (3.0 P/h). Passes were most frequently recorded at D1 (arable land) (3,587 P, 13.0 P/h), followed by D6 (marshy grassland) (3,495 P, 17.2 P/h). 29.8 % and 29.0 % of all common pipistrelle passes were recorded at D1 and D6 respectively. The lowest number of passes occurred at D5 (arable land) (598 P, 2.2 P/h).
- 9.6.110 The earliest common pipistrelle pass was recorded 20 minutes after sunset, and the latest pass 18 minutes before sunrise. There were 14 early passes, likely to be attributable to six bats²⁶, between 20 and 30 minutes after sunset through the survey period. A peak in activity occurred from 60 to 80 minutes after sunset. Most early passes occurred during spring (8 P, likely corresponding to five bats), followed by autumn (6 P, likely corresponding to two bats), with no early passes recorded in summer. Early passes were recorded at D1 (arable land), D4 (mixed woodland plantation (Perry's Wood)) and D6 (marshy grassland) with the majority (10 P, likely corresponding to four bats) recorded at D4.
- 9.6.111 Late passes were only recorded during the summer: two passes, likely to be attributable to one bat, were recorded in summer at D6, 18 minutes before sunrise, and another one was recorded 27 minutes after sunrise also at D6 on a different date.

²⁶ Numbers of bats estimated by clustered number of calls (<1 min between each call).

- 9.6.112 Early passes and the timings of the peaks in common pipistrelle activity indicate that there may be infrequent local roosting of small numbers of bats near the Study Area. The timing in the peak of the activity indicates that the Study Area is a valuable foraging resource for this species.
- 9.6.113 The level of flight activity by common pipistrelle over the Study Area falls within the low category (when compared to reference data using the Ecobat tool), and there is no indication that the proposed wind farm is more than **Site** value to the species.

Soprano pipistrelle

- 9.6.114 Soprano pipistrelles are considered to be at high risk of collision with wind turbines (SNH *et al.*, 2021). This assessment is based on evidence from the National Bats & Wind Turbines study (Mathews *et al.*, 2016) and Eurobats data, and the physical and behavioural characteristics of this species. However, soprano pipistrelle is common and widespread in the UK (Wray *et al.*, 2010). SNH (2021) guidance therefore considers the species to be of medium vulnerability to population level effects.
- 9.6.115 Soprano pipistrelle was recorded at all static detector locations and was the second most frequently recorded species during the survey period.
- 9.6.116 A total of 4,495 soprano pipistrelle passes (2.9 P/h) were recorded during the survey period. The species was most frequently recorded in autumn (2989 P, 4.7 P/h), followed by spring (1203 P, 2.2 P/h) and then summer (303 P, 0.8 P/h). Passes were most frequently recorded at D6 (2493 P, 12.3 P/h) (marshy grassland). The lowest numbers of passes (134 P, 0.5 P/h) were recorded at D5 (arable land).
- 9.6.117 The species was most frequently recorded between 40 to 60 minutes after sunset (8.3 P/h), followed by another slightly smaller peak (5.9 P/h) between 40 to 60 minutes before sunrise. The earliest soprano pipistrelle pass was recorded 19 minutes after sunset. There were 33 early passes for soprano pipistrelle recorded between 19 and 30 minutes after sunset through the survey period (likely attributed to 13 bats overall²⁷). Most early passes occurred during spring (22 P), followed by autumn (9 P), and there were two early passes recorded in summer. Early passes were recorded at D4 (mixed plantation woodland (Perry's Wood)) and D6 (marshy grassland) with the majority (17 P) recorded at D6.
- 9.6.118 There were 31 late passes for soprano pipistrelle recorded between 20 and 30 minutes before sunrise through the survey period (likely attributed to eight bats overall). The latest pass was recorded 20 minutes before sunrise. Most late passes occurred during autumn (27 P, likely to be attributable to six bats), followed by spring (4 P, likely to be attributable to two bats), with no late passes recorded in summer. Late passes were recorded at D4 (mixed plantation woodland (Perry's Wood)), D5 (arable

²⁷ Numbers of bats estimated by clustered number of calls (<1 min between each call).

land) and D6 (marshy grassland) with the majority (29 P, likely attributed to seven bats) recorded at D6.

- 9.6.119 Early and late passes and the timings of the peaks in soprano pipistrelle activity indicate that there may be local roosting of small number of bats near the Study Area. The timing in the peak of the activity indicates that the Study Area is a valuable foraging resource for this species.
- 9.6.120 A further 864 passes (0.6 P/h) were recorded that could have been either common pipistrelle or soprano pipistrelle but could not be determined to species level due to overlapping call parameters. These were recorded during all periods with most of the recordings in autumn (787 P, 1.2 P/h), followed by summer (57 P, 0.1 P/h) and then by spring (20 P, <0.1 P/h). They occurred most frequently between 40 to 60 minutes after sunset. The overlapping calls match the activity patterns for both species. However, given that common pipistrelle was recorded more frequently than soprano pipistrelle during the survey period, it is likely that a higher proportion of these calls refer to common pipistrelle.
- 9.6.121 Soprano pipistrelle is the most abundant species of bat across the UK, with a population of approximately 3,040,00 (Mathews *et al.*, 2018). Given the low levels of activity recorded during survey work (when compared to reference data using the Ecobat tool), and the abundance of soprano pipistrelle in the UK, the Study Area is considered to be no more than **Site** importance to the species.

Lesser horseshoe bat

- 9.6.122 Lesser horseshoe bat is considered a low collision risk species due to its slow flight and tendency to fly low and hunt close to vegetation (SNH *et al.*, 2021). This species has been classed as a medium vulnerability species to wind farm development at population level, as it is relatively scarce in Wales (and the rest of the UK) (SNH *et al.*, 2021).
- 9.6.123 Two passes for this species were recorded (<0.1 P/h): one pass on 23 September 2023 at D5, three hours after sunset (middle of the night) and one pass at D6 on 21 September 2023 one hour and 20 minutes after sunset. These data suggest that use of the Study Area by lesser horseshoe bat is occasional and limited to a period when bats are dispersing from maternity roosts. The data therefore indicate that the Study Area is not a high value resource for lesser horseshoe bats. In addition, based on the timings of the two passes it is unlikely that bats are roosting close to the Study Area.
- 9.6.124 Given the low levels of activity recorded, it is considered that the Study Area is of **negligible** importance to greater horseshoe bat. The species is **not considered further in this assessment**.

Myotis species

- 9.6.125 All species of the *Myotis* genus have been assessed as having a low collision risk level; however, SNH *et al.* (2021) have assigned each species within the genus with a population vulnerability level based on

their relative abundance within Wales. Bechstein's bat *Myotis bechsteinii*, Brandt's bat, and whiskered bat are considered to be medium vulnerability species²⁸ to wind turbine effects, and Daubenton's bat *Myotis daubentonii*, and Natterer's bat *Myotis nattereri* are considered to be low vulnerability species.

- 9.6.126 A total of 381 *Myotis* species passes (0.2 P/h) were recorded during the survey period. *Myotis* species occurred at all bat detector locations, with the species group most frequently recorded at D6 (marshy grassland) (128 P, 0.6 P/h), and the lowest numbers of passes (3 P, <0.1 P/h) at D4 (mixed plantation woodland (Perry's Wood)).
- 9.6.127 The species was most frequently recorded during autumn (268 P, 0.4 P/h), with 61 passes in spring (0.1 P/h) and 52 passes in summer (0.1 P/h). The earliest *Myotis* sp. record occurred 43 minutes after sunset, and the latest occurred 54 minutes before sunrise, with passes occurring most frequently 80 to 100 minutes before sunrise.
- 9.6.128 Given the timings of the *Myotis* species passes, it is unlikely that the bats recorded roost near to the Study Area. Based on the activity levels the Study Area appears to provide a resource for foraging / commuting to *Myotis* species bats.
- 9.6.129 The level of flight activity by *Myotis* sp. over the Study Area falls within the low category (when compared to reference data using the Ecobat tool), and there is no indication that the Study Area is of more than **Site** value to *Myotis* sp. as a foraging resource (only).

Long-eared bat species

- 9.6.130 Both long-eared bat species have been assessed as having a low collision risk level; however (as with *Myotis* species), the respective species have been assessed separately in terms of population vulnerability level based on their relative abundance in Wales. It follows that grey long-eared bat *Plecotus austriacus* is a medium vulnerability species to wind turbine effects, and brown long-eared bat *Plecotus auritus* is a low vulnerability species. Given the respective distributions of each species, all long-eared bat species records were assumed to be brown long-eared bat. Grey long-eared bat is very rare²⁹, and its distribution is mainly restricted to the south-west of England (Russ, 2012).
- 9.6.131 A total of 342 long-eared bat passes (0.2 P/h) were recorded during the survey period. Long-eared bats were recorded at all bat detector locations, with passes most frequently recorded at D2 (improved

²⁸ Alcahloe bat *Myotis alcahloe* is also included in Table 2 of Appendix 1 as a medium vulnerability species; however, the presence of this species has not yet been confirmed in Wales.

²⁹ One record so far in Wales, in Pembrokeshire in 2012 – see <https://www.bbc.co.uk/news/uk-wales-south-west-wales-18598432>, Accessed 8 April 2024.

grassland) (120 P, 0.5 P/h), and the lowest numbers of passes (11 P, <0.1 P/h) at D4 (mixed plantation woodland (Perry's Wood)).

- 9.6.132 The species was most frequently recorded during autumn (269 P, 0.4 P/h), with 57 passes in summer (0.1 P/h) and 16 passes in spring (<0.1 P/h). The earliest bat pass was recorded 42 minutes after sunset, and the latest bat pass 66 minutes before sunrise, with passes occurring most frequently 60 to 80 minutes and 100 to 120 minutes after sunset.
- 9.6.133 Given the timings of the long-eared bat species passes, it is unlikely that the bats recorded roost near to the Study Area. It is possible that the passes recorded relate to migratory bats passing through the area. Based on the activity levels, the Study Area appears to provide a resource for foraging / commuting to long-eared bat species.
- 9.6.134 The activity level for long-eared bat sp. of 0.2 passes per hour is unlikely to represent more than low activity given that the recorded species is likely to be the common and widespread brown long-eared bat (and not the rarer grey-long-eared bat). Given this low level of activity, and that brown long-eared bat is considered to be a low vulnerability species based on its relative abundance in Wales, it is considered that the Study Area is of **negligible** importance to brown long-eared bat. The species is **not considered further in this assessment**.

Hazel Dormouse

- 9.6.135 Hazel dormouse is afforded full protection under the Conservation of Habitats and Species Regulations 2017 (a European protected species) and is a species of principal importance for the conservation of biodiversity in Wales (a Section 7 species).
- 9.6.136 The data search did not return any records of hazel dormouse *Muscardinus avellanarius*. A scoping comment from RCT noted that "*dormouse has recently been found in the locality for the first time*", but did not give a precise location.
- 9.6.137 The mixed plantation woodland in the Study Area (Perry's Wood) is suitable for dormouse and is well connected to the wider landscape. Survey of Perry's Wood was completed during 2023, in accordance with English Nature's Dormouse Conservation Handbook (English Nature, 2006).
- 9.6.138 No dormice or evidence of their presence was recorded during the survey work.
- 9.6.139 Consideration is given in this EclA to precautionary measures to ensure legal compliance with regard to hazel dormouse during the construction of the wind farm, but given that the species was not recorded in the Study Area (and is likely to be absent from it), the potential for a significant effect on any local population is considered **negligible**. The species is **not considered further in this assessment**.

Otter

- 9.6.140 Otter is a European Protected Species (EPS) with regard to the Conservation of Habitats and Species Regulations 2017. It is a species of principal importance for the conservation of biodiversity in Wales.
- 9.6.141 SEWBRc returned eight records of otter within the last 10 years. All are associated with the River Rhondda and its tributaries, the closest record is approximately 1 km to the south of the Study Area boundary, recorded in 2019.
- 9.6.142 No evidence of the presence of otter was recorded during the riparian mammal survey on 03 October 2024.
- 9.6.143 Given the connection to watercourses and waterbodies in the wider area where otter has been previously recorded, the species may travel through the Proposed Development occasionally when moving between river catchments, but there is little potential for the Proposed Development to act as an important resource.
- 9.6.144 Much of the Study Area is likely to be of negligible importance to otter. However, the ditches / streams within the Study Area, particularly the larger canalised stream in the central – eastern part, which flows into / through Llys Nant & Graig Twyn-y-glog Woodlands SINC and forms a corridor with Nant Blaenhenwysg (outside the Study Area, to the south-east) may be used opportunistically by dispersing animals. They are therefore considered to be of **Local** importance to the species.

Water Vole

- 9.6.145 Water voles are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are included as a species of Principal Importance under Schedule 7 of the Environment (Wales) Act 2016.
- 9.6.146 The data search did not return any records of water vole *Arvicola amphibius*.
- 9.6.147 Field signs of water vole were recorded on the banks of the watercourse south of Perry's Wood, where it passes through marshy grassland (at approximate OSGRs ST050925 and ST0497592719). These included, a latrine, fresh cut stems (feeding remains) and a burrow entrance. The locations at which the field signs were recorded are shown on **Figure 9.4**.
- 9.6.148 Given that water vole (a scarce species in the county) are present along the large canalised stream in the central – eastern part of the Study Area, and may use other watercourses in the Study Area intermittently (given their connectivity with the larger canalised stream, the watercourses are considered to be of **County** level importance for the species.

Badger

- 9.6.149 Badger is protected on welfare grounds under the Protection of Badgers Act 1992. This makes it an offence to intentionally capture, kill or injure a

badger, to damage, destroy or block access to a sett, and to disturb badgers in their setts.

- 9.6.150 The data search returned two records of badger *Meles meles* within 2 km of the Study Area. The records are located approximately 2 km and 1.9 km north of the Study Area, both records are dated 2019.
- 9.6.151 A recently used badger latrine was recorded incidentally in the central part of Perry's Wood, during survey work in December 2024.
- 9.6.152 During the phase 1 survey (in 2024) a badger hair was found on a drystone wall outside the Study Area, approximately 200 m to the south, in grazed pasture adjacent to woodland. No other evidence of badger use or activity was recorded during the survey (nor during the 2022 survey).
- 9.6.153 The Study Area is unlikely to be of ecological importance in maintaining local badger populations, and the potential for a significant effect on any local population is considered **negligible**. Consideration will need to be given to avoidance of killing and injury of badgers during construction.

Reptiles

- 9.6.154 Common reptiles are afforded partial protection (from killing and injury) under the Wildlife and Countryside Act 1981 (as amended). These common species are common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass-snake *Natrix helvetica* and adder *Vipera berus*. The Quinquennial Review of the Wildlife and Countryside Act recommended that the protection level of adder be increased, but its recommendations are yet to be acted upon and it is unclear whether they will be adopted.
- 9.6.155 SEWBRc returned records for three common reptile species within the search radius, these include:
- 16 records of common lizard none of which are from within the Study Area boundary. The nearest record is located 1 km to east of the Study Area in Ynysybwll. The other common lizard records are between 1.2 km and 2 km from the Study Area with a number of records associated with Barry Sidings Countryside Park located to the south of the Study Area.
 - Two records of adder, both records are from Lady Windsor Spoils to the east, with the closest record being approximately 1.5 km from the Study Area boundary.
- 9.6.156 12 records for slow-worm, the closest is located 1.2 km east in a garden in Ynysybwll.
- 9.6.157 The mosaic of habitats within the study area (excluding areas of closely grazed grassland) has potential to support common species of reptile including slow worm, common lizard, and adder. The dry-stone walls also offer shelter and hibernation potential for reptiles.
- 9.6.158 Given the moderate suitability of some of the habitats in the Study Area, the desk study records for surrounding areas, and size of the Study Area in the context of extensive area of similar habitats within RCT county

borough, it is considered that the Study Area is of **Site** importance for reptiles.

Great Crested Newt

- 9.6.159 Great crested newt is afforded full protection under the Conservation of Habitats and Species Regulations 2017 (a European Protected Species) and is a species of principal importance for the conservation of biodiversity in Wales (a Section 7 species).
- 9.6.160 No records of great crested newt within the last 10 years were returned within the data search. Two historic records of great crested newt were obtained, both records are located in Ynysybwll approximately 1.7 km to the north and dated 1991 and 1999.
- 9.6.161 There is an absence of suitable waterbodies in the Study Area, therefore it is unlikely that GCN species breed in or close to the Study Area.
- 9.6.162 Given the lack of suitable breeding habitat on or within 250 m of the Proposed Development, and the lack of local records within the last 10 years returned within the data search, the species is assumed to be absent and is therefore unlikely to be impacted by the proposals. Great crested newt is **not considered further** in this assessment.

Future baseline conditions

- 9.6.163 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that 'an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge' is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.
- 9.6.164 Current management of habitats within the Study Area is variable. Semi-improved and improved grasslands, and sown leys are heavily grazed, and are cultivated (and sown with crop) on a rotational basis. Several fields have extensive areas of encroaching bracken and rush, which is lightly grazed / bruised by livestock but is otherwise unmanaged. The marshy grassland to the south-east of Perry's Wood appears to be frequently cut, and a series of shallow drainage ditches have been recently dug across it. Most streams / wet ditches in the Study Area appear to be unmanaged, however the larger canalised stream in the central – eastern part of the Study Area was recently dredged and reprofiled. Perry's Wood is unmanaged.
- 9.6.165 In the absence of the Proposed Development, it is likely that land management in the Study Area will remain consistent. It follows that in the absence of the Proposed Development being permitted, the main potential for changes in the ecological characteristics of the Study Area

are in regard to vegetative regrowth in the recent works areas along the edges of the existing tracks to the adjacent Llwynneclyn Wind Farm.

- 9.6.166 There is also some potential for changes in the species the Proposed Development (and wider area of upland) currently supports. The national bat populations of those species recorded at the Study Area are stable, so are likely to continue to use the Study Area and adjacent land at approximately the same levels as was recorded during the survey work. There is therefore the risk of collision with turbines of the same assemblage of bat species throughout the lifespan of the schemes.
- 9.6.167 Though dormouse are likely to be absent from the Study Area at present, the species was recorded locally for the first time³⁰ (RCT scoping response letter (ref: 24/5095/PRE)). Given that the mixed plantation woodland in the Study Area (Perry's Wood) is suitable for dormouse and well connected to suitable habitat in the wider landscape, and is likely to become more suitable with age, the species could colonise the woodland during the lifespan of the scheme.
- 9.6.168 Water vole were recorded on one watercourse in the Study Area. Current over-management (reprofiling) of the watercourse could lead to local extinction of the species, given that the most suitable habitat for the species is isolated from other suitable habitat.

Key receptors

- 9.6.169 **Table 9.1622** identifies the receptors taken forward into the assessment for ecology.

Table 9.1622: Key receptors taken forward to assessment

Receptor	Description
Marshy grassland (M25)	Purple moor grass-tormentil mire (M25) is a priority habitat in Wales, though does not meet local designation guidelines. The M25 marshy grassland in the Study Area contains a moderately diverse species assemblage which is uncommon in agricultural landscapes locally, therefore is assessed as important at the County level.
Dry dwarf shrub heath – acid	Dry heath in the Study Area meets both the definition of lowland heathland priority habitat and criteria for local designation. The habitat is limited in extent and isolated from similar unmanaged dry heath habitats locally. This habitat is therefore assessed as of Local importance.
Running water (streams / ditches and acid flush)	Most streams / wet ditches and acid flush habitats in the Study Area do not meet the definition for priority habitat. The larger canalised stream does fit the definition however, by supporting a priority species (water vole). None of the streams / wet ditches in the Study Area meet the guidelines for local designation (Gwent Wildlife Trust, 2004). The acid flush habitat may meet the guidelines for local designation. The running water habitats are assessed as of Local importance overall.

³⁰ The RCTCBC ecologist referenced the record in their scoping response, but did not provide information regarding the location / date of the record in the letter or subsequent consultation meeting.

Receptor	Description
Hedgerows with trees	All native hedgerows meet the definition for priority habitat, but not the criteria for local designation (as SINC). The hedgerows in the Study Area border woodland habitats or form isolated short stretches, therefore do not provide significant connectivity within the local landscape. The hedgerow habitats are assessed as of Local importance.
Mixed woodland – plantation	The mixed woodland does not meet the definition of priority habitat or local designation guidelines (although it falls within Llys Nant & Graig Twyn-y-glog Woodlands SINC). The woodland is assessed as being of Local importance.
Broadleaved woodland	Broadleaved woodland in the Study Area is priority habitat and meets local designation SINC criteria for semi-natural upland woodland. Given its small size and that it does not provide connectivity between other areas of habitat, the semi-natural broad-leaved woodland in the Study Area is considered to be of Local importance.
Bats – noctule	Noctule bats are considered to be at high risk of collision with wind turbine blades. Overall activity of 0.6 P/h was recorded. Early and late passes and the timings of the peaks in noctule activity indicate that there may be local roosting near the Study Area. The level of flight activity by noctule over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool), and there is no indication that the proposed wind farm is more than Site value to the species as a foraging resource.
Bats – Leisler's bat	Leisler's bats are considered to be at high risk of collision with wind turbine blades. Overall activity of <0.1 P/h was recorded. It is unlikely that the Leisler's bat roost near to the Study Area. Given that Leisler's bats use the Proposed Development site infrequently, and the level of flight activity by Leisler's bat over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool), the Proposed Development is considered to be of no more than Site importance for the species.
Bats – serotine	Serotine bats are considered to be at medium risk of collision with wind turbine blades. Overall activity of <0.1 P/h was recorded. There are unlikely to be any roosts within the vicinity of the Study Area. Given that serotine use the Proposed Development site infrequently and seasonally, and the level of flight activity by serotine over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool) the Proposed Development is considered to be of no more than Site importance for the species.
Bats – common pipistrelle	Common pipistrelles are considered to be at high risk of collision with wind turbines, however, this species is common and widespread in the UK. Overall activity of 7.7 P/h was recorded. There may be infrequent local roosting of small numbers of bats near the Study Area. The level of flight activity by common pipistrelle over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool), and there is no indication that the proposed wind farm is more than Site value to the species as a foraging resource.
Bats – soprano pipistrelle	Soprano pipistrelles are considered to be at high risk of collision with wind turbines, however, this species is common and widespread in the UK. Overall activity of 2.9 P/h was recorded. There may be infrequent local roosting of small numbers of bats near the Study Area. Given the low activity recorded during survey work (when compared to reference data using the Ecobat tool), and the abundance of soprano pipistrelle in the UK, the Proposed Development is considered to be no more than Site importance to the species.

Receptor	Description
Bats – <i>Myotis</i> sp.	All species of the <i>Myotis</i> genus have been assessed as having a low collision risk level. Overall activity of 0.2 P/h was recorded (for the species group as a whole). It is unlikely that the bats recorded roost near to the Study Area. The level of flight activity by <i>Myotis</i> sp. over the Proposed Development falls within the (when compared to reference data using the Ecobat tool), and there is no indication that the proposed wind farm is more than Site value to the species as a foraging resource.
Otter	No evidence of the presence of otter was recorded during the riparian mammal survey. Much of the Study Area is considered to be of negligible importance to otter. The ditches / streams in the Study Area, particularly the larger canalised stream which forms a corridor with Nant Blaenhenwysg may be used opportunistically by dispersing animals. They have the potential to be of Local importance to the species.
Water vole	Given that water vole (a scarce species in the county) are present along the large canalised stream in the central – eastern part of the Study Area, and may use other watercourses in the Study Area intermittently, the watercourses in the Study Area are considered to be of County level importance for the species.

9.7 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

- 9.7.1 The design process for the Proposed Development has been heavily influenced by the findings of early environmental appraisals and the EIA process. The Proposed Development has had several measures incorporated into the design to avoid or minimise environmental impacts.
- 9.7.2 The key aspects where the design has evolved are described in Volume 1, Chapter 3: Design evolution and alternatives of the ES. These include measures required for legal compliance, as well as measures that implement the requirements of good practice guidance documents. The assessment has been undertaken on the basis that these measures are incorporated in the design and construction practices (i.e. they are 'embedded mitigation').
- 9.7.3 Embedded mitigation measures for the Proposed Development are set out in Volume 1, Chapter 2: Project Description and the various management plans outlined in this chapter of the ES.
- 9.7.4 Implementation of embedded mitigation relied upon in the assessment will be secured in the DNS. Compliance of detailed design of the Proposed Development with the Outline Design Principles, or through compliance with relevant environmental management plans.
- 9.7.5 Consideration has been given to any 'additional mitigation' over and above the embedded mitigation that may be required and has the potential to mitigate any significant adverse effects identified following the assessment of the Proposed Development inclusive of its embedded mitigation.
- 9.7.6 Where significant effects remain following the implementation of embedded mitigation and achievable further measures could lower the

identified effect, this chapter identifies additional mitigation and explains how the additional mitigation is secured. The residual effects (after the implementation of embedded and additional mitigation) have then been identified and are presented in each topic chapter.

9.7.7 Both embedded and additional mitigation measures relevant to the assessment of ecology are summarised in

9.7.8 Table 9.1723 below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 9.1723: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
Routeing and design of the solar array and access tracks to minimise impacts on the habitats of highest ecological value within the Proposed Development site.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
Rotation and micro-siting of the crane pad locations to avoid the habitats of highest ecological value within the Proposed Development site.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
Limitation as far as possible of habitat loss / modification within the SINC will be during the construction phase by minimising the working footprint as far as practicable. Any temporary lay-down, vehicle access points, material storage or construction compounds (as required during the turbine installation) will be confined to tracks, laybys or appropriate areas as identified / discussed with the Ecological Clerk of Works (ECoW).	The measure will be detailed in the CEMP, which will be secured in a planning condition.
Retained habitats including buffers and root zones and / or working areas will be clearly demarcated with high visibility marker posts and maintained until works are complete. The marked area will act as an exclusion zone. All equipment / plant will operate from within the marked working area, and no spoil, vegetation or other materials are to be placed or stored outside of the working area.	The measure will be detailed in the CEMP, which will be secured in a planning condition.
Provision of a bat buffer of 50 m from blade tip to retained forest edge (as recommended in SNH, 2021) to reduce the risk of bat-strike. All other linear features that are likely to be well used by bats (i.e. woodland edge, watercourses and hedgerows) are outside the bat buffers around proposed turbines.	This measure will be secured in a planning condition for the scheme.
Feathering of the turbines blades at idle to minimise the potential for killing and injury of bats.	This measure will be secured in a planning condition for the scheme.

Mitigation measure	How the measure will be secured
Any fencing will be designed to allow commuting otter to move freely through the Proposed Development	The measure will be secured in the final design for the Proposed Development.
The design has taken consideration and avoided (with stand-offs wherever possible): • Potential roost features for bats, • Watercourses suitable for otter and water vole, and • The areas of highest habitat quality for these species.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
A preconstruction ecological survey programme to provide updated baseline information to feed into the CEMP and other operational plan documents. Surveys will include: • A pre-works inspection for roosting bats in the PRF-I features in trees within Perry's Wood. • A pre-works survey for signs of water vole and water vole burrows within or adjacent to the works areas. • A pre-works check of works areas for active badger setts.	The measure will be detailed in the CEMP, which will be secured in a planning condition.

• The development of a detailed CEMP in consultation with stakeholders (i.e. NRW and RCTCBC) to build on the principles of the Outline CEMP submitted as part of this planning application. The CEMP will include provisions such as: – A pre-construction walkover of the Proposed Development site to ensure no material ecological changes (such as the construction of badger setts); – A precautionary construction method statement to minimise potential for impacts on hazel dormouse; – A reptile construction method statement. This will aim to ensure that killing and injury of reptiles is avoided, and that any hibernation features (such as dry-stone walls or stone piles) are avoided or compensated for if impacted; – Measures to ensure that larger mammals such as otter and badger do not become entrapped in trenches if commuting across the Proposed Development nocturnally; – Onsite speed limits for all construction vehicles, to minimise the potential for incidental killing of mammals crossing the Proposed Development; – Appointment of a suitably qualified and experienced ECoW to oversee the implementation of the CEMP; – Confinement of all construction activity to clearly defined working areas and the storage of materials to areas of hardstanding; – Vegetation stripping and areas of hardstanding to be kept to a minimum to reduce the need for additional drainage provision; – The application of best practice in accordance with SEPA's Guidance for Pollution Prevention; – Avoidance of natural water features with a 50 m stand-off (where possible) for all construction works, alongside measures including silt traps, check dams and barriers to prevent silt-laden run-off from entering watercourses, provision of temporary/permanent drainage routes, including cross-drainage at access tracks, and sensitive design of drainage ditches to avoid potentially silt-laden run-off flowing directly into natural channels or ephemeral streams; – Sensitive location and containment of storage areas and stockpiles; – Where practicable, refuelling of vehicles and machinery will be carried out in designated areas, on an impermeable surface, and well away from any watercourse; and – An ecologically led lighting plan. If lighting is required during the construction phase it will be designed in accordance with industry guidance (Institute of Lighting Professionals and Bat Conservation Trust, 2018) with input from a consultant ecologist. Impacts on	These measures will be detailed in the CEMP, which will be secured in a planning condition.

Mitigation measure	How the measure will be secured
nocturnal species (such as bats) will need to be key considerations of the lighting strategy. – The Japanese knotweed (a Schedule 9 species) located within the Study Area will be removed by a suitably qualified contractor. Any additional Schedule 9 species located within the works area during construction will also be removed by a suitably qualified contractor.	
Further mitigation	
Enhancement of the mixed plantation woodland (Perry's Wood) through measures such as limited selective felling of non-native species (e.g. spruce sp.), planting of fruiting understorey species (tolerant of low light levels) and overseeding with a woodland ground flora seed mix, to compensate for the reduction in the extent of this habitat in the Proposed Development site.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
The creation of habitat piles and retained dead wood from the pruned / felled materials within the woodland, which would provide habitat for invertebrates and reptiles.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Cessation of regular cutting of the marshy grassland south of Perry's Wood, to mitigate for the reduction in the extent of this habitat.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Control of encroaching bracken within semi-improved acid and marshy grassland.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Scrub control within the small area of dry dwarf shrub heath.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
SuDS to be designed to create valuable new features (particularly for water vole).	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.

Mitigation measure	How the measure will be secured
Fencing of field margins within the solar array (between solar panels and walls), to prevent overgrazing and allow the development of a longer and more diverse sward. This habitat will be cut annually in late summer / early autumn.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Incorporating habitat enhancement for reptile including the creation of simple structures such as hibernacula and grass snake egg laying heaps.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Provision of 5 bat and 5 dormouse boxes in woodland: - Suitable trees for boxes should be identified by a suitably experienced ecologist ahead of installation. - The bat boxes will be at least 250 m from turbines, and should target bats in the <i>Pipistrellus</i>, <i>Myotis</i> and <i>Plecotus</i> genus (i.e. Schwegler 2F Bat Box³¹). Pipistrelle bats, Daubenton's and long-eared bats have both been recorded locally and are known to use bat boxes. - Location of dormouse boxes should be focussed on areas with higher availability of foraging resources, as these areas are most likely to be colonised by existing local populations. These will be maintained and replaced as necessary (by a suitably licensed ECoW), for the lifetime of the scheme.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
A treatment plan to remove / reduce the invasive species present in the Study Area should be produced.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.

9.8 Assessment of effects

9.8.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. A description of the potential effect on receptors caused by each identified impact is given below.

³¹ Box type provided as guide only, alternative boxes (suitable for mounting on trees) can also be used subject to availability.

Impacts on Habitats: Marshy Grassland (M25)

Sensitivity of the receptor

- 9.8.2 Purple moor grass-tormentil mire (M25) is a priority habitat in Wales, though does not meet local designation guidelines. Whilst not meeting local designation guidelines, the M25 marshy grassland in the Study Area contains a moderately diverse species assemblage which is uncommon in agricultural landscapes locally, therefore is habitat is assessed as important at the **County** level.

Construction phase

Magnitude of impact

- 9.8.3 The M25 marshy grassland in the Study Area is outside the Proposed Development footprint, and is approximately 75 m from the nearest part of it (the concrete foundation pad of T5). No impacts on M25 marshy grassland are anticipated as a result of construction of the Proposed Development.

Significance of the effect

- 9.8.4 The construction of the wind farm will have a **negligible** effect (not significant at any geographical level) on the M25 marshy grassland habitat.

Operation and maintenance

Magnitude of impact

- 9.8.5 The M25 marshy grassland in the Study Area is outside the Proposed Development footprint, and is approximately 75 m from the nearest part of it (the concrete foundation pad of T5). No impacts on M25 marshy grassland are anticipated as a result of construction of the Proposed Development.

Significance of the effect

- 9.8.6 The operation of the wind farm will have a **negligible** effect (not significant at any geographical level) on the M25 marshy grassland habitat.

Decommissioning

- 9.8.7 Given that the M25 marshy grassland is outside the Proposed Development footprint, the decommissioning of the wind farm will have a **negligible** effect (not significant at any geographical level) on the habitat.

Impacts on Habitats: Dry Dwarf Shrub Heath – Acid

Sensitivity of the receptor

- 9.8.8 Dry heath in the Study Area meets both the definition of lowland heathland priority habitat and criteria for local designation. The habitat is limited in extent and isolated from similar unmanaged dry heath habitats locally. This habitat is therefore assessed as of **Local** importance.

Construction phase

Magnitude of impact

- 9.8.9 The dry heath in the Study Area is outside the Proposed Development footprint, and is immediately adjacent to the nearest part of it (a section of existing track between T2 and T3). No impacts on dry heath are anticipated as a result of construction of the Proposed Development.

Significance of the effect

- 9.8.10 The construction of the wind farm will have a **negligible** effect (not significant at any geographical level) on the dry heath habitat.

Additional mitigation and residual effect

- 9.8.11 Scrub control is proposed within the small area of dry heath. This will lead to a marginal increase in the area and improved condition of the habitat in the Study Area. This will result in a **beneficial** effect on the habitat, at the **Site** level.

Operation and maintenance

Magnitude of impact

- 9.8.12 The dry heath in the Study Area is outside the Proposed Development footprint, and is immediately adjacent to the nearest part of it (a section of existing track between T2 and T3). No impacts on dry heath are anticipated as a result of operation of the Proposed Development.

Significance of the effect

- 9.8.13 The operation of the wind farm will have a **negligible** effect (not significant at any geographical level) on the dry heath habitat.

Decommissioning

- 9.8.14 Given that the dry heath is outside the Proposed Development footprint, the decommissioning of the wind farm will have a **negligible** effect (not significant at any geographical level) on the dry heath habitat.

Impacts on Habitats: Running Water (streams / ditches and acid flush)

Sensitivity of the receptor

- 9.8.15 Most streams / wet ditches and acid flush habitats in the Study Area do not meet the definition for priority habitat. The larger canalised stream (in the central – eastern part of the Study Area) does fit the definition however, by supporting a priority species (water vole). None of the streams / wet ditches in the Study Area meet the guidelines for local designation (Gwent Wildlife Trust, 2004), though the acid flush habitat may meet the guidelines for local designation. The running water habitats are assessed as of **Local** importance overall.

Construction phase

Magnitude of impact

- 9.8.16 The acid flush is located outside the Proposed Development footprint (55 m from the nearest part of it (T5)); no impacts on the flush are anticipated as a result of the Proposed Development.
- 9.8.17 The Proposed Development footprint overlaps two of the existing streams / wet ditches in the Study Area:
- One section of a shallow wet ditch / stream through improved grassland in the northern part of the Study Area is crossed by the access track, and approximately 100 m of the ditch / stream is within the proposed solar array. This ditch is of low ecological value, and does not have potential to support water vole.
 - The larger canalised stream in the central – eastern part of the Study Area will be crossed by the access track at the edge of the Perry's Wood in the eastern part of the Study Area (close to T7). This stream is of Local importance³².
- 9.8.18 The existing (Llwynceilyn Wind Farm) access track which will be utilised during the construction and operation phases of the Proposed Development also crosses the larger canalised stream in the central – eastern part of the Study Area, where the stream crosses the former MG10 marshy grassland.

Significance of the effect

- 9.8.19 Direct loss of running water habitats in the Study Area is anticipated as a result of the Proposed Development. Access track crossings will be culverted (to facilitate water flow under the track), and the stream / wet ditch in the northern part of the Study Area will flow under solar panels.

³² Supporting water vole and having potential to support commuting otter.

- 9.8.20 Culverting of the larger canalised stream in the central – eastern part of the Study Area will lead to a loss of the running water habitats³³. This will lead to the permanent loss of running water habitats along approximately 10 m of the larger canalised stream, and the temporary loss of a larger extent (estimated to be an additional 4 m), as a result of construction phase temporary clearance / reprofiling of adjacent sections.
- 9.8.21 The stream / wet ditch in the northern part of the Study Area is of low ecological value. The access track crossings will be culverted (to facilitate water flow under the track). It will also flow under solar panels and will be partially shaded (panel footings are anticipated to straddle the watercourse).
- 9.8.22 The construction works adjacent to (and over) the streams / wet ditches also have potential to impact the habitat through temporary silt mobilisation and run-off (including run-off of pollutants), which would adversely impact downstream areas of habitat (no impacts on aquatic habitats within statutory designated sites are anticipated (the nearest statutory designation – the Severn Estuary SAC – is approximately 29.5 km downstream³⁴)). However, a range of proposed measures (to be detailed in the CEMP) will be implemented at all streams / wet ditches over which construction traffic will pass (including the existing access track crossing over the larger canalised stream in the central – eastern part of the Study Area). These measures will include; silt traps, check dams and barriers (to prevent silt-laden run-off from entering watercourses), provision of temporary / permanent drainage routes, including cross-drainage at access tracks, and sensitive design of drainage ditches (to avoid potentially silt-laden run-off flowing directly into streams / wet ditches. The risk of silt mobilisation and surface run-off (including run-off of pollutants) will therefore be minimised as far as possible, and is not considered further.
- 9.8.23 The loss of running water habitats along the stream / wet ditch in the northern part of the Study Area (as a result of shading / lack of subsoil within culverts) will have a **negligible** effect (not significant at any geographical level) on the running water habitats along it. The minor permanent loss, and more extensive temporary loss of running water habitats along the larger canalised stream is of significance at the **Site** level.

Additional mitigation and residual effect

- 9.8.24 The cessation of reprofiling along the larger canalised stream will lead to an increase in the structure and density of streamside vegetation.

³³ Potential impacts on the protected species that are / may be supported by the running water habitat (i.e. water vole and otter) are considered under the relevant sections relating specifically to those species.

³⁴ This is the distance along the waterway, taking account of meanders (as opposed to a direct line between the Study Area and the SAC).

- 9.8.25 Having taken into consideration the additional mitigation measures, the impact of construction of the Proposed Development on the running water habitats (along the larger canalised stream) will remain of significance at the **Site** level.

Operation and maintenance

Magnitude of impact

- 9.8.26 As during construction, there is the potential for run-off (including run-off of pollutants), which could adversely effect downstream areas of habitat. Good practice pollution control measures will be implemented for the life of the scheme, which will effectively mitigate the risk.

Significance of the effect

- 9.8.27 The operation of the wind farm will have a **negligible** effect (not significant at any geographical level) on the running water habitat.

Additional mitigation and residual effect

- 9.8.28 Scrub growth along the banks will be controlled, and controlled sectional dredging of the channel will be carried out to ensure continued flow of water along it.
- 9.8.29 The operation of the wind farm will result in a **beneficial** effect, at the **Site** level.

Decommissioning

- 9.8.30 The effects of decommissioning have the potential to be similar to those during the construction phase but are likely to occur over a shorter time period.
- 9.8.31 The decommissioning of the Proposed Development on the running water habitat (along the larger canalised stream) will therefore be of significance at the **Site** level.

Impacts on Habitats: Hedgerows with Trees

Sensitivity of the receptor

- 9.8.32 All native hedgerows meet priority habitat criteria, but do not meet local designation guidelines for SINCS. They border woodland habitats or form isolated short stretches, and therefore do not provide significant connectivity. The hedgerow habitats are assessed as of **Local** importance.

Construction phase

Magnitude of impact

- 9.8.33 The three sections of hedgerow in the Study Area (along the eastern boundary) are outside the Proposed Development footprint, and the nearest is approximately 180 m from the closest part of it (the concrete foundation pad of T8). No impacts on hedgerows are anticipated as a result of construction of the Proposed Development.

Significance of the effect

- 9.8.34 The construction of the Proposed Development will have a **negligible** effect (not significant at any geographical level) on the hedgerows.

Operation and maintenance

Magnitude of impact

- 9.8.35 The three sections of hedgerow in the Study Area (along the eastern boundary) are outside the Proposed Development footprint, and the nearest is approximately 180 m from the closest part of it (the concrete foundation pad of T8). No impacts on hedgerows are anticipated as a result of operation and maintenance of the Proposed Development.

Significance of the effect

- 9.8.36 The operation of the wind farm will have a **negligible** effect (not significant at any geographical level) on the hedgerows.

Decommissioning

- 9.8.37 Given that the hedgerows are outside the Proposed Development footprint, the decommissioning of the wind farm will have a **negligible** effect (not significant at any geographical level) on the hedgerow habitat.

Impacts on Habitats: Mixed Woodland – Plantation

Sensitivity of the receptor

- 9.8.38 The mixed woodland in the Study Area does not meet the definition of priority habitat or local designation guidelines (although it falls within Llys Nant & Graig Twyn-y-glog Woodlands SINCC). The woodland is assessed as being of **Local** importance.

Construction phase

Magnitude of impact

- 9.8.39 Direct, localised impacts on mixed plantation woodland are anticipated within and immediately adjacent to the works area. These impacts will

occur in two areas – with the bulk lost from Perry’s Wood (within Llys Nant & Graig Twyn-y-glog Woodlands SINIC), the remainder will be from the partial clearance of a small strip of mixed plantation woodland in the central part of the Study Area (adjacent to T2).

9.8.40 The total area of mixed plantation woodland within the Study Area is 15.52 ha. The woodland is semi-mature (planted circa 2000³⁵) with most stands of a similar age and showing little structural diversity. Whilst the woodland falls within Llys Nant & Graig Twyn-y-glog Woodlands SINIC, and is relatively species rich in terms of canopy and woodland ground flora, it does not meet the guidelines for local designation.

9.8.41 The Proposed Development is predicted to result in the permanent loss of approximately 3.85 ha of mixed plantation woodland (approximately 25 % of the block. Of this loss, 0.68 ha will be for the Proposed Development footprint, the remainder for clearance of bat buffers around the two turbines (T6 and T7) which are to be located within it. Additional adjacent areas of mixed plantation woodland will be cleared during construction. This will be replanted following completion of the construction phase works, however, the regenerating woodland will take approximately 25 years to surpass the baseline maturity.

Significance of the effect

9.8.42 Although approximately 75 % of the area of the mixed plantation woodland habitat in the Study Area is to be retained, the ecological value of the habitat is such that the 3.85 ha area of it that is to be permanently lost is assessed as being of **Local** importance.

Additional mitigation and residual effect

9.8.43 Five measures are proposed, which will result in enhancement of the retained mixed plantation woodland in the Study Area (in Perry’s Wood):

- Limited selective felling of non-native species (e.g. spruce sp.).
- Planting of fruiting understorey species (tolerant of low light levels).
- Overseeding with a woodland ground flora seed mix.
- The creation of habitat piles and retained dead wood from the pruned / felled materials within the woodland.

9.8.44 Given the proportion of the mixed plantation woodland that will be lost, and that the additional mitigation measures will result in a significant enhancement of the retained habitat, the significance of the residual effect will be of significance at the **Site** level.

³⁵ Visible on historic aerial imagery courtesy of Google Earth Pro 7.3.6.9796 (64-bit).

Operation and maintenance

Magnitude of impact

- 9.8.45 No further effects on the mixed plantation woodland habitats, such as habitat loss or disturbance, are expected to arise from the proposed wind farm during the operational phase.

Significance of the effect

- 9.8.46 The operation of the wind farm will have a **negligible** effect (not significant at any geographical level) on the mixed plantation woodland habitat.

Decommissioning

- 9.8.47 It is anticipated that the decommissioning of the wind farm will require the re-clearance of some of the regenerating mixed plantation woodland (in the areas originally cleared and replanted during the construction phase). The areas affected will be minimised, and replanted following completion of the work.
- 9.8.48 Turbine foundations and access tracks may be left in situ. It is likely that the turbine foundations will be covered with topsoil to allow colonisation of species present within the surrounding sward (albeit there may not be adequate soil depth to allow semi-mature / mature woodland to regenerate), the access tracks are likely to be retained.
- 9.8.49 The decommissioning of the Proposed Development on the mixed plantation habitat will result in a net loss of mixed plantation woodland (as a result of the retained tracks and poorer condition of the replanted woodland over turbine pads), of significance at the **Site** level.

Impacts on Habitats: Broadleaved Woodland

Sensitivity of the receptor

- 9.8.50 Broadleaved woodland in the Study Area is priority habitat, and meets local (SINC) designation criteria for semi-natural upland woodlands. Given its small size and that it does not provide connectivity between other areas of habitat, the semi-natural broad-leaved woodland in the Study Area is considered to be of **Local** importance.

Construction phase

Magnitude of impact

- 9.8.51 The small area of broadleaved woodland in the Study Area (0.42 ha) is outside the Proposed Development footprint, and the nearest is approximately 160 m from the closest part of it (the southern corner of the solar array). No impacts on broadleaved woodland are anticipated as a result of construction of the Proposed Development.

Significance of the effect

- 9.8.52 The construction of the Proposed Development will have a **negligible** effect (not significant at any geographical level) on the broadleaved woodland in the Study Area.

Operation and maintenance

Magnitude of impact

- 9.8.53 All broadleaved woodland is outside the Proposed Development footprint. No impact is anticipated.

Significance of the effect

- 9.8.54 The operation of the Proposed Development will have a **negligible** effect (not significant at any geographical level) on the broadleaved woodland in the Study Area.

Decommissioning

- 9.8.55 Given that the broadleaved woodland is outside the Proposed Development footprint, the decommissioning of the wind farm will have a **negligible** effect (not significant at any geographical level) on the habitat.

Impacts on Species: Bats

Sensitivity of the receptor

- 9.8.56 Construction phase impacts on bats are considered with regard to the bat assemblage rather than by species, reflecting the fact that any impacts are likely to be limited.

Construction phase

Magnitude of impact

- 9.8.57 There would be no loss of PRF-M bat roost features as a result of the Proposed Development. Five trees with PRF-I bat roost features within Perry's Wood are to be cleared to accommodate the Proposed Development. All PRF-I features on trees that are to be cleared will be checked by a suitably qualified ecologist immediately prior to felling works to ensure that they are not occupied at that time.
- 9.8.58 There is some potential for disturbance of foraging and commuting bats if night working takes place and lighting is required during construction, particularly along woodland edge and streams / wet ditches. Lighting may result in displacement of bat species that favour foraging in low light

conditions³⁶ (such as lesser horseshoe bat) if there is light spillage onto habitats they use; however, such effects would be localised and temporary in nature.

- 9.8.59 Some construction phase lighting will be required as standard working hours will be 7am-7pm Monday to Friday; and sunset at the end of October is around 5pm. Lighting will be designed in accordance with industry guidance (Institution of Lighting Engineers and Bat Conservation Trust, 2023). This would include careful consideration of the location, orientation and intensity of lighting, the type of lighting and the overall design of the lighting scheme to minimise the potential for impacts on bats.

Significance of the effect

- 9.8.60 Given the adoption of the embedded mitigation measures outlined above and the industry standard guidance for lighting design, the effect of construction of the Proposed Development on foraging and commuting bats is assessed to be **negligible**. However, the loss of five trees with PRF-I features within the woodland will have an effect on the roosting resource within the Study Area for bats at the **Site** level.

Additional mitigation and residual effect

- 9.8.61 Ten bat boxes will be installed on suitable trees within Perry's Wood (identified by a suitably experienced ecologist) more than 250 m from turbines. The boxes will be designed for crevice dwelling species (typically bats in the *Pipistrellus*, *Myotis* and *Plecotus* genus), and will therefore replicate the PRF-I features to be lost. If bat boxes are appropriately installed and maintained, there will be a **negligible** effect on bats.

Operation and maintenance

Assessment of Site Risk

- 9.8.62 To determine the risk posed to bats during the operational phase of the Proposed Development, guidance set out by NatureScot et al (2021) has been applied³⁷. The Proposed Development site is categorised as a "moderate risk site" (risk level = 3) according to the supporting definitions of moderate habitat risk and medium project size set out by NatureScot et al (2021). The rationale is as follows:

³⁶ The most commonly recorded species was common pipistrelle, which is not considered likely to be displaced and uses lighting opportunistically in some situations as it attracts prey (e.g. Rowse *et al.*, 2018).

³⁷ This requires an element of professional judgement in terms of application, as most wind farms do not fall neatly into one category when all criteria are applied.

- If considered in isolation, the Proposed Development meets the definition of a small-scale development (having fewer than ten turbines);
- However, there are more than 20 proposed or operational schemes within 10 km of the Proposed Development, two operational schemes are located within 5 km (and a further three are proposed / approved);
- The criteria set out in Table 9.1824 (below; reproduced from NatureScot et al., 2021), indicate that to be a 'small wind farm' the Proposed Development must have *'no other wind energy developments within 10km' whereas a 'medium'-sized scheme 'may have some other wind developments within 5km.'*;
- The height of the turbines within the Proposed Development falls within the defined height (up to 180 m to tip) for medium project size, but the number of proposed turbines is fewer (and meets the definition for "small" project size);
- The Proposed Development therefore conforms most readily to a medium-sized project based on scale.
- Habitat quality for bats has been assessed as moderate. The Study Area has a small number of PRF-M roost features (all within a 70 m line of mature trees). The Site contains areas of habitat that can be used extensively by foraging bats, and are connected to the wider landscape by a network of linear features including woodland edge and streams / wet ditches. However, the quality of much of the habitat in the Study Area (improved pasture and arable land) bounded by dry-stone walls is of low quality for foraging bats.

Table 9.1824: Descriptions of habitat risk and project size categories used to inform the risk level for bats (from NatureScot *et al.*, 2021)

Habitat Risk	Description
Low	Small number of potential roost features, of low quality. Low quality foraging habitat that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.

Habitat Risk	Description
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and/or on an important flyway. Close to key roost and/or swarming site.
Project Size	Description
Small	Small scale development (≤ 10 turbines). No other wind energy developments within 10km. Comprising turbines < 50m in height.
Medium	Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. Comprising turbines 50-100m in height.
Large	Largest developments (> 40 turbines) with other wind energy developments within 5km. Comprising turbines > 100m in height.

Table 9.1925: Site risk level derived from the outcome of Table 9.18 (taken from NatureScot et al., 2021)

Site level risk				
Project Size		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

9.8.63 The outcome of applying these criteria is that the Proposed Development is concluded to be of moderate risk for bats (**Table 9.19**); i.e. a site Level Risk of 3. Further consideration is given to those bat species scoped into further assessment below.

Vulnerability to Collision: Species Analysis

9.8.64 There is potential for bats to collide with operating wind turbines. A study undertaken by the University of Exeter on behalf of Defra indicated the mortality rate of bats at wind turbines in the UK ranged from 0 to 5.25 bats per turbine per month across 46 sites sampled over a three-year period (Mathews *et al.*, 2016). It also demonstrated that bat fatality could not be correlated with activity levels; i.e., higher levels of baseline activity

do not necessarily result in a higher risk to bats. Notwithstanding this, the study indicated that the UK bats which were most likely to be killed at wind farm sites were common and soprano pipistrelle and noctule bats.

9.8.65 Table 9.2026 below provides a summary of current knowledge of the UK population sizes³⁸ and the known collisions of noctule, Leisler's bat, serotine, common pipistrelle, soprano pipistrelle and *Myotis* sp.. It is based on mortality data collated by Dürr (2022), and UK population estimates provided by Mathews *et al.* (2018).

