

MYNYDD Y GAER WIND FARM

Environmental Statement

00322
21 January 2025

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
V1	For PAC	LS	RI	DB	21/01/2025

Approval for issue

Damian Barry

21 January 2025

The report has been prepared for the exclusive use and benefit of our client and solely for the purpose for which it is provided. Unless otherwise agreed in writing by R P S Group Limited, any of its subsidiaries, or a related entity (collectively 'RPS') no part of this report should be reproduced, distributed or communicated to any third party. RPS does not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report. The report does not account for any changes relating to the subject matter of the report, or any legislative or regulatory changes that have occurred since the report was produced and that may affect the report.

The report has been prepared using the information provided to RPS by its client, or others on behalf of its client. To the fullest extent permitted by law, RPS shall not be liable for any loss or damage suffered by the client arising from fraud, misrepresentation, withholding of information material relevant to the report or required by RPS, or other default relating to such information, whether on the client's part or that of the other information sources, unless such fraud, misrepresentation, withholding or such other default is evident to RPS without further enquiry. It is expressly stated that no independent verification of any documents or information supplied by the client or others on behalf of the client has been made. The report shall be used for general information only.

Prepared by:

RPS Consulting Services Ltd

Damian Barry
Senior Director

2 Callaghan Square
Cardiff
CF10 5AZ

Prepared for:

Cenin Renewables Ltd

Martyn Popham
Director

The Research Centre, Parc Stormy
Stormydown
Bridgend
CF33 4RS

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'.
Acoustic Character	One or more distinctive features of a sound (e.g. Tones, whines, whistles, impulses) that set it apart from the background noise against which it is being judged, possibly leading to a greater subjective effect than the level of the sound alone might suggest
Air Quality Management Area (AQMA)	An area declared by a local authority where its review and assessment of air quality shows that an air quality objective is likely to be exceeded.
Ambient Noise	All-encompassing noise associated with a given environment, usually a composite of sounds from many sources both far and near, often with no particular sound being dominant
Application Boundary	Proposed application boundary for the proposed development.
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.
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
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.
Baseline	The status of the landscape without the proposed development in place.
CHEGD	Five notable groups of grassland fungi as defined in Joint Nature Conservation Committee guidance.
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.
Cumulative Effects	The combined effect of the Transmission Assets in combination with the effects from other proposed developments, on the same receptor or resource.
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
Demolition	Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.
Deposited Dust	Dust that has settled out onto a surface after having been suspended in air
Designated landscapes	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.
Directivity	The property of a sound source that causes more sound to be radiated in one direction than another

Term	Meaning
Dust Management Plan	A document that describes the site-specific methods to be used to control dust emissions.
Dust	Solid particles suspended in air or settled out onto a surface after having been suspended in air
Earthworks	Covers the processes of soil-stripping, ground-levelling, excavation, and landscaping.
Ecological Impact Assessment (EclA)	Ecological Impact Assessment is a process of identifying, quantifying and evaluating potential effects of development-related or other proposed actions on habitats, species and ecosystems.
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.
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 LAeq,T
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.
Feature	Prominent elements in the landscape, such as tree clumps, church towers or wooded skylines.
Frequency	The number of acoustic pressure fluctuations per second occurring about the atmospheric mean pressure (also known as the 'pitch' of a sound)
Generation Assets	The generation assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, together with other electrical infrastructure that contributes to electricity production, including inter-array cables, offshore substation platforms and possible platform link cables to connect offshore substations.
Green infrastructure	Networks of green spaces and watercourses and water bodies that connect rural areas, villages, towns and cities.
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
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	Inter-related effects arise where an impact acts on a receptor repeatedly over time to produce a potential additive effect or where a number of separate impacts, such as noise and habitat loss, affect a single receptor.

Term	Meaning
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 quality (condition)	A measure of physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.
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.
Maximum design scenario	The realistic worst-case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mitigation	Measures, including any process, activity or design to avoid, reduce, remedy or compensate for potential negative effects of a development.
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
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.
Notable Species	Animals or plants that have experienced decline and are listed on local biodiversity action plans or red lists of threatened species
Nyctaloid	A group of larger bat species that use open landscapes to hunt and have low echolocation frequencies, specifically noctule, Leisler's bat and serotine. The grouping has been used where sonograms have been difficult to separate.
Percentile Exceeded Sound Level	The noise level exceeded for n% of the time over a given time period, T, denoted by L _{An,T}
Photomontage	A sequence of photographs taken from representative viewpoints which illustrate the location, size, degree of visibility or appearance of a development.
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.

Term	Meaning
Protected Species	Animals or plants protected by European and/or domestic legislation.
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
Seascape	The visual and physical conjunction of land and sea which combines maritime, coast and hinterland character.
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.
Site of Special Scientific Interest (SSSI)	Sites of Special Scientific Interest are protected areas that represent the UK's most important wildlife and/or geological sites.
Section 7 species/habitats	Lists of species and habitats of 'principal importance' for maintaining and enhancing biodiversity, as named under the Environment (Wales) Act 20161.
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.
Sound Level Meter	An instrument for measuring sound pressure level
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
Special Area of Conservation (SAC)	Special Areas of Conservation are sites of international importance that have been adopted by the European Commission and formally designated by the UK government under the Conservation of Habitats and Species Regulations 2017 (as amended) in England and Wales.
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.
Spectrum	A description of the amplitude of a sound as a function of frequency
Standardised Wind Speed	Values of wind speed at hub height corrected to a standardised height of ten metres using the same procedure as used in wind turbine emission testing
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.
Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
Trackout	The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network
Tone	The concentration of acoustic energy into a very narrow frequency range

Term	Meaning
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.
Wind Shear	The change in wind speed with height above ground
Zone of Theoretical Visibility	A map, usually digitally produced, showing areas of land within which, a development is theoretically visible.