Table 9.2026: UK bat population sizes

Species	Known collisions in Europe to date (UK component in brackets)	Uk population estimate
Noctule	1765 (11)	656,900 (excl. Scotland)
Leisler's bat	813 (0)	No reliable estimate
Serotine	165 (0)	136,000
Common pipistrelle	3401 (46) ³⁹	3,040,000
Soprano pipistrelle	494 (52)	4,6701,000
<i>Myotis</i> sp.	30 (1) ⁴⁰	No reliable estimate ⁴¹

Noctule

Sensitivity of the receptor

9.8.66 Noctule bats are considered to be at high risk of collision with wind turbine blades. Overall activity of 0.6 P/h was recorded. Early and late passes and the timings of the peaks in noctule activity indicate that there may be local roosting near Study Area. The level of flight activity by noctule over the Study Area falls within the low category (when compared to reference

³⁸ There are no current reliable published estimations of population sizes in Europe.

³⁹ An additional 412 collisions of common / soprano pipistrelle species (which were not identified to species level) have been reported from mainland Europe. A further 864 collisions of unidentified pipistrelle species bats have been reported from mainland Europe (where additional pipistrelle species that are not present in the UK occur) of these, 12 were from the UK, so assumedly related to common, soprano or Nathusius' pipistrelle.

⁴⁰ This total excludes *Myotis* sp. that do not occur regularly / as established populations in Britain and Ireland (greater and lesser mouse-eared bats, pond bat and Geoffrey's bat). It also excludes data for unidentified *Myotis* sp. on the basis that all fatalities for this species grouping were recorded in continental Europe, so could include species that do not occur regularly in Britain and Ireland (such as those listed above).

⁴¹ Reliable estimates are only available for Bechstein's bat (21,800), Daubenton's bat (1,030,000) and Natterer's bat (414,000).

data using the Ecobat tool), and there is no indication that the Study Area is of more than **Site** value to the species as a foraging resource.

Magnitude of impact

- 9.8.67 Dürr (2022) reported 1,765 collisions of noctule with wind farms in Europe, including 11 in the UK. This is the third highest number of collisions for a species reported by Dürr (following common pipistrelle at 3,401 and Nathusius' pipistrelle at 1,792 collisions). The proportion of collision numbers to population size, particularly in the context of the UK population (656,900 individuals) is low, albeit the extent to which post-construction monitoring of fatality at wind farms takes place in the UK and the extent to which those studies that are conducted contribute their fatality data to these figures is unknown.
- 9.8.68 JNCC (2019) reports that noctule are considered to be stable in terms of population numbers and range, and that the species has a favourable conservation status.

Significance of the effect

- 9.8.69 Due to the low level of activity recorded, the potential for the favourable conservation status of the species to be affected by wind farm fatality is considered negligible; however, significant effects at the **Site** level may occur if individuals are lost from the local population because of collision. This assessment is made with a low certainty given that research by the University of Exeter (Mathews, *et al.*, 2016) suggest that baseline levels of bat activity do not always correlate to collision fatality during operation.

Additional mitigation and residual effect

- 9.8.70 NatureScot *et al.* (2021) guidance recommends that, wherever it is practically possible, turbine blades are pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling. This is only applied when the turbines are not generating a commercial output and may reduce fatality rates by up to 50 % (NatureScot *et al.*, 2021). The feathering of blades when idling is also a mitigation measure proposed in the Action Plan for the Conservation of All Bat Species in the European Union 2018-2024 (Barova & Streit, 2018). Therefore, it is proposed that the turbines at the Proposed Development will be feathered when not generating a useable output. Feathering of turbines will significantly reduce the risk of collision of noctule with turbines, to the extent that the potential for the favourable conservation status of the species to be affected by wind farm fatality is considered **negligible**, and no significant effect at any geographical level is predicted.

Decommissioning

- 9.8.71 The effects of decommissioning have the potential to be similar to those during the construction phase but are likely to occur over a shorter time period. The risk of impacts on roosting bats will be lower than during the

construction phase, given that there will be no need for clearance of trees (of adequate maturity to have potential roost features).

Leisler's bat

Sensitivity of the receptor

- 9.8.72 Leisler's bats are considered to be at high risk of collision with wind turbine blades. Overall activity of <0.1 P/h was recorded (with 5 passes in total). It is unlikely that the Leisler's bat roost near to the Study Area. Given that Leisler's bats use the Study Area infrequently, it is considered to be of no more than **Site** importance for the species.

Magnitude of impact

- 9.8.73 Dürr (2022) reported 813 collisions of Leisler's bat in Europe, none of which were in the UK.
- 9.8.74 BSG Ecology is aware of two additional fatalities not included in these data during the past five years; a fatality at a wind farm in the Irish midlands, and one at the Mynydd y Gwair Wind Farm (Swansea). The latter was a late autumn fatality and was determined to species via DNA analysis. It is likely to relate to a migrating / dispersing bat, as the area is outside the species' known range.
- 9.8.75 Activity levels for Leisler's bat within the Proposed Development site were in the low category (when compared to reference data using the Ecobat tool), with five passes recorded in total.
- 9.8.76 JNCC (2019) reports that data on Leisler's bat populations is deficient due to a lack of certainty that many of the field records have been accurately determined (due to overlapping call parameters with other species) and a lack of roost records. Notwithstanding this, the species is not considered sensitive in conservation terms and the population is categorised as stable.

Significance of the effect

- 9.8.77 Due to the very low level of activity recorded, the potential for the favourable conservation status of the species to be affected by wind farm fatality is considered **negligible**, and no significant effect at any geographical level is predicted.

Additional mitigation and residual effect

- 9.8.78 To mitigate impacts on other species for which impacts were predicted as a result of collision with turbines, turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling. This will only be applied when the turbines are not generating a commercial output and may reduce fatality rates by up to 50 %. This will further increase confidence in the conclusion above.

Serotine

Sensitivity of the receptor

- 9.8.79 Serotine bats are considered to be at medium risk of collision with wind turbine blades. Overall activity of <0.1 P/h was recorded. There are unlikely to be any roosts within the vicinity of the Study Area. Given that serotine use the Proposed Development site infrequently and seasonally, and the level of flight activity by serotine over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool) the Proposed Development is considered to be of no more than **Site** importance for the species.

Magnitude of impact

- 9.8.80 Dürr (2022) reported 165 collisions of Serotine in Europe, none of which were in the UK.
- 9.8.81 JNCC (2019) reports that serotine are considered to be stable in terms of population numbers and range, and that the species has a favourable conservation status.

Significance of the effect

- 9.8.82 Due to the very low level of activity recorded, the potential for the favourable conservation status of the species to be affected by wind farm fatality is considered **negligible**, and no significant effect at any geographical level is predicted.

Additional mitigation and residual effect

- 9.8.83 To mitigate impacts on other species for which impacts were predicted as a result of collision with turbines, turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling. This will only be applied when the turbines are not generating a commercial output and may reduce fatality rates by up to 50 %. This will further increase confidence in the conclusion above.

Common and soprano pipistrelle

Sensitivity of the receptor

- 9.8.84 Common and soprano pipistrelles are considered to be at high risk of collision with wind turbines, however, both species are common and widespread in the UK. Overall activity of 7.7 P/h and 2.9 P/h was recorded. There may be infrequent local roosting of small numbers of bats of both species near the Study Area. The level of flight activity for both common pipistrelle and soprano pipistrelle over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool), and there is no indication that the proposed wind farm is more than **Site** value to the species as a foraging resource.

Magnitude of impact

- 9.8.85 Dürr (2022) reported 3,401 collisions of common pipistrelle and 494 collisions of soprano pipistrelle in Europe, with 46 and 52 in the UK respectively. An additional 412 collisions of common / soprano pipistrelle (which were not identified to species level) have been reported from mainland Europe.
- 9.8.86 Common and soprano pipistrelle bats are considered common and widespread within the UK (Wray *et al.*, 2010). In addition, they are known to favour foraging in edge habitat (Natural England, 2014). NatureScot *et al.* (2021) therefore recommends that turbines are positioned such that the rotor swept area is more than 50 m distant from woodland or boundary features. Applying the buffer distance calculation (as presented in NatureScot *et al.*, 2021) indicates that the distance between the turbine swept area and retained forest edge is 80.05 m for the turbines of the shorter model (T1, T2 and T3), 72.39 m for the turbines of the mid-height model (T4, T5 and T6), and 48.86 m of the taller model (T7) (T8 is suitably distant from woodland / linear features that no bat buffer will be required around it). This buffer distance has been applied in the keyhole felling design of the proposed wind farm.
- 9.8.87 JNCC (2019c, 2019d) reports that common and soprano pipistrelle are considered to be stable in terms of their populations, numbers and range, and that they have a favourable conservation status.

Significance of the effect

- 9.8.88 Given the large national populations of both species and low activity rates, it is concluded that the favourable conservation status of both common and soprano pipistrelle status will not be affected by the development. If collisions by individual bats do occur, the impact is unlikely to affect populations at the local level. However, a significant effect at the **Site** level may occur if collisions are regular.

Additional mitigation and residual effect

- 9.8.89 NatureScot *et al.* (2021) guidance recommends that, wherever it is practically possible, turbine blades are pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling. This is only applied when the turbines are not generating a commercial output and may reduce fatality rates by up to 50 % (NatureScot *et al.*, 2021). The feathering of blades when idling is also a mitigation measure proposed in the Action Plan for the Conservation of All Bat Species in the European Union 2018-2024 (Barova & Streit, 2018). Therefore, it is proposed that the turbines at the Proposed Development will be feathered when not generating a useable output. Feathering of turbines will significantly reduce the risk of collision of pipistrelles with turbines, to the extent that the potential for the favourable conservation status of either species to be affected by the Proposed Development is considered **negligible**, and no significant effect at any geographical level is predicted.

Myotis sp.

Sensitivity of the receptor

- 9.8.90 All species of the *Myotis* genus have been assessed as having a low collision risk level. Overall activity of 0.2 P/h was recorded (for the species group as a whole). It is unlikely that the bats recorded roost near to the Study Area. The level of flight activity by *Myotis* sp. over the Proposed Development falls within the low category (when compared to reference data using the Ecobat tool), and there is no indication that the proposed wind farm is of more than **Site** value to the species.

Magnitude of impact

- 9.8.91 Dürr (2022) reported 30 collisions in Europe of the *Myotis* species that occur in the UK⁴², one of which was in the UK. A further 10 collisions of unidentified *Myotis* sp. were reported in continental Europe. Some species within the genus that occur in continental Europe do not occur regularly in the UK (such as those listed in the footnote below).
- 9.8.92 JNCC (2019e, 2019f, 2019g, 2019h) data for most of the species that may occur at the Proposed Development site, populations are considered to be stable in numbers and range, and their conservation status is favourable. Data for one of the species that may occur – Daubenton's bat – is inadequate for population trends to be ascertained.
- 9.8.93 The known ranges of four *Myotis* species (Daubenton's bat, Brandt's bat, Natterer's bat and whiskered bat) overlap the Proposed Development site. It is therefore unlikely that all of the *Myotis* sp. activity recorded at the Site was attributed to one species, and the true level of activity for each will have been lower than 0.2 P/h.

Significance of the effect

- 9.8.94 Given the low level of activity recorded, and that populations of species in the *Myotis* genus are considered to be of medium (Brandt's or whiskered bats) or low (Daubenton's or Natterer's bats) vulnerability to collision with wind turbines in Wales, the potential for the favourable conservation status of any species in the *Myotis* genus to be affected by wind farm fatality is considered **negligible**, and no significant effect at any geographical level is predicted.

Additional mitigation and residual effect

- 9.8.95 To mitigate impacts on other species for which impacts were predicted as a result of collision with turbines, turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling. This will only be applied when the turbines are not generating a

⁴² Excluding greater and lesser mouse-eared bats, pond bat and Geoffrey's bat.

commercial output and may reduce fatality rates by up to 50 %. This will further increase confidence in the conclusion above.

Impacts on Species: Otter

Sensitivity of the receptor

- 9.8.96 Desk study records indicate that otter occur on local river systems. However, survey of the smaller streams / wet ditches in the Study Area has not identified any use by otter to date. These habitats (particularly the larger canalised stream which forms a corridor with Nant Blaenhenwysg) may be used opportunistically by dispersing animals. They therefore have potential to be of **Local** importance to the species.

Construction phase

Magnitude of impact

- 9.8.97 There is a risk of disturbance of commuting otter, should they be present or passing through the Site during construction. The most likely result of potential disturbance is local displacement of otter from the vicinity of the works area to adjacent areas of the Study Area, or adjacent areas outside it.
- 9.8.98 It is also possible that on-site construction traffic could result in a greater risk of otter being hit by moving vehicles. However, this will be largely mitigated through a speed limit for construction traffic. Work will also generally take place during the day when otters are least active, further reducing the likelihood of an impact occurring.

Significance of the effect

- 9.8.99 The embedded mitigation (including speed limits described above and measures to avoid accidental entrapment of animals) will be applied, such that construction phase effects on otter are concluded to be **negligible** (not significant at any geographical level).

Additional mitigation and residual effect

- 9.8.100 Enhancement measures proposed along the watercourse will comprise the cessation of excessive reprofiling (with a programme of controlled dredging / de-silting of the channel instigated to maintain water flow). These will enhance the value of the habitat for otter, by providing greater vegetative cover for animals commuting along the corridor. This will result in a **beneficial** effect, at the **Site** level.

Operation and maintenance

Magnitude of impact

- 9.8.101 It is not anticipated that adverse effects on otter will occur during the operation of the Proposed Development. No further land take will occur during operation. Maintenance visits to the Proposed Development will be relatively infrequent and will take place during daylight hours (when encounters with otter are unlikely to occur). If speed limits are adhered to effects on otter are highly unlikely.

Significance of the effect

- 9.8.102 The operation of the wind farm will have a **negligible** effect (not significant at any geographical level) on the use of the Study Area by otter.

Decommissioning

- 9.8.103 The effects of decommissioning have the potential to be similar to those during the construction phase but are likely to occur over a shorter time period.
- 9.8.104 Therefore, assuming that embedded mitigation (including speed limits described above and measures to avoid accidental entrapment of animals) will be applied, decommissioning phase impacts on otter will be **negligible** (not significant at any geographical level).

Impacts on Species: Water Vole

Sensitivity of the receptor

- 9.8.105 Water vole (a scarce species in the county) have been found to be present (apparently at low density) along the larger canalised stream in the central – eastern part of the Study Area, and may use other watercourses in the Study Area intermittently. The watercourses in the Study Area are considered to be of **County** level importance for the species.

Construction phase

Magnitude of impact

- 9.8.106 The construction phase works will include the construction of a culverted crossing over the larger canalised stream in the central-eastern part of the Study Area, and the use of an existing crossing over it. The low number of field signs recorded confirm that the species is present along the watercourse, but suggest that the species is not present at high density. Works along the larger canalised stream carry a low risk of killing or injury of water vole. Measures to avoid the risk of killing or injury will be implemented as part of the CEMP. These will include a pre-

construction survey for water vole to be completed by a suitably qualified ecologist to locate any burrows within or adjacent to the works area. If the pre-construction survey work finds water vole burrows within or adjacent to the proposed works areas, works will not commence at that location, and a license will be sought.

9.8.107 A watercourse in the northern part of the Study Area will be within the Proposed Development footprint (with solar panels to be placed over it and a culverted crossing of the access track to be installed). However, this watercourse (which comprises a shallow ditch through heavily grazed improved grassland) does not have potential to support water vole – impacts on that watercourse are not considered further in this assessment.

9.8.108 Measures to avoid impacts on watercourses arising as a result of pollution and sedimentation will be implemented as standard practice and further details are included in Chapter 7: Hydrology and Flood Risk. The implementation of the measures will remove the risk of impacts on water vole.

9.8.109 The most likely impact on water vole is a risk of temporary and localised disturbance from construction works, resulting in localised displacement along the larger canalised stream.

Significance of the effect

9.8.110 If it occurs, localised displacement along the larger canalised stream will result in an effect on water vole of significance at the **Site** level.

Additional mitigation and residual effect

9.8.111 The immediate cessation of reprofiling along the larger canalised stream will lead to an increase in the structure and density of streamside vegetation. It will also ensure that existing burrows are not damaged / destroyed. The increase in structure and diversity of the streamside vegetation will aim to ensure that it is of sufficient quality to support temporarily locally displaced water vole during construction. Local displacement of animals along the larger canalised watercourse (within the Study Area) is considered an effect at the **Site** level.

Operation and maintenance

Magnitude of impact

9.8.112 It is not anticipated that adverse effects on water vole will occur during the operation of the Proposed Development. No further land take will occur during operation. Maintenance visits to the Proposed Development will be relatively infrequent (for the existing access track and culvert), and will be similar to the baseline survey work, when the existing track was used for maintenance of the operational Llwynneclyn scheme).

Significance of the effect

- 9.8.113 The operation of the scheme will have a **negligible** effect (not significant at any geographical level) on the use of the Study Area by water vole.

Additional mitigation and residual effect

- 9.8.114 The cessation of reprofiling along the larger canalised stream will lead to an increase in the structure and density of streamside vegetation. Over time, this will mean that (subject to appropriate management), all parts of the watercourse become more suitable for water vole. The management referred to above will be detailed in the OHMP, and will include measures such as control of scrub along the banks, and controlled sectional dredging of the channel to ensure continued flow of water along it.
- 9.8.115 Cessation of overcutting of former MG10 marshy grassland adjacent to the larger canalised stream, and blocking of field drains within it will result in rewetting of the habitat, and an increase in vegetative structure and diversity. Over time, the results of these enhancement measures will have a **beneficial** effect which, given the scarcity of water vole locally, will be of significance at the **Local** level.

Decommissioning

- 9.8.116 It is anticipated that, as a result of the proposed enhancement measures along the watercourse and in the adjacent marshy grassland, the water vole population will increase over the lifespan of the Proposed Development.
- 9.8.117 The effects of decommissioning have the potential to be similar to those during the construction phase but are likely to occur over a shorter time period.
- 9.8.118 Therefore, assuming that embedded mitigation (including pre-works survey for water vole and measures to avoid impacts on watercourses arising as a result of pollution and sedimentation) are applied, decommissioning phase impacts on water vole will be of significance at the **Site** level.

Impacts on Species: Reptiles

Sensitivity of the receptor

- 9.8.119 Given the moderate suitability of some habitats in the Study Area, the desk study records for surrounding areas, and size of the Proposed Development in the context of extensive areas of similar habitats within RCT county borough, it is considered that the Proposed Development is of **Site** importance for reptiles.

Construction phase

Magnitude of impact

- 9.8.120 Habitat loss in the more suitable areas of the Study Area for reptiles will be limited, as the improved grassland, arable land and mixed plantation woodland habitats within which much of the habitat loss / solar panel placement will occur are of low suitability for reptiles.
- 9.8.121 Habitats of moderate suitability, within which habitat loss will occur are; dry-stone walls, grasslands with scattered bracken, continuous bracken, marshy grassland and woodland edge habitats. All works on the Proposed Development site will be completed in accordance with a method statement which will be contained within the CEMP. This will include measures such as:
- Avoidance of works within structures with potential to support hibernating reptiles (such as dry-stone walls) outside of the reptile active season.
 - Habitat manipulation (of habitats with more moderate potential to support reptiles) including directional and phased cutting / stripping of vegetation during the reptile active season.

Significance of the effect

- 9.8.122 On the assumption that the reptile method statement is produced and adhered to, killing and injury is considered unlikely to occur, and potential impacts on reptiles would be limited to localised loss of suboptimal habitat. The effect is therefore likely to be **negligible** and would not require further mitigation.

Operation and maintenance

Magnitude of impact

- 9.8.123 It is not anticipated that adverse effects on reptiles will occur during the operation of the Proposed Development. No further land take will occur during operation, and maintenance visits to the Proposed Development will be relatively infrequent.

Significance of the effect

- 9.8.124 The operation of the Proposed Development will have a **negligible** effect (not significant at any geographical level) on the use of the Study Area by reptiles.

Additional mitigation and residual effect

- 9.8.125 The creation of habitat piles and retention of dead wood from the pruned / felled materials within / at the periphery of mixed plantation woodland

(Perry's Wood), which would provide habitat for invertebrates and reptiles.

- 9.8.126 The creation of simple structures such as hibernacula and grass snake egg laying heaps.
- 9.8.127 Fencing of field margins within the solar array (between solar panels and walls), to prevent overgrazing and allow the development of a longer and more diverse sward will enhance the value of the habitat for reptiles.
- 9.8.128 The cessation of regular cutting of the marshy grassland south of Perry's Wood and scrub control within the small area of dry dwarf shrub heath will enhance the value of both habitats for reptiles.
- 9.8.129 In combination, the creation of habitat features for reptiles and the enhancement of the existing habitats (detailed above) will result in a beneficial effect, at the **Site** level.

Decommissioning

- 9.8.130 The effects of decommissioning have the potential to be similar to those during the construction phase but are likely to occur in a smaller area (expected to be areas of habitat adjacent to existing infrastructure over a shorter time period).

Future monitoring

- 9.8.131 The future monitoring proposed as a consequence of the assessment of ecology are set out in Table 9..

Table 9.21: Future monitoring commitments

Measure adopted	How the measure will be secured
Annual visits will be completed during the summer, to monitor the progress of the habitat enhancement measures detailed in the OHMP (updated to a full HMP) upon consent of the scheme.	This measure will be set out in the OHMP, production of a full HMP will be a condition of planning consent.
There is increasing evidence (e.g. Mathews <i>et al.</i> , 2016) to suggest that collision fatality is difficult to predict from pre-construction baseline levels of bat activity. Therefore, monitoring of bat activity, along with carcass searching will be undertaken for three years post development to determine operational-phase bat activity. The monitoring work will take place in spring, summer and autumn of each year, and will comprise; deployment of static bat detectors at all turbine locations for ten nights (per season) (and simultaneous deployment of a weather station), carcass searching (at all turbine locations) by specialist search dog teams on ten consecutive mornings (per season), additional searcher efficiency trials (using randomly deployed carcasses) and an assessment of scavenger removal rates (using carcasses and camera traps).	This measure will be secured in a planning condition for the scheme.

Measure adopted	How the measure will be secured
Given sensitivity of the water vole population in the Study Area, a programme of water vole survey will be completed (in accordance with industry standard guidance (Dean <i>et al.</i>, 2006), during years 1, 2, 3, 5 and 10 post-construction. The findings of the survey work will inform ongoing habitat management measures along the watercourse.	This measure will be secured in a planning condition for the scheme.

9.9 Cumulative effects assessment

- 9.9.1 A description of the cumulative effects between the Proposed Development and other developments upon ecology receptors is provided below.
- 9.9.2 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.
- 9.9.3 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);
 - 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).
- 9.9.4 Assessment of cumulative effects 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 Llanwonno Energy scheme, a 10 km EZoI has been considered, as this is considered sufficient to cover the core ranging area for mobile species using the Proposed Development site.
- 9.9.5 The main potential for cumulative effects arising from projects in the wider area is with regard to wind farms. There are one proposed, six consented and fifteen operational wind farm within the 10 km EZoI.
- 9.9.6 The proposed wind farm is:
- Mynydd y Gaer (approximately 9.87 km south-west)
- 9.9.7 The consented wind farms are:
- Mynydd y Glyn (approximately 2.56 km south-south-west)
 - Twyn Hywel (approximately 4.56 km east-south-east)
 - Bryntail Farm (approximately 4.66 km south-east)
 - Land at Graig-yr-Hufen (approximately 5.91 km east)
 - Tir Cook (approximately 7.16 km north-east)
 - Abergorki (approximately 9.68 km north-west)
- 9.9.8 The operational wind farms are:

- Llwynceilyn (approximately 260 m north-west⁴³)
- Mynachdy Farm (approximately 2.02 km north)
- Ferndale (approximately 5.41 km north-west)
- Nant-y-Gwyddon (approximately 6.25 km west)
- Cefn Fforest (approximately 6.47 km north-east)
- Pant y Wal (approximately 6.63 km west-south-west)
- West of Rhiwfelin (approximately 6.66 km south-south-west)
- Castell Llwyd (approximately 7.36 km east-north-east)
- Graig Fartha Farm (approximately 7.62 km south-west)
- Bwlfa Farm (approximately 7.72 km west)
- Mynydd Portref Extension (approximately 7.90 km south-west)
- Mynydd Portref (approximately 8.31 km south-west)
- Headwind Taf Ely Replacement (approximately 8.40 km south-west)
- Taff Ely (approximately 8.56 km south-west)
- Pant y Wal Extension (approximately 8.95 km west-south-west)

- 9.9.9 Two schemes exist locally (i.e. within the area comprising Llanwonno Mountain and St Gwynno Forest); Llwynceilyn and Mynachdy Farm. Both are operational, and respectively comprise two turbines located within improved or semi-improved pasture with adjacent coniferous plantation (of St Gwynno Forest).
- 9.9.10 Of the other schemes within the cumulative assessment area, nineteen are located within the county (RCT); one proposed, three consented and fifteen operational. Of these, Mynydd y Glyn, Bryntail Farm and Twyn Hywel are the closest, located (at least partially) within 5 km of the Proposed Development.
- 9.9.11 Where available⁴⁴, the publicly available ecology reports for these schemes showed that they were typically situated in upland habitats; unenclosed upland habitat, commercial conifer plantation or enclosed (grazing) pasture.
- 9.9.12 Residual effects of the Proposed Development (in isolation) are construction phase effects at the Site level on; mixed plantation woodland, running water habitat and water voles.
- 9.9.13 Neither of the local schemes has potential to significantly impact these receptors. Therefore, no cumulative impacts on mixed plantation woodland, running water habitats or water vole are anticipated with local schemes.

⁴³ The distance between the Proposed Development boundary and the nearest turbine base of the Llwynceilyn scheme.

⁴⁴ For the schemes within the county for which no ecology reports were available, aerial imagery was used to ascertain as far as possible, the broad habitat types (e.g. unenclosed upland, enclosed pasture, commercial coniferous plantation etc.)

Impacts on: Mixed Woodland – Plantation

Construction phase

Sensitivity of the receptor

- 9.9.14 The residual effect of the Proposed Development on the mixed plantation woodland during the construction phase is of significance at the **Site** level.

Magnitude of impact

- 9.9.15 The woodland adjacent to the adjacent Llwynceilyn turbines comprises conifer plantation, and its access track was at least 40 m from the mixed plantation woodland (Perry's Wood) edge. The northern turbine of the Mynachdy scheme is approximately 60 m from mixed plantation woodland, but did not result in direct loss of this habitat. The Mynachdy scheme also utilised existing sections of track adjacent to broadleaved woodland, however there was no direct loss of woodland as a result of the scheme, and construction phase effects would have been localised and temporary in nature.
- 9.9.16 At schemes across the county, impacts on mixed plantation woodland are typically very limited (given its absence from the footprints of the various schemes).

Significance of the effect

- 9.9.17 Given the very limited impact of other schemes within the cumulative assessment on mixed plantation woodland, the cumulative effects of the Proposed Development with other schemes on the habitat will not be of greater than the **Site** level.

Operation and maintenance and Decommissioning phases

- 9.9.18 The residual effect of the Proposed Development on mixed plantation woodland during the operational and decommissioning phases has been assessed as being of negligible significance. Given the minimal impact of the proposals in combination with other schemes considered within the cumulative assessment, impacts on mixed plantation woodland during these phases of development are not considered further.

Impacts on: Running Water

Construction phase

Sensitivity of the receptor

- 9.9.19 The residual effect of the Proposed Development on running water habitats during the construction phase is of significance at the **Site** level.

Magnitude of impact

- 9.9.20 The access track for the Proposed Development was originally constructed as part of the adjacent Llwynceilyn scheme (so is shared with it). The track crosses the larger canalised stream in the central – eastern part of the Study Area, so its construction for Llwynceilyn has resulted in a minor loss of running water habitat in the Study Area. The implementation of good practice measures to prevent silt / pollutants from entering the water have meant that no impacts on other (downstream) areas of the stream have occurred. The access track for the Mynachdy scheme also crosses a minor watercourse (a seasonally wet ditch), which is likely to contain running water habitats. The construction of the access track utilised an existing crossing over the watercourse (which was not notably widened), so no habitat loss occurred.
- 9.9.21 Running water habitats are frequent at the sites within the cumulative assessment. However, impacts on this habitat are typically minimised through scheme design (due to difficulties constructing infrastructure over this habitat). Where present, culverted crossings will marginally reduce the area of this habitat.

Significance of the effect

- 9.9.22 Given the limited impact of other schemes within the cumulative assessment on running water habitat, the cumulative effects of the Proposed Development with other schemes on the habitat will not be of greater than the **Site** level.

Operation and maintenance and Decommissioning phases

- 9.9.23 The residual effect of the Proposed Development on running water during the operational and decommissioning phases has been assessed as being of negligible significance. Given the minimal impact of the proposals in combination with other schemes considered within the cumulative assessment, impacts on running water during these phases of development are not considered further.

Impacts on: Water Vole

Construction phase

Sensitivity of the receptor

- 9.9.24 The residual effect of the Proposed Development on water vole during the construction phase is of significance at the **Site** level.

Magnitude of impact

- 9.9.25 The access track for the Proposed Development was originally constructed as part of the adjacent Llwynceilyn scheme, and crosses the larger canalised stream in the central – eastern part of the Study Area, along which the presence of water vole was confirmed. Impacts on water vole along the stream

are likely to have been localised and temporary. This is evidenced by the fact that, during the first riparian mammal survey, which was completed approximately 7 months after the track was constructed, water vole field signs were recorded as close as 30 m from the culverted track.

- 9.9.26 The access track for the Mynachdy scheme crosses a minor watercourse (a seasonally wet ditch), which was assessed as being unsuitable to support water vole during the pre-construction survey work for the scheme. The construction of the access track utilised an existing crossing over the watercourse (which was not notably widened), so no habitat loss occurred, and in the unlikely event that water vole were present, and any disturbance of water vole (if present) would have been localised and temporary.
- 9.9.27 No water vole records were returned by SEWBRcC for the Study Area or 2 km perimeter. The species is scarce in the county, but has been recently discovered in the area of the Pen y Cymoedd scheme (in the north-west of the county)⁴⁵. Local mitigation and enhancement (associated with the Pen y Cymoedd scheme should result in a beneficial effect for the species at that location (similar to that anticipated at the Proposed Development). The species has not been recorded at any other of the sites considered within the cumulative assessment⁴⁶.

Significance of the effect

- 9.9.28 Local displacement of water vole within the Study Area is likely to occur during the construction phase. This is considered significant at the **Site** level. Given that other sites at which the species is known to be present within the county are operational, and potential for effects is principally at the construction stage, cumulative construction phase impacts on the species will not be of greater than the **Site** level.

Operation and maintenance phase

Sensitivity of the receptor

- 9.9.29 The residual effect of the Proposed Development on water vole during the operational phase of the Proposed Development will be beneficial at the **Site** level.

Magnitude of impact

- 9.9.30 Operational phase enhancement at the one other site within the cumulative assessment at which the species is known to be present (Pen y Cymoedd) is anticipated to have a beneficial effect for the species.

⁴⁵ <https://www.natureconservation.wales/project/saving-wales-upland-water-voles/>.

⁴⁶ For which the relevant ecology reports are available, or the data has been made publicly available.

- 9.9.31 Similarly, the effect of the Proposed Development (and associated enhancement measures for water vole) during the operational phase are anticipated to be **beneficial** at the **Local** level (given the species scarcity locally to the Proposed Development).

Significance of the effect

- 9.9.32 Given the scarcity of the species within the county, and the beneficial effects of enhancement work at both sites during the operational phase, a cumulative beneficial effect of significance at the **County** level will result.

Decommissioning

- 9.9.33 The effects of decommissioning at both sites at which the species is known to occur have the potential to be similar to those during the construction phase but are likely to occur in a smaller area (expected to be areas of habitat adjacent to existing infrastructure over a shorter time period).

9.10 Summary of environmental effects, mitigation measures and monitoring

- 9.10.1 Table 9.2728 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.
- 9.10.2 Table 9.2930 presents a summary of the potential cumulative environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 9.2728: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a C O D	Magnitude of impact	Sensitivity of the receptor	Further mitigation	Residual effect	Proposed monitoring	Cumulative effects
Running water (streams / ditches and acid flush)	✓	C: Site O: D:	C: Local O: D:	The cessation of reprofiling along the larger canalised stream will lead to an increase in the structure and density of streamside vegetation.	C: Site (beneficial) O: D:	Annual monitoring visit.	C: Site O: D:
Mixed woodland – plantation	✓	✓ C: Local O: D: Site	C: Local O: D: Local	Limited selective felling of non-native species (e.g. spruce sp.). Planting of fruiting understorey species (tolerant of low light levels). Overseeding with a woodland ground flora seed mix. The creation of habitat piles and retained dead wood from the pruned / felled materials within the woodland. The Japanese knotweed within the woodland is outside of the development footprint.	C: Site O: D: Site	Annual monitoring visit.	C: Site O: D:
Bats – noctule	✓	C: O: Site	C: O: Site	Turbine blades will be pitched out of the wind (feathered) to reduce their	C: O: Negligible	Monitoring of bat activity, and carcass searching will be undertaken	C: O:

Description of impact	Phase ^a			Magnitude of impact	Sensitivity of the receptor	Further mitigation	Residual effect	Proposed monitoring	Cumulative effects
	C	O	D						
				D:	D:	rotation speeds below 2 rpm when idling.	D:	for three years postD: development.	
Bats – Leisler's bat	✓			C: O: Site D:	C: O: Site D:	Turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling.	C: O: Negligible D:	Monitoring of bat activity, and carcass searching will be undertaken for three years postD: development.	C: O: D:
Bats – serotine	✓			C: O: Site D:	C: O: Site D:	Turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling.	C: O: Negligible D:	Monitoring of bat activity, and carcass searching will be undertaken for three years postD: development.	C: O: D:
Bats – common pipistrelle	✓			C: O: Site D:	C: O: Site D:	Turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling.	C: O: Negligible D:	Monitoring of bat activity, and carcass searching will be undertaken for three years postD: development.	C: O: D:
Bats – soprano pipistrelle	✓			C: O: Site D:	C: O: Site D:	Turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling.	C: O: Negligible D:	Monitoring of bat activity, and carcass searching will be undertaken for three years postD: development.	C: O: D:

Description of impact	Phase ^a			Magnitude of impact	Sensitivity of the receptor	Further mitigation	Residual effect	Proposed monitoring	Cumulative effects
	C	O	D						
Bats – <i>Myotis</i> sp.	✓			C: Negligible O: Site D:	C: Negligible O: Site D:	Turbine blades will be pitched out of the wind (feathered) to reduce their rotation speeds below 2 rpm when idling.	C: Negligible O: Negligible D:	Monitoring of bat activity, and carcass searching will be undertaken for three years post-development.	C: Negligible O: Negligible D:
Otter	✓			C: Negligible O: Negligible D:	C: Local O: Negligible D:	Cessation of excessive reprofiling (with a programme of controlled dredging / de-silting of the channel instigated to maintain water flow).	C: Site (beneficial) O: Negligible D:	None	C: Negligible O: Negligible D:
Water vole	✓	✓	✓	C: Site O: Negligible D: Site	C: County O: County D: County	Cessation of excessive reprofiling (with a programme of controlled dredging / de-silting of the channel instigated to maintain water flow). Cessation of overcutting of former MG10 marshy grassland adjacent to the larger canalised stream, and blocking of field drains within it.	C: Site O: Local (beneficial) D: Site	A programme of water vole survey will be completed (in accordance with industry standard guidance (Dean <i>et al.</i> , 2006), during years 1, 2, 3, 5 and 10 post-construction.	C: Site O: County (beneficial) D: Site

^a C=construction, O=operational and maintenance, D=decommissioning

Table 9.2930: Summary of potential cumulative environmental effects, mitigation and monitoring.

Description of effect	Phase C O D	Residual effect	Sensitivity of the receptor	Cumulative effect
Running water (streams / ditches and acid flush)	✓	C: Site (beneficial)	C: Local	C: Site
		O:	O:	O:
		D:	D:	D:
Mixed woodland - plantation	✓	✓ C: Site	C: Local	C: Site
		O:	O:	O:
		D: Site	D: Local	D:
Water vole	✓	✓ C: Site	C: County	C: Site
		O: Local (beneficial)	O: County	O: County (beneficial)
		D: Site	D: County	D: Site

^a C=construction, O=operational and maintenance, D=decommissioning

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LLANWONNO ENERGY PROJECT

ENVIRONMENTAL STATEMENT

Volume 1, Chapter 10: Ornithology

March 2025

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Appendices (See Volume 3: Appendices)

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10.3	Confidential Breeding Schedule 1 Information
10.4	Collision Risk Analysis

10.5	Key Survey Personnel

Glossary

Term	Meaning
Applicant	Cenin Renewables
Environmental Impact Assessment (EIA)	EIA is a means of carrying out, in a systematic way, an assessment of the potential environmental effects from a development.
Environmental Statement (ES)	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations.
Proposed Development	Llanwonno Energy Project
Study Area	The full extent of the land available for, and being investigated for, potential development.
Survey Area	The full extent of the area being investigated for potential development at the time of survey.

Abbreviations

Abbreviation	Meaning
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
ECOW	Environmental Clerk of Works
EIA	Environmental Impact Assessment
EclA	Ecological Impact Assessment
ES	Environmental Statement
GBC	Glamorgan Bird Club
JNCC	Joint Nature Conservation Committee
LMP	Lapwing Management Plan
NBN	National Biodiversity Network
NRW	Natural Resources Wales
OHMP	Outline Habitat Management Plan
OIA	Ornithological Impact Assessment
PEDW	Planning and Environment Decisions Wales
RCT	Rhondda Cynon Taf
RCTCBC	Rhondda Cynon Taf County Borough Council
SAC	Special Area of Conservation
SEWBRcC	South-east Wales Biological Records Centre
SINC	Sites of Importance for Nature Conservation
SNH	Scottish Natural Heritage

Abbreviation	Meaning
SSSI	Site of Special Scientific Interest
VP	Vantage Point
WOS	Welsh Ornithological Society
Zoi	Zone of Influence

Units

Unit	Description
Km	Kilometres
m	Metres
ha	Hectares

10 Ornithology

10.1 Introduction

- 10.1.1 This chapter of the Environmental Statement (ES) evaluates the effects of the Proposed Development on bird species and complements the assessment of ecological effects presented in Volume 1, Chapter 10: Ecology.
- 10.1.2 This chapter describes the methods used to evaluate the ornithological interest within the Study Area boundary, and to determine the nature conservation importance of this interest. It explains the ways in which these ornithological features may be affected by the Proposed Development and assesses the likely effects of the Proposed Development and their significance. In making an assessment of effects, the chapter draws on information obtained through desk study, consultation, and field survey.
- 10.1.3 The assessment has been undertaken by BSG Ecology Ltd.

10.2 Legislative and Policy Context

National Planning Policy Context

- 10.2.1 The key national planning policy documents relevant to the assessment of ornithology for the Proposed Development are as follows:
- Legislation:
 - The Environment (Wales) Act (2016);
 - The Conservation of Habitats and Species Regulations (2017);
 - The Wildlife and Countryside Act (1981);
 - National Planning Policy:
 - Planning Policy Wales Edition 12 (Welsh Government, 2024), including relevant supplementary Technical Advice Notes (TANs), Circulars and Policy Clarification Letters (PCLs);
 - Technical Advice Note (TAN) 5 (Nature Conservation and Planning, 2009);
- 10.2.2 Table 10.1 provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of ornithology, including how and where these have been considered in the ES.

Table 10.1 : Summary of national planning policies relevant to this chapter of the ES

Summary of policy	How and where considered in the ES
Planning Policy Wales Edition 12	
Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is periodically revised. The latest iteration is PPW version 12 (February 2024)¹. Chapter 6 (Distinctive and Natural Places) sets out how the planning system in Wales meets the challenges set out in the Global Biodiversity Framework², the Biodiversity Deep Dive recommendations developed in response to this (Welsh Government, 2022³), and the Duty, under Section 6 of the Environment (Wales) Act 2016, to maintain and enhance biodiversity and ecosystem resilience in Wales. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015⁴, the Well-being of Future Generations (Wales) Act 2015⁵ and other key legislation and resultant duties.	Outline measures to achieve biodiversity net benefit are set out in Chapter 9: Ecology. Those measures relevant to ornithology are set out in this chapter also. [Section 10.7 of this chapter] A Green Infrastructure Statement will be included in the submission. This will detail how the step-wise approach was followed in the design evolution of the scheme.
TAN 5 Nature Conservation and Planning	

¹ Available at: <https://www.gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf> [Accessed: 06 March 2025].

² Available at: <https://www.cbd.int/qbfi/> [Accessed: 06 March 2025].

³ Available at: <https://www.gov.wales/biodiversity-deep-dive-recommendations-html> [Accessed: 06 March 2025].

⁴ Available at: <https://www.legislation.gov.uk/anaw/2015/4/contents/enacted> [Accessed: 06 March 2025].

⁵ Available at: <https://www.legislation.gov.uk/anaw/2015/2/contents/enacted>. [Accessed: 06 March 2025].

Technical Advice Note (TAN) 5⁶ supplements Planning Policy Wales and provides advice about how the land use planning system in Wales “<i>should contribute to protecting and enhancing biodiversity and geological conservation.</i>” The TAN provides guidance to local planning authorities on: ‘the key principles of positive planning for nature conservation; nature conservation and Local Development Plans; nature conservation in development management procedures; development affecting protected internationally and nationally designated sites and habitats; and, development affecting protected and priority habitats and species.’	Outline measures to achieve biodiversity net benefit are set out in Chapter 9: Ecology. Those measures relevant to ornithology are set out in this chapter also. [Section 10.7 of this chapter]

Local Planning Policy Context

- 10.2.3 The Proposed Development is located within Rhondda Cynon Taf County Borough Council (RCTCBC). The local planning policy documents relevant to the assessment of ornithology for the Proposed Development are:
- The Rhondda Cynon Taf Biodiversity Action Plan (Rhondda Cynon Taf County Borough Council, 2000);
 - Rhondda Cynon Taf Local Development Plan (2006 – 2021)
- 10.2.4 Rhondda Cynon Taf County Borough Council are preparing a Revised Local Development Plan for the period 2022 - 2037. This process formally began in April 2022. This will replace the current LDP for Rhondda Cynon Taf (2006 – 2021). The current LDP will remain in force until the Revised LDP is adopted (adoption is anticipated in May 2026).
- 10.2.5 Table 10.2 provides a summary of the provisions contained within the local plan relevant to the assessment of ornithology, including how and where these have been considered in the ES.

Table 10.2: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
The Rhondda Cynon Taf Biodiversity Action Plan (Rhondda Cynon Taf County Borough Council, 2000)	The RCT Biodiversity Action Plan (BAP) sets a framework for nature conservation within RCT. The aim of the RCT BAP is to focus on conserving habitats in order to maintain and enhance biodiversity. It provides action plans for habitats of national and/or international importance, those that support Section 7 species, are of local importance (habitats that are rare, in decline and/or under threat) species of national and/or international importance, Section 7 species and species listed in the Birds of Conservation Concern/IUCN red lists) or of particular local importance.	A detailed assessment of the likely impacts and significance of those impacts on receptors (including Section 7 species) is presented in this chapter. [Section 10.8 of this chapter]
Rhondda Cynon Taf Local	Policy AW 8 of the RCT Local Development Plan (LDP) (2011) states “ <i>Rhondda Cynon Taf’s distinctive natural</i>	Impacts of the Proposed Development

⁶ Available at: <https://www.gov.wales/technical-advice-note-tan-5-nature-conservation-and-planning> [Accessed: 06 March 2025].

Policy	Summary of policy	How and where considered in the ES
Development Plan (2006 – 2021)	<i>heritage will be preserved and enhanced by protecting it from inappropriate development. Development proposals will only be permitted where:</i> <i>1. They would not cause harm to the features of a Site of Importance for Nature Conservation (SINC) or Regionally Important Geological Site (RIGS) or other locally designated sites, unless it can be demonstrated that:</i> <i>a) The proposal is directly necessary for the positive management of the site; or</i> <i>b) The proposal would not unacceptably impact on the features of the site for which it has been designated; or</i> <i>c) The development could not reasonably be located elsewhere and the benefits of the Proposed Development clearly outweigh the nature conservation value of the site.</i> <i>2. There would be no unacceptable impact upon features of importance to landscape or nature conservation, including ecological networks, the quality of natural resources such as air, water and soil, and the natural drainage of surface water.</i> <i>All development proposals, including those in built up areas, that may affect protected and priority species will be required to demonstrate what measures are proposed for the protection and management of the species and the mitigation and compensation of potential impacts. Development proposals must be accompanied by appropriate ecological surveys and appraisals, as requested by the Council. Development proposals that contribute to the management or development of Ecological Networks will be supported.”</i>	upon SINC's and outline management measures proposed at the Proposed Development are set out within Chapter 9: Ecology.

10.3 Consultation and Engagement

Scoping

- 10.3.1 In October 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology of the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 10.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 12 and 26 November 2024. Key issues raised by statutory bodies specific to ornithology are listed in Table 10.3, including how and where these have been considered in the ES.

Table 10.3: Summary of scoping responses relevant to ornithology

Comment	How and where considered in the ES
Planning and Environment Decisions Wales (PEDW) / (Natural Resources Wales (NRW)) (Letter Ref: CAS-02125-Q0T5P0)	
<i>"The EIA must include a description of all the existing natural resources and wildlife interests within and in the vicinity of the Proposed Development, together with a detailed assessment of the likely impacts and significance of those impacts."</i>	This comment is noted and agreed. [Sections 10.6 and 10.8 of this chapter]
<i>"We recommend that the Applicant consults the Local Authority Ecologist on the scope of the work to ensure that regional and local biodiversity issues are adequately considered."</i>	A consultation meeting with Rhondda Cynon Taf's ecologist was held on 24 February 2025. [Sections 10.3.3 and 10.3.4 of this chapter]
<i>"NRW would expect the developer to contact other relevant people/organisations for biological information/records relevant to the site and its surrounds. These include the relevant local records centre and any local ecological interest groups."</i>	Ecological records for the Study Area and surrounding land have been obtained from SEWBrEC (the local environmental records centre), and from GBC's annual bird reports. [Sections 10.5.9 and 10.6 of this chapter]
<i>"NRW notes that the applicant has scoped in the permanent loss of individuals due to collisions, and that both Herring Gull and Lesser Black Backed Gull were recorded frequently flying over the survey area.... Given the proximity of the site to the Severn Estuary SPA (approximately 24km) and Flatholm SSSI (approximately 30km) we advise that these species should be scoped in. "</i>	Impacts on herring gull and lesser black-backed gull are scoped into the assessment. [Sections 10.6.103 and 10.8.121 – 10.8.132 of this chapter]
<i>"We advise that our main concerns would be in relation to collision risk, cumulative impacts, and impacts on breeding lapwing, and breeding raptors. However, we note that these are being considered within the EIA. We look forward to being re-consulted at full planning stage."</i>	Impacts (including collision risk and cumulative effects) on a range of bird species (including breeding lapwing and red kite, and non-breeding red kite, goshawk, peregrine, kestrel and golden plover) have been scoped into assessment in the OIA, on the basis that there is potential for significant effects. [Sections 10.6 and 10.8 of this chapter]
Rhondda Cynon Taf (RCT) (Letter Ref: 24/5095/PRE)	

Comment	How and where considered in the ES
<i>"A clear understanding of the habitat and species impacts of grid connection and site access/ infrastructure requirements will be essential to the EIA ecology assessment process."</i>	Impacts of construction / operation of the access track will be assessed within the EIA and OIA. The scheme will utilise the existing grid connection for the adjacent Llwynycelyn scheme, so no additional impacts on ecological / ornithological features above the existing baseline (extant cabling) are anticipated.
<i>"The presence of nesting lapwing in the locality, one pair in 2022 and two in 2023, is very ecologically significant within an RCT context. These are the only nesting lapwings the Council is aware of in RCT, and potentially the only extant lapwing breeding site in the County Borough. Lapwing are a red list species which has suffered huge declines in breeding numbers and distribution. Understanding how the windfarm development will impact on that use, as well as the closely associated Lapwing Mitigation Area (mitigation for a nearby consented windfarm site), and how mitigation and enhancement might be achieved for this proposal, must be considered within the EIA."</i>	Impacts on a range of bird species (including breeding lapwing) have been scoped into assessment in the OIA, on the basis that there is potential for significant effects. Appropriate mitigation measures will be proposed as part of the management plan for the proposals. The presence of the Lapwing Mitigation area (for the adjacent scheme) has been a key consideration in the design of these proposals. [Sections 10.6 – 10.8 of this chapter]
<i>"Amongst a long list of birds of prey, peregrine, red kite, goshawk, kestrel and buzzard all have some use of the site. It is noted further assessment for these species is proposed. Given the proximity of the consented adjacent wind turbines, the nearby Mynydd Y Glyn windfarm, and a picture of an ever increasing local concentration of wind energy schemes within the lower Rhondda Valley, cumulative impacts on these species will need to be properly and thoroughly assessed."</i>	Assessment will be completed of impacts on all focal species of raptor within the OIA. [Sections 10.6 – 10.8 of this chapter]
<i>"The bird assessment refers to further assessment of golden plover. This is another key assessment issue. At the nearby Mynydd Y Glyn windfarm PEDW enquiry much of the focus on avoiding impact to this species was the availability of other local situated upland hillsides onto which the wintering golden plover population could be displaced. This site was one of those displacement sites. In order to retain wintering golden plover in RCT there will be a likely requirement to retain suitable upland habitat areas free from wind turbines. This scheme therefore needs to address the local context of cumulative impacts on wintering golden plover."</i>	Over the two years of survey, the 20 golden plover flights recorded were mostly outside the Study Area. Birds occasionally overflowed the Study Area, and were observed landing within it very infrequently (on two occasions). Cumulative effects on non-breeding golden plover are assessed in this document on the basis that there is potential for an effect on the species. [Sections 10.9.18 – 10.9.28 of this chapter]

Comment	How and where considered in the ES
<i>"The impacts and implications for development on nightjar use of the site should also be an important element of the ornithological assessment."</i>	Nightjar breed in low numbers within 800 m of the boundary of the Study Area, and may forage over it (desk study data suggests that up to seven territories are typically present in St Gwynno Forest). Studies at other wind farm sites in south Wales have demonstrated that nightjar are not significantly displaced by operational phase wind farms, and that nightjar quickly habituate to turbines. Collisions of nightjar with operational wind farms are very rare (two records of collision in Europe were included in data collated by Dürr (2025)), likely as a result of the species' tendency to forage relatively low over vegetation. Given the comment and weight placed on nightjar by the local planning authority, nightjar will be scoped into further assessment. [Sections 10.6.93 – 10.6.97 and 10.8.110 – 10.8.220 of this chapter]
<i>"The Rhondda Valley receives significant autumn movements of swallow and house martins which funnel through the Valleys and can cut across and take short cuts between valleys. This windfarm site is located close to the confluences of the two Rhondda Valleys, and a change of valley direction. Further assessment of autumn bird movements through and down these valleys is something that will need to be addressed."</i>	Collision and displacement of passerines are not generally considered issues for wind farm development. SNH (2017) guidance does not recommend passerine surveys for wind farm proposals). Effects arising from collision with turbines are likely to be very limited owing to the high reproductive rates and low annual survival of passerines. No notable counts of migrating house martin or swallow were recorded during two years of VP survey work. [Sections 10.6.111 – 10.6.114 of this chapter]
<i>"Ecological mitigation/ enhancement should be on-site. It should focus on better land management of the windfarm site and adjacent areas. The evidence would suggest potential for ecological betterment on site through Habitat Management Plan delivery for the lifetime of the scheme, via a S106 Agreement, with conservation grazing, cut and collect management, removal of herbicide/ fertiliser input, SINC management / mitigation and pro-active lapwing mitigation etc. Measures to avoid bird and bat fatality and habitat loss will be important. Providing effective mitigation for grid and access infrastructure will need to be addressed. Setting out the mechanics of mitigation/ enhancement delivery and evidencing that landowner 'buy-in' into the ecology mitigation/ enhancement commitments has been properly addressed and incorporated into a 'scheme lifetime' species and habitat management and monitoring proposal, will be key requirements that need to be addressed."</i>	Mitigation / enhancement within the Study Area will focus on improving the habitat management of the Study Area. The principles of the enhancement proposals were discussed in a consultation meeting with RCTs ecologist (during a meeting, held on 24 February 2025). Mitigation / enhancement proposals will be detailed in a Habitat Management Plan. [Sections 10.7 of this chapter]

Other consultation

- 10.3.3 Following scoping, consultation and engagement with interested parties specific to ornithology has continued. These included discussions with

RCTCBC regarding ecology and ornithology, and a meeting with Natural Resources Wales (NRW) protected species ecologists (requested via the Discretionary Planning Advice service).