Abbreviations

Term	Definition
AIL	Abnormal Indivisible Load
ALTMP	Abnormal Load Transport Management Plan
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
ATC	Automatic Traffic Count
AV	All Vehicle
BCBC	Bridgend County Borough Council
BCT	Bat Conservation Trust
CAA	Civil Aviation Authority
CCC	Climate Change Committee
CEA	Cumulative Effects Assessment
CEMP	Construction Environmental Management Plan
CHEGD	<i>Clavarioid, Hygrocybe, Entoloma, Geoglossoid and Dermoloma</i>
CIEEM	Chartered Institute of Ecology and Environmental Management
CLVIA	Cumulative Landscape and Visual Impact Assessment
CTMP	Construction Traffic Management Plan
dB	abbreviation for 'decibel'
dB(A)	abbreviation for the decibel level of a sound that has been A-weighted
DBA	Desk-Based Assessment
DBEIS	Department for Business, Energy & Industrial Strategy
Defra	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DNS	Development of National Significance
EcIA	Ecological Impact Assessment
ECoW	Ecological Clerk of Works
EIA	Environmental Impact Assessment
ELC	European Landscape Convention
EPUK	Environmental Protection UK
EIA	Environmental Impact Assessment
ES	Environmental Statement

Term	Definition
FCA	Flood Consequence Strategy
FW	Future Wales
GIS	Geographical Information Systems
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GDWTE	Ground Water Dependent Terrestrial Ecosystem
HDV	Heavy Duty Vehicle
HFoV	Horizontal Field of View
HGV	Heavy Goods Vehicle
HRA	Habitat Regulations Assessment
HSI	Habitat Suitability Index
HV	Heavy Vehicle (used by some guidance in place of HGV)
Hz	Hertz
IAQM	Institute of Air Quality Management
IEF	Important Ecological Feature
IEMA	Institute of Environmental Management and Assessment
JNCC	Joint Nature Conservation Committee
LAeq	The abbreviation of the A-weighted equivalent continuous sound pressure level
LA10	The abbreviation of the 10-percentile exceeded sound level, often used for the measurement of road traffic noise
LA90	The abbreviation of the 90-percentile exceeded sound level, often used for the measurement of background noise
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LCA	Landscape Character Area
LDV	Light Duty Vehicle
LNR	Local Nature Reserve
LPA	Local Planning Authority
LVIA	Landscape and Visual Impact Assessment
NDF	National Development Framework
NLCA	National Landscape Character Areas (Wales)
NML	Noise Monitoring Location
NNR	National Nature Reserve
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NTS	Non-Technical Summary
NVC	National Vegetation Classification
OEMP	Operational Environmental Management Plan
OBS	Outline Biodiversity Strategy
PAA	Pre-assessed Area (PPW Policy 17)
PAC	Pre-Application Consultation
PEDW	Planning and Environment Decisions Wales
PM ₁₀	Particulate matter with diameters of 10 micrometres or smaller

Term	Definition
PM _{2.5}	Particulate matter with diameters of 2.5 micrometres or smaller
PPW	Planning Policy Wales
PRF	Potential Roost Feature
PRoW	Public Right of Way
R&A	Review and Assessment
SAC	Special Area of Conservation
SEWBRcC	South-East Wales Biodiversity Records Centre
SINC	Site of Importance for Nature Conservation
SSSI	Sites of Special Scientific Interest
TA	Transport Assessment
TAN	Technical Advice Note
TEMPro	Trip End Model Presentation Program
TG	Technical Guidance
VP	Viewpoint
WCA	Wildlife and Countryside Act (1981)
WG	Welsh Government
ZoI	Zone of Influence
ZTV	Zone of Theoretical Visibility

Units

Unit	Description
°	Degrees
°C	Degrees centigrade
ha	Hectare
%	Percentage
m	Metre
m ²	Square metre
m ³	Cubic metre
Km	Kilometre
km ²	Square kilometre
µg.m ⁻³	Microgram per cubic metre
Rpm	Revolutions per minute
m/s	Metres per second
mph	Miles per Hour
t	Tonnes
dB	Decibel
dB(A)	Decibel level of a sound that has been A-weighted
Hz	Hertz

Contents

GLOSSARY	ii
1 INTRODUCTION	1
2 SITE AND PROJECT DESCRIPTION	14
3 NEED AND ALTERNATIVES CONSIDERED	33
4 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY	46
5 LANDSCAPE AND VISUAL IMPACT ASSESSMENT	56
6 TERRESTRIAL ECOLOGY	187
7 ORNITHOLOGY	270
8 TRANSPORT	310
9 HISTORIC ENVIRONMENT	355
10 NOISE	389
11 AIR QUALITY	412
12 SHADOW FLICKER	450
13 AVIATION AND TELECOMMUNICATIONS	468
14 SOCIOECONOMICS	491
15 GEOLOGY AND HYDROGEOLOGY	544
16 LAND AND SOILS	551