10.3.4 Further detail regarding key items discussed and how these have been addressed is provided in this ES chapter.

Table 10.4: Summary of other consultation relevant to ornithology

Comment	How and where considered in the ES
NRW DPAS Meeting – 11 March 2025 (held with Sandra Wells, Protected Species Team Representative)	
No members of the NRW ornithology team were available to attend the meeting, so no comments with regard to ornithology were made.	
RCT Consultation Meeting – 24 February 2025 (held with Richard Wistow and Kate Stock, Council Ecologists)	
RCT noted that lapwing breeding adjacent to the site comprise the only known breeding birds within RCT, impacts on breeding lapwing will be a key consideration. RCT highlighted the lapwing mitigation plan for the adjacent Llwynneclyn scheme and noted that they would like to see lapwing-specific mitigation / enhancement for this scheme.	The lapwing mitigation area for the adjacent Llwynneclyn scheme was a key consideration in the design evolution of the Proposed Development, with all turbines located to the east of (and buffered from) it, and no solar panels to be located within the breeding fields. Specific mitigation / enhancement measures targeting lapwing are detailed within the enhancement section of this document. However, given the small size of the population and the significant national decline of the species at inland breeding sites (unrelated to wind farm development), there is a reasonable likelihood of local extinction of the species during the lifetime of the scheme, irrespective of works locally to / enhancement measures for the species. [Sections 10.7 of this chapter]
RCT noted the presence of passage / wintering golden plover during the survey work. They highlighted that two nearby wind farm schemes (Mynydd y Glyn and Twyn Hywel) also supported wintering population(s) of golden plover, and noted that the possibility of displacement of birds from those schemes to adjacent suitable hilltops (including the Llanwonno site) were considered when assessing the likely impacts of those schemes.	Possible impacts from the schemes on non-breeding golden plover were discussed during the meeting and are considered in the cumulative assessment. [Sections 10.9.18 – 10.9.28 of this chapter]
RCT stated that impacts on locally breeding nightjar (populations of which fluctuate in response to the felling cycle in forestry to the north of the Site) foraging over the Site, should be considered.	Impacts on nightjar were discussed during the meeting and are considered within this chapter of the ES. [Sections 10.6.93 – 10.6.97 and 10.8.110 – 10.8.220 of this chapter]

Comment	How and where considered in the ES
RCT considered whether the abundance of wind farms locally would have a cumulative effect on the red kite population.	Cumulative impacts on red kite were discussed during the meeting and are considered within this chapter of the ES. [Sections 10.9.13 – 10.9.17 of this chapter]
RCT stated that significant autumn movements of swallow and house martin are recorded within RCT (following valleys south through the county borough), and asked whether this had been recorded at the Site.	Notable movements of swallow or house martin were not recorded during the survey work. Collision and displacement of passerines are not generally considered issues for wind farm developments (SNH guidance does not recommend passerine surveys for wind farm proposals). Any effect on populations arising because of collision with turbines is likely to be very localised owing to the high reproductive rates and low annual survival of passerines. [Sections 10.6.111 – 10.6.114 of this chapter]
RCT confirmed that RCT are satisfied with the scope of the ornithological survey work.	

10.4 Assessment Methodology

Relevant Guidance

10.4.1 The assessment of ornithology has been based principally on relevant parts of the CIEEM (2018, updated 2022) guidelines:

- Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom developed by the Chartered Institute of Ecology and Environmental Management (CIEEM).

Scope of the Assessment

10.4.2 Taking into account the scoping responses and further consultation completed, Table 10.5 summarises the issues considered as part of this assessment.

Table 10.5: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Impacts on Species – Red Kite	Direct and indirect habitat loss. Disturbance to nest sites.
Impacts on Species – Goshawk	Direct and indirect habitat loss.
Impacts on Species – Peregrine	Direct and indirect habitat loss.
Impacts on Species – Kestrel	Direct and indirect habitat loss.
Impacts on Species – Golden plover	Direct and indirect habitat loss.

Impacts on Species – Lapwing	Direct and indirect habitat loss. Disturbance to nest sites.
Impacts on Species – Nightjar	Direct and indirect habitat loss.
Impacts on Species – Herring Gull and Lesser Black-Backed Gull (Non-Focal Species)	Direct and indirect habitat loss.
Operation and maintenance	
Impacts on Species – Red Kite	Indirect habitat loss. Disturbance to nest sites. Turbine collision related fatality.
Impacts on Species – Goshawk	Indirect habitat loss. Turbine collision related fatality.
Impacts on Species – Peregrine	Indirect habitat loss. Turbine collision related fatality.
Impacts on Species – Kestrel	Indirect habitat loss. Turbine collision related fatality.
Impacts on Species – Golden plover	Indirect habitat loss. Turbine collision related fatality.
Impacts on Species – Lapwing	Indirect habitat loss. Disturbance to nest sites. Turbine collision related fatality.
Impacts on Species – Nightjar	Indirect habitat loss. Turbine collision related fatality.
Impacts on Species – Herring Gull and Lesser Black-Backed Gull (Non-Focal Species)	Indirect habitat loss. Turbine collision related fatality.
Decommissioning	
Impacts on Species – Red Kite	Indirect habitat loss. Disturbance to nest sites.
Impacts on Species – Goshawk	Indirect habitat loss. Disturbance to nest sites.
Impacts on Species – Peregrine	Indirect habitat loss.
Impacts on Species – Kestrel	Indirect habitat loss. Disturbance to nest sites.
Impacts on Species – Golden plover	Indirect habitat loss.
Impacts on Species – Lapwing	Indirect habitat loss. Disturbance to nest sites.
Turbine collision related fatality.	Indirect habitat loss.

Impacts on Species – Herring Gull and Lesser Black-Backed Gull (Non-Focal Species)	Indirect habitat loss.

10.4.3 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in Table 10.6.

Table 10.6: Issues scoped out of the assessment

Issue	Justification
Impacts on non-statutory designated sites	The SINCs located within the Study Area or immediately adjacent to it are not designated for their bird interest.
Impacts on species – osprey	Significant effects are considered unlikely to occur on osprey, given the low level of activity over the Study Area, and that no evidence of breeding was recorded locally.
Impacts on species – honey buzzard	Significant effects are considered unlikely to occur on honey buzzard, given the low level of activity over the Study Area, and that no evidence of breeding was recorded locally.
Impacts on species – merlin	Significant effects are considered unlikely to occur on merlin, given the low level of activity over the Study Area, and that no evidence of breeding was recorded locally.
Impacts on species – curlew	Significant effects are considered unlikely to occur on curlew, given the low level of activity over the Study Area, and that no evidence of breeding was recorded locally.
Impacts on species – common snipe	Significant effects are considered unlikely to occur on common snipe, given the low level of activity over the Study Area, and that no evidence of breeding was recorded locally.
Impacts on species – non-focal species (excluding herring gull, lesser black-backed gull and skylark)	Significant effects on non-focal species (excluding those listed to the left) are considered unlikely to occur, due to a range of factors (e.g. low levels of activity, large populations at all geographic levels, high reproductive rates and low annual survival (of passerines)).

Study area

10.4.4 The original red-line boundary covered 82.08 ha of the ridgeline at Llanwonno (including the western spur above Ynyshir) and part of the eastern slope. This area was presented in the EIA Scoping Report (as it was the extant survey area at that stage). As feasibility has evolved, the Proposed Development layout was adjusted. In November 2024 (following completion of the bird survey work in March 2024) the layout was adjusted to include three turbine locations marginally outside the original survey area; T3, T4 and T7. These are approximately 65 m, 85 m and 90 m outside the original survey area (respectively) but are within the raptor, wader and nightjar perimeter survey areas.

10.4.5 The application boundary (hereafter referred to as the ‘Study Area’ now comprises 132.14 ha of the ridgeline and eastern slope. The extent of field

survey was based on relevant industry standard guidance, as indicated in Table 10.7 below. The survey area for each survey type is as follows:

- Raptor Survey Area describes an area extending to 2 km beyond the original Study Area boundary⁷;
- Goshawk *Accipiter gentilis* and hobby *Falco subbuteo* Survey Area is limited to 1 km beyond the original Study Area boundary⁸; and
- Nightjar *Caprimulgus europaeus* Survey Area describes an area extending to 800 m beyond the original Study Area boundary⁹.

Table 10.7: Definition of survey area in relation to survey type

Survey Type	Relevant Guidance	Survey Area
VP survey	SNH (2017)	2 km viewing arcs covering a 500 m perimeter around proposed turbine locations.
Breeding raptor survey	Hardey <i>et al.</i> , (2013); SNH (2017)	Suitable breeding habitat within 2 km of proposed turbine locations ¹⁰ . For goshawk and hobby, the survey area is suitable habitat within 1 km of proposed turbine locations ¹¹ .
Nightjar survey	Gilbert <i>et al.</i> , (1998)	Suitable breeding habitat for nightjar (permanently open habitat, clear fell and recently re-stocked plantation) within 800 m of proposed turbine locations ¹² .
Breeding wader (and notable passerine) territory mapping survey	Brown & Shepherd, (1993); Calladine <i>et al.</i> (2009)	Suitable habitat within 800 m of proposed turbine locations ¹³ .

10.4.6 The Proposed Development access route falls within the Study Area, and a large proportion of it will utilise the existing access route for the adjacent Llwynceilyn Scheme, with no access works required along the road network leading to the Proposed Development.

10.4.7 The location and geographic extent of the study area is presented in Volume 2, Figures, Figure 10.1 of the ES.

⁷ The original site boundary differed from the current Study Area, reflecting the proposals as they were at the time of survey. The raptor study area boundaries are shown on the associated figures.

⁸ The original site boundary differed from the current Study Area, reflecting the proposals as they were at the time of survey. The goshawk and hobby study area boundaries are shown on the associated figures.

⁹ The original site boundary differed from the current Study Area, reflecting the proposals as they were at the time of survey. The nightjar study area boundary is shown on the associated figures.

¹⁰ As turbine locations were not fixed at the time of survey, survey to within 2 km of the original site boundary was completed.

¹¹ As turbine locations were not fixed at the time of survey, survey to within 1 km of the original site boundary was completed.

¹² As turbine locations were not fixed at the time of survey, survey to within 800 m of the original site boundary was completed.

¹³ As turbine locations were not fixed at the time of survey, survey to within 800 m of the original site boundary was completed.

Establishing the Zone of Influence

- 10.4.8 The Zone of Influence (Zoi) is defined as the area within which there may be ornithological features subject to effects from the Proposed Development. Such effects could be direct, e.g., habitat loss resulting from land-take, or indirect, e.g., noise or visual disturbance causing a species to move out of the ZOI. The ZOI was determined through:
- Review of the existing baseline conditions based on desk study results, field surveys and information supplied by consultees;
 - Identification of sensitivities of ornithological features, where known;
 - The outline design of the Proposed Development and approach to construction; and
 - Through liaison with other technical specialists involved in the assessment, including the project hydrologists.
- 10.4.9 A 10 km Zoi has been adopted for the species considered in this assessment. This Zoi encompasses all sites that could potentially be affected by impact mechanisms that are most wide-ranging. Potential impact mechanisms are:
- Disturbance and displacement as a result of habitat loss, noise/vibration, or visual disturbance; and
 - Increased mortality.
- 10.4.10 Habitat loss and disturbance is only likely to have an effect on receptors within or close to the Proposed Development. As the nearest SPA is the Severn Estuary (22.1 km from the Study Area) there will be no habitat loss or disturbance within this or any other European sites.

10.5 Assessment Criteria and Assignment of Importance and Significance

Receptor Value and Importance

- 10.5.1 The criteria for defining importance in this chapter of the ES are outlined in Table 10.8 below.

Table 10.8 : Importance criteria

Sensitivity/Value	Definition
International and European – Very High	Of importance at the International / European level.
National – High	Of importance at the national (UK) level.
Regional – Medium / High	Of importance at the regional level (Wales).

Sensitivity/Value	Definition
County – Medium	Of importance at the county level (Rhondda Cynon Taf).
Local – Low / Medium	Of importance at the local level (Llanwonno Mountain and St Gwynno Forest).
Site – Low	Of importance at the level of the Proposed Development Study Area boundary.
Negligible	Receptors valued below the Proposed Development (Site) level of importance.

10.5.2 The CIEEM guidance indicates that features of less than local importance are generally considered unlikely to trigger a mitigation or policy response in EIA terms (and it follows effects on these features are unlikely to be significant at EIA level). For significant residual effects on features of greater geographical importance (based on the CIEEM assessment method), professional judgement is applied to determine whether the conservation status of that feature is likely to be affected, and national and local policy considered in drawing a conclusion as to whether it is significant in EIA terms.

Significance Criteria

10.5.3 The CIEEM (2018) guidance states that ecological (ornithological) effects or impacts should be characterised in terms of ecosystem structure and function and reference should be made to:

- Beneficial, adverse or neutral effects;
- Extent;
- Magnitude¹⁴;
- Duration;
- Reversibility¹⁵;
- Timing and frequency; and
- Cumulative effects.

10.5.4 The CIEEM guidance provides a list of *‘aspects of ecological structure and function to consider when predicting impacts and effects’* (Box 16). The terms ‘impact’ and ‘effect’ are used within this chapter in accordance with the following definitions (as provided by the guidelines):

¹⁴ Magnitude refers to size, amount, intensity and volume. It is quantified where possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area or the percentage decline in a species population.

¹⁵ This relates to the inherent fragility/the degree of sensitivity of habitats, communities and species to environmental change.

- Impact: Actions resulting in changes to an ornithological feature. For example, the construction activities of a development removing an area of grassland; and
- Effect: Outcome to an ornithological feature from an impact. For example, the change in a curlew *Numenius arquata* population from loss of an area of grassland.

10.5.5 Following the characterisation of effects, an assessment of their ornithological significance is made. The guidelines promote a transparent approach in which a beneficial or adverse effect is determined to be significant or not, in ecological (ornithological) terms, in relation to the integrity of the defined site or ecosystem(s) and/or the conservation status of habitats or species within a given geographical area, which relates to the level at which it has been valued. The decision about whether an effect is significant or not, is independent of the importance of the ecological (ornithological) feature; the importance of any feature that will be significantly affected is then used to determine the implications, in terms of legislation and/or policy.

10.5.6 Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of this assessment, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological (ornithological) features'. A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. CIEEM (2018) state that *'A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant adverse ecological effects can be lawfully permitted following EIA procedures'*. The assessment of significance is based on professional judgement.

Mitigation

10.5.7 Where significant effects have been identified, the mitigation hierarchy has been taken into account, as suggested by CIEEM (2018), who set 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 national level.

10.5.8 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).

Desk studies

10.5.9 A detailed desk-based review was undertaken to inform the baseline assessment for ecology. The existing studies and datasets referred to as part of the desk-based review for ecology are summarised in Table 10.9 below.

Table 10.9: Summary of desk study sources

Title	Source	Year published	Details
Habitat characteristics and connectivity	Current and historical aerial imagery.	Ongoing publication (imagery was accessed prior to survey work commencing and revisited regularly throughout)	Online sources of information were interrogated to understand altitude and landform, the characteristics of the vegetation on and close to the Proposed Development, the presence of features (such as watercourses) and landscape-scale habitat connectivity. This was completed prior to survey work commencing, with aerial imagery and maps revisited regularly to inform the scope of each element of survey work.
Statutory designated site data	The UK Government's Magic website, the Joint Nature Conservation Committee (JNCC) website and the NRW website were interrogated for information on the locations of statutory designated sites and their interest features.	Ongoing publication	Information on the locations and interest features of SPAs and SSSIs was reviewed to determine their locations in relation to the Proposed Development, and whether species associated with them might range as far as the Proposed Development (resulting in effects on these designated sites needing to be addressed).

Title	Source	Year published	Details
Non-statutory site data	Data held by Rhondda Cynon Taf County Borough Council.	Ongoing publication. Data are requested from RCT, and once provided are held on BSG Ecology's internal GIS system.	Data were requested for non-statutory designated sites for an area extending to 2 km from the Study Area boundary. Non-statutory designated sites have some planning policy protection, are of biological interest, and can be an important element in local landscape-scale connectivity.
Biological records (protected, priority and non-native invasive species)	SEWBRcC.	Data were initially requested from SEWBRcC in May 2022, to inform the scope of the baseline survey work. A second data request was submitted in October 2024 to ensure that any relevant records / information submitted to the records centre in the intervening period was captured to inform the DNS application.	Data were requested for birds for an area extending to 2 km from the Study Area boundary.

Site-specific surveys

10.5.10 Site specific surveys were undertaken to inform the baseline ornithological assessment. Bird survey was based on industry standard guidance for onshore wind farms (SNH, 2017). In the absence of their own guidance relating to bird survey at onshore wind farms, SNH guidance is applied in Wales by Natural Resources Wales (NRW) and other nature conservation stakeholders. A summary of the site specific surveys undertaken to inform this chapter of the ES are provided in Table 10.10.

Table 10.10: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
VP survey	To characterise flight activity over the Study Area and adjacent land, and to obtain data consistent with that required for collision risk modelling using SNH's Band Model.	March 2022 – March 2024

Survey type	Purpose of survey	Date undertaken
Breeding raptor survey	To locate territories of breeding raptor species within the Survey Area and perimeter areas around it (as defined by industry standard guidance (SNH, 2017), providing context to raptor flight activity recorded during VP surveys.	April 2022 – July 2022 April 2023 – June 2023
Breeding wader (and notable passerine) territory mapping survey	To locate territories of upland breeding wader species within the Survey Area and adjacent land, providing context to wader flight activity recorded during VP surveys (and to map territories of notable passerine species).	April 2022 – July 2022 April 2023 – June 2023
Nightjar survey	To locate territories of breeding nightjar within suitable habitat adjacent to the Survey Area.	June 2022 – July 2022 June 2023

VP Survey

- 10.5.11 Vantage Point (VP) surveys were conducted during the breeding season of 2022 (late March to August inclusive), the non-breeding (winter) season of 2022/ 2023 (September to March inclusive) and the breeding season of 2023 (April to August inclusive).
- 10.5.12 Key principles of VP survey are set out by SNH (2017). These are:
- VPs should be chosen parsimoniously to achieve maximum visibility from the minimum number of survey locations;
 - An arc of up to 180 degrees extending up to two kilometres from the observer can be effectively surveyed from each VP;
 - VPs are best located outside of the survey area where possible;
 - Observers should try to position themselves inconspicuously to minimise their effect on bird behaviour/ movement;
 - VPs that are located within the survey area should not be used simultaneously with other VP locations which overlook them as the presence of an observer either sitting at or moving to/ from the VP could affect bird behaviour; and
 - At least 36 hours of survey per VP should be conducted per 'season' to enable representative data collection.
- 10.5.13 Two VP locations were selected for survey of land within the Study Area. VP positions were situated outside the Study Area in accordance with guidance and their locations are illustrated in **Figure 10.1**.
- 10.5.14 Three hours were spent at each VP location per 'watch' where weather conditions allowed, during which the surveyor scanned a 180 degree viewshed extending up to two kilometres from the observer using binoculars. During VP survey the viewing arc was scanned constantly until a 'target species' was detected. The bird was then followed until it landed or was lost to view. The

following information was recorded for each target species on a standardised paper or digital form:

- Species
- Time of observation
- Duration of observation
- Count
- Estimated flight height
- Direction of flight
- Estimated distance and direction of bird from the observer
- Flight type and behaviour, where apparent (e.g., flapping / gliding and foraging, displaying, commuting etc.)

- 10.5.15 Height bands of 0-30 m, 30-200 m and 200+ m were used for recording flight height. During survey work, the height range 30-200 m was considered as collision risk height (based on the parameters of the proposed turbines). Features of known height (or for which height could be estimated accurately) such as the tree lines of Llanwonno forestry to the north of the Study Area, were used when assessing flight height. The method of data collection is consistent with that required for collision risk modelling using SNH's Band Model (SNH, 2018a; NatureScot, 2024).
- 10.5.16 SNH Guidance (2017) states that, "*In most circumstances ... target species will be limited to those species which are afforded a higher level of legislative protection*". Target (or focal) species at Llanwonno were defined as all Schedule 1¹⁶ and Annex 1¹⁷ raptors / owls and waterbirds (excluding *Larus* and *Croicocephalus* gulls¹⁸, Canada goose *Branta canadensis*, mallard *Anas platyrhynchos* and cormorant *Phalacrocorax carbo*).
- 10.5.17 Passerines were not treated as target species. SNH (2017) guidance states, "*It is generally considered that passerine species are not significantly impacted by wind farms.*" This statement reflects the fact that there are no European studies that indicate population level effects resulting from wind farm mortality in passerine species.
- 10.5.18 Information on non-focal species was aggregated and summarised in five-minute intervals on a separate recording form.
- 10.5.19 During March to August 2022, a total of 36 hours of survey was completed at each VP location, during September to March 2022/ 23, 45 hours survey was undertaken at VP1 and 48 hours 35 minutes undertaken at VP2. During April

¹⁶ Of the Wildlife and Countryside Act, 1981 (as amended).

¹⁷ Of Directive 2009/147/EC, often referred to as The Birds Directive.

¹⁸ Common gull *Larus canus*, herring gull *Larus argentatus*, great black-backed gull *Larus marinus*, lesser black-backed gull *Larus fuscus* and black-headed gull *Croicocephalus ridibundus*.

to August 2023 36 hours 18 minutes survey was undertaken at VP1 and 36 hours survey undertaken at VP2.

- 10.5.20 Weather data were recorded at the start of each watch, with the conditions formally reassessed on at least an hourly basis thereafter (or at such point as it was apparent a change in conditions had occurred). Dates, times and weather conditions during VP surveys are provided in **Appendix 10.2**.

Breeding Raptor Survey

- 10.5.21 Raptor survey methods were based on industry standard guidance (Gilbert *et al.*, 1998; Hardey *et al.*, 2013; SNH, 2017) and were carried out on a minimum of 6 visits each year between and including April and August 2022 and 2023.
- 10.5.22 Surveys of potential breeding areas were completed using a combination of walkover survey and mobile VPs¹⁹ where access was not possible. The durations of supplementary VP watches varied by location depending on the extent to which viewsheds covered the areas in question. During the surveys, habitat features²⁰ were searched for signs of raptors. Cliff faces were scanned using binoculars and a telescope. The surveys also involved walking along plantation edges and undertaking short VP watches of up to one hour duration over semi-natural and plantation woodland and quarries.
- 10.5.23 Dates, times and weather conditions during these surveys are recorded in **Appendix 10.2**.
- 10.5.24 SNH (2017) guidance recommends that surveys for breeding raptors including hen harrier *Circus cyaneus*, red kite *Milvus milvus*, peregrine *Falco peregrinus* and merlin *Falco columbarius* are completed within 2 km of proposed wind farms. For goshawk and hobby *Falco subbuteo*, which often nest in plantation habitats, 1 km is applicable. These perimeter survey areas help build an understanding of raptor activity at the local landscape scale and provide context when considering flight data. A map illustrating survey extents for raptor surveys can be found in **Figure 10.2**.
- 10.5.25 As part of the desk study and to inform survey design, habitats within 1-2 km of the Study Area were assessed for their potential to support raptor territories. The following birds were considered potentially breeding:
- Goshawk within 1 km. Goshawk are included in the citations of Llys Nant & Graig Twyn-y-glog Woodlands and St Gwynno Forest SINCS, which border the Study Area. Conifer plantation potentially suitable for breeding goshawk exists within 1 km of the Study Area to the north.
 - Hen harrier within 2 km. Areas of open moorland adjacent to young forestry plantation exists within 2km of the Study Area to the north. A

¹⁹ Informal watches from VP locations other than those used for the formalised watches, which usually lasted for 2 hours or less.

²⁰ Habitat features included fence lines, rock outcrops, prominent mounds / tussocks and isolated trees.

spring record of a hen harrier was recorded from Llanwonno Forestry in 2008 (albeit this is not necessarily (or likely) linked to breeding).

- Hobby within 1 km. Semi-natural woodland exists within the Study Area and plantation woodland immediately adjacent to the boundary which is potentially suitable for this species.
- Kestrel *Falco tinnunculus* within 1 km. Mature trees and buildings potentially suitable for kestrel can be found within and bordering the Study Area.
- Peregrine within 2 km. Historically, peregrine have been reported breeding at Birch Grove Slopes SINC approximately 830 m to the west of the Study Area. Craig y Hesg Quarry is located approximately 2.2 km east-south-east of the Study Area and was considered potentially suitable breeding habitat for peregrine falcon.
- Red kite within 2 km. Deciduous woodland is present within the Study Area and on valley sides surrounding the Study Area which could support breeding red kite. Large areas of mature coniferous woodland are present to the north of the Study Area which are also potentially suitable nesting habitat.
- Merlin within 2 km. Areas of open moorland adjacent to young forestry plantation exists within 2 km of the Study Area to the north.

Breeding Wader (and Notable Passerine) Territory Mapping Survey

- 10.5.26 A walkover breeding bird survey was completed in 2022 and 2023. Four visits were completed in 2022 and three visits in 2023.
- 10.5.27 Surveys were undertaken between 08:30 and 18:00. In farmland habitat, fields were scanned with binoculars and telescope from field edges and entrances. In open habitats the surveyor walked to within 100 m of all suitable breeding wader habitat. Edges of plantation woodland were walked to record passerines by sight and sound.
- 10.5.28 Frequent stops were made during transit to listen for singing and calling birds and to scan areas around the observer.
- 10.5.29 Standard British Trust for Ornithology (BTO) species and activity codes were used to record birds and their behaviour. Birds were considered to be breeding if displaying and/ or singing on suitable territory, if nests, eggs or young were found, if adults repeatedly alarm called or attempted distraction displays or if territorial disputes were recorded.
- 10.5.30 Dates, times and weather conditions during these surveys are recorded in **Appendix 10.2** and the survey area is illustrated on **Figure 10.2**.
- 10.5.31 In addition to waders recorded during the walkover surveys, evidence of waders during VP work was systematically recorded and used to build a picture of territory occupancy and breeding success.

Nightjar Survey

- 10.5.32 Areas of suitable breeding habitat for nightjar (defined as permanently open habitat, clear fell and recently re-stocked plantation in accordance with the findings of Scott *et al.*, 1998) were identified during a preliminary desk study.
- 10.5.33 The survey was based on the methods described in Gilbert *et al.* (1998). Surveyors walked a transect with four listening points. Eight minutes were spent at each listening point.
- 10.5.34 Surveys took place during June and July 2022 and June 2023 to locate churring male nightjars.
- 10.5.35 Dates, times and weather conditions during nightjar surveys are tabulated in **Appendix 10.2** and results are shown on **Figure 10.2**.

Assumptions and limitations of the assessment

- 10.5.36 The weather conditions throughout the VP work were representative of the geographical location of the Study Area. Survey work was as evenly spaced as weather allowed. However, the altitude of the Study Area in relation to the surrounding landscape and local weather stations meant that conditions were not always reflective of weather forecasts. Poor conditions forced the early abandonment or cancellation of some VP watches. The time missed as a result of poor weather was re-scheduled to ensure that the target threshold of hours at each VP was achieved.
- 10.5.37 The breeding wader (and notable passerine) survey was completed over three visits during 2023, with the fourth (July) visit cancelled due to inclement weather. This is not considered to have significantly limited the survey, given that four visits were completed during the first year of survey, and that the July visit is typically used to confirm continued presence at known nest sites, which had been established during the June survey visits.
- 10.5.38 The 2023 nightjar surveys were restricted to one visit due to unauthorised shooting restricting access in July 2023. This is not considered to have significantly limited the survey, given that two visits were completed during the first year of survey (2022), and a nightjar territory had already been detected in the most suitable (clear-fell) habitat within the nightjar survey area (at the same approximate location as during the first year of survey) during the June 2023 visit.
- 10.5.39 There were no significant limitations identified to the baseline work and there is no reliance on any assumptions in this chapter (that reflect a limitation to data collection).
- 10.5.40 Survey was completed in accordance with guidance. Equipment failure, weather and physical access to complete the work did not present issues or affect outcomes, and the assessment is not considered to be limited.

10.6 Baseline Environment Conditions

Statutory Designated Sites

- 10.6.1 No statutory designated sites exist within 2 km of the Study Area.

Non-Statutory Designated Sites

- 10.6.2 SEWBSReC returned 19 records of non-statutory designated sites within the search radius; these are all Sites of Interest for Nature Conservation (SINC). SINCS within and adjacent to the Proposed Development and are mostly designated for their habitat interest and are primarily considered in Volume 1, Chapter 9: Ecology. Of those returned, one falls within the Study Area boundary and a further four are within 500 m. None are designated for their bird interest.
- 10.6.3 The remaining SINCS are >500 m from the Proposed Development boundary. These are described in Volume 1, Chapter 9: Ecology, however, given the distance and / or separation by existing development and road infrastructure, these sites are unlikely to be affected by the proposals. These sites are not considered further in this report.

Species

Red kite

- 10.6.4 SEWBSReC returned 25 records of red kite within 2 km of the Study Area, between 2010 and 2024. Records concerned one to five birds. None referred to confirmed breeding. Records were widely distributed, two records were from 1 km squares which partially overlap the Study Area. The NBN Gateway²¹ returned 114 records for the 10 km square (OSGR ST09) which includes the Study Area, between 2004 and 2024 (with records during all months of the year).
- 10.6.5 In total, 229 red kite flights were recorded. The flights occurred as follows:
- 45 flights during the 2022 breeding season surveys.
 - 59 flights during the 2022 / 2023 winter surveys.
 - 53 flights during the 2023 breeding season surveys.
 - 72 flights during the 2023 / 2024 winter surveys.
- 10.6.6 These flights resulted in a total flight time of 9 hours, 30 minutes and 22 seconds (of which 6 hours, 21 minutes and 58 seconds were spent within the 30-200 m height band and 2 hours, 33 minutes and 34 seconds were spent within the 0-30 m height band). Flight time occurred as follows:

²¹ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

- 1 hour, 29 minutes and 40 seconds (of which 16 minutes and 55 seconds were spent within the 30-200 m height band and 1 hour, 6 minutes and 35 seconds were spent within the 0-30 m height band) during the 2022 breeding season surveys.
- 2 hours, 31 minutes and 55 seconds (of which 2 hour, 19 minutes and 5 seconds were spent within the 30-200 m height band and 11 minutes and 33 seconds were spent within the 0-30 m height band) during the 2022 / 2023 winter surveys.
- 2 hours, 12 minutes and 41 seconds (of which 1 hour, 27 minutes and 1 second were spent within the 30-200 m height band and 21 minutes and 47 seconds were spent within the 0-30 m height band) during the 2023 breeding season surveys.
- 3 hours, 16 minutes and 6 seconds (of which 2 hours, 18 minutes and 57 seconds were spent within the 30-200 m height band and 53 minutes and 39 seconds were spent within the 0-30 m height band) during the 2023 / 2024 winter surveys.

- 10.6.7 Flights were concentrated over the ridgeline (along the south-western part of the Study Area) and over rye-grass leys outside the Study Area to the south-west and south. Fewer flights were recorded over central and eastern parts of the Study Area (the eastern slope of the ridgeline).
- 10.6.8 During both years of survey, an active red kite nest was identified outside the Study Area, less than 300 m from it (at the same location). Full details of these records are provided in the Confidential **Appendix 10.3**.
- 10.6.9 Full details of red kite activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.10 Suitable habitat is present for red kite within the 2 km perimeter area around the Study Area. This comprises deciduous woodland on valley slopes. Large areas of mature coniferous woodland to the north of the Study Area also have some potential as nesting habitat.
- 10.6.11 The conservation status of red kite was amended from amber-listed in the UK to green-listed in 2015 on account of its rapidly expanding range (Eaton *et al.*, 2015)²², but the species remains on the amber-list in Wales (Johnstone *et al.*, 2022). The red kite population is in ongoing recovery following historic decline (Hereward *et al.*, 2024), the population in the UK has increased by 139% in the ten years 2012 to 2022, and by 86% in Wales over the same period (Heywood *et al.*, 2024). The species' breeding range now includes much of central and south Wales, and the Welsh population is now likely to be more than 2,000 pairs²³ and was estimated at 2,500 pairs in 2019 (Welsh Kite Trust,

²² The species is recolonising its former breeding range, following significant historical decline during the 18th and 19th centuries (WOS, 2021).

²³ Kelvin Jones (Wales Development Officer at the British Trust for Ornithology; pers. comms.) has suggested that the population is now over 2000 pairs.

2020). In East Glamorgan, red kite is a locally common resident in the north of the recording area, and rare breeder. One, three and two active nests were reported (at undisclosed locations) during 2020, 2021 and 2022 (respectively) (GBC, 2021; GBC, 2022; GBC, 2024). However, considering the number of birds resident in the area, and the amount of suitable breeding habitat, it is likely that the breeding population is notably higher than the number of known nest sites would suggest. This is evidenced by the fact that in 2020 and 2021 probable breeding was reported from numerous additional sites in East Glamorgan (three and seven sites respectively) (GBC, 2021; GBC, 2022)²⁴.

- 10.6.12 Given the rapidly expanding populations throughout both mid and south Wales, it is unlikely that the importance of the Proposed Development site for red kite will extend beyond the **Local** level. Impacts on red kite are **scoped into further assessment**.

Osprey

- 10.6.13 No osprey *Pandion haliaetus* records were returned by SEWBRcC. The NBN Gateway²⁵ returned five records for the 10 km square (OSGR ST09) which includes the Study Area, between 2005 and 2020 (all during April).
- 10.6.14 Two flights (involving the same individual osprey) were recorded on 23 September 2022 for 1 min 21 secs in total. This included 1 min 11 secs within the 30-200 m height band and 10 seconds within the 0-30 m height band.
- 10.6.15 Osprey were not recorded during breeding raptor surveys in 2022 or 2023.
- 10.6.16 Full details of osprey activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.17 Osprey is amber listed in the UK (Stanbury *et al.*, 2021) and Wales (Johnstone *et al.*, 2022), where it is a rare breeding species, mainly in the north and north-west. The species is a scarce passage migrant in East Glamorgan, where 6-17 records per year were returned during the five-year period 2018-2022, all involving birds on spring or autumn passage (GBC, 2019; GBC, 2020; GBC, 2021; GBC, 2022; GBC, 2024). The species has not been recorded breeding in East Glamorgan to date. Suitable breeding habitat Castell-nos reservoir lies approximately 10.5 km to the north-west, Llest-wen reservoir lies approximately 12.3 km to the north-west and Llanishen reservoir lies approximately 16.7 km to the south-east. The larger reservoirs within the Bannau Brycheiniog National Park to the north are more distant (18 - 28 km to the north) and Llandegfedd reservoir is 27.2 km to the east.
- 10.6.18 Given the low level of osprey activity over the Study Area (two flights involving one bird), and that no evidence of breeding was recorded locally, nor has the potential to occur locally, it is concluded that the Proposed Development site does not lie on a regular flight route or close to high quality foraging habitat for

²⁴ There is no structured survey for red kite within the recording area.

²⁵ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

osprey. The Proposed Development site is of **negligible** importance for osprey, and this species is **scoped out of further assessment**.

Honey buzzard

- 10.6.19 No honey buzzard *Pernis apivorus* records were returned by SEWBRcC. The NBN Gateway²⁶ does not hold higher resolution data for honey buzzard. Honey buzzard are known to breed annually in the Neath Valley and adjacent areas, more than 20 km north-west of the Study Area.
- 10.6.20 One honey buzzard flight was recorded during the VP survey work, on 25 September 2022. It involved a juvenile flying north-west over land immediately to the west of the Study Area, for 1 minute, within the 30-200 m height band).
- 10.6.21 During a breeding raptor survey on 22 June 2023, a honey buzzard was observed in display flight²⁷ outside the 2 km perimeter area (more than 2.5 km north of the Study Area). It is possible that a honey buzzard territory was located outside the 2 km perimeter area, but this record is considered more likely to have involved a transient bird (given the absence of other records in that area). There were no other confirmed records of honey buzzard during the 2023 breeding season survey work.
- 10.6.22 Full details of honey buzzard activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.23 Suitable habitat for breeding honey buzzard is present within 2 km of the Study Area, in St Gwynno Forest, however plantation of higher suitability (greater maturity) is present further north in the forest (beyond 2 km from the Study Area).
- 10.6.24 Honey buzzard is a rare but increasing breeding species in the UK. The species is amber listed in the UK (Stanbury *et al.*, 2021) and is red listed in Wales (Johnstone *et al.*, 2022). Two years of national (UK) survey completed in 2020 and 2021 reported 108 pairs (in 2021) and 110 pairs (in 2022), though given variation in coverage between the two years, the UK population is estimated to be 130-150 pairs. Approximately 100 of these pairs are present within three core breeding areas (Southern England²⁸, central Scotland²⁹ and northern Scotland³⁰), with 30-50 pairs present elsewhere in the UK (Eaton *et al.*, 2023). In Wales most records of confirmed breeding are from one area, the Neath Valley and immediately surrounding areas, where one to four active nests are typically present in each year.
- 10.6.25 While the UK honey buzzard population has increased by more than 85% over the period between national surveys (2000 to 2020 / 2021), a decline has been

²⁶ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

²⁷ The display flight involved exaggerated wing beats / wing clapping.

²⁸ Hampshire, Sussex and surrounds.

²⁹ Perth and Kinross.

³⁰ Highland, and Moray and Nairn.

recorded in the west (including in Wales) (Eaton *et al.*, 2023). The species was first recorded breeding in the Neath Valley and surrounds at one active nest in 1999. This increased to three active nests in 2001 and four in 2006, however the number of active nests has since declined, with two in 2013 and one in 2015 (WOS, 2021). This decline is mirrored by data for confirmed breeding / territorial pairs in Wales, with an average of 6.1 confirmed breeding / territorial pairs present in Wales during the 8-year period 2003-2010, declining to an average of 2.5 confirmed breeding / territorial pairs were recorded during the 8-year period 2012-2019. During the national survey years of 2020 and 2021, 7 and 6 confirmed breeding / territorial pairs were recorded in Wales (the increase largely as a result of new confirmed breeding / territorial pairs being located elsewhere in Wales³¹ (Eaton *et al.*, 2023). These trends suggest that Welsh and Neath Valley populations fluctuate, and it should be noted that there is typically no co-ordinated survey for the species in Wales (away from the Neath Valley). In East Glamorgan (and RCT), the species is a rare and erratically recorded non-breeding summer visitor and passage migrant, with six records (three in RCT) in the 10-year period 2013 to 2022 (including records of different adult birds more than 2.5 km north of the Study Area (at Penrhiwceiber) and 2.5 km south of the Study Area (south-west of Mynydd y Glyn) during August 2021) (GBC, 2016; GBC, 2017; GBC, 2021; GBC, 2022)).

- 10.6.26 Following the breeding season, migrant birds are recorded outside the breeding areas, typically during the period late-August to late-September (though failed breeders are likely to depart earlier and lingering juveniles can be recorded into October).
- 10.6.27 Given the lack of honey buzzard activity over the Study Area (one flight was recorded immediately adjacent to it), and that no evidence of breeding was recorded locally, it is concluded that the Proposed Development site is not within a regularly used area of any breeding birds. The Proposed Development site is of **negligible** importance for honey buzzard, and this species is **scoped out of further assessment**.

Goshawk

- 10.6.28 SEWBRc returned ten records of goshawk within 2 km of the Study Area, between 1996 and 2022. All records within 2 km concerned one to three birds, nine records referred to St Gwynno Forest and adjacent land³², four of these referred to grid references that partially overlap the Study Area. Two records concerned confirmed breeding at a nest site in conifer plantation less than 500 m from the Study Area within the past 20 years. The NBN Gateway³³ returned 131 records for the 10 km square (OSGR ST09) which includes the Study Area, between 1993 and 2023 (with records during all months of the year).

³¹ In 2020, 5 confirmed breeding / territorial pairs (1 in Caernarfonshire, 2 in Carmarthenshire and 2 in Meirionnydd) were recorded elsewhere in Wales, and in 2021, 1 territorial pair was recorded elsewhere in Wales (in Breconshire).

³² The tenth referred to an area to the south-east (centred on Graig-Wen, Pontypridd).

³³ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

- 10.6.29 In total, 49 goshawk flights were recorded. The flights occurred as follows:
- No flights during the 2022 breeding season surveys.
 - 22 flights during the 2022 / 2023 winter surveys.
 - 11 flights during the 2023 breeding season surveys.
 - 16 flights during the 2023 / 2024 winter surveys.
- 10.6.30 These flights resulted in a total flight time of 1 hour, 32 minutes and 50 seconds (of which 46 minutes and 55 seconds was spent within the 30-200 m height band). Flight time occurred as follows:
- 48 minutes and 18 seconds (of which 36 minutes and 1 second were spent within the 30-200 m height band and 39 seconds within the 0-30 m height band) during the 2022 / 2023 winter surveys.
 - 17 minutes and 28 seconds (of which 5 minutes and 17 seconds were spent within the 30-200 m height band and 3 minutes and 6 seconds were spent within the 0-30 m height band) during the 2023 breeding season surveys.
 - 26 minutes and 19 seconds (of which 5 minutes and 37 seconds were spent within the 30-200 m height band and 20 seconds were spent within the 0-30 m height band) during the 2023 / 2024 winter surveys.
- 10.6.31 Activity typically involved birds soaring over land outside the Study Area, to the south and south-west. Comparatively few flights (19 flights (39% of the total)) were (at least in part) over the Study Area at collision risk height (ground level to 200 m above ground level, 11 flights (22% of the total) were in the 30-200 m height band)³⁴.
- 10.6.32 In June 2022, goshawk were observed hunting over Llanwonno forestry on two occasions during breeding raptor visits, but no territories were identified. In 2023, three goshawk flights were recorded during raptor surveys; two on 29 May and one on 22 June. One of the flights on 29 May involved an immature bird entering conifer plantation at Gelliwion woodland, approximately 1.9 km south of the Study Area. The second was of a bird flying over conifer plantation more than 2 km north-east of the Study Area. The flight on 22 June involved a bird flying over, then entering Llanwonno forestry approximately 1.7 km north of the Study Area.
- 10.6.33 Full details of goshawk activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.34 Goshawk breed in mature woodland areas, only leaving regularly during periods of territorial display between early-February and mid-April (Hardey et

³⁴ Given that the turbine parameters meant that for three turbines, the bottom of the rotor swept area reaches 23.8 m above ground level, and that CRH was taken as 30-200 m above ground level during the survey work, all flights recorded as 'below CRH' during the survey work have been assumed as being at CRH. In reality a high proportion of the flights recorded as being 'below CRH' during the survey work will have been below 23.8 m above ground level (and therefore genuinely below CRH). The number of goshawk flights over the Study Area at CRH is therefore likely to be lower than 19.

al., 2013³⁵). Habitat suitable for breeding goshawk within 1 km is likely to be limited to the small areas of mature conifer plantation in the north-eastern part of the survey area. The mixed plantation woodland in the central – eastern part of the Study Area is comparatively immature (approximately 25 years) and is unsuitable for nesting goshawk, predominantly comprising semi-mature willow and birch, with occasional semi-mature conifer species. The small belt of mature conifers connected to these woods is narrow and exposed.

- 10.6.35 Goshawk is amber listed in Wales, where it is an introduced and increasing breeding resident (WOS, 2021). The latest Welsh population estimate is 310 pairs (in 2018) (Hughes *et al.*, 2020³⁶). In East Glamorgan, goshawk is an uncommon resident breeding species; the number of confirmed, probable or possible territories reported varies between years (likely as a result of varying observer coverage), nine, six and three were reported during 2020, 2021 and 2022 (respectively) (GBC 2021; GBC, 2022; GBC, 2024). However, given the extensive areas of suitable habitat within East Glamorgan it is likely that the actual breeding population in the area is higher (for example, birds were reported in suitable breeding habitat at 29 sites in East Glamorgan during 2019) (GBC, 2020).
- 10.6.36 Goshawk do not use the airspace over the Study Area on a regular basis, as evidenced by the low encounter rate of this species during the survey work. The open pasture and semi-mature mixed plantation woodland habitats typifying most of the Study Area are unlikely to be of importance to goshawk at greater than the **Site** level. Impacts on goshawk are **scoped into further assessment**.

Peregrine

- 10.6.37 SEWBRc returned seven records of peregrine within 2 km of the Study Area, between 1988 and 2021. All records within 2 km concerned singletons, none concerned confirmed breeding. Records of possible or failed breeding were returned for a nest site between 2 km and 2.1 km north-west of the Study Area (between 2000 and 2003) and pairs in suitable breeding habitat at a site between 2 km and 2.5 km east-south-east of the Study Area (between 1992 and 2010). The NBN Gateway³⁷ returned 101 records for the 10 km square (OSGR ST09) which includes the Study Area, between 1986 and 2023 (with records during all months of the year).
- 10.6.38 In total, 31 peregrine flights were recorded. The flights occurred as follows:
- 5 flights during the 2022 breeding season surveys.

³⁵ Hardey, J., Crick, H., Riley, H., Etheridge, B., and Thompson, D. (2013). *Raptors: A field guide to surveys and monitoring*. The Stationery Office; 3rd revised edition.

³⁶ Hughes, J., Spence, I.M. & Gillings, S. (2020) *Estimating the sizes of breeding populations of birds in Wales*. Birds in Wales 17(1): pp.56-67.

³⁷ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

- 8 flights during the 2022 / 2023 winter surveys.
- 15 flights during the 2023 breeding season surveys.
- 3 flights during the 2023 / 2024 winter surveys.

10.6.39 These flights resulted in a total flight time of 47 minutes and 20 seconds (of which 30 minutes and 40 seconds were spent within the 30-200 m height band and 11 minutes and 30 seconds were spent within the 0-30 m height band). Flight time occurred as follows:

- 7 minutes and 5 seconds (of which 2 minutes and 25 seconds were spent within the 30-200 m height band and 7 minutes and 10 seconds were spent within the 0-30 m height band) during the 2022 breeding season surveys.
- 15 minutes and 57 seconds (of which 11 minutes and 37 seconds were spent within the 30-200 m height band (no time was spent within the 0-30 m height band) during the 2022 / 2023 winter surveys.
- 19 minutes and 40 seconds (of which 13 minutes and 6 seconds were spent within the 30-200 m height band and 4 minutes and 20 seconds were spent within the 0-30 m height band) during the 2023 breeding season surveys.
- 4 minutes and 38 seconds (of which 3 minutes and 32 seconds were spent within the 30-200 m height band (no time was spent within the 0-30 m height band)) during the 2023 / 2024 winter surveys.

10.6.40 Activity typically involved birds commuting over the Study Area and adjacent land. Birds were also seen hunting wood pigeon *Columba palumbus* and lapwing *Vanellus vanellus* in the Study Area during the 2023 breeding season.

10.6.41 No peregrine flights were recorded during breeding raptor surveys in 2022. In 2023, six peregrine flights involving at least two birds were recorded over the valley to the west of the Study Area, during a breeding raptor survey on 29 May.

10.6.42 Full details of peregrine activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.

10.6.43 Suitable habitat for breeding peregrine is present within 2 km of the Study Area. Breeding peregrine are included in the description of the Birch Grove Slopes SINC which is located approximately 335 m³⁸ to the west of the Study Area, however no peregrine territories were identified during the breeding raptor surveys in 2022 or 2023.

10.6.44 The UK population of peregrine increased by 22% over the twelve years between 2002 and 2014 (Wilson *et al.*, 2018) and more than quadrupled over the 43 years 1971 to 2014. Peregrine is an uncommon resident breeding species in Wales (WOS, 2022), with a stable breeding population estimated at 280 pairs in 2014 (Wilson *et al.*, 2018). Peregrine is a locally common resident

³⁸ Though suitable breeding habitat for peregrine within the SINC is more than 1 km from the Study Area.

breeding species in East Glamorgan. During the five-year period 2018 to 2022, the number of sites at which breeding was confirmed was in the range 15-18 sites per year.

- 10.6.45 There is no suitable habitat on the Proposed Development site for breeding peregrine, the nearest suitable habitat for breeding is approximately 830 m west of the Study Area (within the Birch Grove Slopes SINCC). No behaviour recorded during the survey work suggested local breeding. Given that peregrine were recorded commuting over the Study Area and adjacent land (albeit infrequently) during the survey work, and occasionally hunting in the Study Area, the Study Area is considered to be of importance for the species at the **Site** level. Impacts on peregrine are **scoped into** further assessment.

Kestrel

- 10.6.46 SEWBRc returned sixteen records of kestrel within 2 km of the Study Area, between 1971 and 2023. Records concerned one to two birds. None concerned confirmed breeding (though a historic record of two birds on a cliff face 1.2 km south of the Study Area in July 1987) is likely to have involved a breeding attempt). Two records (in 2010 and 2011) were from 1 km squares which partially overlap the Study Area. The NBN Gateway³⁹ returned two records for the Study Area, from June 2010 and February 2011, and a further 54 records for the 10 km square (OSGR ST09) which includes the Study Area, between 1968 and 2023 (with records during all months of the year).
- 10.6.47 In total, 5 kestrel flights were recorded. The flights occurred as follows:
- No flights during the 2022 breeding season surveys.
 - 3 flights during the 2022 / 2023 winter surveys.
 - 1 flight during the 2023 breeding season surveys.
 - 1 flight during the 2023 / 2024 winter surveys.
- 10.6.48 These flights resulted in a total flight time of 8 minutes and 8 seconds (all of which was spent within the 30-200m height band). Flight time occurred as follows:
- 6 minutes and 23 seconds (all of which was spent within the 30-200 m height band) during the 2022 / 2023 winter surveys.
 - 30 seconds (all of which was spent within the 30-200 m height band) during the 2023 breeding season surveys.
 - 1 minute and 15 seconds (all of which was spent within the 30-200 m height band) during the 2023 / 2024 winter surveys.
- 10.6.49 No kestrel territories were recorded in 2022. In 2023, four kestrel flights (involving at least two individuals) were recorded during a raptor survey on 22 June, however no potential kestrel territories were recorded.

³⁹ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

- 10.6.50 Full details of kestrel activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.51 Suitable breeding habitat for kestrel is present within 1 km of the Study Area, along the steep valley sides and in small disused quarries and to the south of the Study Area, associated with isolated farm buildings and old corvid nests in the surrounding forestry. Foraging opportunities are likely to be limited to rougher areas of grassland in the north-eastern and south-eastern parts of the Study Area, away from proposed turbine locations. The more intensively managed areas in the central parts of it (within most proposed turbines are located, are likely to provide fewer foraging opportunities.
- 10.6.52 Kestrel is included in Section 7 of the Environment (Wales) Act 2016 and is red-listed in Wales (Johnstone *et al.*, 2022) and amber-listed in the UK (Stanbury *et al.*, 2021). In the UK, it is a declining breeding species, with the UK population trend considered to have been a 13% decline over the ten years between 2012 and 2022, and a 40% decline over the 27 years 1995-2022 (Heywood *et al.*, 2024), and declines in recent years have been greatest in the west (WOS, 2021). In East Glamorgan, kestrel is a common resident breeding species. During the five-year period 2018 to 2022, confirmed, probable or possible breeding records were returned for widespread sites across the area, in both upland, lowland and coastal areas, and (both breeding and non-breeding records were submitted for between approximately 100 and 142 sites per year (GBC, 2019; GBC, 2020; GBC, 2021; GBC, 2022; GBC, 2024).
- 10.6.53 Though suitable breeding habitat for kestrel is present in the Study Area and within 1 km of it, no evidence of breeding was recorded during the survey work, and no behaviour recorded during the work suggested local breeding. Given that kestrel were recorded foraging over the Study Area and adjacent land infrequently, the Study Area is considered to be of importance for the species at the **Site** level. Impacts on kestrel are **scoped into** further assessment.

Merlin

- 10.6.54 No merlin records were returned by SEWBRReC. The NBN Gateway⁴⁰ returned five records for the 10 km square (OSGR ST09) which includes the Study Area, between 1988 and 2006 (where dates were provided, records were during the periods May-June and October).
- 10.6.55 Two merlin flights were recorded on 04 February 2023. They were recorded for 48 seconds in total, within the 0-30m height band. A male and an immature / female were noted.
- 10.6.56 Merlin were not recorded during the breeding raptor surveys in 2022 or 2023.
- 10.6.57 Full details of merlin activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.

⁴⁰ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

- 10.6.58 Merlin is red listed in the UK (Stanbury *et al.*, 2021) and in Wales (Johnstone *et al.*, 2022). The species is a scarce breeding resident and uncommon passage and winter migrant in Wales (WOS, 2021). The Welsh population is estimated at 46 pairs (WOS, 2021). In East Glamorgan, the species is a rare breeding resident, and uncommon passage migrant and winter visitor. During the ten-year period 2013 to 2022, breeding was recorded on one occasion (in 2019), at the northern boundary of the recording area. Merlin are recorded annually in East Glamorgan, typically during the winter, spring and autumn passage periods, with 23-62 records per year during the five-year period 2018-2022. Moorland habitats suitable for breeding merlin in the Study Area and 2 km perimeter survey area are insufficient to support an active nest, due to the limited extent of moorland (supporting high densities of passerines), human disturbance, topography and / or grazing pressure).
- 10.6.59 Given the low level of merlin activity over the Study Area (two flights), that no evidence of breeding was recorded locally, and that there is no habitat present in the Study Area or 2 km perimeter area that is suitable to support breeding merlin, it is concluded that the Proposed Development site is not within a regularly used area of any breeding birds. The Proposed Development site is of **negligible** importance for osprey, and this species is **scoped out of further assessment**.

Curlew

- 10.6.60 Two curlew records were returned by SEWBReC; a historic breeding record from Llanwonno forestry, within approximately 1 km of the Study Area, exact date unknown but between 1924 – 2004⁴¹, and a record of presence from Mynydd y Glyn, more than 1.2 km to the south of the Study Area, in 1989. The NBN Gateway⁴² returned nine records for the 10 km square (OSGR ST09) which includes the Study Area, between 1924 and 2019 (where dates were provided, records were during March, April and June).
- 10.6.61 One curlew flight was recorded during the survey work, on 17 March 2023. The flight lasted for 20 seconds, all of which was spent within the 30-200 m height band.
- 10.6.62 Curlew territories were not identified during the 2022 or 2023 surveys.
- 10.6.63 Full details of curlew activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.64 Marshy grassland within the Study Area is unlikely to be suitable for breeding curlew, due to the proximity of the surrounding woodland.
- 10.6.65 Curlew is red listed in the UK (Stanbury *et al.*, 2021) and Wales (Johnstone *et al.*, 2022), and is listed under Section 7 of the Environment (Wales) Act 2016. In the UK, the species is a declining breeding species, with the UK population

⁴¹ Irrespective of the date, this record is likely to precede afforestation of the site.

⁴² The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

trend considered to have been an 8% decline over the ten years between 2012 and 2022, and a 50% decline over the 27 years 1995-2022 (Heywood *et al.*, 2024). The species breeding range in Wales is now centred on North and mid Wales (WOS, 2021).

- 10.6.66 In East Glamorgan, the species is a common winter visitor (typically at coastal sites) and passage migrant, but is rarely recorded breeding within the recording area. Birds occur annually during the early spring (typically March to May) at upland sites across the recording area, likely on spring passage to breeding areas further north. No confirmed breeding curlew were recorded in the uplands of East Glamorgan during the five-year period 2018-2022. The most recent confirmed breeding in the recording area was in 2016, near Rhaslas Pond (outside RCT) (GBC, 2017; GBC, 2019; GBC, 2020; GBC 2021; GBC, 2022; GBC, 2024).
- 10.6.67 Given the very low levels of activity recorded during the survey work for curlew, and absence of any evidence of breeding locally, it is concluded that the Proposed Development site is not within a regularly used area of any breeding birds. The Proposed Development site is of **negligible** importance for curlew, and this species is **scoped out** of further assessment.

Golden plover

- 10.6.68 One golden plover *Pluvialis apricaria* record was returned by SEWBRc a record of confirmed presence⁴³ at / over the northern slopes of Mynydd y Glyn, more than 800 m west-south-west of the Study Area, in January 2022. The NBN Gateway⁴⁴ returned one record for the 10 km square (OSGR ST09) which includes the Study Area, in November 2019.
- 10.6.69 In total, 20 golden plover flights were recorded. The flights occurred as follows:
- 1 flight during April 2022.
 - 14 flights during the period October 2022 to February 2023.
 - 5 flights during the period October 2023 to February 2024.
- 10.6.70 These flights resulted in a total flight time of 54 minutes and 24 seconds (of which 43 minutes and 45 seconds were spent within the 30-200 m height band and 3 minutes and 15 seconds were spent within the 0-30 m height band). Flight time occurred as follows:
- 7 minutes and 45 seconds (of which 4 minutes were spent within the 30-200 m height band and 45 seconds were spent within the 0-30 m height band) during the 2022 breeding season surveys.
 - 36 minutes and 17 seconds (of which 35 minutes and 3 seconds were spent within the 30-200m height band and 1 minute and 14 seconds

⁴³ No additional information (such as count of birds) was provided.

⁴⁴ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

were spent within the 0-30 m height band) during the 2022 / 2023 winter surveys.

- 10 minutes and 22 seconds (of which 4 minutes and 42 seconds were spent within the 30-200 m height band and 1 minute and 16 seconds were spent within the 0-30 m height band) during the 2023 / 2024 winter surveys.

- 10.6.71 Activity involved flocks of 12-22 birds, and was concentrated over two main areas; open ground immediately to the west of the Study Area and over Mynydd y Glyn distantly (more than 2 km) to the south of the Site. On two occasions during the survey work, birds were observed landing within the Study Area (on one of these occasions birds landed within the proposed solar array, within the Proposed Development site). Four flights involved viewed distantly (beyond the 2 km viewing arc) to the south of the Proposed Development, over Mynydd y Glyn.
- 10.6.72 The Study Area is outside the breeding range of golden plover in Wales; no breeding activity was expected or recorded in 2022 or 2023. The Welsh breeding population is small and declining (Pritchard *et al.* 2021).
- 10.6.73 Full details of golden plover activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.74 Golden plover is included in Section 7 of the Environment (Wales) Act (2016) and is red-listed in Wales (Johnstone *et al.*, 2022) as a result of severe decline in the number and range of the breeding population (WOS, 2021). Wintering golden plover are recorded in nationally and internationally important numbers in Wales (WOS, 2021), primarily at coastal sites, though birds also winter at inland (upland) sites in Wales. In East Glamorgan the species is a locally common winter visitor and passage migrant⁴⁵. Wintering flocks are recorded annually on Mynydd y Glyn (2.18 km south of the Study Area) and Mynydd Eglwysilan⁴⁶ (4.05 km east of the Study Area), with peak counts over the five-year period 2018 to 2022 being 121 birds (in 2021) at the former site, and 350 birds (in 2020) at the latter (GBC, 2019; GBC, 2020; GBC 2021; GBC, 2022; GBC, 2024).
- 10.6.75 Habitat in open areas of the Study Area⁴⁷ is of limited value for golden plover, mostly comprising improved pasture or arable land (as demonstrated by the low frequency of birds landing within the scheme⁴⁸). Habitat outside the Study Area, to the north-west, comprises less managed acid grassland which is more suitable for non-breeding golden plover.

⁴⁵ A pair bred successfully at Waun Wen (at the northern extreme of the East Glamorgan recording area) which was the first breeding in the recording area, and the most southerly breeding record in Britain. No evidence of breeding golden plover has been recorded at the site subsequently.

⁴⁶ On which the Twyn Hywel Wind Farm scheme is proposed.

⁴⁷ Golden plover typically avoid areas close to treelines or woodland (which offers perches and refuges for predators).

⁴⁸ Two flights (of the total twenty recorded) involved birds landing within the Study Area.

- 10.6.76 Given the occasional use of the airspace over the Study Area by non-breeding golden plover, and birds landing within it infrequently, the Study Area is considered to be of importance for the species at the **Local** level. Impacts on golden plover are **scoped into** further assessment.

Lapwing

- 10.6.77 SEWBrEC returned three records of lapwing⁴⁹; all of which referred to grid references partially overlapping the Study Area. Two were from April 2020 and referred to 2 – 20 birds, one was from April 2021 and referred to a singleton flying over an area “*known for breeding / nesting*”. The NBN Gateway⁵⁰ returned one record, on 19 April 2020, for a 1 km-square (OSGR ST0392) which partially overlaps the Study Area (in the north-western corner) and covers fields and unenclosed pasture to the south-west, west and north-west of the Study Area. A further nine records are held by NBN for the 10 km square (OSGR ST09) which includes the Study Area, between 1968 and 2022 (where dates were provided, records were during April and May).
- 10.6.78 In total, 52 lapwing flights were recorded. The flights occurred as follows:
- 11 flights during the 2022 breeding season surveys.
 - 21 flights during the 2022 / 2023 winter surveys.
 - 17 flights during the 2023 breeding season surveys.
 - 3 flights during the 2023 / 2024 winter surveys.
- 10.6.79 These flights resulted in a total flight time of 1 hour, 32 minutes and 25 seconds (of which 39 minutes and 23 seconds were spent within the 30-200 m height band and 52 minutes and 23 seconds were spent within the 0-30m height band). Flight time occurred as follows:
- 31 minutes and 50 seconds (of which 1 minute and 45 seconds were spent within the 30-200 m height band and 30 minutes and 5 seconds were spent within the 0-30 m height band) during the 2022 breeding season surveys.
 - 23 minutes and 38 seconds (of which 19 minutes and 33 seconds were spent within the 30-200 m height band and 2 minutes and 45 seconds were spent within the 0-30 m height band) during the 2022 / 2023 winter surveys.
 - 26 minutes and 39 seconds (of which 7 minutes and 56 seconds were spent within the 30-200 m height band and 19 minutes and 24 seconds were spent within the 0-30 m height band) during the 2023 breeding season surveys.

⁴⁹ A further record of birds breeding in the Study Area was returned by SEWBrEC. The record was originally provided by BSG Ecology, and is detailed in the species account.

⁵⁰ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

- 10 minutes and 18 seconds (of which 10 minutes and 9 seconds were spent within the 30-200 m height band and 9 seconds were spent within the 0-30 m height band) during the 2023 / 2024 winter surveys.

- 10.6.80 In 2022, eleven lapwing were recorded during the breeding wader survey on 16 April, and territorial behaviour was noted over a semi-improved grassland field at the western edge of the Study Area. The distribution and number of displaying birds indicated that at least one lapwing territory had been established, and a second territory in the same approximate area was suspected though could not be confirmed. The field was fertilized and cultivated between the April and May survey visits. Two lapwing chicks from one nest site were present on 16 May and in June (when the birds were fully mobile) indicating productivity. Two adults (the breeding pair) and nine other adults (failed or non-breeding birds) were present at the Study Area in June. Lapwing had left the Study Area by the visit on 15 July.
- 10.6.81 In 2023 two lapwing territories were identified during breeding wader surveys. Territorial activity such as adults returning to the same areas and defensive territorial displays was seen at both sites, however there was no clear evidence of productivity at either. Territories were located in rye grass leys in the western part of the Study Area and outside the Study Area to the west respectively.
- 10.6.82 During both breeding seasons, birds were recorded foraging in rye grass leys in the western and central part of the Study Area, and outside the Study Area to the west and south-west.
- 10.6.83 Full details of lapwing activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.84 Lapwing is red listed in the UK (Stanbury *et al.*, 2021) and Wales (Johnstone *et al.*, 2022), and is listed under Section 7 of the Environment (Wales) Act 2016. In the UK, the species is a declining breeding species, with the UK population trend considered to have been a 13% decline over the ten years between 2012 and 2022, and a 51% decline over the 27 years 1995-2022 (Heywood *et al.*, 2024). In Wales, it is a declining breeding species, reflecting the national trend. Historical declines were significant (the population halved between the early 1970s and 1987, to an estimated 7,448 pairs), and continued at a faster rate than in any other part of the UK (WOS, 2021). In the period 2015-2019, the Welsh population was estimated to be in the range 690-970 pairs (WOS, 2021). In East Glamorgan, numbers of breeding pairs reported varied between years during the five-year period 2018-2022, with total confirmed breeding records per year in the range 0-10 nest sites. Most are outside RCT, though six nests were recorded at Llanilid (in the south-west of the county) in 2021 (GBC, 2019; GBC, 2020; GBC 2021; GBC, 2022; GBC, 2024). Also during that year, *“a single bird was noted over an historic breeding location above Llwynhelyn on 5th April, but no breeding activity was noted there”* – this record is likely to refer to the breeding at the western edge / to the west of the Study Area (GBC, 2022). RCT consider the birds breeding immediately to the west of the Study Area to comprise the last known breeding birds within RCT (pers comm. Richard Wistow (RCT Ecologist), 2025). The declines in lowland Wales are considered to be largely as a result of a move

from arable / mixed farming to grass leys and drainage of wet grassland (as well as other changes in habitat such as succession of brownfield sites).

- 10.6.85 Given the frequent flight activity over the Study Area throughout the survey work (during the winter as well as the breeding season), and the presence of 1-2 pairs breeding immediately to the west of the Study Area, the Study Area is considered to be of importance at the **County** level. Impacts on golden plover are **scoped into** further assessment.

Common Snipe

- 10.6.86 SEWBrEC returned one record of common snipe *Gallinago gallinago*, involving a bird in St Gwynno Forest (the record referred to a 1 km-square 670 m north-west of the Study Area at its closest edge), in November 2004. The NBN Gateway⁵¹ returned nine records for the 10 km square (OSGR ST09) which includes the Study Area, between 1968 and 2019 (where dates were provided, records were during September, November and the period January to March).
- 10.6.87 Two flights of snipe were recorded, on 30 January and 24 February for 1 minute and 25 seconds, and 18 seconds respectively. The former was within the 30-200 m height band for 22 seconds (and above 200 m for 1 minute and 3 seconds), the latter was within the 30-200 m height band throughout.
- 10.6.88 No common snipe territories were identified during the 2022 or 2023 surveys.
- 10.6.89 Full details of common snipe activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.90 Marshy grassland within the Study Area is of low suitability for breeding common snipe, due to the proximity of the surrounding woodland (which offers perches and refuges for predators).
- 10.6.91 Common snipe is amber listed in the UK (Stanbury *et al.*, 2021) and in Wales (Johnstone *et al.*, 2022). The species is more common in the UK during passage periods and in winter, when the UK population is estimated to be more than 1 million birds (Birdlife International, 2021). Common snipe is a scarce breeding species in Wales with an estimated breeding population of 1,100 pairs (Hughes *et al.*, 2020). In East Glamorgan, the species is a common winter visitor and passage migrant in the recording area, but is typically absent from the area during the breeding season. No confirmed breeding has been recorded in the area in the five-year period 2018-2022⁵² (GBC, 2019; GBC, 2020; GBC 2021; GBC, 2022; GBC, 2024).
- 10.6.92 Common snipe is amber-listed in the UK (Stanbury *et al.*, 2021) and in Wales (Johnstone *et al.*, 2022). The species is more common in the UK during passage periods and in winter, when the UK population is estimated to be more than one million birds (Birdlife International, 2021). Given the low levels of use

⁵¹ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

⁵² Though probable breeding was recorded at one site in the north of the county in each of 2021 and 2022.

of the Study Area during passage periods and winter (when the species is abundant in the UK) and absence of breeding activity, the Study Area is considered to be of **negligible** importance for the species, and this species is **scoped out of further assessment**.

Nightjar

- 10.6.93 SEWBRc returned twenty records of nightjar within 2 km of the Study Area between 2000 and 2023. Nineteen⁵³ of these clearly referred to the conifer plantation of St Gwynno Forest (to the north of the Study Area), or were low resolution grid references apparently referring to that area. These included records of probable and confirmed breeding. The NBN Gateway⁵⁴ returned 51 records, between 2006 and 2021 (during the period May to September), for the 1 and 4 km-squares (OSGR ST0393 and ST09G) which partially overlap the Study Area (in the north-western corner) and covers the southern extent of St Gwynno Forest to the north and north-west of the Study Area (and adjacent land to the west). NBN also holds 246 records for the 10 km square (OSGR ST09) which includes the Study Area, between 1988 and 2023 (where dates were provided, records were during the periods April and August). In East Glamorgan the species is an uncommon breeding summer visitor, confined to clear-fell in conifer plantations. The species was reported on territory at Llanwonno / in St Gwynno Forest in all years during the five-year period 2018-2022, with up to seven territories typically recorded in the whole of the area (GBC, 2019; GBC, 2020; GBC 2021; GBC, 2022; GBC, 2024)⁵⁵.
- 10.6.94 During both years of survey, one nightjar territory was recorded in clear felled conifer plantation in St Gwynno Forest, approximately 550 m north of the Study Area. During both years, flight calls heard in the area of the territory were heard (whilst the territorial male was churring during at least one of the years), calling birds heard were considered likely to be female or juvenile⁵⁶ birds.
- 10.6.95 Full details of nightjar activity recorded during the survey work are provided within the baseline ornithology report in **Appendix 10.2**.
- 10.6.96 Nightjar is a scarce but widespread migratory breeding species in the UK and Wales, and is listed under Section 7 of the Environment (Wales) Act (2016). The UK census of the species (in 2004) estimated that 280 males were present, an increase of 24 % on the findings of the previous census in 1992 (Conway *et al.*, 2007). However, by extrapolating data from three wind farm sites at which intensive and sustained monitoring has been conducted (Brechfa Forest, Clocaenog Forest and Pen-y-Cymoedd) over the total area of suitable habitat in Wales, WOS (2021) estimated that the Welsh population was likely to be approximately 500 churring males.

⁵³ One referred to a 1 km-square to the north-east of the Study Area, centred on land to the west of Ynysybwl.

⁵⁴ The NBN Gateway data are of low resolution and therefore the precise locations of records are not provided.

⁵⁵ Though it is unclear whether these data were obtained through structured survey.

⁵⁶ Due to low light, views were insufficient to determine whether these birds were adult females or juveniles (of either sex).

- 10.6.97 Given the small size of the local nightjar population, and that the species breeds locally to the Study Area and may forage over it, the Study Area is considered to be of importance at the **Local** level. Impacts on nightjar are **scoped into** further assessment.

Non-focal species

- 10.6.98 Eleven secondary species were recorded during the VP surveys; Canada goose, cormorant, buzzard *Buteo buteo*, sparrowhawk *Accipiter nisus*, herring gull *Larus argentatus*, lesser black-backed gull *Larus fuscus*, great black-backed gull *Larus marinus*, raven *Corvus corax*, rook *Corvus frugilegus*, carrion crow *Corvus corone* and jackdaw *Corvus monedula*.
- 10.6.99 Canada geese were recorded on one occasion during the VP surveys. Canada goose is an introduced species in the UK, Wales, and RCT, where it is locally common. Given the lack of open water in the Study Area and the low levels of activity over the Proposed Development site, it is unlikely to support this species, therefore Canada goose is **scoped out** of further assessment.
- 10.6.100 Cormorant was recorded on one occasion during the VP surveys. Cormorant is a common and widespread resident in the UK and Wales (where it is green-listed (Stanbury *et al.*, 2021; Johnstone *et al.*, 2022), and is a common non-breeding resident in East Glamorgan (including at inland lakes, reservoirs and rivers in RCT) (GBC, 2024). Given the lack of open water in the Study Area and the low levels of activity over the Proposed Development site, it is unlikely to support this species, therefore cormorant is **scoped out** of further assessment.
- 10.6.101 Buzzard was recorded frequently throughout the survey work. Buzzard is a common and widespread breeding resident in the UK, Wales, and RCT. The species is categorised as being of 'least concern' in conservation terms and has increased considerably in number over the past twenty years at both the UK and European levels. The UK population is estimated at 63,000-87,500 pairs with a long-term increasing trend of 1,070% between 1970 and 2018 (Burns, *et al.*, 2020). Given the size of the population, the Proposed Development is unlikely to be of value to buzzard populations at any geographic level. Buzzard is therefore **scoped out** of further assessment.
- 10.6.102 Sparrowhawk were recorded infrequently during the survey work. Sparrowhawk is categorised as being of 'least concern' in conservation terms and has increased considerably in number over the past twenty years at both the UK and European levels. Atlas work has demonstrated an expansion of range in the UK of 29% between 1968/72 and 2007/11 (Balmer *et al.*, 2013). The species is green-listed in the UK (Stanbury *et al.*, 2021) where its population is estimated at 30,500 pairs (Burns *et al.*, 2020). The species is also green-listed in Wales (Johnstone *et al.*, 2022), and in East Glamorgan sparrowhawk is considered a common resident breeding species (GBC, 2024). Given the size of the population, the Proposed Development is unlikely to be of value to sparrowhawk populations at any geographic level. Sparrowhawk is therefore **scoped out** of further assessment.

- 10.6.103 Herring gull and lesser black-backed gull were both recorded frequently in low numbers during the survey work. Herring gull is included in Section 7 of the Environment (Wales) Act (2016), and is red-listed in the UK (Stanbury *et al.*, 2021) and Wales (Johnstone *et al.*, 2022). Lesser black-backed gull is amber-listed in the UK (Stanbury *et al.*, 2021) and red-listed in Wales (Johnstone *et al.*, 2022). Herring gull were recorded on 102 occasions, and lesser black-backed gull on 73 occasions during the two years of survey. For both species, most activity was recorded during the breeding seasons (83% and 92% respectively). No obvious flight patterns were detected regarding location / time of day present. Given the frequency of flight activity recorded, a proportion of which was over the Study Area, and their conservation concern regionally and nationally, the Study Area is considered to be of importance for the species at the **Site** level. Herring gull and lesser black-backed gull are both **scoped into** further assessment.
- 10.6.104 Great black-backed gull was recorded on one occasion during the survey work. The species is amber-listed in the UK (Stanbury *et al.*, 2021) and Wales (Johnstone *et al.*, 2022). The species breeds in coastal habitats where it is a common resident species in Wales, though is recorded less frequently inland. Given the low levels of activity recorded during the survey work, the Proposed Development is unlikely to be of value to great black-backed gull at any geographic level. Great black-backed gull is therefore **scoped out** of further assessment.
- 10.6.105 Raven flights were recorded frequently during the survey work, with the species recorded on 115 occasions over the two years of survey. Activity was distributed widely over the Study Area and surrounding land. Raven is common and widespread throughout Wales and is a common resident in East Glamorgan (including RCT) (GBC, 2024). In the UK, the species has shown an expansion in range by around 70% since the late 1970's (Balmer *et al.*, 2013). The current UK population is estimated at 10,000 pairs (Burns *et al.*, 2020). No evidence of breeding raven was recorded on or within 2 km of the Proposed Development site. Given this, the use of the Proposed Development site is not considered to be exceptional, and the habitats within it do not appear to provide a high quality foraging resource for raven in the context of the local landscape. The importance of the Proposed Development site and surrounding land for the local population is likely to be negligible. Raven is therefore **scoped out** of further assessment.
- 10.6.106 Rook were recorded frequently during the work, with flights involving up to approximately 100 birds. No rookery was recorded on or adjacent to the Study Area. Birds foraging in the Study Area are likely to breed at rookeries on the lower slopes and in the valley bottoms. Activity typically involved birds foraging in mixed corvid flocks on arable land in the western part of the Study Area. The species is amber-listed in the UK (Stanbury *et al.*, 2021) and red-listed in Wales (Johnstone *et al.*, 2022). The UK population is estimated to be 980,000 pairs (Burns *et al.*, 2020). In East Glamorgan (including RCT) the species remains a common resident breeding species (GBC, 2024). A rookery survey in 2022 (the first of two years of rookery survey) recorded eight rookeries within RCT, with a total of 74 active nests (breeding pairs) recorded (GBC, 2024),

three were in the valley below the Study Area, at Porth (2.20 km), at Pontypridd (3.72 km) and Penygraig (3.88 km), with a combined total of 23 active nests (breeding pairs). Given that the area in which the birds were typically foraging is outside the Proposed Development (to the west) and that flights are likely to involve birds moving below collision risk height up / down the slopes into the valleys, and that corvids are not typically displaced by wind turbines / solar farms, the impacts of the Proposed Development on rook is likely to have be **negligible**. Rook is therefore **scoped out** of further assessment.

- 10.6.107 Carrion crow were recorded during a majority of watches, throughout the survey work. Flights involved up to 36 birds. Carrion crow is abundant throughout the UK, including RCT. Given this, the use of the Proposed Development site is not considered to be exceptional and the importance of the Proposed Development site and surrounding land for the local population is likely to be **negligible**. Carrion crow is therefore **scoped out** of further assessment.
- 10.6.108 Jackdaw were recorded on 47 occasions during VP surveys in the breeding season of 2023 and the non-breeding / winter season 2023 / 2024. Jackdaw is a common and widespread breeding resident in the UK and Wales. The species is categorised as being of 'least concern' in conservation terms and the UK population increased by 20% over the period 2008-2018, with the UK population estimated to be 1,550,000 pairs (Burns *et al.*, 2020). In East Glamorgan (and RCT), jackdaw is a common resident breeding species, especially in the upland valleys (GBC, 2024). Given the size of the population, the Proposed Development is unlikely to be of value to jackdaw populations at any geographic level. Jackdaw is therefore **scoped out** of further assessment.
- 10.6.109 Breeding passerine surveys across the Study Area in 2022 and 2023 identified a range of species, some specialists of grassland, woodland and open areas, and some of more general farmland and countryside habitats. Species listed under Schedule 1⁵⁷ or Section 7⁵⁸ recorded on territory in the survey area, were; crossbill *Loxia curvirostra*, skylark *Alauda arvensis*, tree pipit *Anthus trivialis*, song thrush *Turdus philomelos*, dunnock *Prunella modularis*, wood warbler *Phylloscopus sibilatrix*, starling *Sturnus vulgaris*, common linnet *Linaria cannabina*, bullfinch *Pyrrhula pyrrhula* and reed bunting *Emberiza schoeniclus*. Skylark, song thrush, starling, linnet and reed bunting were recorded breeding in grassland or woodland-edge habitats in the Study Area, crossbill, tree pipit, dunnock, wood warbler and bullfinch were recorded breeding in woodland and woodland-edge habitats in the wider survey area.
- 10.6.110 Species recorded holding territory within the proposed solar array were skylark and meadow pipit *Anthus pratensis*. Both are ground-nesting and readily nest within improved grassland and arable land, albeit they require a moderate or long sward. Pied wagtail *Motacilla alba* and northern wheatear *Oenanthe oenanthe* were also recorded in the area (though no evidence of territoriality

⁵⁷ Of the Wildlife and Countryside Act 1981 (as amended).

⁵⁸ Of the Environment Wales Act, 2016.

was recorded), and suitable habitat for both species (drystone walls and rock piles) are present within the area.

- 10.6.111 Passerine species recorded overflying the Study Area included:
- Crossbill, on sixteen occasions during the period August 2023 to February 2024 inclusive, with flights involving up to 27 birds;
 - At least one woodlark *Lullula arborea* in November 2023;
 - One ring ouzel *Turdus torquatus* in March 2024;
 - Wood pigeon, stock dove *Columba oenas*, house martin *Delichon urbicum*, sand martin *Riparia riparia*, skylark, meadow pipit, mistle thrush *Turdus viscivorus*, redwing *Turdus iliacus*, fieldfare *Turdus pilaris* (including three birds in April 2023), redpoll *Carduelis flammea*, bullfinch, chaffinch *Fringilla coelebs* and brambling *Fringilla montifringilla*.
- 10.6.112 Collision and displacement of passerines are not generally considered issues for wind farm developments (SNH (2017) guidance does not recommend passerine surveys for wind farm proposals). Any effect on populations arising because of collision with turbines is likely to be very localised owing to the high reproductive rates and low annual survival of passerines.
- 10.6.113 Skylark (listed under Section 7, red listed in the UK and amber listed in Wales) and meadow pipit (amber listed in the UK and red listed in Wales), which nest grassland with a moderate or long sward, were recorded holding territory at low density in the improved grassland and arable land in which the solar array is proposed. Both species are common and widespread in the UK, Wales and the uplands of East Glamorgan (including RCT) (GBC, 2024). The UK skylark population is estimated to be 1,550,000 pairs, the UK population of meadow pipit is estimated to be 2,450,000 pairs. Given the abundance of suitable breeding habitat for ground-nesting passerines in the local area (Llanwonno Mountain), the area of the solar array is considered to be of importance for the species at no greater than the **Site** level (and are therefore not significant). Impacts on ground-nesting passerines are therefore **scoped out** of further assessment, though further consideration is given to them with regard to habitat enhancement within the Proposed Development.
- 10.6.114 Adverse effects on passerines may occur because of loss of breeding habitat and disturbance during construction phase works. These may include adverse effects on the Section 7 passerine and near-passerine species breeding on the Proposed Development site. Measures to ensure legislative compliance regarding nesting passerines and near-passerines (including Section 7 species) through the development process are set out under 'Tertiary Mitigation'. Habitat management measures intended to enhance the habitats on Site for birds, including Section 7 passerines and near-passerines, are set out under 'Secondary Mitigation'. Displacement of skylark territories from the Study Area (as a result of displacement from the solar array) is also anticipated during the operational phase.

Future baseline conditions

- 10.6.115 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that ‘an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge’ is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.
- 10.6.116 Current management of habitats within the Study Area is variable. Semi-improved and improved grasslands, and sown leys are heavily grazed, and are cultivated (and sown with crop) on a rotational basis. Several fields have extensive areas of encroaching bracken and rush, which is lightly grazed / bruised by livestock but is otherwise unmanaged. The marshy grassland to the south-east of the mixed plantation woodland appears to be frequently cut, and a series of shallow drainage ditches have been recently dug across it. Most streams / wet ditches in the Study Area appear to be unmanaged, however the larger canalised stream in the central – eastern part of the Study Area was recently dredged and reprofiled. The woodland in the central – eastern part of the Study Area is unmanaged.
- 10.6.117 In the absence of the Proposed Development, it is likely that land management in the Study Area will remain consistent. It follows that in the absence of the Proposed Development being permitted, the main potential for changes in the ecological characteristics of the Study Area are in regard to vegetative regrowth in the recent works areas along the edges of the existing tracks to the adjacent Llwynceilyn Wind Farm.
- 10.6.118 Populations trends for those species recorded during the baseline survey work are likely to result in changes to their population status at all geographic scales over the operational life of the Proposed Development.
- 10.6.119 The Welsh red kite population is increasing rapidly, with birds infilling the species’ historical breeding range, which includes suitable habitat in RCT. Given the relative abundance of suitable breeding habitat within 10 km of the Proposed Development site, it is likely that the breeding population of red kite in the ZoI will increase over the operational life of the Proposed Development.
- 10.6.120 Lapwing are in rapid decline in Wales, particularly at inland lowland sites in the south. This is considered to be largely as a result of a move from arable / mixed farming to grass leys and drainage of wet grassland (as well as other changes in habitat such as succession of brownfield sites). The population of the species adjacent to the Study Area constitutes the last remaining birds known to be breeding within RCT. Given the population decline and range retraction that the species is undergoing in Wales, it is likely that the species will cease breeding at the Study Area in the near future. Improved management of the breeding site was a condition of the adjacent Llwynceilyn scheme (constructed during 2024), and was detailed in a lapwing management Technical Note (BSG Ecology, 2022). The measures to be implemented are:

- Lapwing management areas within two fields, sown with cereal crop during February / early March or maintained as set-aside plots.
- Creation and maintenance of a shallow scrape in one of the fields.

10.6.121 Therefore, without the Proposed Development, the quality of the habitat for lapwing within proximity of the Study Area will improve. However, given the population decline and range retraction of the species in south Wales, local extinction of the breeding population remains likely.

10.6.122 Though goshawk and peregrine were not recorded breeding within the 1 and 2 km perimeter areas during the survey work, they may do so in the future. Suitable habitat is present for both locally (goshawk has bred adjacent to the Study Area historically, and there is suitable habitat for breeding peregrine within the 2 km perimeter area around the Study Area. The distribution for both species is likely to vary between years.

Key receptors

10.6.123 **Table 10.11** identifies the receptors taken forward into the assessment for ornithology.

Table 10.11: Key receptors taken forward to assessment

Receptor	Description
Red Kite	Given the rapidly expanding populations throughout both mid and south Wales, it is unlikely that the importance of the Proposed Development site for red kite will extend beyond the Local level.
Goshawk	Goshawk do not use the airspace over the Study Area on a regular basis. The open pasture and semi-mature mixed plantation woodland habitats typifying most of the Study Area are unlikely to be of importance to goshawk at greater than the Site level.
Peregrine	Peregrine was not recorded breeding locally to the Study Area during the survey work. Given that peregrine were recorded commuting, and occasionally hunting, over the Study Area and adjacent land (albeit infrequently) during the survey work, the Study Area is considered to be of importance for the species at the Site level.
Kestrel	No evidence of breeding kestrel was recorded during the survey work. Given that kestrel were recorded foraging over the Study Area and adjacent land infrequently, the Study Area is considered to be of importance for the species at the Site level.
Golden plover	Given the occasional use of the airspace over the Study Area by non-breeding golden plover, and birds landing within it infrequently, the Study Area is considered to be of importance for the species at the Local level.
Lapwing	Given the frequent lapwing flight activity over the Study Area throughout the survey work (during the winter as well as the breeding season), and the presence of 1-2 pairs breeding immediately to the west of the Study Area (the only breeding birds within RCT), the Study Area is considered to be of importance at the County level.
Nightjar	Given the small size of the local nightjar population, and that the species breeds locally to the Study Area and may forage over it, the Study Area is considered to be of importance at the Local level.
Non-focal species – herring gull and lesser black-backed gull	Given the frequency of flight activity recorded, a proportion of which was over the Study Area, and their conservation concern regionally and nationally, the Study Area is considered to be of importance for the species at the Site level.

10.7 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

- 10.7.1 The design process for the Proposed Development has been heavily influenced by the findings of early environmental appraisals and the EIA process. The Proposed Development has had several measures incorporated into the design to avoid or minimise environmental impacts.
- 10.7.2 The key aspects where the design has evolved are described in Volume 1, Chapter 3: Design evolution and alternatives of the ES. These include measures required for legal compliance, as well as measures that implement the requirements of good practice guidance documents. The assessment has been undertaken on the basis that these measures are incorporated in the design and construction practices (i.e. they are 'embedded mitigation').
- 10.7.3 Embedded mitigation measures for the Proposed Development are set out in Volume 1, Chapter 2: Project Description and the various management plans outlined in this chapter of the ES.
- 10.7.4 Implementation of embedded mitigation relied upon in the assessment will be secured in the DNS. Compliance of detailed design of the Proposed Development with the Outline Design Principles, or through compliance with relevant environmental management plans.
- 10.7.5 Consideration has been given to any 'additional mitigation' over and above the embedded mitigation that may be required and has the potential to mitigate any significant adverse effects identified following the assessment of the Proposed Development inclusive of its embedded mitigation.
- 10.7.6 Where significant effects remain following the implementation of embedded mitigation and achievable further measures could lower the identified effect, this chapter identifies additional mitigation and explains how the additional mitigation is secured. The residual effects (after the implementation of embedded and additional mitigation) have then been identified and are presented in each topic chapter.
- 10.7.7 Both embedded and additional mitigation measures relevant to the assessment of ecology are summarised in
- 10.7.8 **Table 10.12** below. Measures have been identified that may result in enhancement of existing environmental conditions.

Table 10.12: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	

Routeing and design of the solar array and access tracks to minimise impacts on the lapwing breeding area (no panels are proposed within the breeding fields, one of which is within the landholding), or habitats likely to be of high ecological value to most passerines (e.g. marshy grassland, scrub and hedgerows) within the Proposed Development site (in line with the step-wise approach set out in PPW 12.	The measure has been incorporated during the evolution of the design, and secured in the final design for the Proposed Development.
Retained habitat (suitable for nesting passerines) including buffers and root zones and / or working areas will be clearly demarcated with high visibility marker posts and maintained until works are complete. The marked area will act as an exclusion zone. All equipment / plant will operate from within the marked working area, and no spoil, vegetation or other materials are to be placed or stored outside of the working area.	The measure will be detailed in the CEMP, which will be secured in a planning condition.
A preconstruction ornithological survey programme to provide updated baseline information to feed into the CEMP and other operational plan documents. Surveys will include: • Pre-works survey for nesting red kite, at the known nest site, and all suitable habitat within 300 m of proposed infrastructure / construction operations. This should commence in the March prior to construction commencing. • Pre-works survey for goshawk within 500 m of proposed infrastructure / construction operations. This should commence in the March prior to construction commencing. • Pre-works survey for breeding lapwing in all suitable habitat on the Proposed Development site, or within 600 m of it (which includes the known breeding area and the Llwynceilyn lapwing management area). This should commence in the March prior to construction commencing.	The measure will be detailed in the CEMP, which will be secured in a planning condition.
The development of a detailed CEMP in consultation with stakeholders (i.e. NRW and RCTCBC) to build on the principles of the outline CEMP submitted as part of this planning application. The CEMP will include provisions relevant to birds, to prevent an offence from being committed under the Wildlife and Countryside Act 1981 (as amended), which prevents intentional or reckless killing, injury or taking of any wild bird; taking, damaging, destroying or otherwise interfering with the nest of that bird while it is in use or being built; obstruction of any wild bird from using its nest; and taking or destroying an egg of any wild bird. The measures will include: • The appointment of a suitably qualified Environmental Clerk of Works (ECoW) to oversee the application of the CEMP; • The clearance of vegetation during the winter (between September and February inclusive). If there is a need for destruction of habitats outside of the period October to February inclusive, this will be overseen by the ECoW, whose role will be to establish whether breeding birds are present or not; • The ECoW will undertake construction phase surveys of birds within the Proposed Development and will record information of breeding success as far as is possible (avoiding disturbance, and following relevant survey guidance provided in SNH, 2017). The data will be used with pre-construction baseline survey data and future data obtained during monitoring work to provide population information across each phase of the Proposed Development; and • Onsite speed limits for all construction vehicles, to minimise the potential for incidental killing of birds.	These measures will be detailed in the CEMP, which will be secured in a planning condition.
Further mitigation	

Enhancement of land outside the Proposed Development (to the west), to benefit breeding lapwing, will be detailed in a Lapwing Management Plan (LMP). Outline measures, to be detailed within the plan are as follows: • Creation of a 3.2 ha lapwing management area in the southern half of the field centred on OSGR ST 03872 92713 in which lapwing bred during the second year of survey (additional to those created for the Llwynneclyn scheme) • The extension of the existing 3.6 ha lapwing management area in 'Field 1' of the Llwynneclyn LMP, by 1.0 ha. • The lapwing management area will be sown with cereal crop during February / early March or will be a set-aside plot (a spring-sown crop / plot within the field will provide vegetative cover from predators for breeding lapwing).	This measure will be set out in the LMP.
Enhancement of the mixed plantation woodland through measures such as limited selective felling of non-native species (e.g. spruce sp.), planting of fruiting understorey species (tolerant of low light levels) and overseeding with a woodland ground flora seed mix, will improve the value of the habitat foraging resource for insectivores (such as <i>Phylloscopus</i> warblers) and berry-eating birds (e.g. fieldfare and redwing).	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Cessation of regular cutting of the marshy grassland south of the mixed plantation woodland, to mitigate for the reduction in the extent of this habitat. This will increase sward length and invertebrate biomass within the habitat, thereby increasing its suitability for passerines (e.g. meadow pipit and grasshopper warbler <i>Locustella naevia</i>).	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Control of encroaching bracken within semi-improved acid and marshy grassland. This will enhance the area of suitable foraging and breeding habitat for ground-nesting species (including skylark and meadow pipit).	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Fencing of field margins within the solar array (between solar panels and walls), to prevent overgrazing and allow the development of a longer and more diverse sward. This habitat will be cut annually in late summer / early autumn. This management will increase the invertebrate biomass within it, enhancing its value as a foraging resource for a range of passerines and near-passerines (e.g. linnet and skylark).	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.
Provision of 15 bird boxes in woodland (to compensate for the loss of suitable nest sites in the areas to be cleared): • Suitable trees for boxes should be identified by a suitably experienced ecologist ahead of installation. • A variety of nest boxes will be used, with most being 'standard' passerine nest boxes with 28 or 32 mm entrance holes (suitable for species such as blue tit and redstart <i>Phoenicurus phoenicurus</i>). A smaller number of species specific boxes (such as boxes designed for starling, treecreeper <i>Certhia familiaris</i> and spotted flycatcher <i>Muscicapa striata</i>) will also be installed.	This measure will be set out in the OHMP, and secured in a full HMP, which will be a condition of planning consent.

10.8 Assessment of effects

- 10.8.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development are listed in Error! Reference source not found., along with the maximum design

parameters against which each impact has been assessed. A description of the potential effect on receptors caused by each identified impact is given below.

Construction

- 10.8.1 The extent of the effects of construction on birds would depend upon the timing of disturbing activities, the degree of displacement (spatially and temporally) that occurs, the size, suitability and proximity of habitats available to displaced birds, and their capacity to accommodate them.
- 10.8.2 There have been only a small number of wind farm construction phase specific studies published in the peer reviewed literature. This is likely to be because disturbance during construction is short term and can often be mitigated by avoiding sensitive areas and certain times of year. Most studies of bird / wind farm interactions have concentrated on operational phase disturbance and collision.
- 10.8.3 Notwithstanding the above, there is a risk that construction work undertaken in the breeding season (the species recorded during baseline breeding bird survey work will predominantly breed between March and August inclusive) could result in the damage or destruction of active nests or the killing and injury of young birds. Without mitigation this would contravene the provisions of the Wildlife and Countryside Act 1981 (as amended). The effect of this has not been assessed as measures would inevitably need to be taken to ensure legislative compliance. There is specific guidance on the NatureScot website regarding this⁵⁹. The measures to manage the implementation of appropriate protection measures will be included in the CEMP.
- 10.8.1 Construction phase displacement impacts will be greatest on species that are intolerant of noise and the visible presence of people. Many common species of passerines and some waders breed in or alongside industrial sites, close to major roads and in heavily disturbed areas of farmland if the habitat is otherwise appropriate. However, individuals and populations not exposed to disturbance may not habituate to it in the short term. It follows that a worst-case assessment is that there will be some disturbance of breeding birds resulting from construction, and this could result in declines in productivity in some species during the construction period.

Operational

- 10.8.2 There are two ways in which birds can be affected by operational wind farms: through displacement due to ongoing disturbance caused by the turbine towers and moving blades (and by periodic servicing of them), and through collision with moving blades or associated infrastructure, e.g. the guy lines of meteorological masts.

⁵⁹ Available at: <https://www.nature.scot/doc/dealing-construction-and-birds> [Accessed 26/05/2023]

Displacement

- 10.8.3 A range of studies have concluded that most bird species are not significantly affected by operational wind farms (e.g. Vauk, 1990; Phillips, 1994; Percival, 2005, 2000; Devereux *et al.*, 2008; Winkelmann, 1994; Langston & Pullan, 2003; Hotker *et al.*, 2006). This is reflected by SNH Guidance (2017) on birds and wind farms which does not, for example, normally recommend surveys for breeding passerines. SNH Guidance, which is the UK standard, indicates that effort should focus on species/species groups that are thought to be susceptible to the effects of wind farms or highly protected species on which effects remain unclear. In the context of the Proposed Development, those species that are most susceptible are likely to be those that have a low tolerance to disturbance when breeding such as golden plover (Pearce-Higgins *et al.*, 2009), snipe and curlew (Pearce-Higgins *et al.*, 2012)), that breed on open moorland (such as merlin), and are susceptible to collision (such as red kite and kestrel (inferred from collision data presented by the Brandenburg Institute (Dürr, 2025)).

Collision

- 10.8.4 Worked collision risk analysis for target bird species is contained in **Appendix 10.4**.
- 10.8.1 The level of collision will depend on the extent to which birds are displaced, and their ability to detect and manoeuvre around rotating turbine blades. Birds that collide with blades are likely to be killed or fatally injured.
- 10.8.2 NatureScot and other nature conservation consultees recommend that collision risk of birds at wind farms is calculated using the model developed by Bill Band of SNH (Band *et al.*, 2007), and updated in 2024 (Band *et al.*, 2024). The extent to which outcomes of modelling reflect observed mortality rates has always been questionable, and the subject of academic debate (Chamberlain *et al.*, 2005; Chamberlain *et al.*, 2006; Madders & Whitfield, 2006; Drewitt & Langston, 2006; Fernley, Lowther & Whitfield, 2006). The main limitations of the model are that pre-construction use of the airspace above a Proposed Development by birds is assumed to be representative of the use of the airspace following wind farm construction, and that the rate of avoidance applied to the output of the model is often arbitrary. Where empirical estimates of avoidance can be applied, the model becomes a far more useful tool.
- 10.8.3 Red kite, goshawk, peregrine, kestrel, golden plover and lapwing were recorded overflying the Proposed Development site at collision risk height at a frequency that is likely to generate a risk of collision.
- 10.8.4 The recommended avoidance rate for red kite is 99% derived by Urquhart & Whitfield (2016) based on a study wind farm (Braes of Doune). For kestrel, a 95% avoidance rate is applied given its apparent vulnerability to collision (Whitfield & Madders, 2006). SNH (2018a) accepts that a “*default value*” avoidance rate of 98% can be applied when modelling collision risk for goshawk, peregrine, golden plover and lapwing.

- 10.8.5 The approach that has therefore been taken has been to look at empirical data for avoidance or typical flight characteristics that may have a bearing on likelihood of collision in each species seen, while also considering modelled collision risk where data has been collected that allow calculations to be made.
- 10.8.6 Various published studies have concluded that collisions are rare events, often occurring in situations where there are large numbers of birds (such as on narrow-front migratory flyways), or where the behaviour of birds leads to high risk situations (such as where wind turbines are located on the shortest route between a breeding colony and a foraging area) (e.g. Langston & Pullan, 2003; Drewitt & Langston, 2006; Hotker *et al.*, 2006). Any source of additional mortality may be significant for long-lived species with low productivity and slow maturation rates, especially if these species are relatively rare or in decline. Assessment of collision risk therefore concentrates on these species, as relevant to the Proposed Development.
- 10.8.7 Knowledge of the susceptibility of bird species to collision with wind turbines has taken many years to emerge. Before empirical data was available, it was assumed that species with a high wing loading and low manoeuvrability in flight were likely to be most susceptible to collision with turbine blades. However, as data has emerged it has become clear that this initial assessment was too simplistic.
- 10.8.8 Table 10.3 provides a summary of current knowledge of the UK and European population sizes and the known collisions of red kite, goshawk, kestrel, peregrine, golden plover and lapwing. It is based on mortality data collated by Dürr (2025), with context provided by European bird population estimates from Birdlife International (2021) and UK population estimates by Woodward *et al* (2020).

Table 10.13: Known collisions of the bird species that have been evaluated for further consideration in this assessment with wind turbines in Europe (in the context of populations)

Species	Known collisions in Europe to date ⁶⁰	UK population estimate	European population estimate (breeding pairs)
Red kite	910 (5)	4,400 breeding pairs	19,000-24,000
Goshawk	19 (0)	620 breeding pairs	130,000-180,000
Peregrine	48 (1)	1,750 breeding pairs	7,600-11,000
Kestrel	928 (2)	31,000 breeding pairs	300,000-440,000
Golden plover	47 (0)	32,500-50,500 breeding pairs 410,000 wintering individuals	520,000-720,000

⁶⁰ UK component in brackets where relevant.

Species	Known collisions in Europe to date ⁶⁰	UK population estimate	European population estimate (breeding pairs)
Lapwing	31 (0)	97,500 breeding pairs 635,000 wintering birds	2,000,000-11,000,000
Nightjar	2 (0)	3,700-5,500 breeding pairs	310,000-860,000

CSource: BirdLife International/European Bird Census Council (2000) European Bird Populations: Estimates and Trends. Cambridge, UK: BirdLife International (BirdLife Conservation Series No. 10)

10.8.9 Robust monitoring of bird mortality at wind farms is uncommon, and collisions are therefore under recorded. There will also be biases in the data, as wind farms in some parts of Europe are more frequently and effectively monitored than others, and bird species show differences in abundance across their range which may influence their likelihood of encountering wind farms.

10.8.10 Despite these shortcomings and biases, however, the data collated by Dürr on behalf of the Brandenburg Institute indicate that some species and species groups appear more susceptible to collision than others. Many collisions of raptors, such as kestrel, have occurred around migratory bottlenecks, particularly Southern Spain where wind farms are located along the low hills directly north of the Strait of Gibraltar⁶¹, and some individual wind farms account for a disproportionately large proportion of total collisions. In the context of populations, the number of collisions of all species presented here is very small.

Decommissioning

10.8.11 The effects of decommissioning have the potential to be similar to those during construction phase but are likely to occur over a shorter time period.

10.8.12 Species most likely to be disturbed and displaced from the Proposed Development site during decommissioning are those that breed, roost or forage within it at that time.

10.8.13 It is reasonable to expect that there will 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, changes in the attitude of land managers to birds, the spread of reintroduced populations, changes on the wintering and staging grounds of migrant species and other factors.

10.8.14 Predictions are not therefore possible, with any confidence, over a 35-year period (particularly given the rate of change in number and distribution of many protected species over the past 35 years). It follows that effects on birds would

⁶¹ Of the total reported kestrel collisions, 273 occurred in Spain of which the highest proportion of collisions occurred within the Cadiz province, including the coastlines near to Tarifa and Gibraltar.

be best addressed through a decommissioning phase Environmental Management Plan.

Impacts on Species: Red Kite

Sensitivity of the receptor

- 10.8.15 Given the rapidly expanding populations throughout both mid and south Wales, it is unlikely that the importance of the Proposed Development site for red kite will extend beyond the **Local** level.

Construction phase

Magnitude of impact

- 10.8.16 An active red kite nest was located within 300 m of the Proposed Development (the closest area in which construction works will take place, where solar panels are proposed), during both years of survey.
- 10.8.17 Goodship & Furness (2022) suggest an upper disturbance threshold of 150 – 300 m for red kite. There is therefore potential for birds breeding at the nest site to be displaced by construction activity.
- 10.8.18 Construction activities within 300 m of the nest site will be limited temporally and spatially. They may also take place outside of the breeding season (and period during which red kite are reestablishing presence at the nest site), considered to be mid-January to mid-August as a guide.
- 10.8.19 The nest is located in a copse surrounded by actively farmed enclosed pasture. It is likely that farm vehicles are present within the habitat intermittently (for example, aerial imagery shows the presence of a livestock feeding unit within the field, which is likely to have been transported by vehicle, and several tracks are visible). Birds nesting at the location are therefore likely to be habituated to infrequent anthropogenic (vehicular) disturbance within 300 m of the nest site.
- 10.8.20 The nest is located approximately 250 m ASL, whilst the nearest area at which proposed construction work is to take place (installation of solar panels) is approximately 300 m ASL, and is on a flatter plateaued area. The line of sight between the nest site and the area of the Proposed Development between 280 and 300 m of the nest site is therefore restricted.
- 10.8.21 Red kite were frequently recorded overflying the Study Area. There is therefore potential for birds foraging over the Proposed Development site to be displaced by construction activity.