Tables

Table 1.1: ES Structure	12
Table 2.1: Turbine Specifications	17
Table 2.2: Individual Turbine Specifications and Grid References	17
Table 2.3: Summary of the Key Parameters of the Proposal	24
Table 4.1: Sensitivity Criteria	51
Table 4.2: Impact Magnitude Criteria	52
Table 4.3: Typical Assessment Matrix	53

Plates

Plate 3.1: Initial Site Layout	40
Plate 3.2: Second Site Layout Iteration	41
Plate 3.3: Renewable Energy Search Area	42
Plate 3.4: Third Site Layout Iteration	42
Plate 3.5: Fourth Site Layout Iteration	43
Plate 3.6: Fifth Site Layout Iteration	44
Plate 3.7: Sixth Site Layout Iteration	45

1 INTRODUCTION

- 1.1 This Environmental Statement (ES) has been prepared by RPS Consulting Services Limited on behalf of Cenin Renewables Limited (the Applicant).
- 1.2 Cenin Renewables Limited ('The Applicant') proposes to submit an application for a Development of National Significance (DNS) to the Planning and Environment Decisions Wales (PEDW) for the development of Mynydd y Gaer Wind Farm (referred to hereafter as 'the Proposed Development').
- 1.3 This ES reports on the findings of the Environmental Impact Assessment (EIA) process and accompanies the DNS Application.

Overview of the Proposed Development

- 1.4 The Proposed Development comprises the construction and operation of up to 11 wind turbines and associated infrastructure including substation switches, access tracks and turning heads, borrow pits, temporary construction compounds (including holding bays), crane pads, underground cabling, drainage works and biodiversity proposals including creation, enhancement and restoration.

The Applicant

- 1.5 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.

Statutory Framework and Purpose of the Environmental Statement

- 1.6 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.
- 1.7 The primary legislation governing planning in Wales includes the Town and Country Planning Act 1990 and the Planning (Wales) Act 2015.
- 1.8 The Welsh Government is responsible for setting national planning policy. The key policy document is Planning Policy Wales (PPW) Version 12 (February 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 (TANs), which provide detailed guidance on specific planning issues (e.g., housing, transportation, the environment).

-
- 1.9 'Future Wales (FW): The National Plan 2040' is a strategic development plan for Wales, published by the Welsh Government in 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.
- 1.10 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 Development Framework in place of the Wales Spatial Plan, 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 'Developments of National Significance'.

Development of National Significance

- 1.11 Developments of National Significance (DNS) refer 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.
- 1.12 The criteria for qualifying as a DNS are set out in the Developments of National Significance (Wales) Regulations 2016. 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 1st April 2019, the DNS thresholds relating to generating stations were extended; and as a result, all energy generation projects of between 10MW and 350MW are now categorised as DNS under the revised National Significance (Wales) Regulations.
- 1.13 Paragraph 5.7.5 of Planning Policy Wales (PPW) Edition 12 (February 2024) states the following with respect to onshore generating projects in Wales:
- '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 Developments of National Significance (DNS) process and considered under policies in Future Wales'*
- 1.14 The anticipated maximum export capacity of the Proposed Development is 75 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 Planning and Environment Decisions Wales (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 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.

1.15 The Proposed Development is currently at Stage 1: Pre-application, undergoing statutory Pre-Application Consultation (PAC).

Consultation

Scoping

- 1.16 A scoping opinion was sought from PEDW on 30th March 2023 and was subsequently issued by PEDW on 25th August 2023.
- 1.17 This Scoping exercise has been used to inform the ES, by highlighting a number of areas that consultees wished to see addressed within the ES, and setting a scope of ES chapters and assessments to be captured within the ES.
- 1.18 The ES topic chapters provide a summary of the key points raised during Scoping and as a result of any further consultation with both statutory and non-statutory consultees.

Non-Statutory Consultation

- 1.19 Prior to statutory consultation, the client has undertaken a number of non-statutory engagements with local councillors, commoners and members of the public since 2021.
- 1.20 Community Council engagement with Coychurch Higher Community Council, St Brides Minor Community Council, Pencoed Town Council, and Ogmores Valley Community Council has been conducted since the end of 2021.

-
- 1.21 A number of meetings have been held with the Board of Conservators, Commoners of the Coity Wallia Commoners Association and Active Graziers of Coity Wallia Commoners Association since 2022.
- 1.22 Drop in Sessions were held in the community during 2023 in the following venues:
- Heol Y Cyw Welfare Hall 27.09.23
 - Bryncethin Memorial Hall 25.10.23
 - Bryncethin Community Centre 16.10.23
 - St Tyfodwgs Church 23.10.23
 - Blackmill Community Centre 20.11.23
- 1.23 There has been consultation with Bridgend County Borough Council in 2023 and 2024. All 51 Bridgend Councillors and relevant officers have been notified of all new content and Drop In Sessions. The following meetings have been held:
- Meeting with Bridgend County Borough Council Cabinet on 04.05.23 and 09.04.24
 - Meeting with Bridgend County Borough Council Officers on 07.09.23, 16.11.23, and 01.08.24
 - Meeting Cllr Paul Davies Cabinet Member for Climate Change and Environment 01.08.24
 - Meeting Bridgend County Borough Youth Council 18.10.23
- 1.24 The following local councillors have been engaged with the scheme from 2022:
- Cllr Paula Ford
 - Cllr Tim Thomas
 - Cllr Mark John
 - Cllr Melanie Evans
 - Cllr Alex Ulberini- Williams
 - Cllr Richard Williams
 - Cllr Amanda Williams
 - Cllr Martin Williams
- 1.25 Similarly, all relevant politicians at the time have been engaged with between 2021 and 2024:
- Jamie Wallis MP
 - Sarah Murphy MS
 - Huw Irranca Davies MS
 - Chris Elmore MP
 - Luke Fletcher MS