Significance of the effect

- 10.8.22 Construction phase impacts (such as noise and presence of people and machinery) are anticipated to be limited temporally and spatially (construction activity is unlikely to occur over a large proportion of the Proposed Development site at any given time). Given this, and the extent of suitable

foraging habitat for the species in the wider area, it is considered that disturbance effects during construction could be adverse but are likely to be of **negligible** significance in terms of the local and favourable conservation status of red kite.

- 10.8.23 Given that construction activities will be limited temporally and spatially, that birds nesting at this location are likely to be habituated to a baseline level of disturbance within the buffer area (given that the nest site is located within actively farmed enclosed pasture) and that line of sight between the nest site and the area of the Proposed Development is restricted, it is considered that disturbance effects during construction are likely to be of **negligible** significance

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.24 An active red kite nest was located 280 m south-west of the nearest edge of the Proposed Development, during both years of survey.
- 10.8.25 Infrastructure of the Proposed Development that is to be located within 300 m of the nest site comprises solar panels.
- 10.8.26 Red kite were frequently recorded overflying the Study Area.
- 10.8.27 There appear to be few, if any, studies of red kite displacement as a result of wind farms. In deriving an avoidance rate for red kite, Urquhart & Whitfield (2016) reference an unpublished report (Fielding & Urquhart, 2013), which concluded that any background change in potential for flight activity post-construction (as a result of displacement) was unlikely, due to the effect of an expanding population at the study wind farm⁶². In addition, survey work for monitoring or to support built schemes, such as that at Mynydd y Gwair (Swansea) and Bryn Titli (Powys) indicate that flights regularly occur within 200 m of turbines, which therefore suggests that displacement effects are minimal. Authors such as Bellebaum *et al.* (2013) have concluded that kites are not displaced based on finding corpses close to turbines in Germany. However, this may not be entirely representative of the situation at the Proposed Development site, as in the German study the turbines are in arable land and kites are more likely to forage in the habitat around the turbine bases than elsewhere. Furthermore, northern, and central European populations are migratory⁶³ (Keller *et al.*, 2020), and may be more prone to collision with wind turbines whilst migrating, when it is likely that birds will spend more time at collision risk height.

Significance of the effect

⁶² Braes of Doune Wind Farm, Perthshire.

⁶³ Whereas British populations are largely sedentary.

- 10.8.28 It is concluded that very localised displacement may occur in the immediate vicinity of turbines, but that this will be of **negligible** significance for red kite.

Collision

Magnitude of impact

- 10.8.29 Data collated by Dürr (2025) indicate there have been 910 collisions of red kite with wind turbines recorded in Europe to date⁶⁴. Of these, 5 are noted as having occurred in Great Britain. Most of the collisions have been in Germany 793, with fewer in other countries; 53 in France, 34 in Spain, 12 in Sweden, 5 in Belgium, 3 in Luxembourg, 2 in Netherlands, and 1 in each of the Czech Republic, Denmark and Austria. BSG Ecology is aware of two additional fatalities not included in these data during the past five years; a fatality at a wind farm in the South Wales valleys, and one at the Mynydd y Gwair Wind Farm (Swansea).
- 10.8.30 The collision risk model (based on all flights recorded within the VP viewsheds) predicts that 2.7 collisions per annum will occur at the Proposed Development.

Significance of the effect

- 10.8.31 Given the rapidly expanding populations of the species at all geographic levels the anticipated loss of 2.7 red kite per year will result in a significant adverse effect at the **Local** level.

Decommissioning

- 10.8.32 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit over a shorter time period. It is considered that, provided no nesting red kite are present within 300 m of infrastructure at the time of decommissioning, disturbance effects during decommissioning could be adverse but are likely to be of **negligible** significance in terms of the local and favourable conservation status of red kite.

Impacts on Species: Goshawk

Sensitivity of the receptor

- 10.8.33 Goshawk do not use the airspace over the Study Area on a regular basis. The open pasture and semi-mature mixed plantation woodland habitats typifying most of the Study Area are unlikely to be of importance to goshawk at greater than the **Site** level.

⁶⁴ Most recently updated 26 February 2025.

Construction phase

Magnitude of impact

- 10.8.34 No goshawk nests were located on or within 1 km of the Study Area during either year of survey (a probable territory was located more than 1 km from the Study Area during the second year of survey). Disturbance and / or displacement of breeding birds by construction phase activity is not anticipated. Goodship & Furness (2022) suggest an upper disturbance threshold of 300 – 500 m for goshawk, and reference the lowest recommended buffer (dependant on individual tolerance) as being 200 m. Suitable breeding habitat (mature coniferous plantation), including an historic nest site (occupied within the last 20 years) is present within 500 m of the Proposed Development.
- 10.8.35 Goshawk hunting and commuting flights were recorded infrequently over the Proposed Development site throughout the survey work.

Significance of the effect

- 10.8.36 No forestry operations will be required as part of the Proposed Development. Disturbance effects may occur if a nest site is located within 500 m of the Proposed Development at the time of construction. Such disturbance effects could be adverse but are likely to be **negligible** in terms of the local and favourable conservation status of goshawk, given the expanding populations of goshawk at all geographical levels. However, in the absence of mitigation measures, disturbance could represent an offence under the Wildlife & Countryside Act 1981 and mitigation needs to be considered. The low levels of hunting activity over the Proposed Development site means that any temporally or spatially limited displacement effects of hunting birds will be of **negligible** significance in terms of the local and favourable conservation status of goshawk.

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.37 No goshawk nests were located on or within 1 km of the Study Area during either year of survey (a probable territory was located more than 1 km from the Study Area during the second year of survey). Disturbance and / or displacement of breeding birds by the operational scheme is not anticipated. Goodship & Furness (2022) suggest an upper disturbance threshold of 300 – 500 m for goshawk, and reference the lowest recommended buffer (dependant on individual tolerance) as being 200 m. Suitable breeding habitat (mature coniferous plantation), including an historic nest site (occupied within the last 20 years) is present within 500 m of the Proposed Development.
- 10.8.38 Goshawk hunting and commuting flights were recorded infrequently over the Proposed Development site throughout the survey work.

Significance of the effect

- 10.8.39 Given the low levels of hunting and commuting activity over the Proposed Development site, limited displacement effects of hunting and commuting non-breeding birds are anticipated. This effect is considered to be of **negligible** significance in terms of the local and favourable conservation status of goshawk.

Collision

Magnitude of impact

- 10.8.40 Data collated by Dürr (2025) indicates there have been 19 collisions of goshawk with wind turbines recorded in Europe. Of these, 12 were reported from Germany, four from Spain and singles from Denmark, France and the Netherlands; none have been reported in the UK.
- 10.8.41 The collision risk model (based on all flights recorded within the VP viewsheds) predicts that 0.2 collisions per annum will occur at the Proposed Development (or 1 bird every 5 years). Comparatively few flights (19 flights (39% of the total)) were at least partially over the Study Area at collision risk height (ground level to 200 m above ground level, 11 flights (22% of the total) were in the height band 30-200m)⁶⁵. The actual collision risk is therefore likely to be lower than that produced by the collision risk modelling.
- 10.8.42 The number of collisions recorded in Europe (19) is very small in the context of the European population of 130,000-180,000 breeding pairs, and the 'default' avoidance rate of 98% is applied to the collision risk model in the absence of any empirical study of collision mortality of goshawk. The regional and national populations of goshawk are reported to be expanding; WOS, 2021; Balmer, 2013), and productivity rates of goshawk are likely to be high (Cramp (1980) reported 2.7 to 3.1 fledged young per nest).

Significance of the effect

- 10.8.43 Given the low number of recorded collisions throughout Europe, expanding populations at all geographical levels, and likelihood that a high proportion of flights will be associated with areas away from the proposed turbine locations, it is reasonable to conclude that collision impacts on goshawk will be of **negligible** significance.

Decommissioning

- 10.8.44 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit over a shorter time period. It is considered that, provided no nesting goshawk are present within 500 m of infrastructure at the

⁶⁵ Given that the turbine parameters meant that for three turbines, the bottom of the rotor swept area reaches 23.8 m above ground level, and that CRH was taken as 30-200 m above ground level during the survey work, all flights recorded as 'below CRH' during the survey work have been assumed as being at CRH. In reality a high proportion of the flights recorded as being 'below CRH' during the survey work will have been below 23.8 m above ground level (and therefore genuinely below CRH). The number of goshawk flights over the Study Area at CRH is therefore likely to be lower than 19.

time of decommissioning, disturbance effects could be adverse but are likely to be **negligible** in terms of the local and favourable conservation status of goshawk.

Impacts on Species: Peregrine

Sensitivity of the receptor

- 10.8.45 Peregrine was not recorded breeding locally to the Study Area during the survey work. Given that peregrine were recorded commuting, and occasionally hunting, over the Study Area and adjacent land (albeit infrequently) during the survey work, the Study Area is considered to be of importance for the species at the **Site** level.

Construction phase

Magnitude of impact

- 10.8.46 No peregrine nest sites were located on or within 2 km of the Study Area during either year of survey. The closest suitable habitat (cliff faces within disused quarries) are more than 1 km from the Proposed Development site. Goodship & Furness (2022) suggest an upper disturbance threshold of 500 – 750 m for peregrine.
- 10.8.47 Peregrine hunting and commuting flights were recorded infrequently over the Proposed Development site throughout the survey work.

Significance of the effect

- 10.8.48 Given the lack of active nests, or suitable habitat to support active nests within recognised disturbance distances for the species, disturbance during the construction phase, impacts on breeding peregrine are anticipated to be of **negligible** significance. The low levels of hunting and commuting activity over the Proposed Development site means that limited displacement effects of hunting and commuting birds (that do not breed within 1 km of the Study Area), this displacement could be adverse but is likely to be **negligible** in terms of the local and favourable conservation status of peregrine.

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.49 No peregrine nest sites were located on or within 2 km of the Study Area during either year of survey. The closest suitable habitat (cliff faces within disused quarries) are more than 1 km from the Proposed Development site. Goodship & Furness (2022) suggest an upper disturbance threshold of 500 – 750 m for peregrine.

- 10.8.50 Peregrine hunting and commuting flights were recorded infrequently over the Proposed Development site throughout the survey work.

Significance of the effect

- 10.8.51 Given the lack of active nests, or suitable habitat to support active nests within recognised disturbance distances for the species, disturbance during the construction phase, impacts on breeding peregrine are anticipated to be of **negligible** significance. The infrequent hunting and commuting activity over the Proposed Development site means that limited displacement effects of hunting and commuting birds (that do not breed within 1 km of the Study Area), this displacement could be adverse but is likely to be **negligible** in terms of the local and favourable conservation status of peregrine.

Collision

Magnitude of impact

- 10.8.52 Data collated by Dürr (2025) indicates there have been 48 recorded collisions of peregrine with wind turbines in Europe, 1 of which was from Great Britain. Of these, 32 were reported from Germany, 6 from Spain, 4 from France, 3 from Belgium and 1 in each of Austria and the Netherlands.
- 10.8.53 The collision risk model (based on all flights recorded within the VP viewsheds) predicts that 0.1 collisions per annum will occur at the Proposed Development (or 1 bird every 10 years).

Significance of the effect

- 10.8.54 Given the low number of recorded collisions throughout Europe, stable (and slightly increasing populations at the national and regional level, and the absence of locally breeding pairs, it is considered that the loss of one non-breeding bird every ten years is anticipated to have a **negligible** impact on the favourable conservation status of the species.

Decommissioning

- 10.8.55 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit over a shorter time period. It is therefore considered that disturbance effects could be adverse but are likely to be **negligible** in terms of the local and favourable conservation status of peregrine.

Impacts on Species: Kestrel

Sensitivity of the receptor

- 10.8.56 No evidence of breeding kestrel was recorded during the survey work. Given that kestrel were recorded foraging over the Study Area and adjacent land infrequently, the Study Area is considered to be of importance for the species at the **Site** level.

Construction phase

Magnitude of impact

- 10.8.57 No kestrel nests were located on or within 2 km of the Study Area during either year of survey, therefore disturbance and / or displacement of breeding birds by construction phase activity is not anticipated.
- 10.8.58 Kestrel were recorded occasionally during the VP survey work, with five flights recorded in total (during the two years of survey) and a maximum of three flights in a survey season. Two flights were partially over the Study Area, both at collision risk height (in the 30-200m height band), the three other flights were over land adjacent to the Study Area.

Significance of the effect

- 10.8.59 Given the absence of breeding birds locally, and the low levels of activity recorded at and adjacent to the Proposed Development, construction phase impacts on kestrel are anticipated to be of **negligible** significance.

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.60 No kestrel nests were located on or within 2 km of the Study Area during either year of survey. Kestrel were recorded occasionally during the VP survey work, with five flights recorded in total (during the two years of survey) and a maximum of three flights in a survey season. Two flights were partially over the Study Area at collision risk height (in the 30-200 m height band), the three other flights were over land adjacent to the Study Area. One flight over the Proposed Development site involved a bird hunting (hovering) over the improved and semi-improved pasture in the fields in the southern part of the Study Area, within which solar panels are proposed (the other involved a bird commuting west along the boundary of the Study Area, over land immediately adjacent to the location of proposed solar panels).

Significance of the effect

- 10.8.61 The installation of solar panels may lead to a reduction in the area of the suitable foraging habitat (improved and semi-improved pasture) for kestrel in the Study Area. Given the low levels of activity recorded at and adjacent to the Proposed Development and the abundance of suitable foraging habitat locally, operational phase displacement of kestrel is not anticipated, so the impact will be of **negligible** significance.

Additional mitigation and residual effect

- 10.8.62 Several of the enhancement measures proposed in open habitats within the Study Area will benefit foraging kestrel. They are:
- Cessation of regular cutting of the marshy grassland.

- Control of encroaching bracken within semi-improved acid and marshy grassland.
- Fencing of field margins within the solar array (between solar panels and walls), to prevent overgrazing and allow the development of a longer and more diverse sward.

10.8.63 In combination, these measures will result in an increase in the invertebrate, reptile and rodent populations in the Study Area, which will compensate for the loss of suitable foraging habitat within the solar array (an effect of negligible significance given the low levels of kestrel activity recorded), and the effect of the displacement effect of the operational scheme on kestrel will remain of **negligible** significance.

Collision

Magnitude of impact

10.8.64 Of a total of 928 officially documented collisions in Europe, two are from the UK. Large proportions of the total collisions across Europe were reported from France (404 collisions), Germany (159 collisions) and Spain (273 collisions) (Dürr, 2025). Thirty-six of the collisions in Spain have been recorded at the Park Pesur, Gibraltar, and 107 at Tarifa Wind Farm. The collisions at these sites are likely to include migrating birds (given the location of the wind farms on the primary raptor flyway between Western Europe and West Africa).

10.8.65 The collision risk model (based on all flights recorded within the VP viewsheds) predicts that 0.1 collisions per annum will occur at the Proposed Development (or 1 bird every 10 years).

10.8.66 A review of data by Whitfield & Madders (2006) suggests that kestrel appear to be relatively vulnerable to collision strikes. This observation was based on collision fatality data collected at 13 wind farms in northern Spain by Lekuona & Ursúa (2006). During the two-year study, a total of 457 observations of kestrel were made, and 12 birds were found dead as a result of collision.

10.8.67 Kestrel were recorded occasionally during the VP survey work, with five flights recorded in total (during the two years of survey) and a maximum of three flights in a survey season. Two flights were partially over the Study Area at collision risk height (in the 30-200 m height band). The three other flights were at collision risk height (in the 30-200 m height band) over land adjacent to the Study Area.

Significance of the effect

10.8.68 Given the low collision risk generated by the model, collision impacts on kestrel would be likely to be of **negligible** significance to the favourable conservation status of the species.

Decommissioning

10.8.69 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit over a shorter time period. It is therefore considered

that disturbance effects could be adverse but are likely to be **negligible** in terms of the local and favourable conservation status of kestrel.

Impacts on Species: Golden Plover

Sensitivity of the receptor

- 10.8.70 Given the occasional use of the airspace over the Study Area by non-breeding golden plover, and birds landing within it infrequently, the Study Area is considered to be of importance for the species at the **Local** level.

Construction phase

Magnitude of impact

- 10.8.71 The Study Area is outside the breeding range of golden plover in Wales. No indication of breeding was recorded.
- 10.8.72 Twenty golden plover flights were recorded during the two years of VP survey, all during the period October to early April (inclusive). Nine of the flights were at least partially over the Study Area at collision risk height. Two of the flights ended with birds landing in the Study Area and one of these involved birds (a flock of 19) landing within the footprint of the proposed solar array, within the Proposed Development site (the other involved a flock of 22 birds landing in a field in the western part of the Study Area, within which no development is proposed). On most occasions where birds were seen to land, they landed on the acid grassland to the north-west of the Proposed Development (approximately 230 m from the nearest proposed infrastructure), over which most flight activity was concentrated. Four flights involved birds viewed distantly (beyond the 2 km viewing arc) to the south of the Proposed Development, over Mynydd y Glyn.
- 10.8.73 Given the relatively short distances between the known wintering sites of Mynydd y Glyn and Mynydd Eglwysilan from the site to the north-west of the Proposed Development, the intermittent use of the site adjacent to the Proposed Development, it is likely that birds move between the local hilltops throughout the passage periods / winter, and that birds recorded at all three locations comprise one local non-breeding population (typically present during the period October to March).

Significance of the effect

- 10.8.74 Construction phase impacts (such as noise and presence of people and machinery) are anticipated to be limited temporally and spatially (construction activity is unlikely to occur over a large proportion of the Proposed Development site at any given time). Birds that use local hilltops (including Mynydd y Glyn and Mynydd Eglwysilan) use land adjacent to the Proposed Development intermittently, overfly the Proposed Development infrequently and occasionally land within or immediately adjacent to it. Disturbance during the construction phase (if construction activity takes place during the period

October to early April (inclusive)) are anticipated to displace birds from within the Proposed Development to the favoured areas adjacent, resulting in an effect of significance at no greater than the **Local** level. Construction phase activities outside the period October to mid-April will be of **negligible** significance to the species.

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.75 Survey work for monitoring at other wind farms in South Wales, including Mynydd y Gwair (Swansea) indicates that flights regularly occur within 200 m of turbines, and found that, though peak flock size fluctuates between years, peak counts for the first five years post-construction were in the range 90-600 birds with a median value of 268 birds, whilst pre-construction VP surveys recorded up to 260 birds. It was concluded that golden plover were not obviously displaced by the wind farm, which suggests that displacement effects from turbines are minimal for non-breeding golden plover.
- 10.8.76 The occasional use of the Study Area for foraging is anticipated to reduce as a result of the installation of solar panels within a proportion of the foraging area (given that birds were observed landing within the proposed solar array area on one occasion during the survey work). However, birds are likely to continue to overfly it infrequently (given the lack of displacement from turbines evidenced at other schemes).
- 10.8.77 The creation of the lapwing management area for the adjacent Llwyncelyn scheme (at least one year prior to the construction of the Proposed Development) is likely to enhance the suitability of habitat in that area, more distantly to the west, for non-breeding golden plover.

Significance of the effect

- 10.8.78 Given that the occasional foraging within the Proposed Development is anticipated to cease (due to installation of solar panels in the fields) with birds likely to continue to rely on the favoured area (outside the Study Area, to the north-west) and the newly created lapwing management area (more distantly to the west), displacement of foraging birds of significance at no greater than the **Local** level is anticipated.

Additional mitigation and residual effect

- 10.8.79 The creation of additional lapwing management areas to the west of the Proposed Development will further enhance the area for non-breeding golden plover (through the creation of a scrape and set-aside areas).
- 10.8.80 The enhancement of the lapwing management area is considered likely to more than compensate for the loss of occasionally used areas within the Proposed Development footprint, so will not reduce the overall foraging resource available to the local non-breeding golden plover population. Taking into account the mitigation proposals, impacts of displacement of the local non-

breeding golden plover population is considered to be of significance at no greater than the **Site** level.

Collision

Magnitude of impact

- 10.8.81 Data collated by Dürr (2025) indicates there have been 47 collisions of golden plover recorded in Europe. Of these, 25 were reported from Germany, 7 from Norway, 5 from each of France and the Netherlands, three from Spain and one from each of Denmark and Sweden; none have been recorded in the UK.
- 10.8.82 The collision risk model (based on all flights recorded within the VP viewsheds) predicts that 3.5 collisions per annum will occur at the Proposed Development.
- 10.8.83 Survey work from monitoring at other wind farms in South Wales, including Mynydd y Gwair (Swansea) indicates that flights regularly occur within 200 m of turbines, and found no evidence of a reduction in the number of birds wintering at the site post-construction. Post-construction fatality survey (using dogs) during the same monitoring period did not record any collision related golden plover fatalities^{66 67}.
- 10.8.84 The creation of the lapwing management area for the adjacent Llwyncelyn scheme (at least one year prior to the construction of the Proposed Development) is likely to create further suitable habitat for non-breeding golden plover, more distantly to the west. Foraging within fields in the Proposed Development, is anticipated to cease (as a result of installation of solar panels). However, these considerations are not anticipated to result in a significant reduction in the (infrequent) flight activity over the Proposed Development, as most flights that were partially over the Proposed Development did not result in birds landing within it (but were part of much longer circling flights over the area), and evidence from other schemes does not suggest that birds avoid turbines⁶⁸.

Significance of the effect

- 10.8.85 Given the evidence from other wind farms of low collision impacts on golden plover, it is considered likely that collision impacts on golden plover would be of **negligible** significance to the favourable conservation status of the species.

⁶⁶ A minor feather spot of golden plover feathers was recorded during the final year of monitoring, however due to the lack of a carcass, it was inconclusive whether this represented a collision fatality – a range of raptor species including peregrine and merlin were recorded during winter at the site, and several clear instances of predation of other bird species were recorded.

⁶⁷ Fatality searches were completed during the periods; February, April, July and October. Birds were typically present at the site during the period September to March (inclusive), therefore the February and October were completed during the period in which birds were present at the site.

⁶⁸ In 2015 BSG Ecology recorded golden plover foraging approximately 25 m from the base of a turbine (at night, using a thermal imaging camera), at a site in East Yorkshire.

Decommissioning

- 10.8.86 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit over a shorter time period. It is therefore considered that disturbance effects could be of significance at the **Local** level for golden plover.

Impacts on Species: Lapwing

Sensitivity of the receptor

- 10.8.87 Given the frequent lapwing flight activity over the Study Area throughout the survey work (during the winter as well as the breeding season), and the presence of 1-2 pairs breeding immediately to the west of the Study Area (the only breeding birds within RCT), the Study Area is considered to be of importance at the **County** level.

Construction phase

Magnitude of impact

- 10.8.88 In the first year of survey, successful breeding by lapwing was recorded at one nest site in the western part of the Study Area (outside the footprint of the Proposed Development, 70 m from the nearest part of it – an existing access track). During the second year of survey, two lapwing nest sites were inferred (from behaviour of adult birds at the locations throughout the breeding season), one in the same field as that recorded in the first year of survey (approximately 20 m from the nearest part of the Proposed Development – the existing access track), the second outside the Study Area to the west, approximately 170 m from the nearest part of the Proposed Development.
- 10.8.89 Pre and post breeding, flocks of up to 11 birds were recorded in the breeding area.
- 10.8.90 Lapwing flights were centred on the breeding areas in both years and a high proportion of flight activity was over the Proposed Development site. More than half of the flight activity (52 minutes and 23 seconds (57% of the total flight time)) was below 30 m above ground level (the lower end of the collision risk height band used during the survey work). A high proportion of that activity is likely to have been below 23.8 m (and therefore below collision risk height), given the species typical flight style.
- 10.8.91 A lapwing management area is to be created (as a condition of the adjacent Llwyncelyn scheme), outside the Proposed Development site, centred on two fields to the west-south-west of the current breeding area (away from the Proposed Development). The area is to be located approximately 20 m from the nest site recorded during the first year of survey, and 110 m and 70 m (respectively) from the nest sites inferred during the second year of survey. The shortest distance between the nearest Proposed Development (the existing access track) and the lapwing management area is 73 m, though 80% of the total area of the lapwing management is beyond 200 m from it. The

shortest distance between the nearest proposed turbine and the lapwing management area is 180 m, though 96% of the total area of the lapwing management is beyond 200 m from it.

Significance of the effect

- 10.8.92 Construction phase impacts (such as noise and presence of people and machinery) are anticipated to be limited temporally and spatially (construction activity is unlikely to occur over a large proportion of the Proposed Development site at any given time). Taking into consideration the value of the breeding area for the species (being the only remaining known breeding birds in RCT), and the proximity of the Proposed Development, construction phase impacts have the potential to be of significance at the **County** level, if construction works within 200 m of the breeding area are to be carried out during the breeding season for lapwing (mid-February to July as a guide). If construction works are to be conducted outside the breeding season, construction phase impacts are anticipated to be of **negligible** significance to the species.

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.93 In the first year of survey, successful breeding by lapwing was recorded at one nest site in the western part of the Study Area (outside the footprint of the Proposed Development, 70 m from the nearest part of it – an existing access track). During the second year of survey, two lapwing nest sites were inferred (from behaviour of adult birds at the locations throughout the breeding season), one in the same field as that recorded in the first year of survey (approximately 20 m from the nearest part of the Proposed Development – the existing access track), the second outside the Study Area to the west, approximately 170 m from the nearest part of the Proposed Development.
- 10.8.94 Pre and post breeding, flocks of up to 11 birds were recorded in the breeding area.
- 10.8.95 Lapwing flights were centred on the breeding areas in both years and a high proportion of flight activity was over the Proposed Development site. A high proportion of the flight activity (52 minutes and 23 seconds (57% of the total flight time)) was below 30 m above ground level (the lower end of the collision risk height band used during the survey work). A high proportion of that activity is likely to have been below 23.8 m (and therefore below collision risk height), given the species typical flight style.
- 10.8.96 On at least six occasions, birds were observed landing or taking off from fields within the Proposed Development site, within which solar panels are to be installed; with three flights during the 2022 breeding season (two during May and one in June) and two flights during the 2023 breeding season (both during April) involving birds commuting between the Proposed Development site and

the breeding area. One flight during each non-breeding / winter season (in October 2022 and January 2024) also involved birds landing / taking off from fields within the Proposed Development (within which solar panels are to be installed). Flights between the breeding area and fields to the west and south-west were also recorded.

- 10.8.97 A lapwing management area is to be created (as a condition of the adjacent Llwynneclyn scheme), outside the Proposed Development site, centred on two fields to the west-south-west of the current breeding area (away from the Proposed Development. The area is to be located approximately 20 m from the nest site recorded during the first year of survey, and 110 m and 70 m (respectively) from the nest sites inferred during the second year of survey. The shortest distance between the nearest Proposed Development (the existing access track) and the lapwing management area is 73 m, though 80% of the total area of the lapwing management is beyond 200 m from it. The shortest distance between the nearest proposed turbine and the lapwing management area is 180 m, though 96% of the total area of the lapwing management is beyond 200 m from it.
- 10.8.98 Operational phase displacement of nest sites may occur due to proximity of turbines, and evidence suggests that lapwing will not forage within solar arrays.
- 10.8.99 Lapwing flights between the breeding area and fields within the Proposed Development, as well as fields to the west and south-west suggest that the fields within the Proposed Development within which solar panels are to be installed form part of a cluster of fields within which the breeding birds forage. In isolation, loss of these areas (due to installation of solar panels) would adversely impact the breeding birds adjacent to the Proposed Development. However, the creation of a lapwing management area (at least one breeding season prior to construction of the Proposed Development) as part of the Llwynneclyn proposals, is likely to enhance the suitability of the foraging habitat to the west and south-west of the current breeding area. This is anticipated to more than compensate for the loss of foraging habitat within the scheme.

Significance of the effect

- 10.8.100 It is anticipated that lapwing are unlikely to be displaced from the breeding area as a result of operational phase effects⁶⁹. However, foraging lapwing will be displaced from the fields within the Proposed Development within which solar panels are to be installed. Displacement of foraging lapwing (which breed on adjacent land) is therefore anticipated to have an adverse impact on the species, of significance at the **Local** level (birds formerly foraging within the Proposed Development site will be displaced outside it).

Additional mitigation and residual effect

⁶⁹ Though they may relocate to the more suitable habitat that will have been created within the lapwing management area for the adjacent Llwynneclyn scheme.

- 10.8.101 Further lapwing management areas (in addition to those created prior to construction as part of the adjacent Llwynceilyn scheme) are to be created. Outline measures, to be detailed within the plan are as follows:
- Creation of a 3.2 ha lapwing management area in the southern half of the field centred on OSGR ST 03872 92713 in which lapwing bred during the second year of survey (additional to those created for the Llwynceilyn scheme)
 - The extension of the existing 3.6 ha lapwing management area in 'Field 1' of the Llwynceilyn LMP, by 1.0 ha.
 - The lapwing management area will be sown with cereal crop during February / early March or will be a set-aside plot (a spring-sown crop / set-aside plot within the field will provide vegetative cover from predators for breeding lapwing).
- 10.8.102 The enhancement of further habitat for lapwing, in addition to the existing measures of the adjacent Llwynceilyn scheme, increases confidence that the significance of displacement effects on lapwing during the operational phase of the Proposed Development will not be of significance at greater than the **Local** level.

Collision

Magnitude of impact

- 10.8.103 Data collated by Dürr (2025) indicates there have been 31 collisions of lapwing, none of which have occurred in the UK. Of these, 19 were reported from Germany, six from France and three from each of Belgium and the Netherlands.
- 10.8.104 The collision risk model (based on all flights recorded within the VP viewsheds) predicts that 0.9 collisions per annum will occur at the Proposed Development (or 1 bird every 1.1 years). These numbers are likely to be a significant overestimate, due to the fact that all flights from ground level to 30 m (the height band considered to be below collision risk height during the survey work) have been treated as being at collision risk height (given the lower sweep of 23.8m of the shortest models now being considered). Comparatively few flights (52 minutes and 23 seconds (57% of the total flight time)) were in the 30-200m height band⁷⁰. A high proportion of that activity is likely to have been below 23.8 m (and therefore below collision risk height), given the species typical flight style. The actual collision risk is therefore likely to be lower than that produced by the collision risk modelling.

⁷⁰ Given that the turbine parameters meant that for three turbines, the bottom of the rotor swept area reaches 23.8 m above ground level, and that CRH was taken as 30-200 m above ground level during the survey work, all flights recorded as 'below CRH' during the survey work have been assumed as being at CRH. In reality a high proportion of the flights recorded as being 'below CRH' during the survey work will have been below 23.8 m above ground level (and therefore genuinely below CRH). The number of lapwing flights over the Study Area at CRH is therefore likely to be lower.

- 10.8.105 The creation of the lapwing management area for the adjacent Llwynneclyn scheme (at least one year prior to the construction of the Proposed Development) is likely to encourage the breeding birds to forage (and possibly nest) more distantly to the west. Foraging within fields in the Proposed Development, adjacent to the breeding area is anticipated to cease, as a result of installation of solar panels. It follows that there will be a reduction in lapwing activity over the Proposed Development site, and therefore activity around turbines will decrease.

Significance of the effect

- 10.8.106 Due to the inclusion of flights within the 0-30 m height band (a majority of which are likely to be below collision risk height) within the collision risk modelling, and the installation of solar panels in former foraging areas around proposed turbines being anticipated to reduce flight activity over the Proposed Development, the expected collision risk of 0.9 collisions per annum is considered to be a significant overestimate.
- 10.8.107 However, given the fragility of the lapwing population in fields adjacent to the Proposed Development (the only known breeding birds in RCT) the loss of any birds are likely to result in an adverse effect on the species of significance at the **County** level.

Additional mitigation and residual effect

- 10.8.108 Further lapwing management areas (in addition to those created prior to construction as part of the adjacent Llwynneclyn scheme) are to be created in land to the west of the Proposed Development. These are anticipated to increase the resilience of the population, however, this is unlikely to be sufficient to significantly reduce level of the impact on the species.

Decommissioning

- 10.8.109 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit over a shorter time period. It is therefore considered that disturbance effects could be of significance at the **County** level for lapwing.

Impacts on Species: Nightjar

Sensitivity of the receptor

- 10.8.110 Given the small size of the local nightjar population, and that the species breeds locally to the Study Area and may forage over it, the Study Area is considered to be of importance at the **Local** level.

Construction phase

Magnitude of impact

- 10.8.111 Construction of the proposed development during the period in which nightjar are present (May to September) will be completed during daylight hours.

- 10.8.112 No construction works will take place within suitable breeding habitat for nightjar, the nearest clear-fell habitat suitable for breeding nightjar is approximately 420 m from the nearest edge of the Proposed Development.

Significance of the effect

- 10.8.113 Given the timing of construction phase work during daylight hours in the nightjar breeding season, and the distance between construction areas and suitable nightjar breeding habitat, no effects of construction of the Proposed Development on foraging or breeding nightjar are anticipated. Construction phase impacts are anticipated to be of **negligible** significance.

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.114 The territory location recorded during both years of survey is more than 550 m north of the nearest proposed turbine location (though territory locations will vary between years in response to the felling cycle). The nearest clear-fell habitat suitable for breeding nightjar is approximately 420 m from the nearest edge of the Proposed Development.
- 10.8.115 Studies at other wind farm sites in south Wales have demonstrated that nightjar are not significantly displaced by operational phase wind farms. At Brechfa West Wind Farm, areas of plantation cleared for turbines and infrastructure were quickly adopted by territorial males and half of all recorded nests during pre-construction survey work were established in newly cleared areas (Natural Power, 2016). Monitoring work at operational wind farms has also shown that nightjar quickly habituate to turbines, and will regularly nest within the published disturbance distance (up to 200 m) of turbines. During the first year of post-construction monitoring at the Pen y Cymoedd Wind Farm, the nearest nightjar nest to a wind turbine was 58 m from the base (two young fledged from the nest; BSG Ecology, 2017). At Brechfa West Wind Farm, an analysis of 124 nest positions over a period of 10 years of monitoring work (2013 to 2022 inclusive) has concluded no displacement by operational turbines, and no correlation between nest productivity and distance from operational turbines, and nests were located as close as 15 m from the base of turbines in the first year of operation (Aderyn Ecology, 2022). At Clocaenog Wind Farm, post-construction monitoring work recorded churring males approximately 80 m from turbine bases, albeit the nearest nest was within 200 m of a turbine (SLR Consulting, 2022).

Significance of the effect

- 10.8.116 Given that the nearest suitable habitat for breeding nightjar is approximately 420 m from the nearest edge of the Proposed Development, and that evidence from other schemes has demonstrated that nightjar are not typically displaced by wind turbines, operational phase displacement effects are anticipated to be of **negligible** significance to nightjar.

Collision

Magnitude of impact

- 10.8.117 Data collated by Dürr (2025) indicate there have been 2 collisions of nightjar with wind turbines recorded in Europe to date. Neither of these occurred in Great Britain; one was recorded in Bulgaria and the other in Spain.
- 10.8.118 Collisions of nightjar with operational wind farms are very rare, likely as a result of the species' low foraging flight habit.

Significance of the effect

- 10.8.119 Given that nightjar do not regularly collide with wind turbines, this effect is likely to be of **negligible** significance to the favourable conservation status of the species.

Decommissioning

- 10.8.120 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit over a shorter time period. It is considered that disturbance effects during decommissioning could be adverse but are likely to be of **negligible** significance in terms of the local and favourable conservation status of nightjar.

Impacts on Species: Non-Focal Species (Herring Gull and Lesser Black-Backed Gull)

Sensitivity of the receptor

- 10.8.121 Given the frequency of flight activity recorded, a proportion of which was over the Study Area, and their conservation concern regionally and nationally, the Study Area is considered to be of importance for the species at the **Site** level.

Construction phase

Magnitude of impact

- 10.8.122 Gulls were frequently recorded foraging on fields in the western part of the Study Area (including several within the Proposed Development), and commuting to and from the Study Area.
- 10.8.123 It is considered unlikely that foraging or commuting gulls will be significantly disturbed or displaced by construction work. Small movements between areas of foraging habitat within the Study Area may occur in close proximity to construction machinery may occur.

Significance of the effect

- 10.8.124 Given the low likelihood of significant disturbance / displacement of foraging gulls from construction works, construction phase impacts are anticipated to be of **negligible** significance to both species.

Operation and maintenance

Displacement

Magnitude of impact

- 10.8.125 Gulls were frequently recorded foraging on fields in the western part of the Study Area (including several within the Proposed Development), and commuting to and from the Study Area.
- 10.8.126 It is considered unlikely that foraging gulls will be significantly disturbed or displaced by the operational scheme. Most foraging activity was outside the Proposed Development (in arable land), though a proportion was in land within which the solar array is proposed. This is likely to result in a reduction in the area of suitable foraging habitat for the species in the Study Area.

Significance of the effect

- 10.8.127 Although a proportion of the area of suitable foraging habitat for both species in the Study Area will be lost, given the abundance of suitable foraging habitat within and adjacent to the Study Area, and in the wider landscape, operational phase displacement effects are anticipated to be of **negligible** significance to both species.

Collision

Magnitude of impact

- 10.8.128 Gulls were frequently recorded commuting to and from suitable foraging habitat within the Study Area (primarily to the west of the Proposed Development). No regularly used flight path of gulls was recorded over the Study Area during the survey work.
- 10.8.129 There is potential for collision of birds with turbine blades to occur. Given the large local, regional and national populations of both species, only a large number of collisions would constitute an effect of significance to the local and favourable conservation status of either species.
- 10.8.130 SNH accept avoidance rates of 98 % can be applied when modelling collision risk for gulls (Urquhart, 2010). A study by the British Trust for Ornithology (BTO) suggests that this value is precautionary and presents data from seven terrestrial wind farm sites which demonstrate that actual avoidance by large gulls was 99.5 % (Furness, 2019).

Significance of the effect

- 10.8.131 Given that no regularly used flight path of gulls was recorded over the Study Area during the survey work, and that gulls have been found to exhibit high avoidance of turbines, it is reasonable to conclude that a large number of collisions is unlikely to occur. Collision impacts on herring gull or lesser black-backed gull are therefore likely to be of **negligible** significance to the favourable conservation status of either species.

Decommissioning

- 10.8.132 Decommissioning phase effects are likely to be similar to those of the construction phase, albeit will occur over a shorter time period. It is therefore considered that disturbance effects are likely to be **negligible** in terms of the local and favourable conservation status of either species.

Future monitoring

- 10.8.133 The future monitoring proposed as a consequence of the assessment of ecology are set out in Table 10.14.

Table 10.14: Future monitoring commitments

Measure adopted	How the measure will be secured
Annual visits will be completed during the summer, to monitor the progress of the habitat enhancement measures detailed in the OHMP (updated to a full HMP) upon consent of the scheme. These will include monitoring of the Lapwing Management areas.	This measure will be set out in the OHMP, production of a full HMP will be a condition of planning consent.
Monitoring of the breeding lapwing population in years 1, 2, 3, 5 and 10 post-construction.	This measure will be a condition of planning consent.

10.9 Cumulative effects assessment

- 10.9.1 A description of cumulative effects between the Proposed Development and other developments identified upon ornithological receptors is provided below.
- 10.9.2 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 ornithological features from multiple projects may result in a significant cumulative effect.
- 10.9.3 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);
 - 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).
- 10.9.4 Assessment of cumulative effects 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 Llanwonno Energy scheme, a 10 km Zol has been considered, as this is considered sufficient to cover the core ranging area for mobile species using the Study Area.

- 10.9.5 The main potential for cumulative effects arising from projects in the wider area is with regard to wind farms. There are two proposed, five consented and fifteen operational wind farms within the 10 km Zol.
- 10.9.6 The proposed wind farms are:
- Mynydd y Gaer (approximately 9.87 km south-west)
- 10.9.7 The consented wind farms are:
- Mynydd y Glyn (approximately 2.56 km south-south-west)
 - Twyn Hywel (approximately 4.56 km east-south-east)
 - Bryntail Farm (approximately 4.66 km south-east)
 - Land at Graig-yr-Hufen (approximately 5.91 km east)
 - Tir Cook (approximately 7.16 km north-east)
 - Abergorki (approximately 9.68 km north-west)
- 10.9.8 The operational wind farms are:
- Llwynceilyn (approximately 260 m north-west⁷¹)
 - Mynachdy Farm (approximately 2.02 km north)
 - Ferndale (approximately 5.41 km north-west)
 - Nant-y-Gwyddon (approximately 6.25 km west)
 - Cefn Fforest (approximately 6.47 km north-east)
 - Pant y Wal (approximately 6.63 km west-south-west)
 - West of Rhiwfelin (approximately 6.66 km south-south-west)
 - Castell Llwyd (approximately 7.36 km east-north-east)
 - Graig Fartha Farm (approximately 7.62 km south-west)
 - Bwlfa Farm (approximately 7.72 km west)
 - Mynydd Portref Extension (approximately 7.90 km south-west)
 - Mynydd Portref (approximately 8.31 km south-west)
 - Headwind Taf Ely Replacement (approximately 8.40 km south-west)
 - Taff Ely (approximately 8.56 km south-west)
 - Pant y Wal Extension (approximately 8.95 km west-south-west)
- 10.9.9 Two schemes exist locally (i.e. within the area comprising Llanwonno Mountain and St Gwynno Forest); Llwynceilyn and Mynachdy Farm. Both are operational, and respectively comprise two turbines located within improved or

⁷¹ The distance between the Proposed Development boundary and the nearest turbine base of the Llwynceilyn scheme.

semi-improved pasture with adjacent coniferous plantation (of St Gwynno Forest).

- 10.9.10 Of the other schemes within the cumulative assessment area, nineteen are located within the county (RCT); one proposed, three consented and fifteen operational. Of these, Mynydd y Glyn, Bryntail Farm and Twyn Hywel are the closest, located (at least partially) within 5 km of the Proposed Development.
- 10.9.11 Where available⁷², the publicly available ecology reports for these schemes showed that they were typically situated in upland habitats; unenclosed upland habitat, commercial conifer plantation or enclosed (grazing) pasture.
- 10.9.12 Residual effects of the Proposed Development (in isolation) are construction phase effects at the Local and County level on; golden plover and lapwing (respectively), and operational phase effects at the Local or County level on red kite, golden plover and lapwing.

Cumulative Impacts on Species: Red Kite

Sensitivity of the receptor

- 10.9.13 The residual effect of the Proposed Development on red kite during the operational phase of the Proposed Development, as a result of collision with turbines, will be of significance at the **Local** level.

Operation and maintenance

Collision

Magnitude of impact

- 10.9.14 The collision risk model (based on all flights recorded within the VP viewsheds) predicts that 2.7 collisions per annum will occur at the Proposed Development.
- 10.9.15 Given that red kite is a locally common resident in the north of the East Glamorgan recording area and is commonly reported in RCT, it is likely that the species is at risk of collision with turbines at all schemes within the cumulative assessment (given that all are at least partially in open habitat).
- 10.9.16 Hereward *et al* (2024) modelled likely impacts of currently-planned wind farms on the Welsh red kite population, compared with the baseline scenario (which incorporates existing wind turbines in Wales while assuming no further wind turbines are commissioned). The study found that *“currently proposed levels of wind farm development are unlikely to prevent the continued growth of the Welsh red kite population, even in the most extreme scenario where all sites currently in development go ahead”*.

Significance of the effect

⁷² For the schemes within the county for which no ecology reports were available, aerial imagery was used to ascertain as far as possible, the broad habitat types (e.g. unenclosed upland, enclosed pasture, commercial coniferous plantation etc.)

- 10.9.17 Collisions of red kite with wind turbines are likely to occur over the operational life of the scheme, and are almost certain to occur at schemes within the cumulative assessment over the same timeframe. However (as found by Hereward *et al.* (2024), cumulative collision impacts on red kite will be of significance at no greater than the **Local** significance in terms of the local and favourable conservation status of the species.

Cumulative Impacts on Species: Golden Plover

Sensitivity of the receptor

- 10.9.18 The residual effect of the Proposed Development on golden plover during the construction (and decommissioning) phases of the Proposed Development (if works are to take place during the period September to early April) will be of significance at the **Local** level.
- 10.9.19 The residual effect of the Proposed Development on golden plover during the operational phase of the Proposed Development, as a result of displacement, will be of significance at the **Local** level.

Construction (and decommissioning) phase

Magnitude of impact

- 10.9.20 Occasional use of the airspace over the Study Area by the local wintering population of golden plover was recorded. Populations are known to winter on Mynydd y Glyn and Mynydd Eglwysilan with in excess of 100 birds (and up to 350 birds (at the latter site) recorded (WSP, 2023; GBC, 2021). Schemes being considered within the cumulative assessment have been approved at both sites (Mynydd y Glyn and Twyn Hywel), and golden plover were a key consideration for both. It is likely that the birds move between Mynydd y Glyn and Twyn Hywel during the non-breeding season, and intermittently use other hilltops locally, including land to the north-west of (and occasionally within) the Study Area.
- 10.9.21 Construction of Mynydd y Glyn in isolation is anticipated to be of low (Local) significance⁷³. Given that Mynydd y Glyn and Twyn Hywel have been approved, they are likely to be constructed before the Proposed Development.

Significance of the effect

- 10.9.22 The golden plover that intermittently use land adjacent to the Proposed Development occasionally use the airspace over the Proposed Development (and land within it), are likely to be part of a larger population wintering on local hilltops and moving between them. Given that construction phase impacts of the Mynydd y Glyn and Twyn Hywel schemes in isolation are anticipated to be

⁷³ The ES chapter for the Twyn Hywel scheme is not publicly available, however, construction phase effects are unlikely to be of significance to the local non-breeding golden plover population of greater than the Local level.

of low (Local) significance. The ES chapter for the Twyn Hywel scheme assessed the effect of the construction of that development on non-breeding golden plover as being of low significance (i.e. of significance at the Site level). The construction phases of those schemes are unlikely to temporally overlap the construction of the Proposed Development (due to differing project timelines), cumulative construction phase impacts are unlikely to be of significance at greater than the **Local** level.

Operation and maintenance

Displacement

Magnitude of impact

- 10.9.23 Occasional use of the airspace over the Study Area by the local wintering population of golden plover was recorded. Populations are known use Mynydd y Glyn and Mynydd Eglwysilan during the non-breeding season, with in excess of 100 birds (and up to 350 birds (at the latter site) recorded (GBC, 2021). Schemes being considered within the cumulative assessment have been approved at both sites (Mynydd y Glyn and Twyn Hywel), and golden plover were a key consideration for both. It is likely that the birds move between Mynydd y Glyn and Twyn Hywel over the course of the winter, and intermittently use other hilltops locally, including land to the north-west of (and occasionally within) the Study Area.
- 10.9.24 Survey work for monitoring at Mynydd y Gwair (Swansea) indicates that flights regularly occur within 200 m of turbines, and found that, though peak flock size fluctuates between years, peak counts for the first five years post-construction were in the range 90-600 birds with a mean value of 306 birds, whilst pre-construction VP surveys recorded up to 260 birds. It was concluded that golden plover were not obviously displaced by the wind farm, which suggests that displacement effects from turbines are minimal for non-breeding golden plover.
- 10.9.25 The creation of the lapwing management area for the adjacent Llwyncelyn scheme (at least one year prior to the construction of the Proposed Development) is likely to create further suitable habitat for non-breeding golden plover, more distantly to the west.

Significance of the effect

- 10.9.26 Given that non-breeding golden plover do not appear to be displaced by wind turbines, the Mynydd y Glyn scheme is unlikely to result in displacement of non-breeding golden plover, and operational displacement effects of the scheme on golden plover were assessed as being low (Local) significance.
- 10.9.27 The occasional foraging recorded within the Proposed Development is anticipated to cease (due to installation of solar panels in the fields) with birds likely to continue to rely on the favoured area (outside the Study Area, to the north-west) and the newly created lapwing management area (more distantly to the west).

- 10.9.28 Given the above, cumulative displacement of non-breeding golden plover of significance at no greater than the **Local** level is anticipated.

Cumulative Impacts on Species: Lapwing

Sensitivity of the receptor

- 10.9.29 The residual effect of the Proposed Development on lapwing during the construction (and decommissioning) phases of the Proposed Development (if works are to take place during the period mid-February to July) will be of significance at the **County** level.
- 10.9.30 The residual effect of the Proposed Development on lapwing during the operational phase of the Proposed Development, as a result of displacement, will be of significance at the **Local** level.
- 10.9.31 The residual effect of the Proposed Development on lapwing during the operational phase of the Proposed Development, as a result of collision with turbines, will be of significance at the **County** level.

Construction, Operation and maintenance (and decommissioning) phases

Magnitude of impact

- 10.9.32 Lapwing were recorded breeding successfully at up to two nest sites between 20-170 m west of the Proposed Development. Breeding birds forage within the Proposed Development (within the area proposed for the solar array), as well as in areas outside the Study Area, to the west. The species was recorded overlying the Proposed Development site. Pre and post breeding, flocks of up to 11 birds were recorded in the breeding area.
- 10.9.33 The operational Llwynceilyn scheme is located 330-700 m from the lapwing breeding area recorded during the survey work. Lapwing were not recorded at the breeding area during the pre-construction works for the scheme, so impacts of that proposal on the species were not assessed in the ES chapter⁷⁴.
- 10.9.34 Lapwing do not breed at any other sites within the cumulative assessment, therefore no cumulative impacts are anticipated with those schemes on the species.

Significance of the effect

- 10.9.35 Given that the 1-2 pairs of lapwing present to the west of the Proposed Development comprise the entirety of the known RCT (county) population, cumulative impacts on the species from the Proposed Development with the

⁷⁴ The lapwing management scheme for the scheme was produced whilst the proposal was in planning, as the breeding lapwing were newly recorded at that stage (in 2022).

adjacent Llwynceilyn scheme are anticipated to be of significance at the **County** level.

10.10 Summary of environmental effects, mitigation measures and monitoring

Table 10.15 Table 10.15:10 Summary of potential environmental effects, mitigation and monitoring. presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES. **Table 10.16**

10.10.1 Table 10.16 presents a summary of the potential cumulative environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 10.15:10 Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a C O D	Magnitude of impact	Sensitivity of the receptor	Further mitigation	Residual effect	Proposed monitoring	Cumulative effects
Red Kite	✓	C: O: Local D:	C: O: Local D:	None applicable.	C: O: Local D:	None.	C: O: Local D:
Golden Plover	✓ ✓ ✓	C: Local O: Local D: Local	C: Local O: Local D: Local	Enhancement of land outside the Proposed Development (to the west) (to benefit breeding lapwing) will create more valuable habitat for non-breeding golden plover.	C: Local O: Site D: Local	None.	C: Local O: Local D: Local
Lapwing	✓ ✓ ✓	C: County O: County D: County	C: County O: County D: County	Enhancement of land outside the Proposed Development (to the west), to benefit breeding lapwing, referred to as a lapwing management area.	C: County O: County D: County	Monitoring of the breeding lapwing population in years 1, 2, 3, 5 and 10 post-construction.	C: County O: County D: County

^a C=construction, O=operational and maintenance, D=decommissioning

Table 10.16: Summary of potential cumulative environmental effects, mitigation and monitoring.

Description of effect	Phase C O D	Residual effect	Sensitivity of the receptor	Cumulative effect
Red Kite	✓	C: O: Local D:	C: O: Local D:	C: O: Local D:
Golden Plover	✓ ✓ ✓	C: Local O: Site D: Local	C: Local O: Local D: Local	C: Local O: Local D: Local
Lapwing	✓ ✓ ✓	C: County O: County D: County	C: County O: County D: County	C: County O: County D: County

^a C=construction, O=operational and maintenance, D=decommissioning

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 11: Noise and Vibration

March 2025

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Glossary

Term	Meaning
A-Weighting	A filter that weights individual frequencies of sound to better represent the frequency response of the human ear when assessing the likely effects of noise on humans
Attenuation	The reduction in level of a sound between the source and a receiver due to any combination of effects including: distance, atmospheric absorption, acoustic screening, the presence of a building façade, etc.
Background Noise	The noise level rarely fallen below in any given location over any given time period. The LA90 indices is often used to represent the background noise level.