-
- Rhun ap Iorwerth
- 1.26 The applicant has also conducted a number of brochure drops, advertising the wider Bridgend Energy Hub
- 1.27 In August 2022, the applicant conducted an initial brochure drop. In July 2023, an update brochure was distributed to 22,000 people, providing additional specific details of the Mynydd y Gaer scheme. In summer 2024, another Project Update Brochure was sent out to 15,000 homes. Finally, a Bridgend Energy Hub update and pre-PAC brochure was sent out to 15,000 homes in January 2025, also making local residents aware of the upcoming PAC.
- 1.28 To compliment the PAC process, The Applicant is hosting a number of drop-in sessions in the following locations:
- Glynogwr on 06.02.25
 - Bryncethin on 12.02.25
 - Blackmill on 19.02.25
 - Heol Y Cyw on 27.02.25
 - Pencoed on 05.03.25

Statutory Consultation

- 1.29 The DNS (Wales) Regulations 2016 (the DNS regulations) requires the Applicant to undertake statutory Pre-Application Consultation (PAC) on the full draft DNS 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 DNS application.
 - It improves transparency, public engagement, and quality of decision-making, reducing potential objections and delays.

- 1.30 The Applicant intends to submit the draft DNS application for Mynydd y Gaer Wind Farm for PAC in January 2025.

The EIA Regulations

- 1.31 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 15th May 2014.
- 1.32 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’.
- 1.33 The EIA Regulations are designed to assess the potential significant effects of certain developments on the environment before planning permission is granted. The EIA Regulations ensure that environmental considerations are integrated into the planning process, helping to protect the environment and promote sustainable development.

Need for EIA

- 1.34 Schedule 1 of the EIA Regulations identifies development types that always require EIA due to their likely significant environmental impact. Examples include major industrial installations; large-scale infrastructure projects (e.g., airports, highways); waste disposal facilities; and certain energy production facilities.
- 1.35 Schedule 2 of the EIA Regulations 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.’*
- 1.36 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.’*
- 1.37 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.

Content of this ES

- 1.38 This ES has been prepared in accordance with the EIA Regulations and informed by the EIA Scoping Direction (dated 25th August 2023). 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. A copy of the EIA Scoping Direction Request and EIA Scoping Direction are included in Appendix 4.1 and 4.2 respectively.

1.39 This ES provides all information required under Regulation 17 and Schedule 4. The information supplied within this ES provides a clear understanding of the main and likely significant effects of the Proposed Development upon the environment, and the likely residual effects having regard to the mitigation proposed, taking account of the fact that effects will be both negative and positive.

1.40 Table 1.1 below sets out the information required under Schedule 4 of the EIA Regulations, including where this has been addressed in this Environmental Statement.

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

Information required	Where this is addressed in the Environmental Statement
<ol style="list-style-type: none"> 1. A description of the development, including in particular - <ol style="list-style-type: none"> 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. 	<p>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 Environmental Statement.</p> <p>An estimate of the quantities and types of waste this will be reported in a Site Waste Management Plan (SWMP), which will be submitted as part of the final Construction Environmental Management Plan (CEMP) prior to the commencement of construction of the Proposed Development. An Outline CEMP will be submitted as part of the DNS application.</p>
<ol style="list-style-type: none"> 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. 	<p>A description of the reasonable alternatives to the Proposed Development studied by the Applicant is provided in Volume 1, Chapter 3: Design evolution and alternatives of the Environmental Statement.</p>

- | | |
|--|---|
| <p>3. A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.</p> | <p>A description of the baseline and future baseline environment is provided in the relevant sections of each topic chapter of the Environmental Statement, which includes Volume 1, Chapter 5 to 14 of the Environmental Statement.</p> |
| <p>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.</p> | <p>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 Environmental Statement, which includes Volume 1, Chapter 5 to 14 of the Environmental Statement.</p> |
| <p>5. A description of the likely significant effects of the development on the environment resulting from, inter alia -</p> <ul style="list-style-type: none"> 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 | <p>A description of the likely significant effects of the Proposed Development on the environment, including direct and indirect, secondary, cumulative, transboundary, short 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 Environmental Statement, which includes Volume 1, Chapter 5 to 14 of the Environmental Statement, where appropriate.</p> <p>In addition, the inter-related effects within and between environmental topics have also been considered within relevant sections of each topic chapter of the Environmental Statement, which includes Volume 1, Chapter 5 to 14 of the Environmental Statement.</p> |

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.

<p>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.</p>	<p>The overarching methodology used to undertake the EIA for the Proposed Development is provided in Volume 1, Chapter 4: Environmental Assessment Methodology of the Environmental Statement. 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 Environmental Statement, where appropriate.</p>
<p>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.</p>	<p>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 Environmental Statement. In addition, major accidents and disasters have also been considered in relevant sections of Volume 1, Chapter 5 to 14 of the Environmental Statement, where appropriate.</p>
<p>8. A non-technical summary of the information provided under paragraphs 1 to 8.</p>	<p>A non-technical summary of the information provided under paragraphs 1 to 8 of Schedule 4 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.</p>
<p>9. A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.</p>	<p>A reference list detailing the sources used for the descriptions and assessments is provided at the end of each chapter and appendices of the Environmental Statement and other documentation submitted in support of the DNS application for the Proposed Development.</p>

1.41 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 Environmental Statement.

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

Information required	Where this is addressed in the Environmental Statement
----------------------	--

-
- | | |
|---|--|
| <p>3. An environmental statement is a statement which includes at least—</p> <ul style="list-style-type: none"> a. a description of the proposed development comprising information on the site, design, size and other relevant features of the development; b. a description of the likely significant effects of the proposed development on the environment; c. a description of any features of the proposed development, or measures envisaged in 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. | <p>A description of the Proposed Development is provided in Volume 1, Chapter 2: Project description of the Environmental Statement.</p> <p>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 Environmental Statement, which includes Volume 1, Chapter 5 to 14 of the Environmental Statement.</p> <p>A description of the mitigation measures required to avoid, prevent or reduce and, if possible, offset adverse environmental effects is provided in the relevant sections of each topic chapter of the Environmental Statement, which includes Volume 1, Chapter 5 to 14 of the Environmental Statement.</p> <p>Mitigation measures are also set out in the following documents/management plans submitted in support of the DNS application: Framework Construction Traffic Management Plan (fCTMP) [Volume 3, Appendix 8.2 of the ES] and Outline Biodiversity Strategy (OBS) [Volume 3, Appendix 6.6 of the ES].</p> <p>A description of the reasonable alternatives considered to the Proposed Development is provided in Volume 1, Chapter 3: Need and alternatives of the Environmental Statement.</p> <p>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.</p> <p>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 Environmental Statement and supporting documentations.</p> |
| <hr/> <p>4. An environmental statement must -</p> <ul style="list-style-type: none"> a. (a) be prepared by persons who in the opinion of the | <p>A statement setting out the relevant expertise of the EIA team responsible for the preparation of the Environmental Statement is provided in Volume 1, Appendix 1.1: Statement of expertise of the Environmental Statement.</p> |
-

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 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.

Feedback received as part of the Scoping Direction (Volume 3, Appendix 3.2) of the Environmental Statement⁰ has been used to inform the scope of the EIA and relevant sections of the Environmental Statement 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 Environmental Statement and supporting documentation.

1.42 As demonstrated in Table 1.1 and Table 1.2 above, the Environmental Statement for the Proposed Development provides all information required under Schedule 4 and Regulation 17 of the EIA Regulations.

1.43 Regulations 18 and 21 of the EIA Regulations sets out the procedure where an Environmental Statement 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.

Structure of the ES

- 1.44 The ES has been structured 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;
- 1.45 A Non-Technical Summary (NTS) of the ES is provided as a separate summary document.
- 1.46 Chapter 2 of Volume 1 provides a description of the Proposed Development. Chapter 3 provides information relating to the main alternatives considered during the evolution of the Proposed Development and the reasons for the choices made. Chapter 4 outlines the approach and methodology adopted for the EIA. The remainder of Volume 1 contains environmental assessment information by topic.
- 1.47 The structure of the ES is as follows:

Table 1.3: ES Structure

Heading	Description
Volume 1: Written Statement	
Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Need and Alternatives Considered
Chapter 4	Environmental Assessment Methodology
Chapter 5	Landscape and Visual
Chapter 6	Terrestrial Ecology
Chapter 7	Ornithology
Chapter 8	Traffic and Transport
Chapter 9	Historic Environment
Chapter 10	Acoustics
Chapter 11	Air Quality
Chapter 12	Shadow Flicker
Chapter 13	Aviation and Telecommunications
Chapter 14	Socioeconomics
Chapter 15	Geology/Hydrogeology
Chapter 16	Land and Soils
Volume 2: Figures	
Chapter Figures	Figures submitted in support of each chapter of the Environmental Statement
Volume 3: Technical Appendices	
Technical Appendices	Technical appendices submitted in support of each chapter of the Environmental Statement

The Applicant

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

The EIA Team

- 1.49 The EIA has been managed by RPS, and considers information provided by the Applicant and the Applicant's design team. The ES has been completed in accordance with the guidance of Institute of Environmental Management and Assessment (IEMA) Quality Mark. All authors of this ES are qualified consultants and a statement setting out how the authors have sufficient expertise to ensure the completeness and quality of the ES is provided in Appendix 1.1.

Further Information

- 1.50 The Environmental Statement will be submitted as part of the DNS application for the Proposed Development to PEDW.
- 1.51 Copies of the ES and DNS application documents can be viewed on the PEDW Developments of National Significance (DNS) website: <https://gov.wales/developments-national-significance-dns-applications> under the reference: CAS-01773-Z5L1D0.
- 1.52 Further copies of the ES can be obtained from the following address:
RPS
2 Callaghan Square
Cardiff
CF10 5AZ
- 1.53 A paper copy of the full ES can be obtained from RPS for a cost of £250 plus VAT, or an electronic copy (CD) or USB for a cost of £25. A hard copy of the NTS can also be obtained from RPS, free of charge.