Term	Meaning
Daytime Hours	07.00 to 23.00 any day of the week. Different to the quiet daytime hours
Decibel	The unit normally employed to measure the magnitude of sound
Equivalent Continuous Sound Pressure Level	The steady sound level which has the same energy as a time varying sound signal when averaged over the same time interval, T, denoted by $L_{Aeq,T}$
Frequency	The number of acoustic pressure fluctuations per second occurring about the atmospheric mean pressure (also known as the 'pitch' of a sound)
Ground Effects	The modification of sound at a receiver location due to the interaction of the sound wave with the ground along its propagation path from source to receiver. Described using the term 'g', and ranges between 0 (hard), 0.5 (mixed) and 1 (soft).
Hertz (Hz)	The unit normally employed to measure the frequency of a sound, equal to cycles per second of acoustic pressure fluctuations about the atmospheric mean pressure
Noise	Physically: a regular and ordered oscillation of air molecules that travels away from the source of vibration and creates fluctuating positive and negative acoustic pressure above and below atmospheric pressure.
Noise Emission	The noise emitted by a source of sound
Noise Immission	The sound pressure level at a receiver
Night-Time Hours	Defined by ETSU-R-97 as the hours between 23.00 and 07.00, any day
Percentile Exceeded Sound Level	The noise level exceeded for n% of the time over a given time period, T, denoted by $L_{An,T}$
Quiet Daytime Hours	Defined by ETSU-R-97 as the hours between 18.00 and 23.00 Monday to Friday, 13.00 and 23.00 Saturdays and 07.00 and 23.00 Sundays
Receiver	A person or property exposed to the noise being considered
Sound	Physically: a regular and ordered oscillation of air molecules that travels away from the source of vibration and creates fluctuating positive and negative acoustic pressure above and below atmospheric pressure
Sound Level Meter	An instrument for measuring sound pressure level

Term	Meaning
Sound Power Level	The total sound power radiated by a source, in decibels
Sound Pressure Level	A measure of the sound pressure at a point, in decibels
Spectrum	A description of the amplitude of a sound as a function of frequency

Abbreviations/ Acronyms

Abbreviation	Meaning
BESS	Battery Energy Storage System
DNS	Developments of National Significance
GPG	Good Practice Guide
IoA	Institute of Acoustics
NML	Noise Monitoring Location
NSR	Noise Sensitive Receptor
PEDW	Planning and Environment Decisions Wales

Units

Unit	Description
dB	abbreviation for 'decibel'
dB(A)	abbreviation for the decibel level of a sound that has been A-weighted
L _{Aeq}	the abbreviation of the A-weighted equivalent continuous sound pressure level
L _{A10}	the abbreviation of the 10-percentile exceeded sound level, often used for the measurement of road traffic noise
L _{A90}	the abbreviation of the 90-percentile exceeded sound level, often used for the measurement of background noise

11 Noise and Vibration

11.1 Introduction

- 11.1.1 This chapter presents the assessment of noise and vibration effects from the construction and operation of the proposed Llanwonno Wind Farm on nearby noise-sensitive receptors.
- 11.1.2 Potential construction noise and vibration impacts have been determined with reference to British Standard 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1 Noise (BS 5228-1).
- 11.1.3 The assessment of operational noise from the wind farm has been undertaken through consultation with Rhondda Cynon Taf County Borough Council and in accordance with the guidance contained within the ETSU-R-97 report “The Assessment and Rating of Noise from Wind Farms” and the Institute of Acoustics publication “A Good Practice Guide to the Application of ETSU-R- 97 for the Assessment and Rating of Wind Turbine Noise”.
- 11.1.4 The assessment includes the cumulative impact from other wind energy developments both operating and within the planning system.
- 11.1.5 The assessment of operational noise from the solar and BESS has been undertaken in accordance with the guidance contained British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS 4142).
- 11.1.6 This chapter of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, Sep 2024) and subsequent EIA Scoping Direction (PEDW, Feb 2025).

11.2 Legislation and Policy

- 11.2.1 The legislation and planning policy relevant to the assessment of noise for the Proposed Development are summarised in

- 11.2.2 Table 11.1 below.

Table 11.1: Summary of legislation and policy relevant to this chapter of the ES

Summary of provision	How and where considered in the ES
Future Wales: The National Plan 2040 (2021)	
Renewable and Low Carbon Energy Developments of Natural Significance will be permitted subject to no unacceptable adverse impacts from noise	Noise assessment undertaken in accordance with current guidance and best practice
Planning Policy Wales Edition 12	

Summary of provision	How and where considered in the ES
Development Management and Renewable and Low Carbon Energy identifies the need to minimise impacts on local communities due to noise [paragraph [5.9.20] of Planning Policy Wales Edition 12]	Noise assessment undertaken in accordance with current guidance and best practice
Framework for Addressing Air quality and Soundscape requires that developments must not create areas of inappropriate soundscape [paragraph [6.7.6] of Planning Policy Wales Edition 12]	Noise assessment undertaken in accordance with current guidance and best practice
Rhondda Cynon Taf County Borough Council	
Development proposals will not be permitted where they would cause or result in a risk of unacceptable harm to health and/or local amenity because of noise [Policy AW 10]	Noise assessment undertaken in accordance with current guidance and best practice

11.3 Consultation and Engagement

Scoping

- 11.3.1 In September 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 11.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 14 February 2025. Key issues raised by statutory bodies specific to noise are listed in **Table 11.2**, including how and where these have been considered in the ES.
- 11.3.3 In addition, consultation and engagement with interested parties specific to noise has continued. These included discussions with the Environmental Health Department at Rhondda Cynon Taf County Borough Council regarding background noise monitoring methodology and assessment. Further detail regarding key items discussed and how these have been addressed is provided in Table 11.3 of this ES chapter below.

Table 11.2: Summary of key scoping responses relevant to noise

Comment	How and where considered in the ES
PEDW	
Acceptable approach to assessment of noise with continued consultation with Environmental Health at Rhondda Cynon Taf County Borough Council [paragraph ID.62 of the EIA Scoping Direction]	Consultation undertaken with the Environmental Health Officer at Rhondda Cynon Taf County Borough Council
Rhondda Cynon Taf County Borough Council Environmental Health Officer	
Consultation to agree survey and assessment methodology	Noise survey and assessment in accordance with the IoA GPG and ETSU-R-97

11.4 Assessment Methodology

Relevant Guidance

11.4.1 The assessment of noise has been undertaken in accordance with the methodology set out in Volume 1, Chapter 4: Approach to environmental assessment of the ES in addition to the following guidance, where appropriate:

- ETSU-R-97 The Assessment & Rating of Noise from Wind Farms (ETSU-R-97), 1996
- Institute of Acoustics (IoA) Good Practice Guide (GPG), 2013
- British Standard 5228-1:2009+A1 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise, 2014
- British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound 2019
- International Standard ISO 9613-2, Acoustics – Attenuation of Sound During Propagation outdoors – Part 2: General Method of Calculation, 1996

Scope of the Assessment

11.4.2 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 11.2**.

11.4.3 Taking into account the scoping and other consultation, **Table 11.3** summarises the issues considered as part of this assessment.

Table 11.3: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Construction Noise	Noise from construction activities has been predicted to the nearest noise-sensitive receptors and assessed in accordance with BS5228-1.
Operation and maintenance	
Operational Noise	Noise from the operation of the Proposed Development has been predicted to the nearest noise-sensitive receptors and assessed in accordance with ETSU-R-97, the IoA GPG and BS4142.
Cumulative Noise	Noise from the operation of the Proposed Development in combination with consented wind developments has been assessed in accordance with ETSU-R-97 and the IoA GPG.
Decommissioning	
Decommissioning	Decommissioning is likely to result in similar activities to the construction phase, however, it would be less intrusive and for a shorter period of time.

11.4.4 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in **Table 11.4**.

Table 11.4: Issues scoped out of the assessment

Issue	Justification
Construction Vibration	The type of works and separation to vibration sensitive receptors are considered to be such that the risk of significant construction vibration impacts is very low.
Operational Vibration	Ground borne operational vibration would be low and therefore given the separation distance to sensitive receptors the risk of significant operational vibration impacts is very low.
Blade Swish (Amplitude Modulation)	Currently no prediction method and the best practice is not to carry out an assessment
Infrasound and Low Frequency Noise	Currently no robust evidence that low frequency noise (including 'infrasound') or ground-borne vibration from wind farms generally has adverse effects on wind farm neighbours.

Study area

- 11.4.5 The noise study area (hereafter referred to as the study area) extends to the nearest noise-sensitive receptors surrounding the Proposed Development and covers an area approximately 2 km from the boundary.
- 11.4.6 The location and geographic extent of the study area is presented in Volume 2, Figures, Figure 11.1 of the ES.

11.5 Assessment Criteria and Assignment of Significance

Construction Noise Criteria

- 11.5.1 BS5228-1:2009+A1:2014 sets out a methodology for predicting noise levels arising from a wide variety of construction activities and it contains tables of sound power levels generated by mobile and fixed plant.
- 11.5.2 Annex E of BS5228-1:2009+A1:2014 gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. In this respect, Section E.2 of the standard states: "Noise from construction sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut".
- 11.5.3 The assessment of construction noise associated with the Proposed Development is based on the following fixed limit from BS5228-1:2009+A1:2014:
- Noise levels, between 07:00 and 19:00 hours, outside the nearest window of the occupied room closest to the Site boundary, should not exceed 70dB(A).

Operational Noise Criteria Wind Farm

- 11.5.4 The assessment of operational noise from wind farms is undertaken in accordance with the guidance contained within ETSU-R-97 The Assessment and Rating of Noise from Wind Farms (ETSU-R-97), dated September 1996. The guidance recommends that acceptability of wind farm noise should be assessed relative to existing background noise levels. It suggests that noise from wind turbines should be limited to 5dB above background at all times. It does, however, suggest absolute limits of between 35-40dB $L_{A90,10min}$ for daytime and 43dB $L_{A90,10min}$ for night-time.
- 11.5.5 ETSU-R-97 provides further guidance where a property occupier has a financial involvement in the wind farm development. Where this is the case then the lower fixed portion of the noise limit at that property is set to 45 dB(A) during both the daytime and the night-time periods, even in low noise environments.
- 11.5.6 The assessment is undertaken in accordance with the Institute of Acoustics (IoA) Good Practice Guide (GPG) which details the use of ETSU-R-97 including appropriate survey and prediction methodology.

Operational Noise Criteria Solar and BESS

- 11.5.7 The assessment of operational noise from windfarms is undertaken in accordance with the guidance contained within British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound
- 11.5.8 BS4142:2014 is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby sensitive receptor locations within the context of the existing sound environment.
- 11.5.9 Where the specific sound contains tonality, impulsivity and/or other sound characteristics penalties should be applied depending on the perceptibility. For tonality a correction of either 0, 2, 4 or 6dB should be added; for impulsivity a correction of either 0, 3, 6 or 9dB should be added and if the sound contains specific sound features which are neither tonal nor impulsive a penalty of 3dB should be added.
- 11.5.10 In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.
- 11.5.11 The assessment of impacts contained in BS4142:2014 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the sensitive receptor location. Consideration is then given to the context of the existing sound environment at the sensitive receptor location to assess the potential impact.
- 11.5.12 Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014 states that the following should be considered:
- Typically, the greater the difference, the greater the magnitude of the impact;
 - A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context; and
 - The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. It is an indication that the specific sound source has a low impact when the rating level does not exceed the background sound level, depending on the context.
- 11.5.13 BS4142:2014 notes that:

“Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.”

- 11.5.14 BS4142:2014 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.
- 11.5.15 Based on the above the impact of operational noise upon residential receptors is as detailed in **Table 11.6** below.

Table 11.5: Impact on Residential Receptors

Magnitude	Description
Major	Rating level is 10dB(A) or more above the background
Moderate	Rating level is between 6 and 9dB(A) above the background
Minor	Rating level is between 1 and 5dB(A) above the background
Negligible	Rating level is below the background

Receptor Value and Sensitivity

- 11.5.16 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 11.6** below.

Table 11.6: Sensitivity criteria

Sensitivity/Value	Definition
Very High	Residential properties (night-time), Schools and healthcare buildings (daytime)
High	Residential properties (daytime), Special Areas of Conservation, Special Protection Areas, Sites of Special Scientific Interest
Medium	Offices and other non-noise producing employment areas
Low	Industrial area

Magnitude of impact

- 11.5.17 The criteria for defining magnitude in this chapter of the ES are outlined in **Table 11.7** below.

Table 11.7: Impact magnitude criteria

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

Duration of impacts

11.5.18 The criteria for describing the duration of impacts in this chapter of the ES are outlined in **Table 11.8** below.

Table 11.8: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year.
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years.

Definition	Duration of impact	Definition
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development.

Significance of effect

- 11.5.19 The method employed significance of the effect is presented in **Table 11.9**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 11.5.20 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 11.9: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact				
	No Change	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Negligible	Minor	Moderate or Major	Major	substantial

- 11.5.21 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described in **Table 11.10** below.

Table 11.10: Definitions of significance

Significance	Definition
Major	These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed this level of significance.
Moderate	These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
Minor	These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assumptions and limitations of the assessment

11.5.1 No significant information gaps were identified, and the assessment was undertaken in line with relevant standards and policy documents.

11.6 Baseline Environment Conditions

Site-specific surveys

11.6.1 Site specific surveys are due to be undertaken to inform the baseline assessment for noise. A summary of the Site specific surveys undertaken to inform this chapter of the ES are provided in **Table 11.11**.

Table 11.11: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken

Baseline Noise Survey	Establish prevailing background sound level at the noise-sensitive receptors surrounding the development	TBC

- 11.6.2 At this time it is anticipated that a total of five Noise Monitoring Locations (NML) will be used as detailed in **Table 11.12**. These are considered to be representative of the nearest noise-sensitive receptors to the Proposed Development i.e. NML1 is representative of NSR1.

Table 11.12: Noise Monitoring Locations

Noise Monitoring Location	Address	Easting	Northing
NML 1	Llysant Farm	304817	193438
NML 2	Woodlands	305594	192340
NML 3	Near Rhiw-yr-uchain	304915	191563
NML 4	Near Pen-Rhiw-Gwynt	302943	191771
NML 5	59 Heath Terrace	302696	192959

- 11.6.3 The survey duration will exceed the minimum recommended period as detailed in ETSU-R-97 and the IOA GPG to capture representative data through the range of wind speeds.
- 11.6.4 Further details of the existing conditions will be presented in **the Noise Impact Assessment** including charts of the measurement results once complete.

Future baseline conditions

- 11.6.5 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that 'an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge' is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.
- 11.6.6 Based on the relatively rural nature of the soundscape, the future baseline without the Proposed Development is considered to be similar to the existing baseline with no significant changes to background sound level.

11.7 Assessment of effects

11.7.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development are listed in **Table 11.3**. A description of the potential effect on receptors caused by each identified impact is given below.

Loss of Amenity

Construction phase

11.7.2 Any development of a nature such as the Proposed Development has the potential to generate noise during the construction phase, should appropriate mitigation not be employed. However, disruption due to construction noise is a localised phenomenon, and is both temporary and intermittent in nature.

11.7.3 The techniques available to predict the likely noise effects from construction are necessarily based on quite detailed information on the type and number of plant being used, their location within the Site and the length of time they are in operation.

11.7.4 Based on available information at the time of the assessment and past experience of wind farm developments, the likely construction plant has been assumed for each task as detailed in **Table 11.13**. Predictions of construction noise have been based on the corresponding 10m Sound Pressure Levels (SPLs) listed in Annex C of BS5228-1:2009+A1:2014.

Table 11.13: Noise Levels for Construction Activities (SPL at 10m), dB

BS5228 Reference	Activity	Sound Pressure Level at 10m							
		63	125	250	500	1000	2000	4000	8000
Construction Compound									
C.4, 78	Diesel Generator	64	67	68	65	58	54	49	42
Concrete Batching									
C.2, 45	Water Pump	73	68	62	62	61	56	53	41
C.4, 22	Large Concrete Mixer	72	73	79	72	69	67	63	60

C.4, 29	Concrete Pump & Boom Arm	83	77	75	75	74	75	67	63
All Plant Combined		84	79	81	77	75	76	69	65
Mobile Plant									
C.2, 14	Tracked Excavator	85	78	77	77	73	71	68	63
C.9, 8	Wheeled Loader	89	88	85	83	82	81	73	67
All plant combined		90	88	85	83	82	81	73	67
Base of Turbine									
C.2, 11	Dozer	75	79	77	77	74	71	65	57
C.2, 14	Tracked Excavator	85	78	77	77	73	71	68	63
C.2, 31	Dump Truck	86	79	79	79	79	84	69	60
C.4, 27	Concrete Mixer Truck	84	74	74	73	73	75	65	59
C.4, 50	Mobile Crane	68	71	68	62	66	66	55	46
C.4, 52	Mobile Crane	73	71	66	67	74	66	58	49
All plant combined		90	84	83	83	82	85	73	66
Borrow Pit									
C.1, 14	Tracked Crusher	93	86	79	81	75	71	66	59
C.2, 11	Dozer	75	79	77	77	74	71	65	57
C.2, 14	Tracked Excavator	85	78	77	77	73	71	68	63
C.2, 31	Dump Truck	86	79	79	79	79	84	69	60
All plant combined		94	88	84	85	82	85	73	66

- 11.7.5 The predicted construction noise levels have assumed that all items of plant and all activities would operate and occur simultaneously; however, it is likely that plant would operate for much shorter periods during the construction phase, resulting in lower noise levels.
- 11.7.6 **Table 11.14** presents the maximum noise level expected from the simultaneous operation of all anticipated plant and construction activities, as well as those activities associated with the construction compound and borrow pit.

Table 11.14: Predicted Construction Noise Levels

Noise-Sensitive Receptor	Predicted Noise Level, L_{Aeq} dB
NSR 1	61
NSR 2	59
NSR 3	50
NSR 4	43
NSR 5	44
NSR 6	57
NSR 7	50
NSR 8	44
NSR 9	44
NSR 10	44

Significance of the effect

- 11.7.7 The predicted construction noise levels have been assessed against an external daytime criterion of 70dB L_{Aeq} . The predicted noise levels from all assumed construction plant and activities are shown to be comfortably below the adopted criterion of 70dB L_{Aeq} and therefore effects would be **temporary medium term and not significant**.
- 11.7.8 No further evaluation has been undertaken; however, Best Practicable Means that should be adopted during construction and decommissioning work are set out within the mitigation section.

Additional mitigation and residual effect

- 11.7.9 There are several safeguards exist to minimise the effects of construction and demolition noise and include:
- the various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant;
 - guidance set out in BS5228-1:2009+A1:2014, that covers noise control on construction and open sites; and
 - the powers that exist for local authorities under Sections 60 and 61 of the Control of Pollution Act 1974 to control environmental noise and pollution on demolition sites.
- 11.7.10 It is recommended that the precise mitigation measures to control noise from the works are agreed with the local authority prior to the works starting. Generic measures below are given to illustrate the range of techniques available.
- 11.7.11 The adoption of Best Practicable Means, as defined in the Control of Pollution Act 1974, is usually the most effective means of controlling noise from sites. Within the constraints of efficient site operations and the requirements of the relevant British Standards, the following is advisable:
- limit the use of particularly noisy plant, i.e. do not use particularly noisy plant early in the morning;
 - limit the number of plant items in use at any one time;
 - plant maintenance operations should be undertaken as far away from noise-sensitive receptors as possible;
 - phasing the works to maximise the benefit from perimeter structures;
 - any compressors brought on to site should be silenced or sound reduced models fitted with acoustic enclosures;
 - reduce the speed of vehicle movements;
 - all pneumatic tools should be fitted with silencers or mufflers;
 - ensure that operations are designed to be undertaken with any directional noise emissions pointing away from noise-sensitive receptors where practicable;
 - when replacing older plant, ensure that the quietest plant available is considered wherever possible; any deliveries/spoil removal vehicles should be programmed to arrive and depart during daytime hours only.
 - drop heights must be minimised when loading vehicles with rubble.
 - care should be taken when loading vehicles to minimise disturbance to local residents. Vehicles should be prohibited from waiting within the Site with their engines running;

- all plant items should be properly maintained and operated according to the manufacturers' recommendations in such a manner as to avoid causing excessive noise. All plant should be sited so that the noise impact at nearby noise-sensitive properties is minimised;
- local hoarding, screens or barriers should be erected as necessary to shield particularly noisy activities; and
- any problems concerning noise from construction works can sometimes be avoided by taking a considerate and neighbourly approach to relations with local residents. Works should not be undertaken outside of the hours agreed with the local authority.

11.7.12 Experience from other sites has shown that by implementing these measures, typical noise levels from construction works can be reduced by 5dB(A) or more.

11.7.13 Taking the additional mitigation into account, it is assessed that there will be a **temporary, not significant** residual effect.

Operation and maintenance

11.7.14 Operational noise levels from the proposed wind farm will be assessed against the results of the baseline survey in accordance with the ETSU-R-97 guidance at the nearest noise-sensitive receptors.

Decommissioning

11.7.15 Decommissioning is likely to result in similar activities to the construction phase, however, it would be less intrusive and for a shorter period of time. Based on the assessment of construction noise it is considered that decommissioning would result in a minor effect and therefore not significant.

11.8 Cumulative Effects

11.8.1 The assessment of cumulative effects for noise has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. The specific projects, plans and activities scoped into the assessment of cumulative effects are set out in **Table 11.15**.

11.8.2 The other projects have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the information provided in Volume 1, Chapter 2: Project Description, of the ES as well as the information available on other projects.

11.8.3 A grid connection for the turbines would be a 33kV substation at Upper Boat and will be subject to a separate planning application and does not form part of the Proposed Development for the purposes DNS application. However, the grid connection has been considered as part

of the assessment of cumulative effects within this chapter of the Environmental Statement alongside the BESS.

Table 11.15: List of other projects considered within the CEA.

Other projects	Status	Distance (km)	Description
Llwyncelyn	Operational	0.40 km (adjacent to Proposed Development)	2No. wind turbines
Mynydd y Glyn	Proposed	1.80 km (southwest of Proposed Development)	7No. wind turbines
33kV substation at Upper Boat	Pre-application	0.00 km (within Proposed Development site)	Grid connection for Proposed Development

Cumulative effects assessment

11.8.4 Following the completion of the baseline noise survey and assessment of the Proposed Development, an assessment of cumulative effects between the Proposed Development and other developments identified in **Table 11.15** upon noise receptors will be undertaken in accordance with the ETSU-R-97 guidance. The results will be presented in an updated Chapter.

11.9 Summary of environmental effects, mitigation measures and monitoring

11.9.1 **Table 11.16** presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 11.16: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a			Significance of effect	Further mitigation	Residual effect
	C	O	D			
Construction Noise	✓		✓	C: Not Significant D: Not Significant	Best Practicable Means	C: Not Significant D: Not Significant
Operational Noise		✓		O: TBC	TBC	O: TBC

^a C=construction, O=operational and maintenance, D=decommissioning

11.10 References

UK Institute of Acoustics', Good Practice Guide to the Application of ETSU-R-97 for the Assessment at Rating of Wind Turbine Noise (2013)

UK Department of Trade and Industry (DTI), ETSU-R-97, the Assessment and Rating of Noise from Wind Farms (1996)

International Standard Organisation, ISO 9613-2, Acoustics – Attenuation of Sound during Propagation Outdoors (1996)

British Standards, BS 5228:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites (2014)

British Standards, BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (2019)



LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 12: Shadow Flicker

March 2025

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Glossary

Term	Meaning
Baseline	The status of the landscape without the proposed development in place.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for potential negative effects of a development.
Proposed Development	Llanwonno Energy Project
The Applicant	Cenin Renewables Ltd

Abbreviations/ Acronyms

Abbreviation	Meaning
DNS	Development of National Significance
EIA	Environmental Impact Assessment
ES	Environmental Statement
FW	Future Wales: The National Plan 2040
PEDW	Planning Environment Decisions Wales

Units

Unit	Description
%	Percentage
m	Metre
Km	Kilometre

12 SHADOW FLICKER

12.1 Introduction

- 12.1.1 This chapter of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, Sep 2024) and subsequent EIA Scoping Direction (PEDW, Feb 2025).
- 12.1.2 This chapter presents an assessment of the likely effects of the Proposed Development on surrounding dwellings during the construction, operation, and decommissioning phases in relation to Shadow Flicker. The proposed mitigation measures to reduce the impacts of the Development are also provided.
- 12.1.3 Shadow Flicker is an effect whereby a moving structure, in this case, a wind turbine rotor and blades intermittently obstructs the sun's rays causing a strobing effect. This effect can be observed in nearby properties under specific conditions.

12.2 Legislation and Policy

- 12.2.1 The legislation and planning policy relevant to the assessment of Shadow Flicker for the Proposed Development are summarised in Table 12.1 below.

Table 12.1: Summary of legislation and policy relevant to this chapter of the ES

Summary of provision	How and where considered in the ES
Future Wales: The National Plan 2040 (2021)	
Renewable and low carbon energy projects will be permitted subject to no unacceptable adverse impacts by way of shadow flicker - Policy 18 of Future Wales: The National Plan 2040	Assessed throughout this chapter, with the resulting effects and mitigation detailed at section 1.8 and summarised in Table 1.13.

12.3 Consultation and Engagement

Scoping

- 12.3.1 In September 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 12.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 14 February 2025. Key issues raised by statutory bodies specific to Shadow Flicker are listed in Table 12.2, including how and where these have been considered in the ES.

Table 12.2: Summary of key scoping responses relevant to Shadow Flicker

Comment	How and where considered in the ES
PEDW	
PEDW notes that in 'Review of Light and Shadow Effects from Wind Turbines in Scotland' there is a lack of evidence to support the use of ten rotor diameters as a cut-off	An assessment area of ten rotor diameters has been used as the industry standard; however, considerations of effects greater than this area have been considered by the modelling software when analysing results and determining impact.

12.4 Assessment Methodology

Relevant Guidance

- 12.4.1 The assessment of shadow flicker has been undertaken in accordance with the methodology set out in Volume 1, Chapter 4: Approach to environmental assessment of the ES in addition to the following guidance, where appropriate:

- Scottish Government Onshore wind turbines: Planning advice (“Onshore wind turbines,” 2014)
- Renewable and low carbon energy. Paragraph: 020 Reference ID: 5-020-20140306. Revision date: 06 03 2014 (“Renewable and low carbon energy,” 2023)
- Parsons Brinckerhoff, 2011 – Update of UK Shadow Flicker Evidence Base, Department for Communities and Local Government, July 2013, Planning practice guidance for renewable and low carbon energy. (“Update of UK Shadow Flicker Evidence Base,” 2011)
- Department for Communities & Local Government (July 2013): Planning practice guidance for renewable and low carbon energy. (“Planning_Practice_Guidance_for_Renewable_and_Low_Carbon_Energy.pdf,” n.d.)

Scope of the Assessment

12.4.2 Taking into account the scoping and other consultation, Table 12.3 summarises the issues considered as part of this assessment.

Table 12.3: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
N/A	No impacts during the construction phase have been considered, as shadow flicker impacts would not be possible.
Operation and maintenance	
Shadow flicker	A shadow flicker impact assessment has been carried out to identify sensitive receptors and possible significant impacts.
Decommissioning	

N/A	No impacts during the decommissioning phase have been considered, as shadow flicker impacts would not be possible.

Study area

- 12.4.3 It is common to use 10 rotor diameters as a maximum limit to assess shadow flicker effects. The validity of this limit is discussed at length within the relevant literature (Parsons Brinckerhoff, 2011; DCAL, 2013). The guidance on this particular criterion varies in different documents and countries, with some stating that effects can only occur within this distance and others stating that this is a general rule or that the risk beyond this distance is low.
- 12.4.4 In reality, there is no fixed cut off distance at which effects can occur, because this is sensitive to many parameters including the exact latitude and the terrain around the Development location. The study area of 10 rotor diameters was applied to the Proposed Development based on Pager Power's professional experience and assessment methodology, and the Scottish Government Onshore wind turbines: planning advice guidance. The ten-rotor diameter study area for the Proposed Development was mapped for all turbines.

12.5 Assessment Criteria and Assignment of Significance

- 12.5.1 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and the magnitude of potential impacts.
- 12.5.2 The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England *et al.*, 2020).
- 12.5.3 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.
- 12.5.4 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Environmental Assessment Methodology.

Receptor Value and Sensitivity

12.5.5 The criteria for defining sensitivity in this chapter of the ES are outlined in Table 12.4 below.

Table 12.4: Sensitivity criteria

Sensitivity/Value	Definition
Very High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
High	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Low	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.
Negligible	The receptor is resistant to change and is of little environmental value.

Magnitude of impact

12.5.6 The criteria for defining magnitude in this chapter of the ES are outlined in Table 12.5 below.

Table 12.5: Impact magnitude criteria

Magnitude of impact		Definition
High	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements
Low	Adverse	Some measurable change in attributes, quality or vulnerability, minor loss or, or alteration to, one (maybe more) key characteristics, features or elements
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Duration of impacts

12.5.7 The duration of impacts is either permanent or not experienced.

Significance of effect

12.5.8 The significance of the effect upon shadow flicker has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in Table 12.6. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

- 12.5.9 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.
- 12.5.10 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 12.6: Assessment matrix

Sensitivity of Receptor		Magnitude of Impact			
	No Change	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Negligible	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Negligible	Minor	Moderate or Major	Major	Major

- 12.5.11 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described in Table 12.7 below.

Table 12.7: Definitions of significance

Significance	Definition

Major	These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed to this level of significance.
Moderate	These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
Minor	These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assumptions and limitations of the assessment

- 12.5.12 The assessment is limited to desk-based modelling.
- 12.5.13 It is assumed each dwelling has a 1m-by-1m window directly facing the nearest wind turbine which may not be the case in reality. This technique provides conservative results and a reduction in the amount of data, simplifying the assessment process and aiding comprehension.
- 12.5.14 The model assumes a 'bare earth' scenario and additional screening in the form of vegetation etc. is not considered within the model. This is a robust approach as additional screening may remove the wind turbines from the view of a dwelling.

- 12.5.15 It is assumed that the weather is bright/clear/sunny at all times of day and throughout the year. In the UK, sunshine typically occurs for approximately 30% of daylight hours rather than 100% of daylight hours every day. Therefore, the modelling results are conservative.
- 12.5.16 The model assumes the wind is always blowing at sufficient velocity to spin the blades, whereas wind turbines do not spin at low wind speeds. Therefore, the modelling results are conservative.
- 12.5.17 It is assumed that the wind turbines causing shadow flicker are orientated directly towards the dwellings, which produces the worst-case shadow flicker effects. In practice, a turbine's orientation is dependent on wind direction, and a turbine facing off to one side produces less significant shadow flicker. Therefore, the modelling results are conservative.

12.6 Baseline Environment Conditions

Site-specific surveys

- 12.6.1 No site surveys have been undertaken which may provide more accurate dwelling data within the assessment. Despite this limitation, the assessment is considered to be both appropriate and robust, as it is standard practice for shadow flicker to be considered within a desk-based assessment.

Future baseline conditions

- 12.6.2 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that 'an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge' is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.
- 12.6.3 The future baseline conditions, in the context of shadow flicker will be as per the existing baseline conditions.

Key receptors

- 12.6.4 Table 12.8 identifies the receptors taken forward for the assessment.

Table 12.8: Key receptors taken forward for assessment

Receptor	Description and Reason for Consideration
21 dwelling receptors	A total of 21 dwelling receptors have been modelled.

12.7 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

- 12.7.1 Both embedded and additional mitigation measures relevant to the assessment of Shadow Flicker are summarised in
- 12.7.2 Table 12.9 below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 12.9: Mitigation measures to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Shutdown scheme	A shutdown scheme will be implemented for dwelling receptors

12.8 Assessment of effects

- 12.8.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development are listed in Table 12.3. A description of the potential effect on receptors caused by each identified impact is given below.

Shadow flicker impacts upon dwelling receptors

Operation and maintenance

Sensitivity of the receptor

- 12.8.2 In total, 21 dwelling receptors have been identified within the study area. The sensitivity of the receptors is **high**.

Magnitude of impact

- 12.8.3 17 dwelling receptors are predicted to experience shadow flicker impacts for more than the threshold limits of 30 minutes on any given day and/or more than 30 hours per year. The magnitude of the impact is **high**.
- 12.8.4 The remaining 4 dwelling receptors are not expected to experience shadow flicker impacts. The magnitude of impact is **negligible**.

Significance of the effect

- 12.8.5 On the basis that the sensitivity of the receptor is high and the magnitude of the impact is high, it is assessed that there will be a **major adverse** effect for 17 dwellings, which is significant.

Additional mitigation and residual effect

- 12.8.6 A shutdown scheme will remove shadow flicker impacts for 17 dwellings where the magnitude of impact is **high**.
- 12.8.7 Taking the additional mitigation into account, it is assessed that there will be a **negligible** residual effect, which is **not significant**.

Future monitoring

- 12.8.8 No future monitoring is required as a consequence of the assessment of shadow flicker.

12.9 Cumulative Effects

The assessment of cumulative effects for Shadow Flicker has followed the methodology set out in Volume 1, Chapter 4: Environmental Assessment Methodology. The specific projects, plans and activities scoped into the assessment of cumulative effects are set out in Table 12.10. **Table 12.10: List of other projects considered within the CEA.**

Other projects	Status	Distance (km)	Description
Mynydd Portref	Operational	8.64	11 turbines of 52m diameter

Cumulative effects assessment

- 12.9.1 A description of the cumulative effects between the Proposed Development and other developments identified in .Table 12.10 upon Shadow Flicker receptors is provided below.
- 12.9.2 No cumulative effects are considered possible considering the distance between the Proposed Development and other developments identified in .Table 12.10.

Receptor led effects

- 12.9.3 Taking the above information into account, it is concluded that inter-related effects between shadow flicker and other environmental topics on identified receptors would not result in effects of greater significance than those already assessed within this chapter of the ES.

Project lifetime effects

- 12.9.4 Taking the above information into account, it is concluded that inter-related effects on shadow flicker on identified receptors would not result in effects of greater significance than if assessed in isolation within this chapter of the ES.

12.10 Summary of environmental effects, mitigation measures and monitoring

- 12.10.1 Table 12.11 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 12.11: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a			Mitigation measures	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect
	C	O	D						
Shadow flicker		✓		C: Negligible O: High D: Negligible	C: Negligible O: High D: Negligible	Major adverse	Shutdown scheme	C: None O: None D: None	None

^a C=construction, O=operational and maintenance, D=decommissioning

12.11 References

Department for Communities & Local Government (2013) Planning practice guidance for renewable and low carbon energy. Available at: https://assets.publishing.service.gov.uk/media/5a7c2a20ed915d1d1741c82d/Planning_Practice_Guidance_for_Renewable_and_Low_Carbon_Energy.pdf

Design Manual for Roads and Bridges (DMRB) (2020) Methodology. Available at: <https://www.standardsforhighways.co.uk/dmrb>, accessed March 2025.

Future Wales: the national plan 2040 (2019) *Welsh Government*. Available at: <https://www.gov.wales/future-wales-national-plan-2040>

Parsons Brinckerhoff (2011) Update of UK Shadow Flicker Evidence Base, Department for Communities and Local Government, July 2013, Planning practice guidance for renewable and low carbon energy. Available at: <https://assets.publishing.service.gov.uk/media/5a79770bed915d0422068aa3/1416-update-uk-shadow-flicker-evidence-base.pdf>

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 13: Aviation and Telecommunications

March 2025

Document status					
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Glossary

Term	Meaning
Baseline	The status of the landscape without the proposed development in place.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for potential negative effects of a development.
Proposed Development	Llanwonno Energy Project
The Applicant	Cenin Renewables Ltd

Abbreviations/ Acronyms

Abbreviation	Meaning
BT	British Telecom
DNS	Development of National Significance
EIA	Environmental Impact Assessment
ES	Environmental Statement
FW	Future Wales: The National Plan 2040
JRC	The Joint Radio Company
MBNL	Mobile Broadband Network Limited
MOD	Ministry of Defence
PEDW	Planning Environment Decisions Wales
PSR	Primary Surveillance Radar

Units

Unit	Description
Km	Kilometre

13 Aviation and Telecommunications

13.1 Introduction

13.1.1 The Proposed Development has the potential to cause a variety of effects upon aviation activity and infrastructure, and telecommunication infrastructure by introducing new physical structure into an area. Large structures can affect this infrastructure in predominantly two ways, these are:

- By presenting a collision risk for aircraft;
- The diffraction and/or reflection of electromagnetic waves between telecommunication infrastructure, radar installations and navigation aids.

13.1.2 This section of the chapter describes the existing environment with respect to aviation (including radar) infrastructure, and telecommunication infrastructure, and the potential impacts to their operations as a result of construction and operation of the Development. Where required the associated impact significance is provided and the appropriate mitigation options are presented.

13.1.3 This chapter is based on work completed by Pager Power Limited and should be read in conjunction with the technical assessments, where the specific impact assessments relating to each discipline are presented.

13.1.4 This chapter of the ES has been prepared in accordance with the approach set out in the Llanwonno Wind Farm Scoping Report (RPS, Sep 2024) and subsequent EIA Scoping Direction (PEDW, Feb 2025). In addition, this chapter of the ES has been informed by the following documents:

Other Documents

- Aviation Risk Assessment; and
- Telecommunications Impact Assessment.

13.2 Legislation and Policy

13.2.1 The legislation and planning policy relevant to the assessment of Aviation and Telecommunications for the Proposed Development are summarised in Table 13.1 below.

Table 13.1: Summary of legislation and policy relevant to this chapter of the ES

Summary of provision	How and where considered in the ES
Future Wales: The National Plan 2040 (2021)	
Aviation (policy 18) - Future Wales: The National Plan 2040	There are no unacceptable impacts on the operations of defence facilities and operations (including aviation and radar) or the Mid Wales Low Flying Tactical Training Area (TTA-7T).

Telecommunications - Future Wales: The National Plan 2040	In sensitive landscapes and other designated areas digital telecommunications infrastructure will be carefully located to minimise visual impact.
Planning Policy Wales Edition 12	
Aviation – paragraph 5.2.17 of Planning Policy Wales Edition 12	Where a new mast is proposed on or near a sensitive use, for example, an airport, hospital, crèche, school or college, it is important that operators engage with the owners and operators of the use early on in the development process to discuss any technical or other concerns the siting of a mast may cause. This will also include sites that may be near military or other communication networks.
Telecommunications Reception and Interference - paragraph 5.2.20 of Planning Policy Wales Edition 12	The construction of large or prominent new buildings or other structures, such as wind turbines, can interfere with telecommunications and broadcast services due to the physical obstruction or reflection of signals. Interference can be a material consideration. Local planning authorities should satisfy themselves that the potential for interference has been taken into consideration in the siting and design of developments, as this may be difficult to correct after the event. Consultation with telecommunications or broadcast authorities may be appropriate in certain cases.

13.3 Consultation and Engagement

Scoping

- 13.3.1 In September 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 13.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on 14 February 2025. Key issues raised by statutory bodies specific to Aviation and Telecommunications are listed in **Error! Reference source not found.**, including how and where these have been considered in the ES.

Table 13.2: Summary of key scoping responses relevant to Aviation and Telecommunications

Comment	How and where considered in the ES
PEDW	
PEDW welcomes that consultation will continue with key stakeholders, e.g. OFCOM, Arqiva etc. In the absence of the result of any such consultations / technical assessments, it is not possible to scope this out of the ES at this stage. Electromagnetic interference is therefore Scoped in. Should further technical work demonstrate that with mitigation there would be no significant effects, then this should be reported in the ES.	Aviation and Telecommunication Impact Assessments have been conducted to determine the impact significance of the Proposed Development. Aviation stakeholders are to be consulted in planning. Telecommunications stakeholders (i.e. link operators) have been consulted to obtain details of their link infrastructure and inform the design of the Proposed Development. Consultation undertaken is set out in Table 1.3: Summary of Stakeholder Consultation Responses.

Table 13.3: Summary of Stakeholder Consultation Responses

Stakeholder	Consultation Response
Arqiva	
Link operator regarding Telecommunications Infrastructure	Arqiva have not confirmed their position on the Proposed Development at present.
Atkins / Dwr Crymu	
Link operator regarding Telecommunications Infrastructure	Atkins / Dwr Crymu have not confirmed their position on the Proposed Development at present.
BT	
Link operator regarding Telecommunications Infrastructure	BT have confirmed they have no link infrastructure within the vicinity of the Proposed Development, and therefore have raised no objection.
The JRC	

Stakeholder	Consultation Response
Link operator regarding Telecommunications Infrastructure	The JRC have confirmed they have no link infrastructure within the vicinity of the Proposed Development, and therefore have raised no objection.
MBNL	
Link operator regarding Telecommunications Infrastructure	MBNL have confirmed they have no link infrastructure within the vicinity of the Proposed Development, and therefore have raised no objection.
MLL Telecom	
Link operator regarding Telecommunications Infrastructure	MLL Telecom have confirmed they have no link infrastructure within the vicinity of the Proposed Development, and therefore have raised no objection.
Virgin Media O2	
Link operator regarding Telecommunications Infrastructure	Virgin Media O2 have confirmed they have no link infrastructure within the vicinity of the Proposed Development, and therefore have raised no objection.
Vodafone	
Link operator regarding Telecommunications Infrastructure	Vodafone have confirmed they have no link infrastructure within the vicinity of the Proposed Development, and therefore have raised no objection.

13.4 Assessment Methodology

Relevant Guidance

- 13.4.1 The assessment of Aviation and Telecommunications has been undertaken in accordance with the methodology set out in Volume 1, Chapter 4: Approach to the environmental assessment of the ES in addition to the following guidance, where appropriate:
- International Telecommunications Union (1992), Assessment of impairment caused to television reception by a wind turbine, Recommendation ITU-R BT805;
 - International Telecommunications Union (2010), ITU-R BT.2142-1;
 - Bacon (2002), A proposed method for establishing an exclusion zone around a terrestrial fixed radio link outside of which a wind turbine will cause negligible degradation of the radio link performance;

- Joint Radio Company (2014): Calculation of Wind Turbine clearance zones for JRC UHF (460MHz) Telemetry Systems when turbine sizes and locations are accurately known – Issue 4.2.

Aviation

- Civil Aviation Authority (2016), Civil Aviation Publication 764: CAA Policy and Guidelines on Wind Turbines – Version 6
- Civil Aviation Authority (2019), Civil Aviation Publication 168: Licensing of Aerodromes – Edition 11

Scope of the Assessment

- 13.4.2 The scope of this ES has been developed in consultation with relevant statutory and non-statutory consultees as detailed in **Table 13.4**.
- 13.4.3 Taking into account the scoping and other consultation, summarises the issues considered as part of this assessment.

Table 13.4: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Crane Usage (Aviation and Telecommunications)	Installation of the Proposed Development would require cranes to install. Cranes have the potential to block or reflect signals during the construction of the Proposed Development. The construction phase could therefore potentially result in some temporary electromagnetic interference which would present a temporary low adverse impact to telecommunication links. No impact would be anticipated for aviation; however, lighting may be required if they measure 150m above ground level or above Any effect of the Proposed Development during construction would be less than or, at worst, the same as the effect during operation and maintenance of the Proposed Development
Operation and maintenance	
Aviation Infrastructure	The Proposed Development is sufficiently laterally and vertically clear of licensed and unlicensed aerodromes and therefore do not pose a significant collision risk as a physical obstruction. The Proposed Development is within line-of-sight to the Primary Surveillance Radar (PSR) at Bristol Airport and Cardiff Airport, at distances 53km and 25km away, respectively. The Cardiff Airport PSR is understood to provide Approach Radar services for St Athan Airport, at a distance of 24km away.

Activity	Impacts scoped into the assessment
Telecommunications Infrastructure	One telecommunication link was identified within the vicinity of the Proposed Development
Decommissioning	
Aviation and Telecommunications	The impact for the decommissioning stage is as per the construction stage

Study area

13.4.4 The study area for aviation infrastructure was defined by identifying aerodromes and infrastructure that was within or close to their safeguarded range of the Proposed Development. Specifically, this includes the following infrastructure:

- UK AIP listed Civil Aerodromes and Heliports within 15km of the site centre;
- Unlicensed airfields within 15km of the site centre;
- NATS en-route radar sites within 100km of the site centre;
- Civil Airport ATC radar within 40km of the site centre;
- En-Route radio navigation beacons within 10km of the site centre;
- Use of the on-line NATS self-assessment maps;
- Ministry of Defence ASACS radar sites within 100km of the site centre;
- Military Aerodromes within 60km of the site centre;
- Military ATC radar sites within 60km of the site centre;
- Military PAR radar sites within 40km of the site centre;
- Ministry of Defence Tactical Training Areas within 10km of the site centre;
- Meteorological radar within 20km of the site centre.

13.4.5 The study area for Telecommunications infrastructure was identified through consultation with the relevant communication stakeholders. The search radius was approximately 1000m from the site boundary of the Proposed Development; however, most stakeholders apply their own safeguarding criteria.

13.5 Assessment Criteria and Assignment of Significance

13.5.1 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and the magnitude of potential impacts.

- 13.5.2 The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England *et al.*, 2020).
- 13.5.3 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.
- 13.5.4 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Environmental Assessment Methodology.

Receptor Value and Sensitivity

- 13.5.5 The criteria for defining sensitivity in this chapter of the ES are outlined in Error! Reference source not found. below.

Table 13.5: Sensitivity criteria

Sensitivity/Value	Definition
High	The receptor has little or no ability to absorb change without fundamentally altering its present character, is of very high environmental value, or of international importance.
Medium	The receptor has low ability to absorb change without fundamentally altering its present character, is of high environmental value, or of national importance.
Low	The receptor has moderate capacity to absorb change without significantly altering its present character, has some environmental value, or is of regional importance.
Negligible	The receptor is tolerant of change without detriment to its character, is low environmental value, or local importance.

Magnitude of impact

- 13.5.6 The criteria for defining magnitude in this chapter of the ES are outlined in Error! Reference source not found. below.

Table 13.6: Impact magnitude criteria

Magnitude of impact		Definition
High	Adverse	Total loss or substantial alteration to key features of the baseline conditions such that receptor attributes will be fundamentally changed

Magnitude of impact		Definition
Moderate	Adverse	Loss or alteration to one or more key features of the baseline conditions such that receptor attributes will be materially changed
Low	Adverse	A minor shift away from baseline conditions. Change arising from the alteration will be discernible but not material. The underlying attributes of the baseline condition will be largely unchanged
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements

Significance of effect

- 13.5.7 The significance of the effect upon Aviation and Telecommunications has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in Table 13.7. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 13.5.8 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.
- 13.5.9 For the purpose of this assessment, any effects with a significance level of minor adverse or less are not considered to be significant in terms of the EIA Regulations.

Table 13.7: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact			
	High	Moderate	Low	Negligible
High	Major adverse	Major adverse	Moderate adverse	Major adverse
Medium	Major adverse	Moderate adverse	Moderate adverse	Major adverse
Low	Minor adverse	Minor adverse	Minor adverse	Minor adverse
Negligible	Negligible	Negligible	Negligible	Negligible

- 13.5.10 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described in Table 13.8 below.

Table 13.8: Definitions of significance

Significance	Definition
Major	These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed this level of significance
Moderate	These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
Minor	These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Assumptions and limitations of the assessment

- 13.5.11 The assessments are limited to desk-based modelling. This limitation was managed by obtaining infrastructure details directly from link operators, which is the most credible source. Additionally, a buffer distance to account for inaccuracies when assessing impact upon telecommunications infrastructure.

13.6 Baseline Environment Conditions

Desk studies

- 13.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment for Aviation and Telecommunications. The existing studies and datasets referred to in the Relevant Guidance in Section 1.4 have informed the assessments for the desk-based studies.

Site-specific surveys

- 13.6.2 No site-specific surveys were undertaken to inform the baseline assessment for Aviation and Telecommunications.

Future baseline conditions

- 13.6.3 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that ‘an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge’ is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.
- 13.6.4 The future baseline conditions, in the context of Aviation and Telecommunications will be as per the existing baseline conditions.

Key receptors

- 13.6.5 Table 13.9 identifies the receptors taken forward for the assessment.

Table 13.9: Key receptors taken forward for assessment

Receptor	Description and Reason for Consideration
Telecommunication infrastructure pertaining to Arqiva	The telecommunication infrastructure pertaining to the link operator Arqiva has been assessed
Bristol Airport PSR	The Primary Surveillance Radar providing air traffic services at Bristol Airport has been assessed
Cardiff Airport PSR	The Primary Surveillance Radar providing air traffic services at Cardiff Airport (and St Athan Airport) has been assessed

13.7 Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

- 13.7.1 The design process for the Proposed Development has been heavily influenced by the findings of early environmental appraisals and the EIA process. The Proposed Development has had several measures incorporated into the design to avoid or minimise environmental impacts.
- 13.7.2 The key aspects where the design has evolved are described in Volume 1, Chapter 3: Need and Alternatives Considered of the ES. These include measures required for legal compliance, as well as measures that implement the requirements of good practice guidance documents. The assessment has been undertaken on the basis that these measures are incorporated in the design and construction practices (i.e. they are 'embedded mitigation').
- 13.7.3 Embedded mitigation measures for the Proposed Development are set out in the Volume 1, Chapter 2: Project Description and the various management plans outlined in this chapter of the ES.
- 13.7.4 Implementation of embedded mitigation relied upon in the assessment will be secured in the DNS. Compliance of detailed design of the Proposed

Development with the Outline Design Principles, or through compliance with relevant environmental management plans.

13.7.5 Consideration has been given to any ‘additional mitigation’ over and above the embedded mitigation that may be required and has the potential to mitigate any significant adverse effects identified following the assessment of the Proposed Development inclusive of its embedded mitigation.

13.7.6 Where significant effects remain following the implementation of embedded mitigation and achievable further measures could lower the identified effect, this chapter identifies additional mitigation and explains how the additional mitigation is secured. The residual effects (after the implementation of embedded and additional mitigation) have then been identified and are presented in each topic chapter.

13.7.7 Both embedded and additional mitigation measures relevant to the assessment of Aviation and Telecommunications are summarised in Table 13.10 below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 13.10: Mitigation measures to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
The Proposed Development is not expected to require mitigation for impacts upon Aviation and Telecommunications.	
Further mitigation	
Radar blanking	If the technical impact predicted also results in an operational impact. The radar is secured by the specific aerodrome.
Aviation lighting	The Proposed Development will adopt a lighting scheme, in accordance with the CAA and MOD to ensure visibility and reduce risk of a collision risk.

13.8 Assessment of effects

13.8.1 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. A description of the potential effect on receptors caused by each identified impact is given below.

Impact Upon Bristol Airport PSR

Construction phase

Sensitivity of the receptor

- 13.8.2 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.8.3 The magnitude of the impact is **High**.

Significance of the effect

- 13.8.4 On the basis that the sensitivity of the receptor is High and the magnitude of the impact is High, it is assessed that there will be a **major adverse** effect, which is significant.

Additional mitigation and residual effect

- 13.8.5 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being erected to ensure no interference caused by the cranes during the construction period. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development.
- 13.8.6 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Operation and maintenance

Sensitivity of the receptor

- 13.8.7 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.8.8 The magnitude of the impact is **High**.

Significance of the effect

- 13.8.9 On the basis that the sensitivity of the receptor is High and the magnitude of the impact is High, it is assessed that there will be a **major adverse** effect, which is significant.

Additional mitigation and residual effect

- 13.8.10 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being operational to ensure no

interference is caused. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development.

- 13.8.11 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Decommissioning

Sensitivity of the receptor

- 13.8.12 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.8.13 The magnitude of the impact is **High**.

Significance of the effect

- 13.8.14 On the basis that the sensitivity of the receptor is High and the magnitude of the impact is High, it is assessed that there will be a **major adverse** effect, which is significant.

Additional mitigation and residual effect

- 13.8.15 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being decommissioned to ensure no interference caused by the cranes during the c period. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development
- 13.8.16 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Impact Upon Cardiff Airport PSR

Construction phase

Sensitivity of the receptor

- 13.8.17 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.8.18 The magnitude of the impact is **High**.