References

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

2 SITE AND PROJECT DESCRIPTION

Introduction

2.1 This chapter provides details of:

- a brief description of the Proposed Development Site, as defined by the Red Line Boundary in Volume 2, Figure 2.1 of the ES ('the Site') and its surrounding environs. Detailed descriptions of the Site baseline are provided in the relevant topic chapters within the ES.
- a description of the Proposed Development and the approach to the construction, operation and decommissioning of the development, the parameters of which form the basis for the assessment provided in this ES.
- measures to avoid, reduce, or offset any adverse environmental effects have been included/ 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.

2.2 This chapter, together with the subsequent topic chapters, provides the detail to assess the effects of the Proposed Development in accordance with Regulation 17 and Schedule 4 of the EIA Regulations.

The Site and Surrounding Area

Site Location and Surrounding Area

2.3 The Site is located north of the M4 motorway and the village of Heol y Cyw, which lies approximately 5 miles from the town of Bridgend. The highest point of Mynydd y Gaer mountain is 295 m. The Site includes common land and a network of footpaths. From the junction on the B4280 at Pencoed, the road north to the A4093 near Glynogwr passes through the Site. The location and geographic extent of the Site is illustrated in Volume 2, Figure 2.1: Site Location Plan of the ES.

Agriculture, Geology, and Topography

2.4 The Site comprises mainly grassland common land.

2.5 Mynydd y Gaer itself is an upland plateau, the ridge runs west to east, and the south side is prominent in the wider landscape.

Planning History

2.6 Consultation with BCBC has confirmed the following planning history on site:

- Application reference P/12/797/FUL – Coity Wallia Common - Construct 5 ponds around each for biodiversity benefit – Approved 10/12/12
- Application reference P/17/912/FUL – Caner Mawr, Blackmill - Change of Use of existing dwelling to tourism holiday let dwelling (affecting Footpath No. 33, Coychurch Higher)

Planning Context

- 2.7 The Site lies within the administrative boundary of Bridgend County Borough Council (BCBC) which is the LPA. Consequently, 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
 - Bridgend County Borough Council Replacement Local Development Plan (RLDP) 2018-2033.
- 2.8 The LDP Proposals Map indicate the following designations are on site or in close proximity:
- Policy DNP4: Special Landscape Area – Mynydd y Gaer
 - Policy SP17: Conservation and Enhancement of the Natural Environment
 - SP17(1): National Site Network Sites (including Special Areas of Conservation (SACs);
 - SP17(2): Sites of Special Scientific Interest (SSSI)
 - DNP5: Local And Regional Nature Conservation Sites
 - DNP5(2): Site of Importance for Nature Conservation (SINC)
 - Policy ENT12: Development in Mineral Safeguarding Zones - Sandstone and Igneous Rock
- 2.9 The ES provides an overview of relevant legislative and planning policy context within each topic chapter. The assessments have regard to national and local policy documents, where relevant.
- 2.10 The ES does not include a separate chapter on Planning Policy Context. The draft guidance on EIA from the Department for Communities and Local Government 'EIA: A Guide to Good Practice and Procedures' (DCLG 2006) (paragraph 155) states that there is no requirement to provide chapters on planning and sustainability in Environmental Statements.
- 2.11 A separate Planning Statement is submitted with the DNS application.

Details of the Proposed Development

Project Description

- 2.12 The Proposed Development comprises 11 wind turbines and associated infrastructure, including substation switches, access tracks and turning heads, borrow pits, temporary construction compounds (including holding bays), crane pads, underground cabling, drainage works and biodiversity proposals including creation, enhancement and restoration.
- 2.13 Please refer to Volume 2, Figures 2.1: Site Location Plan and 2.2: Site Layout Plan of the ES.

- 2.14 Each of these elements are described in further detail in the following sections of this chapter of the ES.

Bridgend Energy Hub

- 2.15 Cenin has plans to develop the Bridgend Energy Hub, a scheme that will combine the production of renewable energy for use in the local area, the development of employment space and sustainable transport hub near junction 36 of the M4. Mynydd y Gaer wind farm forms part of the Hub scheme. As well as generating electricity, Mynydd y Gaer will create improved access for walkers and cyclists to utilise the common. The Energy Hub is made up of the following elements:
- Mynydd y Gaer Wind Farm
 - Ty'n y Waun Solar Farm
 - Ti'r Isha Employment Area
 - Junction 36 Transport Hub

Ty'n y Waun Solar

- 2.16 Ty'n y Waun is a Solar Farm is also a DNS application (ref. DNS/3279521) for circa 40 MW solar photovoltaic electricity generating station 'solar farm' and associated ancillary development located at Land at Ty'n Y Waun, near Heol y Cyw, Bridgend.
- 2.17 The application was approved by the Welsh Ministers in on 11th October 2024.
- 2.18 The Proposed Development has been strategically co-located with the Ty'n y Waun scheme. The schemes will share a grid connection west of Heol y Cyw.