Significance of the effect

- 13.8.19 On the basis that the sensitivity of the receptor is High and the magnitude of the impact is High, it is assessed that there will be a **major adverse** effect, which is significant.

Additional mitigation and residual effect

- 13.8.20 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being erected to ensure no interference caused by the cranes during the construction period. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development.
- 13.8.21 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Operation and maintenance

Sensitivity of the receptor

- 13.8.22 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.8.23 The magnitude of the impact is **High**.

Significance of the effect

- 13.8.24 On the basis that the sensitivity of the receptor is High and the magnitude of the impact is High, it is assessed that there will be a **major adverse** effect, which is significant.

Additional mitigation and residual effect

- 13.8.25 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being operational to ensure no interference is caused. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development.
- 13.8.26 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Decommissioning

Sensitivity of the receptor

- 13.8.27 The sensitivity of the receptor is **High**.

Magnitude of impact

13.8.28 The magnitude of the impact is **High**.

Significance of the effect

13.8.29 On the basis that the sensitivity of the receptor is High and the magnitude of the impact is High, it is assessed that there will be a **major adverse** effect, which is significant.

Additional mitigation and residual effect

13.8.30 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being decommissioned to ensure no interference caused by the cranes during the c period. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development

13.8.31 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Impact Upon Arqiva Telecommunications Infrastructure

Construction phase

Sensitivity of the receptor

13.8.32 The sensitivity of the receptor is **Medium**.

Magnitude of impact

13.8.33 The magnitude of the impact is **Moderate**.

Significance of the effect

13.8.34 On the basis that the sensitivity of the receptor is Medium and the magnitude of the impact is Moderate, it is assessed that there will be a **major adverse** effect, which is significant.

Additional mitigation and residual effect

13.8.35 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being erected to ensure no interference caused by the Proposed Development during the construction period. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development.

13.8.36 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Operation and maintenance

Sensitivity of the receptor

13.8.37 The sensitivity of the receptor is **Medium**.

Magnitude of impact

13.8.38 The magnitude of the impact is **Moderate**.

Significance of the effect

13.8.39 On the basis that the sensitivity of the receptor is medium and the magnitude of the impact is moderate, it is assessed that there will be a **major adverse effect**, which is significant.

Additional mitigation and residual effect

13.8.40 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being operational to ensure no interference is caused. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development.

13.8.41 Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant.

Decommissioning

Sensitivity of the receptor

13.8.42 The sensitivity of the receptor is **medium**.

Magnitude of impact

13.8.43 The magnitude of the impact is **moderate**.

Significance of the effect

13.8.44 On the basis that the sensitivity of the receptor is medium and the magnitude of the impact is moderate, it is assessed that there will be a **major adverse effect**, which is significant.

Additional mitigation and residual effect

13.8.45 It will be ensured, likely through a planning condition, that mitigation is in place ahead of the Proposed Development being decommissioned to ensure no

interference caused by the cranes during the c period. The condition should allow flexibility as to the proposed mitigation to be implemented, allowing for other solutions which may be identified, but ensures that a satisfactory solution must be in place before operation of the Proposed Development

Taking the additional mitigation into account, it is assessed that there will be a **negligible residual effect**, which is not significant

13.9 Cumulative Effects

13.9.1 The assessment of cumulative effects for Aviation and Telecommunications has followed the methodology set out in Volume 1, Chapter 4: Environmental Assessment Methodology. As part of the assessment, all projects and plans considered alongside the Proposed Development have been allocated into 'tiers' reflecting their current stage within the planning and development process.

Cumulative effects assessment

13.9.2 No potential for cumulative effects pertaining to Aviation and Telecommunication has been identified.

Inter-related effects

13.9.3 Inter-relationships are the impacts and associated effects of different aspects of the Proposed Development on the same receptor. The assessment has included the inter-relationships between Aviation and Telecommunications with other topics considered as part of the ES. The assessment considered the following types of inter-related effects:

- **Project lifetime effects:** Assessment of the effects that may occur across multiple phases of the Proposed Development (i.e. construction, operation and maintenance, and decommissioning) and result in a more significant effect on a receptor than if each phase were assessed in isolation; and
- **Receptor-led effects:** Assessment of the effects that may occur via the combined interaction between different environmental impacts, either spatially or temporally, on a single receptor and result in a more significant effect than if each environmental impact were assessed in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

13.9.4 No inter-related effects pertaining to Aviation and Telecommunication are predicted.

13.10 Summary of environmental effects, mitigation measures and monitoring

13.10.1 **Table 13.11** presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

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Table 13.11: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a			Mitigation measures	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect
	C	O	D						
Impact upon Bristol Airport Primary Surveillance Radar	P	P	P	C: High O: High D: High	C: High O: High D: High	Moderate adverse	Not considered operationally significant	C: None O: Radar blanking D: None	N/A
Impact upon Cardiff Airport Primary Surveillance Radar	P	P	P	C: High O: High D: High	C: High O: High D: High	Moderate adverse	Not considered operationally significant	C: None O: Radar blanking D: None	N/A
Impact upon Arqiva Telecommunications Infrastructure	P	P	P	C: Moderate O: Moderate D: Moderate	C: Medium O: Medium D: Medium	Moderate adverse	Micrositing turbines	C: None O: None D: None	N/A

^a C=construction, O=operational and maintenance, D=decommissioning

13.11 References

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LLANWONNO ENERGY PROJECT

Environmental Statement

Volume 1, Chapter 14: Socio-Economics, Tourism and Recreation

March 2025

Document status					
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Appendices (See Volume 3: Appendices)

Annex number	Annex title
A14.1	Socioeconomic Baseline Report

Glossary

Term	Meaning
The Applicant	Cenin Renewables Ltd.
The Project	Proposed wind farm and associated ancillary development known as 'Llanwonno' or 'Llanwonno Energy Project'.
Construction Traffic Management Plan (CTMP)	A plan managing all construction traffic, including protocols for delivery of Abnormal Indivisible Loads to site, personnel travel, measures for road cleaning and sustainable site travel measures.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Effect	Best practice guidance defines effect as the change resulting from an impact (which is defined as 'the action being taken') (e.g. the effect erecting a building/structure or removing a tree on seascape/landscape character or views/visual amenity).
Environmental Impact Assessment	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and EIA Regulations, including the publication of an Environmental Statement.
EIA Scoping Report	In November 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development. Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction in February 2025.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process.

Abbreviations/ Acronyms

Abbreviation	Meaning
FTE	Full Time Equivalent
GVA	Gross Value Added
RCT	Rhonda scoping
PRoW	Public Right of Way
PEDW	Planning and Environment Decisions Wales
TMP	Traffic Management Plan

Units

Unit	Description
MW	Megawatts
MWh	Mega Watt Hours

Unit	Description
KW	Kilowatt
KWh	Kilowatt Hour
£	Pound
t	tonnes

14 Socioeconomics, Tourism and Recreation

Introduction

- 14.1.1 This chapter of the PEIR identifies and assesses the likely significant effects of the Development on socioeconomic, tourism and recreational resources.
- 14.1.2 The assessment presented is informed by the following technical chapters in Environmental Statement (ES):
- Chapter 5: Landscape and Visual;
 - Chapter 6: Transport
 - Chapter 11: Noise and Vibration; and
- 14.1.3 This chapter is supported by the following Technical Appendices:
- Technical Appendix A14.1: Socioeconomic Baseline Report

Legislative and Policy Context

National Planning Policy Context

- 14.1.4 The key national planning policy documents relevant to the assessment of Socioeconomics for the Proposed Development are as follows:
- **Future Wales: The National Plan 2040** (Welsh Government, 2021), including Policy 17: Renewable and Low Carbon Energy and Associated Infrastructure and Policy 18: Renewable and Low Carbon Energy Developments of National Significance; and
 - **Planning Policy Wales Edition 12** (Welsh Government, 2024), including relevant supplementary Technical Advice Notes (TANs), Circulars and Policy Clarification Letters (PCLs).
 - **The Equality Act** (UK Public General Acts (2010), Section 1: The Socio-Economic Duty
 - **The Infrastructure Planning (Environmental Impact Assessment) Regulations** (UK Statutory instruments, 2017), specifically Regulation 5(2)(a)

14.1.5

14.1.6 **Table** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of Socioeconomics, including how and where these have been considered in the ES.

Table 14.1: Summary of national planning policies relevant to this chapter of the ES

Summary of policy	How and where considered in the ES
Future Wales: The National Plan 2040	
Future Wales Policy 17 states that proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental, and cultural improvements to local communities.	This assessment considers the social and economic effects of the development at the 'Assessment of Effects' section of this chapter. These effects are considered for the construction, operation, and decommissioning phases of the Development.
Future Wales Policy 18 states that there should be no unacceptable adverse impacts on the transport network through the transportation of components or source fuels during its construction and/or ongoing operation.	Chapter 6: Transport will assess the direct impact upon the road network and users. Within the socioeconomic assessment, the conclusions of Chapter 6 will be utilised to inform the assessment on commuting patterns and the tourism economy.
Planning Policy Wales Edition 12	
Paragraph 5.7.1 of the PPW states that the Welsh Government's highest priority is to reduce energy demand wherever possible and affordable and that low carbon electricity must become the main source of energy in Wales.	The Proposed Development would directly contribute to increasing the low carbon electricity capacity within Wales, helping the nation to move towards becoming the main source of energy in Wales. Potential electricity production is estimated within the 'Assessment of Effects' section at para 14.1.109
PPW 12 states that planning authorities should assess the social, economic, environmental, and cultural impacts and opportunities arising from renewable and low carbon energy (para 5.9.8) development.	This assessment considers the social and economic effects of the development at the 'Assessment of Effects' section of this chapter. These effects are considered for the construction, operation, and decommissioning phases of the Development.
TAN 6 - Planning for Sustainable Rural Communities	
Planning authorities should support the diversification of the rural economy as a way to provide local employment opportunities, increase local economic prosperity and minimise the need to travel for employment (para 3.1.2)	The diversification of the agricultural land, and subsequently rural employment is discussed within the 'Assessment of Effects' section of this chapter.
The Equality Act	
Requires public bodies to adopt transparent and effective measures to address the inequalities that result from differences in occupation, education, place of residence or social class.	The assessment of effects is made in consideration of the social and economic characteristics of the study area, as set out in Technical Appendix A14.1: Socioeconomic Baseline Report.

The Infrastructure Planning (Environmental Impact Assessment) Regulations

Requires that the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the likely significant direct and indirect effects of a development on population and human health.	The assessment of effects considers the direct and indirect impact upon the study area population in consideration of the social and economic characteristics set out in Technical Appendix A14.1: Socioeconomic Baseline Report.

Local Planning Policy Context

- 14.1.7 The Proposed Development site is located within Rhondda Cynon Taf (RCT) Borough Council. The local planning policy document relevant to the assessment of Socioeconomics for the Proposed Development is:
- **Rhondda Cynon Taf County Borough Council Local Development Plan 2006 to 2021.** This is quite outdated, and RCT are currently in the process of producing a new Local Development Plan for the plan period of 2022 to 2037. This will be adopted in October 2025.
- 14.1.8 **Table 1** provides a summary of the provisions contained within the local plan relevant to the assessment of Socioeconomics, including how and where these have been considered in the ES.

Table 14.1: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
Policy AW 2 – Sustainable Locations	As part of adopting a sustainable location approach, development must link with and seek to minimise impacts on the PROW network. Any predicted adverse impacts on the character, safety, enjoyment and convenient use of a PROW must be mitigated.	The impact on local PROW networks have been considered in more detail in the Chapter 6: Transport Assessment, as well as ‘Change in Access to Recreation’ of this assessment which references Chapter 5: Landscape and Visual Impact Assessment.
Policy AW 12 - Renewable & Non-Renewable Energy	Energy development proposals (renewable and non-renewable) are permitted if they do not negatively impact soil, agriculture, nature, wildlife, cultural heritage, landscape, public health, or residential areas. Proposals must minimize resource use during construction, operation, and maintenance.	The impact on local landscape have been considered in more detail in the Chapter 5: Landscape and Visual Assessment.
Policy AW 13 - Large Wind Farm Development	Wind farm developments of 25MW+ should be within strategic areas, on flat uplands, and 500m from homes unless safe. They must not harm landscape, accessibility, or conservation sites, and should protect Brecon Beacons National Park. Developments should enhance public access and enter land management agreements, ensuring	The impact on local landscape have been considered in more detail in the Chapter 5: Landscape and Visual Impact Assessment.

minimal socio-economic disruption and promoting local benefits.

Consultation and Engagement

Scoping

- 14.1.9 In November 2024, the Applicant submitted a Scoping Report to PEDW, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any likely significant effects for the construction, operation and maintenance and decommissioning phases of the Proposed Development.
- 14.1.10 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction in February 2025.
- 14.1.11 “PEDW notes effects on population, including employment, commuting, tourism and recreation will be addressed as part of the Socio-Economics chapter.” (EIA Scoping Direction, pg.13).
- 14.1.12 PEDW also commented that construction may impact several Public Rights of Way (PRoW), with potential temporary or permanent diversions. A management plan might be created for permanent impacts. PEDW appreciates the inclusion of Landscape and Visual Impact Assessment results for indirect recreational impacts and advises coordination with the Local Planning Authority (LPA) on PRoW issues.(EIA Scoping Direction, pg.36-37).

Assessment Methodology

Relevant Guidance

- 14.1.13 There is no specific guidance available which establishes a methodology for undertaking an Environmental Impact Assessment (EIA) of the socio-economic effects of a project. Accordingly, the approach adopted for this assessment is based on professional experience and best practice, and in consideration of the policy requirements/tests set out within the National Planning Policy Framework (NPPF) National Planning Statement's (NPS), Draft NPS and local planning policy. The approach is in line with methodologies used by others, that have withstood public inquiry/DCO examination.

Scope of the Assessment

- 14.1.14 Taking into account the Scoping Direction and other consultation,

14.1.15 **Table 1** summarises the issues considered as part of this assessment.

Table 14.2: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Creation of Jobs	The Development will create direct and indirect jobs this will also present opportunities to increase local skills by providing training and skills to workers.
Spending in local economy	Greater construction worker spending in local economy and the direct investment in the local supply chain could have an impact on economic output.
Temporary road closures/disruption	Temporary road diversions and disruption as a result of increased traffic during construction could impact commuting times/patterns and have potential economic impacts on local economy.
Construction works	The visual impact of construction equipment and the associated noise and traffic impacts has the potential to impact nearby tourism receptors.
Impact on accommodation providers	Potential increase in demand for temporary worker accommodation during the construction phase if large, non-resident workforce is required.
Operation and maintenance	
Creation of Jobs	The maintenance of the Development will require and support the creation of a dedicated work force on a regular basis. Indirect employment may also arise once the Development is operational.
Spending in local economy	The Gross Value Added (GVA) associated with the direct, indirect, and induced jobs over the lifetime of Development can have potential substantial impact on the local economy.
Erection of wind turbines in landscape	There is some potential that the Development could impact the visual amenity of some tourist destinations and therefore impact the visitor economy.
Decommissioning	
Creation of Jobs	The Development will create direct and indirect jobs this will also present opportunities to increase local skills by providing training and skills to workers.
Spending in local economy	Greater decommissioning worker spending in local economy and the direct investment in the local supply chain could have an impact on economic output.
Temporary road closures/disruption	Temporary road diversions and disruption as a result of increased traffic during decommissioning could impact commuting times/patterns and have potential economic impacts on local economy.
Construction works	The visual impact of decommissioning equipment and the associated noise and traffic impacts has the potential to impact nearby tourism receptors.
Impact on accommodation providers	Potential increase in demand for temporary worker accommodation during the decommissioning phase if large, non-resident workforce is required.

14.1.16 Effects which are not considered likely to be significant have been scoped out of the assessment. A summary of the effects scoped out is presented in **Table 14.**

Table 14.3: Issues scoped out of the assessment

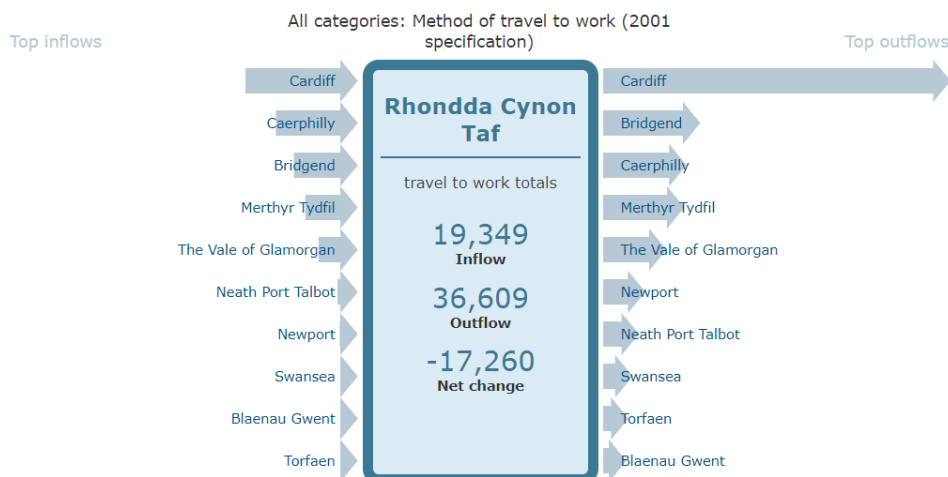
Issue	Justification
Visitor Economy – Operational phase	There is little evidence of wind or solar farms having negative effects on tourism and in fact is suggestive of the potential for some positive effects. However, due to the scale and location of the subject scheme such positive effects will not be expected to be significant according to the EIA Regulations. No significant effects on tourism (either positive or negative) are, therefore, expected in relation to the development.
Housing	House prices are unlikely to be impacted upon by the Proposed Development during any of the development phases due to a lack of residential receptors surrounding the proposed development. Furthermore, public attitudes towards onshore wind farms / renewable energy are typically positive. Subsequently, house prices are unlikely to be impacted.
Commuting Patterns – Operational Phase	Once operational, there is likely to be insignificant additional strain on the road network around the proposed development. Subsequently, it is unlikely that there will be any impact on commuting patterns.
Recreation – Operational Phase	Once operational, there is likely to be an insignificant impact on recreation, with PRoW reopened as before construction.
Crime & Safety	There is the potential for increased crime in relation to theft from the construction sites. Security arrangements for the Proposed Scheme will be in line with the requirements set out the Construction (Design and Management) Regulations and appropriate levels of security (personnel / CCTV) will be appointed. Therefore, there is unlikely to be a significant effect in relation to crime and safety, and this is not considered worthy of further assessment.

Study area

- 14.1.17 The socio-economic baseline data was collected for varying geographic scales depending on the subject indicator. These include:
- Travel to Work Areas (TTWA)
 - Local Authority (CA); and
 - All of Wales (W)
- 14.1.18 The study area has been based on an assessment of the local Travel to Work Areas (TTWA). These TTWA's are a useful starting point for understanding the spatial extents of labour markets. The Office for National Statistics (ONS) 2016 Travel to Work Area (TTWA) boundaries, derived from Census 2011 data show that the subject site is located in the north eastern part of the Cardiff TTWA.
- 14.1.19 In addition to the TTWA's it is also useful to analyse the commuting patterns data from the 2011 Census. The infographic below shows the inflow and outflow of workers in Rhondda Cynon Taf. As can be seen there is a higher net migration of workers out of the area (36,609) compared to those who commute to the area to work (19,349). The majority of residents who commute

out of the area for work travel to Cardiff (16,086). The largest inflow of workers is also from Cardiff (5,043).

Figure 14.1 - Commuting Totals Rhondda Cynon Taf - Source: ONS, Census WU01UK - Location of usual residence and place of work



14.1.20

Table 14.4 is extracted from the ONS data on the location of usual residence compared with the usual place of work. As can be seen; the majority of workers in Rhondda Cynon Taf also live in the area (47,540). There is, however, a large number of workers who come from outside of the identified TTWA from the neighbouring authorities of Bridgend, Merthyr Tydfil, Newport and Neath Port Talbot. It is, therefore, appropriate to also assess the impact of the proposals on these areas.

Table 14.4: Commuter Inflows, Bridgend

place of work: 2011 census merged local authority district	Rhondda Cynon Taf
Rhondda Cynon Taf	47,540
Cardiff	16,086
Bridgend	4,004
Caerphilly	3,336
Merthyr Tydfil	3,197
The Vale of Glamorgan	2,350
Newport	1,339
Neath Port Talbot	1,002
Swansea	714
Torfaen	487
Blaenau Gwent	406

14.1.21

On the basis of the above analysis of Census Travel to Work data, the area that is likely to experience the greatest social and economic benefit from the

Proposed Development is Rhondda Cynon Taf as a whole, the local authority where the majority of its workforce is expected to originate.

- 14.1.22 A wider Employment Area incorporating Rhondda Cynon Taf, Cardiff and Bridgend has been used to better contextualise the study area as these areas will also experience some benefit. Swansea, Newport and Neath Port Talbot may experience some slight benefits due to the inflow of workers to the area, however, it is unlikely to be substantial.
- 14.1.23 Overall, therefore, our suggested study area is the local authority of Rhondda Cynon Taf and the wider employment study area will include Rhondda Cynon Taf, Cardiff and Bridgend.
- 14.1.24 The location and geographic extent of the study area is presented in Technical Appendix A14.1: Socioeconomic Baseline Report of the ES.

Assessment Criteria and Assignment of Significance

- 14.1.25 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts.
- 14.1.26 The terms used to define magnitude and sensitivity are based on and have been adapted from those used in the Design Manual for Roads and Bridges (DMRB) methodology (Highways England *et al.*, 2020).
- 14.1.27 The approach to determining the significance of effects is a two-stage process that involves defining the magnitude of the impact and the sensitivity of the receptor. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.
- 14.1.28 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Environmental Assessment Methodology.

Receptor Value and Sensitivity

- 14.1.29 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 14.5** below.

Table 14.5 : Sensitivity criteria

Sensitivity/Value	Definition
High	Receptor is identified as a policy priority Evidence of major socio-economic challenge or underperformance
Medium	Receptor is important in policy Evidence of under-performance or vulnerability

Sensitivity/Value	Definition
Low	Receptor is not a policy priority Evidence that the receptor is resilient and no particular challenges
Negligible	Receptor is not a policy priority Good overall performance in impact area

Magnitude of impact

14.1.30 The criteria for defining magnitude in this chapter of the ES are outlined in **Table 14.6** below.

Table 14.6: Impact magnitude criteria

Magnitude of impact		Definition
High	Adverse	Severe detrimental impact to key social and/or economic characteristics. Where the impact is able to be quantified this would equate to a percentage change of above 20%. Mitigation is likely to be hard to achieve or will require significant intervention.
	Beneficial	Major enhancement to key social and/or economic characteristics. Where the impact is able to be quantified this would equate to a percentage change of above 20%. There are unlikely to be better alternative means of achieving this benefit or other methods would be more time consuming, more expensive, and/or less effective.
Medium	Adverse	Discernible detrimental impact upon key social and/or economic characteristics. Where the impact is able to be quantified this would equate to a percentage change of 11-20%.
	Beneficial	Discernible improvement to key social and/or economic characteristics. Where the impact is able to be quantified this would equate to a percentage change of 11-20%.
Low	Adverse	Minor detrimental alteration to, one or more key social and/or economic baseline characteristic(s). Where the impact is able to be quantified this would equate to a percentage change of 6-10%.
	Beneficial	Minor benefit to one or more key social and/or economic baseline characteristic(s), or a reduced risk of negative impact occurring. Where the impact is able to be quantified this would equate to a percentage change of 6-10%.
Negligible	Adverse	Very minor detrimental alteration to one or more social and/or economic baseline characteristic(s). Mitigation is either easily achieved or little will be required. Where the impact is able to be quantified this would equate to a percentage change of under 5%.
	Beneficial	Very minor benefit to one or more social and/or economic baseline characteristics. Alternative means of achieving this benefit are likely to be easier, cheaper, more effective, and/or less time-consuming. Where the impact is able to be quantified this would equate to a percentage change of under 5%.

Magnitude of impact	Definition
No change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Duration of impacts

The criteria for describing the duration of impacts in this chapter of the ES are outlined in **Table 14** below.

Table 14.7: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year.
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years.
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development.

Significance of effect

- 14.1.31 The significance of the effect upon Socioeconomics has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in

-
- 14.1.32 **Table 14.** Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 14.1.33 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.
- 14.1.34 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 14.8: Assessment matrix

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	Low	Medium	High
Negligible	Negligible	Negligible	Minor	Minor
Low	Negligible	Negligible	Minor	Moderate
Medium	Negligible	Minor	Moderate	Moderate / Major
High	Negligible	Moderate	Moderate / Major	Major

14.1.35 Where the magnitude of impact is 'no change', no effect would arise. The definitions for significance of effect levels are described as follows

- **Major:** These beneficial or adverse effects are considered to be very important considerations and are likely to be material 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. Effects upon human receptors may also be attributed this level of significance.
- **Moderate:** These beneficial or adverse effects have the potential to be important and may influence the key decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.
- **Minor:** These beneficial or adverse effects are generally, but not exclusively, 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 Proposed Development.
- **Negligible:** No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

14.1.36 The definitions have been specified by the assessors based on professional experience. They are in line with methods used by others, that have withstood public inquiry/DCO examination.

Assumptions and limitations of the assessment

- 14.1.37 One limitation with this assessment is the age of some of the data that has been used to inform the baseline position. In some instances, such as when analysing commuting patterns between local authorities, this has been taken from the 2011 Census, which is now over 10 years old. This is as a result of the 2021 Census no longer producing comparable datasets for certain topics. Where available and appropriate more up to date projections have been used and thus it is concluded that this limitation does not affect the robustness of the assessment for EIA purposes.
- 14.1.38 In addition, there are no generally accepted criteria for assessing the significance of socio-economic effects and, in some cases, it can be difficult to quantify or measure such effects. Where the effect has been difficult to quantify, qualitative professional judgment has been applied, based on experience, best practice and in consideration of relevant planning policy.

Baseline Environment Conditions

Desk studies

- 14.1.39 A comprehensive desk-based review was undertaken to inform the baseline assessment for Socioeconomics. The existing studies and datasets referred to as part of the desk-based review for Socioeconomics are summarised in Table 19 below.

Table 14.9: Summary of desk study sources

Title	Source	Year published	Author
Census 2011	Nomis	2011	Office of National Statistics
Census 2021	Nomis	2021	Office of National Statistics
Business Register and Employment Survey	Nomis	2023	Office of National Statistics
UK Business Count	Nomis	2023	Office of National Statistics
Annual Population Survey	Nomis	2024	Office of National Statistics
National Survey for Wales	Stats Wales	2024	Welsh Government
VEH0142: Licensed plug-in vehicles (PiVs)	gov.uk	2024	Department for Transport and Driver and Vehicle Licensing Agency
Electric Vehicle Charging Infrastructure Statistics	gov.uk	2024	Department for Transport and Office for Zero Emission Vehicles

Title	Source	Year published	Author
Access to Renewable Energy	Energy Trends: UK renewables	2024	Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy
Renewable Energy Consumption	Total final energy consumption at regional and local authority level	2024	Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy
Welsh Index of Multiple Deprivation	Stats Wales	2019	Welsh Government

14.1.40 The Baseline Assessment can be found in full at Appendix 14.1.

Future baseline conditions

- 14.1.41 Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 require that ‘an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge’ is included within the ES. This section provides an outline of the likely future baseline conditions in the absence of the Proposed Development.
- 14.1.42 Welsh Government data estimates future population growth based on the ONS 2018-based interim projections. It suggests that the study area’s (RCT) population will increase to around 254,145 in 2043, from 240,131 in 2018, approximately a 6% increase, which is slightly higher than the Wales population increase (5%) and slightly lower than the South East Wales region (7%) for the same durations.
- 14.1.43 The age group of 16-64 is only expected to see a smaller rise in population, equivalent to a 2.4% rise. On the other hand, significant growth equivalent to 24.8% is expected within the 65+ age band.
- 14.1.44 It should be noted, however, that these population projections are trend-based projections, which means assumptions for future levels of births, deaths and migration are based on observed levels over the previous five years. They show what the population will be if recent trends in these continue.
- 14.1.45 Climate change is not considered to have a significant impact upon the socioeconomic baseline. Increases to the cost of fossil fuels may result in rising household bills, consequently making home ownership more expensive, however, there should also be a greater take up of green energy and electric vehicle ownership which may combat this. Overall, the socioeconomic baseline is not expected to be significantly affected by the impacts of climate change.

Key receptors

14.1.46 **Table 14.10** identifies the receptors taken forward into the assessment for Socioeconomics.

Table 14.10: Key receptors taken forward to assessment

Receptor	Description
Job Creation	The Development will create direct and indirect jobs during all stages of development.
Economic Output	Greater construction worker spending in local economy and the direct investment in the local supply chain could have an impact on economic output.
Tourism Economy	During construction and decommissioning, there could be an impact on local tourism receptors. There is also research into the positive impact wind farms can have on tourism when operational.
Education & Skills	Job creation will provide opportunities to increase local skills by providing training and skills to workers.
Commuting Patterns	During construction and decommissioning phases, there is the potential for additional vehicles to impact commuting flows.
Recreation	During construction and decommissioning, PRow diversions/closures may impact access to recreation. Visual/noise impacts may also reduce the enjoyment of recreation.

Key Parameters for Assessment

14.1.47 The maximum design parameters identified in Table 14.11 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These parameters have been selected from the information provided in Volume 1, Chapter 2: Project Description of the ES.

Table 14.11: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		

Job creation	✓	✓	✓	Construction phase Wind Turbines - The minimum capacity of onshore wind generation that consent is being sought for – 30.4 MW - Minimum construction period of 2 years Solar Farm - The minimum capacity of solar farm generation that consent is being sought for is 30.7 MW - Minimum construction period of 1 years Operation and maintenance phase Wind Turbines - The minimum capacity of onshore wind generation that consent is being sought for – 30.4 MW - Minimum 50 year operational period for the wind turbines Solar Farm - The minimum capacity of solar farm generation that consent is being sought for is 30.7 MW - Minimum 50 year operational period for the solar farms Decommissioning phase Wind Turbines - The minimum capacity of onshore wind generation that consent is being sought for – 30.4 MW - Minimum wind turbine decommissioning period of 2 years Solar Farm - The minimum capacity of solar farm generation that consent is being sought for is 30.7 MW Minimum solar decommissioning period of 2 years	The minimum wind turbines / capacity required will result in the minimum number of jobs. As these are beneficial effects, these assumptions therefore lead to a worst-case assessment.

Economic Output	✓	✓	✓	Construction phase Wind Turbines - The minimum capacity of onshore wind generation that consent is being sought for – 30.4 MW - Minimum construction period of 2 years Solar Farm - The minimum capacity of solar farm generation that consent is being sought for is 30.7 MW - Minimum construction period of 1 years Operation and maintenance phase Wind Turbines The minimum capacity of onshore wind generation that consent is being sought for – 30.4 MW Minimum 50 year operational period Solar Farm - The minimum capacity of solar farm generation that consent is being sought for is 30.7 MW - Minimum 50 year operational period for the solar farms Decommissioning phase Wind Turbines - The minimum capacity of onshore wind generation that consent is being sought for – 30.4 MW Minimum decommissioning period of 2 years Solar Farm - The minimum capacity of solar farm generation that consent is being sought for is 30.7 MW	The minimum wind turbines / capacity required will result in the minimum number of jobs and thus spending in the local economy, and a minimum investment in the local supply chain. As these are beneficial effects, these assumptions therefore lead to a worst-case assessment.

			Minimum solar decommissioning period of 2 years	

Tourism Economy	✓	✓	✓	Construction phase Wind Turbines • Maximum 8 no. of wind turbines • Maximum construction period of 2 years Solar Farm • 30.7 MW of solar panels • Maximum construction period of 1 year Operation and maintenance phase Wind Turbines • Maximum 8 no. of wind turbines • Maximum turbine heights (V126 Turbine ranging from 86.9m to 136.9m) • Maximum operational period of 50 years Solar Farm • The minimum capacity of solar farm generation that consent is being sought for is 30.7MW • Minimum 50 year operational period for the solar farms Decommissioning phase Wind Turbines • Maximum 8 no. of wind turbines • Maximum decommissioning period of 2 years Solar Farm • The minimum capacity of solar farm generation that consent is being sought for is 30.7MW Minimum solar decommissioning period of 2 years	The greatest number of wind turbines, at the highest height, and for the longest period of time will have the most visual impact and thus the most potential to impact upon visitor economy. The larger the area of solar panels, the great the possibility of visual impact that may potentially impact upon the visitor economy.

Education & Skills	✓	✓	✓	Construction, Operation and Maintenance and Decommissioning phase Wind Turbine Minimum capacity of wind turbines equivalent to xxxMW Solar Farm Maximum capacity of solar farm equivalent to 30.7MW	The lower the capacity of onshore wind and solar, and complexity of development will provide least opportunity for improving knowledge and skills in the industry and a lower number of opportunities for learning through employment. As this is a beneficial impact, we have assessed the worst case scenario.
Commuting Patterns	✓	✓	✓	Construction and Decommissioning phases The maximum key routes to be used by the construction traffic: Junction 32 of the M4 and the A470 (Access from the A470 for general construction traffic to be taken via the A4223, B4273, Heol-y-Mynach and Pleasant View before routeing onto an unnamed road).	The greater the number of key routes used by construction traffic, the greater the potential impact on commuting patterns.
Recreation				Construction, Operation and Maintenance and Decommissioning phase Maximum area of development land.	The larger the area of development land, the greater the potential impact on recreation.

^a C=construction, O=operational and maintenance, D=decommissioning

Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

- 14.1.48 The design process for the Proposed Development has been heavily influenced by the findings of early environmental appraisals and the EIA process. The Proposed Development has had several measures incorporated into the design to avoid or minimise environmental impacts.
- 14.1.49 The key aspects where the design has evolved are described in Volume 1, 'Chapter 3: Need and Alternatives Considered' of the ES. These include measures required for legal compliance, as well as measures that implement the requirements of good practice guidance documents. The assessment has been undertaken on the basis that these measures are incorporated in the design and construction practices (i.e. they are 'embedded mitigation').
- 14.1.50 Embedded mitigation measures for the Proposed Development are set out in the Volume 1, Chapter 2: Project Description and the various management plans outlined in this chapter of the ES.
- 14.1.51 Implementation of embedded mitigation relied upon in the assessment will be secured in the DNS. Compliance of detailed design of the Proposed Development with the Outline Design Principles, or through compliance with relevant environmental management plans.
- 14.1.52 Consideration has been given to any 'additional mitigation' over and above the embedded mitigation that may be required and has the potential to mitigate any significant adverse effects identified following the assessment of the Proposed Development inclusive of its embedded mitigation.
- 14.1.53 Where significant effects remain following the implementation of embedded mitigation and achievable further measures could lower the identified effect, this chapter identifies additional mitigation and explains how the additional mitigation is secured. The residual effects (after the implementation of embedded and additional mitigation) have then been identified and are presented in each topic chapter.
- 14.1.54 Embedded mitigation measures for the Proposed Development are set out in the *Volume 1, Chapter 2: Project Description*.
- 14.1.55 No additional mitigations are proposed as part of the socioeconomic, tourism and recreation assessment.

Assessment of effects

- 14.1.56 The impacts of the construction, operation and maintenance, and decommissioning phases of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance and decommissioning phases of the Proposed Development are listed in **Table 14.11**, along with the maximum design parameters against which each impact has been assessed. A description of the potential effect on receptors caused by each identified impact is given below.

Reduced Unemployment Levels

Construction phase (Wind Farm)

- 14.1.57 Construction is estimated to last for 24 months and based on established estimates of person years of employment per installed MW of electricity generation technologies, (12.8 jobs per year per MW installed, established within the 'Regional electricity generation and employment in UK regions' study (2017)), the Development is expected to create up to 960/389 person-years of direct and indirect employment connected to the construction phase.
- 14.1.58 Estimates underpinning this calculation are based on structured research reviews of the employment and economic effect of different electricity technologies carried out by Cardiff University and Regeneris.
- 14.1.59 The research also included a series of consultations with developers/operators to gain information on spending patterns and employment.
- 14.1.60 Low Carbon and Renewable Energy Economy employment multipliers for 2020 (most recent data available) estimate that onshore wind developments have a multiplier of 2.43. This is the figure used for this assessment. Applying this multiplier to the total number of person-years of employment results in 160 person-years of direct employment and 229 person years of indirect and induced employment.
- 14.1.61 Based on the 2017 study into regional electricity generation and employment in UK regions, 84% of these direct jobs are estimated to be gross direct construction and manufacturing employment, with 6% of jobs related to associated professional services, 5% of jobs related to wholesale/retail trade, 2% transport and communication related, 2% financial services and 1% others. This would equate to 134 person years of direct construction and manufacturing employment.
- 14.1.62 The 'Regional electricity generation and employment in UK regions' study states that more established technologies (e.g. onshore wind) can have a high level of employment impact, driven by the high proportion of development cost that is physical installation (often reliant on local labour), and the local sourcing of some device and ancillary elements. Although this study does not specifically split the construction and manufacturing jobs, it is considered that the construction jobs are likely to have a greater local benefit than manufacturing

jobs, many of which may be outside of the study area. (although if a local supply chain plan was developed, the local benefit could be greatly increased).

- 14.1.63 Therefore, in order to estimate the direct construction employment generated by the Project, we have utilised the comparison of capital cost breakdown for typical onshore and offshore wind power systems in developed countries with IRENA's 'Renewable Energy Technologies: Cost Analysis Series (2012).
- 14.1.64 The study suggests that between 4-16% of total capital cost relates to construction activities. The midpoint value of 10% has been adopted within this assessment.
- 14.1.65 It also states that the average total installed cost per kW for wind energy developments equated to \$1,273, or circa. £1,023 (using the average 2023 USD to GBP exchange rate of 0.8170). Subsequently the total installed cost of the Project is estimated to equate to circa £31.1m (£1,023 x 30400 kW). The value of the direct construction activities of the total installed cost (10.0% of £31.1m) equates to £3.1m, this is the identified cost associated with the direct construction.
- 14.1.66 In order to assess the number of jobs the direct construction could support, this cost (£3.1m), is divided by the average construction wages in Wales (most local region for available data). According to the Annual Survey of Hours and Earnings (2024), the average wage for 'Skilled metal, electrical and electronic trades' workers was £39,714, whilst the average wage for 'Skilled construction and building trades' was £34,011. As the Proposed Development will include a variety of electrical and non-electrical construction trades – RPS has taken an average of the two for its general 'construction wage' which equates to **£36,863**.
- 14.1.67 Dividing the construction cost (£3.1m) by the construction wage (£36,863) arrives at an estimate of the person-years required. This equates to 84 direct construction person-years or 63% of the total direct construction and manufacturing jobs identified above (134). Subsequently, it is assumed, there will be 50 direct manufacturing jobs.
- 14.1.68 The impacts of displacement and leakage on the construction and manufacturing workforce also need to be considered.
- 14.1.69 Displacement measures the extent to which the job creation of a project is offset by reductions of employment elsewhere. Any additional demand for labour cannot be treated as a net benefit, as it removes workers from other posts, such as other construction projects, and the net benefit is reduced to the extent that this occurs.
- 14.1.70 Leakage measures the extent to which jobs will be taken from people living outside of the study area.
- 14.1.71 In terms of construction, workers typically move between projects when delays occur or to help the workforce meet construction deadlines. It is, therefore, assumed that due to the flexibility of the construction labour market, displacement effects are low. The HCA Additionality Guide suggests 25% for low levels of displacements.

14.1.72 Applying this level of displacement to the total direct construction jobs created (84), it is estimated that the Project will result in a net direct construction employment equivalent to 63 direct person years of construction employment.

14.1.73 In order to assess the appropriate level of leakage that should be applied, Regeneris and Cardiff University's 2013 study regional sourcing assumptions have been considered. This is shown in Figure 14.2 below. Expenditure related to construction activities ('grid connection and installation') is assumed to be sourced regionally 50% of the time. This has therefore been adopted within our assessment.

Figure 14.2 – Regional Sourcing Assumptions

	Coal	Gas	Nuclear	Onshore wind	Offshore wind	Solar PV	Tidal energy	Wave
CAPITAL & DEVELOPMENT COSTS								
Grid connection & installation		60%	30%	50%	30%	70%	70%	50%
Nacelles / turbines /device manufacture		0%	0%	0%	0%	50%	30%	30%
Other Electrical (inc. solar cells)		20%	10%	40%	30%		20%	20%
Metalworks		10%	10%	50%	40%	80%	10%	10%
Foundations, mooring & other site & port works		50%	35%	80%	30%	90%	40%	70%
Planning, project management, surveys, consultancy		60%	20%	55%	50%	90%	70%	90%
OPERATIONS								
Maintenance inc. port operations & on-going surveys	70%	70%	50%	80%	50%	100%	90%	70%
Grid connection charges	0%	0%	0%	0%	0%	0%	0%	0%
Insurance	10%	10%	0%	30%	20%	20%	0%	0%
Other	50%	45%	40%	50%	50%	50%	0%	0%
Rates/seabed lease etc.	100%	100%	100%	100%	50%	100%	0%	0%

14.1.74 Applying this 50% leakage to the 63 direct person years of construction employment results in an overall net direct local construction employment figure of 32 person years.

14.1.75 Manufacturing workers have less flexibility to move between roles due to the continuous nature of manufacturing processes. It is, therefore, assumed that with greater rigidity in the manufacturing labour market, displacement effects are medium. The HCA Additionality Guide (Now Homes England) suggests 50% for medium levels of displacements.

14.1.76 Applying this level of displacement to the total direct manufacturing jobs created (50) as a result of this Project results in a net direct manufacturing employment equivalent to 25 person years.

14.1.77 However, once again, considering the regional sourcing assumptions presented in Figure 14.2, 0% of manufacturing expenditure is expected to be

sourced locally. Therefore, we would not expect any local employment in the manufacturing sector as a direct result of the Project.

- 14.1.78 As is standard within socio-economic assessments, and found sound at examination, it is considered that one permanent Full Time Equivalent (FTE) job is equivalent to ten person-years of temporary employment. Therefore, on this basis, the construction phase is estimated to create up to around **3 local net direct construction FTE jobs** (equivalent to 30 person years over the construction period).

Construction phase (Solar Farm)

- 14.1.79 Construction from solar farms up to 50 MW typically take 6 months to construct, based on other solar developments. However, as the 30.7 MW solar farm development is part of the wider development, the assessment will use the longer construction duration of 24 months as this is the duration of the wind farm construction time. Based on established estimates of person years of employment per installed MW of electricity generation technologies, (20.8 jobs per year per MW installed, established within the 'Regional electricity generation and employment in UK regions' study (2017)), the Development is expected to create up to 638.56 person-years of direct and indirect employment connected to the construction phase.
- 14.1.80 The estimates underpinning this calculation are based on structured research reviews of the employment and economic effect of different electricity technologies carried out by Cardiff University and Regeneris.
- 14.1.81 The research also included a series of consultations with developers/operators to gain information on spending patterns and employment.
- 14.1.82 The majority of socio-economic assessments of solar developments refer to the report on the growth of solar power in the UK (2014) . In this report, the Centre for Economics and Business Research (Cebr) give an employment multiplier for large-scale solar PV investments of 2.33 – i.e., for every job supported on-site, 1.33 indirect/induced jobs are supported in the wider economy. This is, however, now somewhat outdated. Low Carbon and Renewable Energy Economy employment multipliers for 2020 (most recent data available) estimate that solar PV developments have a multiplier of 2.08, this is the figure used for this assessment. Applying this multiplier to the total number of person-years of employment results in 307 person-years of direct employment and 331.56 years of indirect and induced employment.
- 14.1.83 Based on the 2017 study into regional electricity generation and employment in UK regions; 70% of these jobs (215) are estimated to be direct construction and manufacturing employment, with 11% of jobs related to associated professional services 10% of jobs related to wholesale/retail trade, 4% transport and communication related, 3% financial services and 2% others.
- 14.1.84 The 'Regional electricity generation and employment in UK regions' study states that more established technologies (e.g. Solar PV) can have a high level of employment impact, driven by the high proportion of development cost that is physical installation (often reliant on local labour), and the local sourcing of

some device and ancillary elements. Although this study does not specifically split the construction and manufacturing jobs, it is considered that the construction jobs are likely to have a greater local benefit than manufacturing jobs, many of which may be outside of the study area (although if a local supply chain plan was developed, the local benefit could be greatly increased).

- 14.1.85 Therefore, in order to estimate the direct construction employment generated by the Project, IRENA's detailed breakdown of utility-scale solar PV total installed cost has been utilised. This states that direct installation employment in the United Kingdom accounted for 18.8% of the total installed cost in 2022. It also states that total installed cost per kW equated to \$910.00, or circa £739 (using the average 2022 USD to GBP exchange rate of 0.8116). Subsequently, the total installed cost of the Project is estimated to equate to circa £22.68m. The direct installation employment cost (18.8%) of the total installed cost equates to £4.26m.
- 14.1.86 In order to assess the number of jobs the direct installation could support, this cost (£4.26m), is divided by the average construction worker wage of Wales to arrive at an estimate of the person years required.
- 14.1.87 According to the Annual Survey of Hours and Earnings (2024), the average wage for 'Skilled metal, electrical and electronic trades' workers was £39,714, whilst the average wage for 'Skilled construction and building trades' was £34,011. As the Proposed Development will include a variety of electrical and non-electrical construction trades – RPS has taken an average of the two for its general 'construction wage' which equates to **£36,863**.
- 14.1.88 Dividing the solar construction cost (£4.26m) by the Welsh construction wage (£36,863) equates to 116 direct construction person years or 54% of the total direct construction and manufacturing jobs identified above (215). Subsequently, it is assumed, there will be 99 direct manufacturing jobs.
- 14.1.89 The impacts of displacement and leakage on the construction and manufacturing workforce also need to be considered.
- 14.1.90 Displacement measures the extent to which the job creation of a project is offset by reductions of employment elsewhere. Any additional demand for labour cannot be treated as a net benefit, as it removes workers from other posts, such as other construction projects, and the net benefit is reduced to the extent that this occurs.
- 14.1.91 Leakage measures the extent to which jobs will be taken from people living outside of the study area. In terms of construction; workers typically move between projects when delays occur or to help the workforce meet construction deadlines. It is, therefore, assumed that due to the flexibility of the construction labour market, displacement effects are low. The HCA Additionality Guide suggests 25% for low levels of displacements.
- 14.1.92 Applying this level of displacement to the total direct construction jobs created (116), it is estimated that the Project will result in a net direct construction employment equivalent to 87 direct person years of construction employment.

- 14.1.93 In order to assess the appropriate level of leakage that should be applied, it is necessary to understand the current pool of labour within the study area that work within the 'Construction of utility projects' and 'Electrical, plumbing and other construction installation activities' sub-sectors (1,215 workers).
- 14.1.94 As this pool of labour is significantly higher (over ten times) than the estimated net direct construction job creation figure a low level of leakage is expected. The HCA Additionality Guide states that a low level of leakage is when many of the benefits will remain for people within the study area and suggests a leakage percentage of 10% is expected.
- 14.1.95 Applying this 10% leakage to the 87 direct person years of construction employment results in an overall net direct local construction employment figure of 78 person years.
- 14.1.96 Manufacturing workers have less flexibility to move between roles due to the continuous nature of manufacturing processes. It is, therefore, assumed that, with greater rigidity in the manufacturing labour market, displacement effects are medium. The HCA Additionality Guide (Now Homes England) suggests 50% for medium levels of displacement.
- 14.1.97 Applying this level of displacement (50%) to the total direct manufacturing jobs (99) created as a result of this Project results in a net direct manufacturing employment equivalent to 50 person years.
- 14.1.98 In order to assess the appropriate level of leakage that should be applied, it is necessary to understand the current pool of labour within the study area that work within the 'Manufacture of electrical equipment' sub-sector (10 workers). As this pool of labour is lower than the estimated net direct manufacturing job creation figure a high level of leakage is expected. The HCA Additionality Guide states that a very high level of leakage is when a substantial portion of the benefits will go to people living outside of the study area and suggests a leakage percentage of 75%.
- 14.1.99 Applying 75% leakage to the 50 net direct person years of manufacturing employment identified results in an overall net direct local manufacturing employment figure of 13 person years.
- 14.1.100 As is standard within socio-economic assessments, it is considered that one permanent Full Time Equivalent (FTE) job is equivalent to ten person-years of temporary employment. Therefore, on this basis, the construction phase is estimated to create up to around 9 local net direct construction FTE jobs and 1 local net direct manufacturing FTE jobs – a total of 10 FTE jobs from the solar farm (equivalent to 100 person years over the construction period).

Wind & Solar Summary

- 14.1.101 The combined construction employment from the wind (3) and solar (10) elements of the Proposed Development equate to **13 FTE net direct local employees**.

Sensitivity of the receptor

- 14.1.102 In terms of the vulnerability of the receptor; unemployment levels in the study area has historically fallen below the national average, as well as local comparable between 2021 and 2022. However in 2023 and 2024 unemployment levels were an average of 2% higher than the national average. Employment generation is a policy priority across the study area.
- 14.1.103 The sensitivity of the receptor is **Medium**.

Magnitude of impact

- 14.1.104 The impact of reduced unemployment levels is both direct through construction jobs created as part of the Development and also indirect through jobs created in supply chain or local economy.
- 14.1.105 The impact is predicted to be of regional spatial extent and medium-term continuous duration.
- 14.1.106 Therefore, the magnitude of impact is assessed to be **Low Beneficial**.

Significance of the effect

- 14.1.107 Given the above, it is assessed that there will be a **Minor Beneficial** effect, which is not significant.

Operation and maintenance (Wind Farm)

- 14.1.108 The operational stage is expected to last for 50 years. During the operational stage, a project of 30.4 MW of installed onshore wind capacity is estimated to support 18 full time equivalent (FTE) direct and indirect jobs. This is based on the Cardiff University study into regional electricity generation and employment in UK regions(2017) which states the FTE jobs per MW installed is equivalent to 0.6.
- 14.1.109 Low Carbon and Renewable Energy Economy employment multipliers for 2020 (most recent data available) estimate that onshore wind developments have a multiplier of 2.43. This is the figure used for this assessment. Applying this multiplier to the total number of person-years of employment results in 8 person-years of direct employment and 10 person years of indirect and induced employment.
- 14.1.110 Required jobs are likely to be highly skilled and niche in nature. It is, therefore, considered likely that the jobs may remove a considerable number of workers from other posts and, therefore, a high level of displacement has been applied at 75% with the remaining 25% of roles envisaged to be filled by local employees. In addition, due to the nature of the highly skilled role and likely requirement for existing experience, it is also considered likely that some of these jobs will be taken by people living outside of the study area. A high level of leakage (50%) has, therefore, also been applied.

- 14.1.111 On this basis the operational and maintenance stage would result in the creation of approximately one direct local FTE jobs in the local economy over the full operational phase of 50 years.
- 14.1.112 The job created will be in the renewable energy sector, assisting in the UK's transition to net zero.

Operation and maintenance (Solar Farm)

- 14.1.113 The operational stage is expected to last for 50 years. During the operational stage, a project of 30.7 MW of installed solar capacity is estimated to support 12 full-time equivalent direct and indirect jobs. This is based on the Cardiff University study into regional electricity generation and employment in UK regions¹ (2017) which states the FTE jobs per MW installed is equivalent to 0.4.
- 14.1.114 This is the number of jobs supported on site, in supply chains and via wage effects but does not include employment related to the sale of electricity itself. Low Carbon and Renewable Energy Economy employment multipliers² for 2020 estimate that solar PV developments have a multiplier of 2.08. This means that for every one job provided directly another 1.08 indirect/induced jobs are supported. This would indicate that the operational and maintenance phase would create circa 6 direct jobs with the remaining circa 6 being indirect jobs associated with the supply chain and wage effects.
- 14.1.115 The required jobs are likely to be highly skilled and niche in nature. It is, therefore, considered likely that the jobs may remove a considerable number of workers from other posts and, therefore, a high level of displacement has been applied at 75% with the remaining 25% (1.5) of roles envisaged to be filled by local employees enrolled on an employment skills plan as part of the Development. In addition, due to the nature of the highly skilled role and likely requirement for existing experience, it is also considered likely that some of these jobs will be taken by people living outside of the study area. A high level of leakage (50%) has, therefore, also been applied.
- 14.1.116 On this basis the operational and maintenance stage would result in the creation of approximately 1 direct local FTE job in the local economy over the full operational phase of 50 years, and a further 1 jobs in the wider economy.
- 14.1.117 The jobs created will be in the renewable energy sector, assisting in the UK's transition to net zero.
- 14.1.118 Therefore, the net total jobs created by the Development over the operational phase would, therefore, equate to **2 net direct local FTE jobs**.