Tir Isha

- 2.19 Ti'r Isha Employment Area will be zoned for a purpose-built facility adjacent to the M4, supplying businesses with a significant source of green energy.

Junction 36 Transport Hub

- 2.20 Located just off the M4 motorway, the Junction 36 Transport Hub will be a travel centre for future transport needs.

Key Components

- 2.21 The Proposed Development design/layout has considered key design and environmental constraints (please refer to Volume 1, Chapter 3: Need and Alternatives of the ES). The overall design may be further amended in response to feedback received during PAC.
- 2.22 The Proposed Development comprises 11 onshore wind turbines, with an anticipated maximum export capacity of 75 MW and associated infrastructure. The Proposed Development comprises the following key components, which have been further described in this chapter of the ES:

- Wind turbines,
- Wind turbine foundations
- Crane platforms and temporary laydown areas
- Onsite substation compound
- Temporary construction compounds
- Access tracks
- Underground cabling
- Borrow pits
- Highway access
- Landscaping and ecological enhancement area(s)
- Common land replacement area
- Turbines

2.23 The Proposed Development comprises the construction, operation and decommissioning of 11 wind turbines. Of these, two different types of turbines are proposed, which are the V150 and V162. The Proposed Development will include three V150 turbines and eight V162 turbines. 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 2.4: Indicative Turbine Elevations 180m tip and Figure 2.5: Indicative Turbine Elevations 198m tip of the ES.

Table 2.1: Turbine Specifications

Parameter	V150	V162
Max turbine tip height	180m	198m
Max turbine hub height	105m	119m*
Rotor diameter	150m	162m
Turbine radius (m)	75m	81m

* Note: T11 is a V162 model with a larger hub height of 149m and tip height of 230m.

2.24 An outline of the individual turbine sizes 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	119	162	198	294166	185792
T2	105	150	180	294511	185550

T3	119	162	198	295032	185829
T4	105	150	180	294692	186296
T5	105	150	180	295344	186325
T6	119	162	198	295519	185931
T7	119	162	198	295848	186235
T8	119	162	198	295967	185862
T9	119	162	198	296521	186082
T10	119	162	198	296501	185599
T11	149	162	230	297052	185435

Grid Connection

- 2.25 The grid connection is proposed south of the development, west of Heol y Cyw (see Volume 2, Figure 2.3 of the ES).
- 2.26 The grid connection is shared with the Ty'n y Waun Solar Farm, as part of the Bridgend Energy Hub.

Substation Compound

- 2.27 The substation exterior will be grey render or goose wing grey cladding to blend into the natural environment.
- 2.28 Substation and batteries will be sited on a permeable surface, such as limestone, on concrete pads to ensure foundations are not visible and will not interfere with drainage.
- 2.29 There will be no permanent 24-hour lighting. The lighting will be emergency triggered. CCTV will be infrared and not visible. Deer fencing will surround the substation unit.

Access tracks and turning heads

- 2.30 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;
- 2.31 Most of the on-site access tracks would be required to facilitate the construction of the Proposed Development.
- 2.32 Additionally, a number of access tracks will be retained after construction in order to facilitate maintenance activities during the operational phase.

Borrow pits

- 2.33 Borrow pits will be excavated to provide fill materials required for construction of the Proposed Development, such as the on-site access tracks, wind turbine foundations and landscaping areas.

Temporary construction compounds and holding areas

- 2.34 The compound would be used, where necessary, for temporary storage of the various components and materials which are required for construction.
- 2.35 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.

Crane pads

- 2.36 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.

Access and Parking

- 2.37 Access to the site is achieved via the A473 Penybont Road, the B4280 Penprysg Road and Bryngarn Road, with a new site access proposed approximately 3km north of Pencoed, located as new fourth arm to the junction of Bryngarn Road and Chapel Road. From this location, purpose built on-site access tracks will be provided.
- 2.38 A Framework Construction Traffic Management Plan (fCTMP) describing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic will be submitted with the DNS application (see Volume 3, Appendix 8.2 of the ES). The fCTMP will be refined and agreed with the LPA following consent of the scheme.

Appearance and Design

- 2.39 The Proposed Development proposes introducing tall modern structures into the ridgeline. The appearance will be a more modern and obvious human influence on the landscape compared to that currently formed by grassland and agriculture.
- 2.40 There are a number of wind farms in close proximity, as further outlined within the cumulative assessments.

Landscape Strategy

- 2.41 The landscape strategy consists of the following measures.
- Within the turbine Site – habitat management

- Beyond the Turbine Site – woodland enhancements
- Creation of Exchange Common Land
- Controlled access on Mynydd y Gaer

2.42 Further information is provided in Volume 1, Chapter 5: Landscape and Visual Assessment of the ES.

Drainage and Flood Risk

2.43 Based on the Natural Resources Wales (NRW) mapping, the Site is located within Development Advice Map Zone A and is located within Flood Zone 1.

2.44 Mapping indicates that there is some flood risk from surface water flooding and small watercourses at the site. This is not within the locations of proposed turbines, but some portions of the access track fall within these extents. The flood extents are likely to be associated with the ordinary watercourses located across the site. In some areas the watercourses are proposed to be crossed, the potential flood risk will be considered when designing the crossings. An ordinary watercourse consent will also be required for the proposed watercourse crossings.