¹ Cardiff University (2017). Regional electricity generation and employment in UK regions. Available at: <https://orca.cardiff.ac.uk/id/eprint/77013/3/Energy%20Paper%20Sept%2023rd%20%202015%20Main%20Orca.pdf> [Accessed on 10/10/2024].

² <https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomyindirectestimatesdataset> [Accessed on 10/10/2024].

Wind & Solar Summary

- 14.1.119 The combined operation and maintenance employment from the wind (1) and solar (2) elements of the Proposed Development equate to 3 FTE net direct local employees.

Sensitivity of the receptor

- 14.1.120 The sensitivity of the receptor is **Medium**.

Magnitude of impact

- 14.1.121 The impact of reduced unemployment levels is both direct through operation/maintenance jobs created as part of the Development and also indirect through jobs created in supply chain or local economy.
- 14.1.122 The impact is predicted to be of regional spatial extent and medium-term continuous duration.
- 14.1.123 Employment at the operational phase will be lower intensity than during construction and decommissioning, resulting in an overall increase in employment equivalent to three direct local FTE jobs across both the solar and wind elements of the Development.
- 14.1.124 Given all of the above, the magnitude is **Low Beneficial**.

Significance of the effect

- 14.1.125 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Minor Beneficial**, which is not significant.

Decommissioning

- 14.1.126 The number of construction jobs created by the decommissioning stage is considered to be commensurate with the construction stage (13 fte jobs for both the solar and wind elements), however, it is likely the number of indirect jobs created in the supply chain will be reduced as there will be no requirement for manufacturing the wind turbines.

Sensitivity of the receptor

- 14.1.127 The sensitivity of the receptor is **Medium**.

Magnitude of impact

- 14.1.128 The decommissioning effects are likely to be similar to the construction phase effects. Given the absence of reliable baseline data at a realistic date in the future for decommissioning and on the basis information on the supply chain and employment generation associated with the recycling of wind turbines supply chain is currently unavailable, under a worst-case scenario, the magnitude is assessed as **Low Beneficial**.

Significance of the effect

- 14.1.129 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Minor Beneficial**, which is not significant.

Change in Economic Output

Construction phase (Wind Farm)

- 14.1.130 The Proposed Development comprises 8 onshore wind turbines, with an anticipated maximum export capacity of 30.4 MW. According to the IRENA Renewable Cost Database 2023, the installed cost of onshore wind is approximately £1,023 per kW, based on the average \$ to £ exchange rate in 2023. Therefore, applied to the subject scheme this would result in a direct capital investment of circa £31m.
- 14.1.131 The ONS report 'Low carbon and renewable energy economy indirect estimates' dataset estimates that for every £1 of direct turnover in the UK's onshore wind energy sector, a further £0.39 of indirect turnover is generated. On that basis, a further indirect capital investment of approximately £12m is likely to be generated as a result of this Development. Overall, that equates to a direct and indirect investment of around £43m.
- 14.1.132 This investment will be felt throughout the supply chain providing positive impacts, not only to wind turbine manufacturing businesses, but also to local business such as aggregate suppliers, security and monitoring operatives, landscaping contractors and other construction industries and suppliers.
- 14.1.133 In addition to the direct capital investment in the local economy, there will be an indirect effect on economic output through the additional construction employment generated by the Development. The Development is estimated to create 3 direct local FTE wind farm construction jobs in the study area over the 2-year construction programme.
- 14.1.134 FTE job figures have been used to calculate GVA, as opposed to person years of employment. This also ensures a worst case assessment of economic output is presented.
- 14.1.135 According to the ONS, the current price Gross Value Added (GVA) in RCT generated by the construction industry equated to £574,000,000 in 2022.
- 14.1.136 In order to assess the GVA for the development this figure has been divided by the Business Register and Employment Survey's estimate of construction industry employment in the study area (6,000). This results in an estimate of GVA per construction worker of £95,666.
- 14.1.137 Over the two-year construction programme, wind farm construction employment would, therefore, result in a total contribution to GVA in RCT of approximately £0.29m.

- 14.1.138 There will be no gain in GVA associated with Manufacturing employment, given that regional sourcing assumptions for onshore wind suggest that there will be no capital expenditure related to manufacturing regionally.
- 14.1.139 Overall, therefore, the total GVA associated with the direct and indirect jobs would equate to approximately **£0.29m**.
- 14.1.140 This is in addition to the direct (£31m) and indirect (£43m) capital wind farm investment into the local economy of around £74 million.

Construction phase (Solar Farm)

- 14.1.141 The Development proposes approximately 30.7 MW of Solar PV. According to the IRENA Renewable Cost Database 2022³, the installed cost of utility scale solar PV is approximately £739 per kW, based on the average \$ to £ exchange rate in 2022. Therefore, applied to the subject scheme this would result in a direct capital investment of circa £22.68m.
- 14.1.142 The ONS report 'Low carbon and renewable energy economy, UK: 2019' estimates that for every £1 of direct turnover in the UK's Solar PV energy sector, a further £0.43 of indirect turnover is generated. ONS has published 'Low carbon and renewable energy economy, UK: 2022'. On that basis, a further **indirect capital investment of approximately £9.75m** is likely to be generated as a result of the solar Development. Overall, that equates to a direct and indirect investment into the local economy of around £32.4 million.
- 14.1.143 This investment will be felt throughout the supply chain providing positive impacts, not only to manufacturing businesses but also to local business such as aggregate suppliers, security and monitoring operatives, landscaping contractors and other construction industries and suppliers.
- 14.1.144 In addition to the direct capital investment in the local economy, there will be an indirect effect on economic output through the additional construction employment generated by the Development. The Development is estimated to create 10 direct local FTE construction and manufacturing jobs in the study area over the 2-year construction programme, 9 in construction and 1 in manufacturing.
- 14.1.145 FTE job figures have been used to calculate GVA, as opposed to person years of employment. This also ensures a worst case assessment of economic output is presented.
- 14.1.146 According to the ONS, Rhondda Cynon Taf's construction industry generated £574m of Gross Value Added (GVA) in 2022.
- 14.1.147 In order to assess the GVA for the development this figure has been divided by the Business Register and Employment Survey's estimate of construction

³ IRENA (2023). Renewable Power Generation Costs in 2022. Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Aug/IRENA_Renewable_power_generation_costs_in_2022.pdf [Accessed on 26/06/2024].

industry employment in the study area (6,000). This results in an estimate of GVA per construction worker of £95,666.

- 14.1.148 Over the two-year construction programme, solar construction employment would, therefore, result in a total contribution to GVA in RCT of approximately **£0.86m**.

Wind & Solar Summary

- 14.1.149 The combined construction economic output from the wind (£74.29m) and solar (£33.29m) elements of the Proposed Development equate to **£107.58m**.

Sensitivity of receptor

- 14.1.150 According to the most recent data (Annual Population Survey, 2024) for economic activity, in the 12 months preceding September 2024 the study area had a lower level (70.9%) of economic activity compared to Wales as a whole (75.1%). Potential increases in economic activity will, therefore, have a disproportionally positive effect in the study area. In conclusion, the sensitivity is **High**.

Magnitude of impact

- 14.1.151 The impact on economic output is both direct through capital investment in the Development and also indirect through the GVA of jobs created by the construction works.
- 14.1.152 The impact is predicted to be of regional spatial extent and medium-term continuous duration. The effect on GVA would be considered low accounting for less than 10% of the GVA for the study area (£4.7bn). The direct capital investment would be considered high. The magnitude is, therefore, **Medium Beneficial**.

Significance of effect

- 14.1.153 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Moderate Beneficial**, which is significant.

Operation and maintenance (Wind Farm)

- 14.1.154 The contribution of the operational phase of the development to economic output has been calculated by taking the direct operational job creation associated with the Development, 1 FTE direct local jobs, and multiplying this by the average GVA per employee in the study area (£57,439 per annum). Over the full anticipated operational phase of the Development (50 years) this would equate to an additional GVA associated with the operation and maintenance of the Development of approximately £2.87m. It is good practice, however, to apply a discount rate to future benefits and costs to present a current present value. In a Contracts for Difference Briefing Note, dated 6th March 2024, the Department for Energy Security and Net Zero recommended

a 4.7% per annum post-tax real discount rate for onshore wind developments, applying this discount rate would result in a revised GVA figure would be circa £1.03m.

- 14.1.155 The potential economic output associated with the sale of electricity generated by the Development has been estimated. The Department for Energy Security and Net Zero's 'Contracts for Difference – Allocation Round 5 results' (latest) shows that successful onshore wind farm (>5MW) applicants have been guaranteed a 'strike price' of £50.9/MWh for onshore wind.
- 14.1.156 Capacity Factor is a wind farms actual output divided by maximum output by a period of time, as the Proposed Development is not yet operational RPS have used 'Load Factor' benchmarks instead. Load Factor is a wind farms the actual output of a turbine benchmarked against its theoretical minimum output in a year, and due to technological advances they improve over time (Renewable UK). The Department for Energy Security & Net Zero, give an assume load factor of 44.8% for onshore wind developments (DNSZ, 2024).
- 14.1.157 Based on this the Proposed Development could produce 120,482 MW per annum ((30.7 MW x 0.448) x 8760) or 6,024,077 MW over the operational period. Subsequently, the economic output as a result of the sale of electricity would equate to £6.13m per annum, or £306.6m over the operational period. After accounting for a discount rate of 4.7%, as discussed above, this equates to an economic output of £109.7m during the operational period.

Operation and maintenance (Solar Farm)

- 14.1.158 The contribution of the operational phase of the development to economic output has been calculated by taking the operational job creation associated with the solar elements of the Development, 2 FTE direct local jobs, and multiplying this by the average GVA per employee in the study area (**£57,439 per annum**). Over the full anticipated operational phase of the Development (50 years) this would equate to an additional GVA associated with the operation and maintenance of the Development of approximately £5.7m. It is good practice, however, to apply a discount rate to future benefits and costs to present a current present value. In a Contracts for Difference Briefing Note, dated 6th March 2024, the Department for Energy Security and Net Zero recommended a 4.5% per annum post-tax real discount rate for solar developments, applying this discount rate would result in a revised GVA figure would be circa £2.1m.
- 14.1.159 In addition to the GVA effect, the Development will also generate significant business rate revenue on an annual basis, a proportion of which will be retained by the local authorities in the study area. Having regard to the Photovoltaic Memorandum of Agreement Revaluation 2023 report from the Valuation Office Agency and on the assumption that the installation is unsubsidised, the Development would be liable for business rates of £2,040 per MW per annum. This would equate to business rates liability over the Development lifetime of approximately £3.13m. Applying the same discount rate as discussed above (4.5%), this would result in a present-day value of circa £1.15m.

14.1.160 Finally, the potential economic output associated with the sale of electricity generated by the Development has been estimated. In 2023, RCT consumed a total of 648 GWh of electricity. The Department for Energy Security and Net Zero's 'Contracts for Difference – Allocation Round 5 results'(latest) shows that successful Solar PV applicants have been guaranteed a 'strike price' of £47/MWh. Subsequently, if it is assumed that the Development was to supply the electricity for the whole of the study area, the economic output as a result of the sale of the electricity would equate to approximately £30.45m per annum, or £1.5bn for the full operational phase.

14.1.161 Applying the same discount rate as discussed above (4.5%), would result in a present-day value of circa £560.4m over the operational phase.

Wind & Solar Summary

14.1.162 The combined operation economic output from the wind (c.£110.7m) and solar (c.£562.5m) elements of the Proposed Development equate to **£673.24m**.

Sensitivity of Receptor

14.1.163 The sensitivity of the receptor is **High**.

Magnitude of Impact

14.1.164 The impact on economic output is both direct through electricity generation and also indirect through the GVA of jobs created by the operational requirements.

14.1.165 The impact is predicted to be of local spatial extent and long-term continuous duration and the magnitude is considered to be **Medium Beneficial**.

Significance of Effect

14.1.166 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Moderate Beneficial** which is significant.

Decommissioning phase

14.1.167 The Gross Value Added created by employment associated with the decommissioning stage is considered to be similar to the construction stage. However, due to discounting effect, GVA will be slightly reduced.

Sensitivity of Receptor

14.1.168 The sensitivity of the receptor is **High**.

Magnitude of Impact

14.1.169 The impact on economic output is both direct through capital investment in the Development and also indirect through the GVA of jobs created by the decommissioning works.

- 14.1.170 The impact is predicted to be of regional spatial extent and medium-term continuous duration. The effect on GVA would be considered low accounting for less than 10% of the GVA for the study area. The direct capital investment would be considered high. The magnitude is, therefore, **Medium Beneficial**.

Significance of Effect

- 14.1.171 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Moderate Beneficial** which is significant.

Change in Visitor Economy

- 14.1.172 Potential effects may arise from impacts on the tourism economy, including the operation of nearby attractions and accommodation providers, as well as visiting users of the PROW network. During the construction and decommissioning phases effects on tourism / recreational tourism could arise from noise, visual and air quality effects of construction, whilst during the operational phase the effects are more associated with the visual impact of the Development. It is noted that there will be no permanent or temporary diversions of Public Rights of Way as a result of the proposal.

Construction phase (Wind & Solar Farm)

- 14.1.173 At construction stage the visual impact of construction equipment and the associated noise and traffic impacts has the potential to impact nearby tourism receptors.
- 14.1.174 The Transport chapter states that of the 5 geographical receptor locations only two are predicted to be a short term major adverse (significant) effect on 'Non-motorised user amenity', with the rest being not-significant. Out of the 5 geographical receptor locations all five will have a short-term moderate adverse (significant) effect as a result of 'severance'. Out of the 5 geographical receptor locations all five will have a short-term minor, (not significant) effect as a result of 'road safety'. Lastly, out of the 5 geographical receptor locations all five will have a short-term minor, (not significant) effect as a result of 'Pedestrian Delay (including all non-motorised users).'
- 14.1.175 The Landscape and Visual Impact Assessment chapter states (Table 5.37) that out of 31 viewpoints, there are 8 out of the total 31 viewpoints (circa 26%) that have a major or moderate significant adverse effect within 4km of the Proposed Development. Of these 8, 6 out of the 31 total viewpoints (circa 19%) are related to 'recreational' receptors and of these 6 – 5 are of major adverse significance.
- 14.1.176 The Noise and Vibration chapter states that the predicted noise levels from all assumed construction plant and activities are shown to be comfortably below the adopted criterion of 70dB LAeq and therefore effects would be temporary and not significant.

14.1.177 In addition to the above, the effect of construction works on the attractiveness of local holiday accommodation has also been considered. The baseline assessment has found that short-term rental holiday accommodation is sparsely populated around the Proposed Development. The majority of the short-term holiday accommodation in RCT is situated in Aberdare. There is very little holiday accommodation adjacent / in close proximity to the Proposed Development.

14.1.178 Research into self-catering occupancy rates of accommodation providers in Wales shows that the most popular months for stays are July, August and September. Although there may be some impact on reduced tourist visitors staying in local accommodation this is likely to be more than offset by the need for construction workers to stay overnight.

Sensitivity of receptor

14.1.179 The Study Area is not typically known for its high tourism demand, nor does it have significant leisure amenities or visitor attractions nearby. There are few hotels, B&Bs, and places to eat and drink within close proximity to the Proposed Development. Subsequently, the sensitivity of the receptor is assessed to be **Low**.

Magnitude of impact

14.1.180 The impact is both direct in terms of the visual and noise impacts of construction and indirect in terms of any effect of reduced visitor numbers on local jobs and spending in the local economy as well as via potential traffic / public amenity impacts and congestion on the viability and attractiveness of visitor activities.

14.1.181 It is recognised that accommodation providers would benefit from construction worker stays, particularly in the winter months when occupancy levels drop, with a number of peak construction period workers who are not residents of the area likely to stay in the urban centres, within the study area, but not in close enough proximity to the Development to be impacted by noise or visual impacts. However, there could be a loss in income for some of the accommodation providers located within / around the fringes of the Proposed Development. This is due to reduced attractiveness of visiting the area in terms of the visual impact of the Development directly at the accommodation provider and also on tourist walking and cycling routes.

14.1.182 The impact is predicted to be of local spatial extent and medium-term continuous duration and the magnitude is considered to be **Medium Adverse**.

Significance of effect

14.1.183 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effects on the visitor economy are considered to be **Low Adverse**, which is not significant.

- 14.1.184 However, several mitigations have been recommended as part of the Transport chapter. These include the implementation of a Construction Traffic Management Plan, Onsite Traffic Management Plan, Staff Travel Plan and providing public information. If implemented successfully, this will reduce the impact upon users of on-site Public Rights of Way and, subsequently, reduce the significance of the effect, resulting in a **Negligible** residual effect.

Operational phase (Wind and Solar Farm)

- 14.1.185 The Landscape and Visual Impact Assessment chapter states (Table 5.37) that out of 31 viewpoints, there are 8 out of the total 31 viewpoints (circa 26%) that have a major or moderate significant adverse effect within 4km of the Proposed Development. Of these 8, 6 out of the 31 total viewpoints (circa 19%) are related to 'recreational' receptors and of these 6 – 5 are of major adverse significance. However, of these 6, only 1 is related to a PRow route (VP13-PRow north of Twyn y glog).
- 14.1.186 Out of the ten Special Landscape Character Areas within 5km of the Site (Table 5.23 in LVIA Chapter 5), the majority (6) are not significant, whilst 40% of them are assessed to have a significant negative effect anticipated as a result of the development during operational phase.

Sensitivity of receptor

- 14.1.187 The sensitivity of the receptor is assessed to be **Low**.

Magnitude of impact

- 14.1.188 The impact is both direct in terms of the visual effect of the wind turbines and indirect in terms of any effect of reduced visitor numbers on local jobs and spending in the local economy.
- 14.1.189 The impact is predicted to be of regional spatial extent and long-term continuous duration. While the evidence base is not conclusive, the available research suggests that wider perceptions held by tourists in relation to climate change and renewable energy play a role in how tourists weigh up the positive and negative effects of renewable energy infrastructure and may influence their reactions. This means that, even in cases where a wind turbine or solar farm development may have an effect on characteristics of a tourism area that visitors value, the way that this effect is assessed by visitors (and reflected in future behaviour) is influenced by wider views and perceptions. The most recent Department for Energy Security & Net Zero (DESNZ) Public Attitudes Tracker (PAT) carried out in Summer 2024 found that 84% of people supported renewable energy as a general concept. DESNZ PAT data from Spring 2024 measured renewable energy support. Out of five renewable energy types, solar received the most total support (88%) whilst onshore wind energy was the fourth most supported (77%) form of renewable energy in the survey. Opposition to onshore wind energy represented 5% of those surveyed, compared to 2% opposition for solar developments.

14.1.190 A Welsh Government report produced in 2014 found that there is little evidence that wind farms have had or are having a negative effect on tourism across Wales and the UK as a whole. This and more positive solar attitudes are supported by the latest DESNZ PAT.

14.1.191 Given the existing literature which analyses public attitudes to renewable energy and the impacts on tourism the magnitude of impact is considered to be **Low Adverse**.

Significance of effect

14.1.192 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Negligible**, which is not significant.

Decommissioning Phase (Wind and Solar Farm)

14.1.193 Due to a lack of available data forecasting the tourism economy at the time of decommissioning, the impacts on tourism receptors are assumed to be commensurate with the construction phase.

Sensitivity of receptor

14.1.194 Without any definitive future data, a worst-case scenario assessment has to assume the sensitivity is similar to construction stage. Therefore, the sensitivity of the receptor is considered to be **Low**.

Magnitude of impact

14.1.195 The decommissioning effects are likely to be similar to the construction phase effects. Given the absence of reliable baseline data at a realistic date in the future for decommissioning and given that the effects are likely to be similar in nature, the magnitude is considered to be **Medium Adverse**.

Significance of effect

14.1.196 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effects on the visitor economy are considered to be **Low Adverse**, which is not significant.

14.1.197 During the construction and decommissioning stages of development, there is the potential for an increase in demand for housing / short term rentals to accommodate non-resident workers.

Temporary Worker Accommodation

14.1.198 During the construction and decommissioning stages of the Development, there is the potential for an increase in demand for housing / short term rentals to accommodate non-resident workers.

- 14.1.199 Should a significant proportion of non-resident workers be employed during the construction and decommissioning phases, this could impact residents within the study area. According to the Business Register and Employment Survey (2022), the construction sector is the sixth largest employer in RCT, employing 6,000 individuals, or 7.3% of the workforce. Furthermore, the rate of unemployment within RCT was estimated to be 4.9% in 2024 – which was above both the local (Cardiff and Bridgend) and the national level.
- 14.1.200 Given the estimated local employment generation as a result of the development (13 local FTE jobs during construction or 130 person years), it is anticipated that the pool of labour within the study area (6,000) is more than sufficient to support this 130 workers.
- 14.1.201 Furthermore, CITB's 'Workforce Mobility and Skills in the UK Construction Sector 2022 – Wales (2023) states "In Wales, around one in twenty (6%) construction workers reported that they were currently staying in temporary accommodation while working at their site in line with the... UK average (5%)".
- 14.1.202 Applying this to the 130 workers generated from the construction, will leave circa 8 workers in need of temporary accommodation.
- 14.1.203 Notwithstanding the low number of workers envisaged to require accommodation, AirDNA data for short-term rentals is presented within the baseline assessment. This shows that, within a circa 5km radius from the order limits there is circa 150 short term rental units (some of which will have multiple rooms), with a greater density of options within the towns/villages surrounding the order limits, e.g. Aberdare, Pontypridd, Treharris or Abercynon. Furthermore, there are circa 2,357 bedspaces across the RCT study area.
- 14.1.204 Regional room occupancy rates are measured monthly as part of the Wales Accommodation Occupancy Survey (EOS). It shows that, in Wales in 2023, self-catered room occupancy was at its lowest during the months of January, February and November (47-56%). Should there be a small proportion of non-resident workers employed during construction, they could provide consistent additional income for accommodation providers during the quieter months of the year.

Construction phase (Wind and Solar Farm)

- 14.1.205 During the full two-year construction phase, it is anticipated that there will be a gain in 8 workers in need of temporary accommodation.
- 14.1.206 Based on the minimum supply assessment of short-term rental accommodation in a 5km radius of the order limits (150) and occupancy rates regionally, it is assumed that any non-resident workforce would have an adequate number of short-term rental options that it would not impact upon study area residents.
- 14.1.207 In conclusion, it is envisaged that non-resident employment is likely to be minimal. In addition, should there be any non-resident construction employment, there is likely to be sufficient supply of short-term rental accommodation to cater for demand.

Sensitivity of receptor

- 14.1.208 The vulnerability of the receptor is considered to be low given the adequate supply of short-term rental accommodation within the study area to cater for anticipated number of non-resident workers. Room occupancy data for the region indicates that there are likely to be vacant rooms year-round, but especially during winter months.
- 14.1.209 Therefore, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.210 The impact is predicted to be of local spatial extent and medium-term duration. Given that it is anticipated that the non-resident workforce will be very minimal, the magnitude of the impact is considered to be **Low Adverse**.

Significance of effect

- 14.1.211 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Negligible**.

Decommissioning Phase (Wind and Solar Farm)

- 14.1.212 The effects of the decommissioning stage on temporary worker accommodation are considered commensurate with the construction stage.

Sensitivity of receptor

- 14.1.213 The sensitivity of the receptor is assessed to be commensurate with the construction phase.
- 14.1.214 Therefore, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.215 The impact is predicted to be of local spatial extent and medium-term duration. Given that it is anticipated that the non-resident workforce will be very minimal, the magnitude of the impact is considered to be **Low Adverse**.

Significance of effect

- 14.1.216 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Negligible**.

Impact on Commuting Patterns

- 14.1.217 There is the potential for additional vehicles to be present on the road network as a result of the construction and decommissioning of the proposed development. This has the potential to interfere with study area residents' commuting patterns.

Construction phase (Wind Farm & Solar Farm)

- 14.1.218 The Transport chapter states that of out of the 5 geographical receptor locations all five will have a short-term moderate adverse (significant) effect as a result of 'severance'. Lastly, out of the 5 geographical receptor locations all five will have a short-term minor, (not significant) effect as a result of 'Pedestrian Delay (including all non-motorised users).'

Sensitivity of receptor

- 14.1.219 The vulnerability of the receptor is considered moderate given the modest percentage (c.29%) of people in the study area who work from home. In addition, the recoverability is considered relatively high given the options for alternative travel routes via private car and the availability of rail as an alternative mode of transport in the local area.

- 14.1.220 Therefore, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.221 The impact is predicted to be of local spatial extent and medium-term intermittent duration. The magnitude is therefore considered to be **Low Adverse**.

Significance of effect

- 14.1.222 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be Low Adverse.

- 14.1.223 However, several mitigations have been recommended as part of the Transport chapter. These include the implementation of a Construction Traffic Management Plan, Onsite Traffic Management Plan, Staff Travel Plan and providing public information. If implemented successfully, this will reduce the significance of the effect, resulting in a **Negligible** residual effect.

Decommissioning phase (Wind Farm & Solar Farm)

The effects of the decommissioning stage on commuting patterns are considered commensurate with the construction stage.

Sensitivity of receptor

- 14.1.224 The sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.225 The impact is predicted to be of local spatial extent and medium-term intermittent duration. The magnitude is therefore considered to be **Low Adverse**.

Significance of effect

- 14.1.226 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be **Low Adverse**.

Change in Access to Recreation

- 14.1.227 In order to access the impact upon recreation, the Landscape and Visual Impact Assessment chapter (Chapter 5) has been assessed. The LVIA chapter assesses a number of group receptors pertaining to recreation. There conclusions are:

- An assessment of the **locally promoted trail** where recreational users may have views of the Proposed Development. The significance of effects was judged to range from negligible to Minor.
- An assessment of recreational receptors views within **Open Access land** was carried out. The significance of effects on these viewers as a result of the introduction of the Proposed Development was judged to range from No Change to Minor.
- The effect of the Proposed Development on recreational receptors views from National **Cycle Routes** has been assessed. The significance of effects assessed for the NCN routes range between No Change to Negligible.
- An assessment of recreational receptors views from **Long Distance Route** within the study area of 15 km of the Proposed Development was carried out. The range of effects on these areas as a result of the introduction of the Proposed Development was judged to range from Minor to Moderate and not significant.
- An assessment of recreational receptors views using **Public Rights of Way** within 3.9 km of the Proposed Development was carried out. There would be a Major adverse effect which is significant on recreational users for a section of the Bridleway and footpath over Cefn Gwyngul and a short section of the 'Other Route with Public Access' to Blaenhenwysg.
- The effect of the Proposed Development on dynamic views from **roads** within 15 km has been assessed. The significance of effects assessed for these routes' ranges between Negligible and Minor and not significant.
- An assessment of **sequential views** from important routes near to the Proposed Development has been completed. PRowS which pass to the west of the Proposed Development would have a Major adverse significance of effects which is significant.

- 14.1.228 Overall, the Landscape and Visual Impact Assessment chapter states (Table 5.37) that out of 31 viewpoints, there are 8 out of the total 31 viewpoints (circa 26%) that have a major or moderate significant adverse effect within 4km of

the Proposed Development. Of these 8, 6 out of the 31 total viewpoints (circa 19%) are related to 'recreational' receptors and of these 6 – 5 are of major adverse significance. However, of these 6, only 1 is related to a PRoW route (VP13-PRoW north of Twyn y glog).

- 14.1.229 The Transport chapter states that of the 5 geographical receptor locations only two are predicted to be a short term major adverse (significant) effect on 'Non-motorised user amenity', with the rest being not-significant. Out of the 5 geographical receptor locations all five will have a short-term moderate adverse (significant) effect as a result of 'severance'.

Construction phase (Wind and Solar Farm)

- 14.1.230 The Proposed development construction has the potential to alter access to recreation, mainly through reductions in Public Rights of Way User amenity during the construction of the Wind and Solar Farm.

Sensitivity of Receptor

- 14.1.231 The Study Area's main recreational offer is walking in open green space. However, there are multiple surrounding areas outside of the development land of the Proposed Development that are suitable for walking/hiking. Overall, the sensitivity is considered to be **Low**.

Magnitude of Impact

- 14.1.232 The majority of land within the order limits of the Proposed Development will remain open and accessible to all including the commoners' graziers, dog walkers, hikers etc. However, enjoyment of recreation may be reduced due to ongoing construction works, reducing use. Therefore, the magnitude is considered to be **Medium Adverse**.

Significance of effect

- 14.1.233 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effects on the visitor economy are considered to be **Minor Adverse**, which is not significant.
- 14.1.234 However, several mitigations have been recommended as part of the Transport chapter. These include the implementation of a Construction Traffic Management Plan, Transport Statement, Staff Travel Plan and the provision of public information. If implemented successfully, this will reduce the impact upon users of the Public Rights of Way and, subsequently, reduce the significance of the effect, resulting in a **Negligible** residual effect.

Operational phase (Wind and Solar Farm)

- 14.1.235 It is not anticipated that there will be any additional restrictions to recreational use of the development land once the wind and solar farm is operational. The Site Layout Plan (Appendix), shows that the existing PRoW network will not be

hindered. We would therefore not expect access to recreation to be any different to before the construction of the development.

Sensitivity of receptor

- 14.1.236 The sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.237 As discussed within the assessment of impact on the tourism economy, the most recent Department for Energy Security & Net Zero (DESNZ) Public Attitudes Tracker (PAT) carried out in Summer 2024 found that 84% of people supported renewable energy as a general concept. DESNZ PAT data from Spring 2024 measured renewable energy support. Out of five renewable energy types, solar received the most total support (88%) whilst onshore wind energy was the fourth most supported (77%) form of renewable energy in the survey. Opposition to onshore wind energy represented 5% of those surveyed, compared to 2% opposition for solar developments.
- 14.1.238 Given the predominant support for onshore wind farm and solar farm development in the UK, it is not expected that the visibility of wind turbines or solar panels from PROW routes will deter recreational users from continuing to use the routes through the site or for user enjoyment to significantly decline.
- 14.1.239 Subsequently, the magnitude of impact is assessed as **Low Adverse**.

Significance of effect

- 14.1.240 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effects on the visitor economy are considered to be **Negligible**, which is not significant.

Decommissioning phase (Wind and Solar Farm)

- 14.1.241 Due to a lack of available data forecasting recreation at the time of decommissioning, the impacts on recreational receptors are assumed to be commensurate with the construction phase.

Sensitivity of receptor

- 14.1.242 The sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.243 The decommissioning effects are likely to be similar to the construction phase effects. Given the absence of reliable baseline data at a realistic date in the future for decommissioning and given that the effects are likely to be similar in nature but lesser in magnitude, the magnitude is considered to be **Medium Adverse**.

Significance of effect

- 14.1.244 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effects on the visitor economy are considered to be **Minor Adverse**, which is not significant.

Future monitoring

- 14.1.245 No future monitoring is required as a consequence of the assessment of Socioeconomics, tourism and recreation.

Cumulative Effects

- 14.1.246 The assessment of cumulative effects for Socioeconomics, tourism and recreation has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. As part of the assessment, all projects and plans considered alongside the Proposed Development have been allocated into 'tiers' reflecting their current stage within the planning and development process.
- 14.1.247 The development types allocated to tier 1, tier 2 and tier 3 for the assessment of cumulative effect are summarised in **Table 12**.

Table 14.12: Development tiers used for assessment of cumulative effects

Tier	Development types
Tier 1	Development is under construction
	The planning application for the development has been granted.
	The planning application for the development has been submitted.
	Developments which are currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact
Tier 2	Developments for which a Scoping Report has been submitted.
Tier 3	Developments for which a Scoping Report has not been submitted.
	Developments which are only identified in the relevant Local Development Plan
	Developments identified in other plans / programmes.

-
- 14.1.248 This assessment is followed by all other relevant projects, identified by tier. This tiered approach is adopted to provide a clear assessment of the Proposed Development alongside other projects, plans and activities. The specific projects, plans and activities scoped into the assessment of cumulative effects are set out in **Table 13**.

Table 14.13: List of other projects, plans and activities considered within the CEA

Project/Plan	Operator	Status	Planning Reference
Tier 1 – Wind Developments			
Manmoel Wind Farm	Cenin	Consented	DNS/3239181
Mynydd Carn-y-Cefn Wind Farm	Pennant Walters	Examination	DNS/3270299
Twyn Hywel Energy Park	Bute Energy	Consented	DNS/3272053
Rassau Industrial Estate 1.5MW wind	Infinite Renewables Group	Consented	C/2018/0293
Penrhiwgwaith Farm	Llwyn Celynnen Cyf	Permitted	C/2012/0373
Foel Trawsnant	Pennant Walters	Consented	C/2012/0373
Llwyncelyn Wind Farm	Cenin Renewables	Consented	P/2014/0825
Melin Court	Infinis	Consented	15/1635/FUL
Mynydd y Glyn	Pennant Walters	Consented	P2014/0883
Nat-Y-Gwyddon Landfill Site	Infinite Renewables Group	Consented	DNS/3280378
Upper Ogmores	RES Group	Consented	17/0321/FUL
Tier 1 – Solar Energy Developments			
Wauntysswg	Scottish Power	Consented	DNS/3213639
Cil Lonydd Solar Farm	Cenin	Submitted but not yet consented	CAS-02446-R8X8W2

Oaklands Solar Farm and BESS	Sirius	Consented	DNS/3245503
Ty'n Y Waun	Cenin	Consented	DNS/3279521
Cwm Ifor Solar	Caerphilly Borough Council	Consented	DNS/3266623
Tier 1 – Residential Developments			
Former Aberdare General Hospital	WDL Homes	Consented	22/0676/FUL

Cumulative effects assessment

- 14.1.249 The Proposed Developments identified in **Table 14**Table 1 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. From the order limits of the Proposed Development, the onshore wind farms are within a radius of 35km whilst the solar and other major developments are within 20km.
- 14.1.250 The cumulative effects presented and assessed in this section have been selected from the information provided in Volume 1, Chapter 2: Project Description, of the ES as well as the information available on other projects and plans, in order to inform the maximum design parameters.

Table 14.14: Assessment of cumulative effects

Potential cumulative effect	Phase			Maximum Design Parameters	Justification
	C	O	D		
Impact on Temporary Worker Accommodation	✓	✗	✗	Project assessed cumulatively with all projects listed in Table 1.14 above.	Impact on the demand for temporary worker accommodation requires assessing the maximum number of schemes requiring specialist construction employment

^a C=construction, O=operational and maintenance, D=decommissioning

Cumulative effects assessment

- 14.1.251 A description of the cumulative effects between the Proposed Development and other developments identified in Error! Reference source not found.21 upon Socioeconomics, tourism and recreation receptors is provided below.

Temporary Worker Accommodation

Wind Farm Cumulative Developments

Construction phase

- 14.1.252 The construction employment generated from these developments has been assessed utilising the estimation of jobs required (12.8 jobs per year per MW installed) established within the 'Regional electricity generation and employment in UK regions' study (2017).
- 14.1.253 Displacement measures the extent to which the job creation of a project is offset by reductions of employment elsewhere. Any additional demand for labour cannot be treated as a net benefit, as it removes workers from other posts, such as other construction projects, and the net benefit is reduced to the extent that this occurs.
- 14.1.254 A displacement of 25% was then applied to these numbers to arrive at a net construction employment number.
- 14.1.255 A leakage figure was not applied to provide the worst-case scenario for construction workers coming into the study area who may need accommodation. The net employment number was then divided by the number of construction years to get a net annual construction job figure for the cumulative solar developments.
- 14.1.256 Based on JMS Energy assumptions, which state that, on average, wind farms take between 6 months and 2 years to complete, estimations of construction period for each cumulative development have been made.
- 14.1.257 For 'Estimated Construction Years' less than one, the jobs per annum remain the same as it would be overstating by increasing the amount of jobs. However for 'Estimated Construction Years' more than one, the jobs created after displacement are divided by the 'Estimated Construction Years' to give an 'Estimated Jobs created per annum'.
- 14.1.258 The total net annual construction employment figure for the cumulative wind developments is estimated to be 2,122 as seen in **Table 14.15**.

Table 14.14: Wind Farm Cumulative Developments

Council	Ref	Wind Development Description	No. of Turbines	Capacity (MW)	Gross Estimated Construction Years of Employment	After 25% Displacement	Estimated Construction Period of Schemes	Estimated Jobs Created Per Annum
Blaenau Gwent	DNS/3239181	Manmoel Wind Farm	5	25	320	240	0.5	240
Blaenau Gwent	DNS/3270299	Mynydd Carn-y-Cefn Wind Farm	8	34	435	326	0.5	326
Caerphilly	DNS/3272053	Twyn Hywel Energy Park	14	92.4	1183	887	2	444
Blaenau Gwent	C/2018/0293	Rassau Industrial Estate 1.5MW wind	1	1.5	19	14	0.5	14
Blaenau Gwent	C/2012/0373	Penrhiwgwaith Farm	1	0.5	6	5	0.5	5
Neath Port Talbot	P/2014/0825	Foel Trawsnant	11	33	422	317	1	317
Rhondda Cynon Taf	15/1635/FUL	Llwyncelyn	2	5.5	70	53	0.5	53
Neath Port Talbot	P2014/0883	Melin Court	5	18	230	173	0.5	173
Rhondda Cynon Taf	DNS/3280378	Mynydd Y Glyn	7	30	384	288	0.5	288
Rhondda Cynon Taf	17/0321/FUL	Nat-Y-Gwyddon Landfill Site	1	2.3	29	22	0.5	22
Rhondda Cynon Taf	P2020/1002	Upper Ogmore	7	25	320	240	0.5	240
								2,122

Other Energy Cumulative Developments

Solar

- 14.1.259 The construction employment generated from solar developments has been assessed utilising the estimation of jobs required (20.8 jobs per year per MW installed) established within the 'Regional electricity generation and employment in UK regions' study (2017).
- 14.1.260 Table 14.16 below summarises the estimated jobs required for each of the cumulative solar developments which totals to an net annual construction employment number of 2,730.

Table 14.15: Solar Cumulative Developments

Council	Ref	Solar Development Description	Capacity (MW)	Gross Estimated Construction Years of Employment	After 25% Displacement	Estimated Construction Years	Estimated Jobs Created Per Annum
Blaenau Gwent	DNS/3213639	Wauntysswg	30	624	468	0.5	468
Caerphilly	CAS-02446-R8X8W2	Cil Lonydd Solar Farm	35	728	546	0.5	546
Vale of Glamorgan	DNS/3245503	Oaklands Solar Farm and BESS	50	1040	780	0.5	780
Bridgend	DNS/3279521	Ty'n Y Waun	40	832	624	0.5	624
Caerphilly	DNS/3266623	Cwm Ifor Solar	20	416	312	0.5	312
							2,730

Major Residential Development

- 14.1.261 Construction employment generated as a result of residential developments has been estimated based upon BCIS data for RCT. A construction cost of £155m was estimated for the sole major residential development based in RCT.
- 14.1.262 The estimated construction cost is divided by the average construction worker salary in Wales. According to the Annual Survey of Hours and Earnings (2024), the average wage for 'Skilled construction and building trades' was £34,011. Therefore when dividing the estimated construction cost (£155m) by the average construction wage (£34,011) there is an estimated person years of 4,557.
- 14.1.263 This is a worst-case scenario, as it assumed all construction cost is associated with labour inputs. In the absence of a breakdown of typical components of construction cost, this approach must be utilised.
- 14.1.264 After applying a 25% displacement, this results in 3,418 construction person years. After dividing by the estimated construction years (6.8), this results in 503 jobs created per annum as seen in **Table 14.17**.

Table 14.16 – Residential Cumulative Developments

Council	Ref	Major Residential Development Description	Number of Homes	Gross Estimated Construction Years of Employment	After 25% Displacement	Estimated Construction Years	Estimated Jobs Created Per Annum
Rhondda Cynon Taf	22/0676/FUL	Former Aberdare General Hospital	299	4,557	3418	6.8	503
							503

Overall Cumulative Construction Workers Summary

- 15.1.1 Summarising the information above, a total net additional 5,355 construction workers have been identified (2,122 from onshore wind developments; 2,730 from solar developments and 503 from residential developments) across 17 unique cumulative schemes relevant to the socioeconomic, tourism and recreation assessment. The split of workers is shown in **Figure 14.3** below.

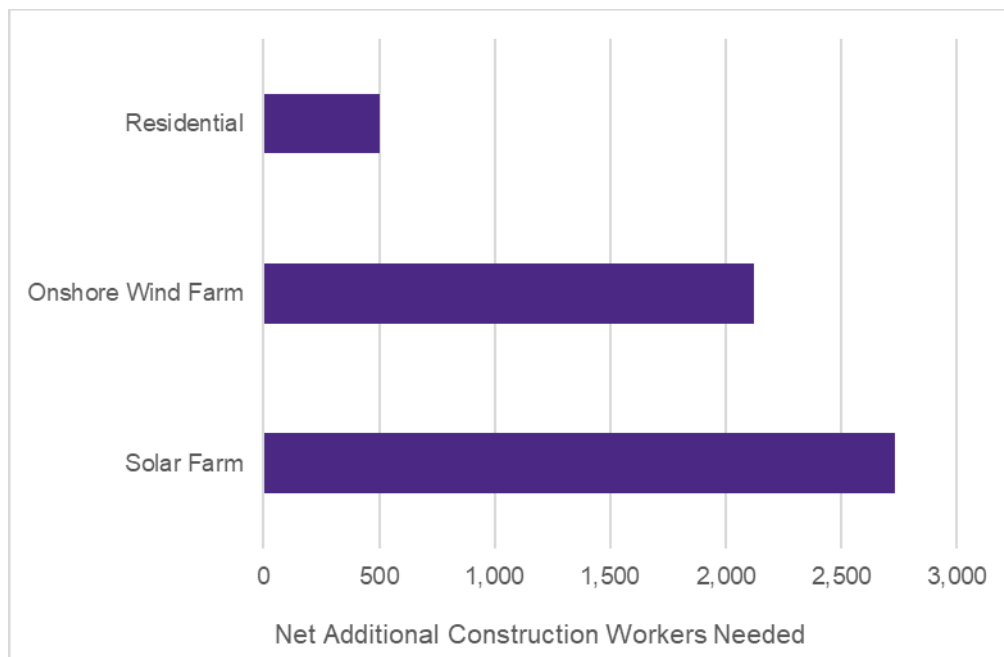


Figure 14.3: Total Number of Construction Workers across Cumulative Developments

Construction Employment Landscape

- 14.1.265 According to the ONS Business Register and Employment Survey (2023), RCT has a higher proportion of total employment working in the construction industry, compared to Wales. Furthermore, when taking into consideration the total number of construction jobs expected to be required as a result of the 17 cumulative developments (5,355) it is clear that the number of construction workers from RCT (6,000) is sufficient to cover this cumulative total. However, it is realistic that not all cumulative employment will occur from within the study area due to displacement.
- 14.1.266 Therefore, when considering the wider Employment Study Area, which, as well as RCT, includes the top 2 highest commuting inflows boroughs into the study area (Cardiff and Bridgend), there are a total of other 17,000 construction workers as seen in Figure 14.3. This would appear an adequate supply of construction workers for the needs of the cumulative developments.
- 14.1.267 The Llanwanno Wind Farm will require a total of 130 person years during its 2 year construction phase, which equates to 65 construction workers per annum. In addition to the 17 cumulative developments (5,355) this equates to 5,420.
- 14.1.268 There is, therefore, a surplus of 11,580 construction workers when compared to the total number of construction workers available in RCT's wider Employment Study Area (RCT, Cardiff and Bridgend).

Table 14.17 - Construction Employment

Industry	Rhondda Cynon Taff (Study Area)		Bridgend		Cardiff		Wales	
	No.	%	No.	%	No.	%	No.	%
4 : Construction (F)	6,000	7.3%	3,000	5.4%	8,000	3.5%	66,000	5.1%

Accommodation Demand

- 15.1.2 Notwithstanding the fact that it is considered the majority of the construction workforce will come from the local area, an analysis of the results of the Great Britain Tourism Survey (2022) has been carried out to assess the demand for temporary accommodation from tourist visitors.
- 15.1.3 On this basis overnight trips are used as a proxy for accommodation demand. The average nights per trip in 2023 was estimated to be 2.9 in Wales, down on 3 observed in 2022.
- 15.1.4 Serviced accommodation was the predominant accommodation used for overnight trips in 2023 in Wales (37%), followed by staying at someone's private home⁴ (26%), then Caravan / Camping / Glamping (17%).
- 15.1.5 As a greater proportion of tourists to Wales use paid accommodation, any demand from temporary construction workers could have a significant effect depending on the supply of paid accommodation.

⁴ including the home of friends/relatives or a second home

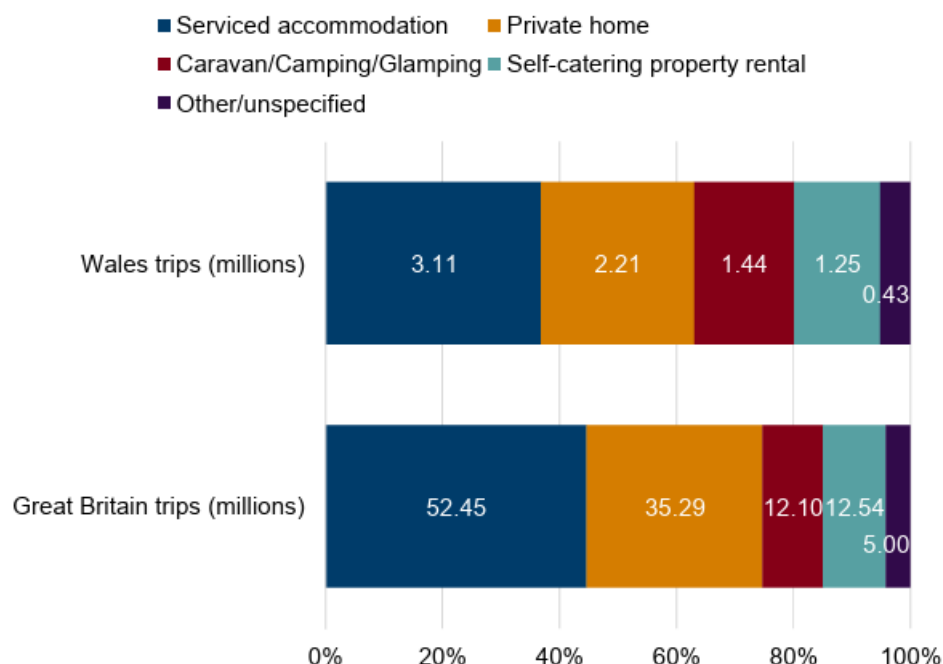


Figure 14.4 – Accommodation Used in Wales (2023)

Temporary Accommodation Demand

- 14.1.269 Although a total of 5,420 annual net direct construction workers has been identified as a result of the cumulative developments (5,355) and Llanwonno Wind Farm (65), RCT and surrounding local authorities providing worker inflows have a minimum up to 11,580 more construction workers, suggesting it is possible that all workers could come from RCT or neighbouring local authorities and thus wouldn't require any temporary accommodation.
- 14.1.270 The CITB Workforce Mobility and Skills in the UK Construction Sector (2023) report claims that, within Wales, one in twenty (6%) construction workers report that they are currently staying in temporary accommodation while working at their site.
- 14.1.271 Applying 6% to the 5,420 workers who may be commuting to site, this would equate to 325 workers who may need to stay in temporary accommodation.

Accommodation Supply

- 14.1.272 Table 14.19 below presents the supply and occupancy rate of RCT and neighbouring local authorities, according to Property Market website, Property Market Intel (2025). Applying the average occupancy rate (52%) to the total supply across Bridgend and neighbouring local authorities (1,851), equates to 888 unoccupied serviced accommodation bedspaces throughout the year.

Table 14.18: Serviced Accommodation Supply & Occupancy

Serviced Accommodation	Rhondda Cynon Taf	Bridgend	Cardiff	Total
Supply	232	282	1,337	1,851
Occupancy Rate	53%	54%	49%	52%

Temporary Workers Accommodation Conclusion

- 14.1.273 Based on the above there will be 2.7 times the amount of available temporary accommodation bed spaces (888) for the 325 construction workers who may need them. Therefore, there is a **Negligible** impact, which is not significant.

Sensitivity of the receptor

- 14.1.274 Given the large supply of accommodation which is vacant approximately 53% of the year, the sensitivity of the receptor to additional demand for temporary accommodation is predicted to be **Low**.

Magnitude of impact

- 14.1.275 Approximately 325 workers are estimated to require temporary accommodation during the construction phase of the development. Relative to the estimated number of unoccupied bedspaces in commuting distance from the proposed development, the magnitude of impact is expected to be **Low Adverse**.

Significance of the effect

- 14.1.276 On the basis that the sensitivity of the receptor is Low and the magnitude of the impact is Low Adverse, it is assessed that there will be a **Negligible** cumulative effect, which is not significant.

Summary of environmental effects, mitigation measures and monitoring

- 14.1.277 Table 10 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.
- 14.1.278 **Table 11** presents a summary of the potential cumulative environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 14.19: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a			Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D						
Impact on Unemployment	✓	✓	✓	C: Low Beneficial	C: Medium	C: Minor Beneficial	N/a	C: Minor Beneficial	N/a
				O: Low Beneficial	O: Medium	O: Minor Beneficial		O: Minor Beneficial	
				D: Low Beneficial	D: Medium	D: Minor Beneficial		D: Minor Beneficial	
Impact on Economic Output	✓	✓	✓	C: Medium Beneficial	C: High	C: Moderate Beneficial	N/a	C: Moderate Beneficial	N/a
				O: Medium Beneficial	O: High	O: Moderate Beneficial		O: Moderate Beneficial	
				D: Medium Beneficial	D: High	D: Moderate Beneficial		D: Moderate Beneficial	
Impact on the Visitor Economy	✓	✓	✓	C: Low Adverse	C: Low	C: Negligible	N/a	C: Negligible	N/a
				O: Low Adverse	O: Low	O: Minor Adverse		O: Negligible	
				D: Low Adverse	D: Low	D: Negligible		D: Negligible	
Impact on Temporary Worker Accommodation	✓		✓	C: Low Adverse	C: Low	C: Negligible	N/a	C: Negligible	N/a
				D: Low Adverse	D: Low	D: Negligible		D: Negligible	
Impact on Commuting Patterns	✓		✓	C: Low Adverse	C: Low	C: Low Adverse	N/a	C: Negligible	N/a
				D: Low Adverse	D: Low	D: Low Adverse		D: Low Adverse	
Impact on Recreation	✓	✓	✓	C: Medium Adverse	C: Low	C: Minor Adverse	N/a	C: Minor Adverse	N/a
				O: Low Adverse	O: Low	O: Negligible		O: Negligible	
				D: Medium Adverse	D: Low	D: Minor Adverse		D: Minor Adverse	

^a C=construction, O=operational and maintenance, D=decommissioning

Table 14.20: Summary of potential cumulative environmental effects, mitigation and monitoring.

Description of effect	Phase C O D	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Tier 1							
Impact on Temporary Worker Accommodation	✓ ✗ ✗	C:Low Adverse	C: Low	Negligible	N/a	C: Negligible	N/a

^a C=construction, O=operational and maintenance, D=decommissioning

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