2.45 A Flood Consequences Assessment has been produced for the Proposed Development (Volume 3, Appendix 2.1 of the ES) which includes the proposed measures which could be incorporated into the development to mitigate the identified risk.

2.46 Filter drains will be placed downgradient of the turbines, which will intercept and attenuate runoff. Additionally, filter strips will be placed adjacent to the access tracks at the site, which will intercept and attenuate runoff. Gravel infill will provide storage and treatment for surface water flows.

2.47 A further detailed design will be development in consultation with the relevant authorities.

Lighting

2.48 Due to the height of the turbines, the proposed development would require an aviation lighting scheme in accordance with the Civil Aviation Authority (CAA) policy. It is likely this would comprise of medium-intensity steady-red lights at the nacelle of the turbines;

2.49 Consultation is recommended with the CAA and Ministry of Defence to confirm the lighting requirements and agree to a lighting scheme.

Replacement Common Land

2.50 Applications under sections 16 and 38 of the Commons Act 2006 have been submitted as part of the DNS application for the Proposed Development. Consent under section 38 of the Commons Act 2006 is required to carry out 'restricted works' on common land, namely; extending the current car park on MYG, and the laying of a section of cable to enable the Proposed Development to export electricity from the site to the south and beyond to National Grid Electricity Distribution network.

- 2.51 A separate section 16 application has been submitted for the Release Land required for the turbine bases, crane pads, new access tracks, drainage works, cable trenches, working areas, Sub-station and their micro-sitting areas.
- 2.52 The replacement land does not adjoin MYG Common (CL20), it is to the south (475m) it abuts another common that of Hirwaun Common (CL21), the proposed land is currently enclosed agricultural pasture used for grazing.
- 2.53 The area of Release Land to be de-registered amounts to approximately 21.12 Ha (of which is 4.01 Ha being the permanent structures of turbine, bases, tracks and substations), it is anticipated that 5.67 Ha is required for allowance on micro siting of turbine basis, compounds and laydowns in construction phase while temporary land for batter cuts and stripping of roads cables at side of roads amount to 11.44 ha. 21.54 ha of Replacement Land is offered in exchange.
- 2.54 It is considered that the proposed area of Replacement Land is wholly suitable. The grazing area to be provided is more than the area released from the Common. The grazing potential offered is the same as adjoining common areas (Hirwaun Common), which is a mix of restored former open cast land and upland permanent pasture. The location, topography being lowland southernly gently sloping in aspect of the Replacement Land does offer shelter for livestock for the prevailing winds, with established shelter belts and an area of grazed native woodland. The incorporation of the Replacement Land to the Common will provide limited similar vegetation/ grazing as the existing common land. There is soft rush on most of the south section of Replacement land, as this is former opencast coal restored land, a management plan will commence prior to the scheme to reduce the rush.
- 2.55 As a result of the Proposed Development there will be no reduction in the Common land area available to all users and there will no be detrimental impact on the commoners, landowners or public.

Mitigation

Primary / Embedded Mitigation

- 2.56 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.
- 2.57 Embedded mitigation developed through the EIA process has been incorporated into the construction and operation of the proposed development in order to avoid and reduce the potential environmental impacts as far as it is practical to do so.
- 2.58 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:

Topic	Mitigation Measure
Landscape	Micro siting design of the turbine layout has respected habitats, site lines between historic features on the plateau and sought to minimise the impacts on residential visual amenity.

	<p>Minimise the potential effects on local residential receptor groups with at least a 500m buffer around properties. Turbines positions were adjusted to lessen the visual impact on residential receptors at Glynogwr, Glynllan to the north and Heol y Cyw to the south. This was achieved by moving the turbines away from these settlements, further towards the centre of Mynydd y Gaer.</p> <p>Turbine T12 on the north east side of the proposed windfarm was removed to reduce the scheme's proximity to properties and settlement to the north east.</p>
Ecology	<p>A 50m buffer added to woodland to protect Goshawks.</p> <p>Three biodiversity mitigation areas have been identified:</p> <ul style="list-style-type: none"> • East of Blackmill Woodland • Wern Tarw Woodland • Exchange Land
Common Land	<p>Creation of an area of exchange common land to the south to mitigate loss of Mynydd y Gaer common from the proposed turbine development.</p>
Telecomms	<p>In consultation with Telecomms operators, lines of site were identified for microwaves and UHF beams. The layout has been adjusted accordingly to microsite T1, T2, T3, T10 and T11.</p>
Historic Environment	<p>The location of Turbine 9 has been moved approx. 70m to the west to avoid archaeology.</p>
Transport	<p>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.</p>

Mitigation Areas

Wern Tarw Woodland

- 2.59 To facilitate the transportation of turbines to the Turbine Site, a small portion (0.11 ha) of the Wern Tarw Woodland will be removed. Therefore the woodland has been identified as an area for mitigation. Whilst woodland removal along the haul road would be located within an area designated as ancient woodland, the extent of loss would be relatively limited.
- 2.60 Given the woodland's deteriorating condition and density of undesirable features, conservation management of the whole woodland under the Applicant's control is proposed.
- 2.61 The wider woodland would significantly benefit from the intervention of long-term, sympathetic ancient woodland restoration. It is estimated that more than 6 hectares of ancient woodland could be managed and restored to its former condition.

East of Blackmill Woodland

- 2.1.1 Blackmill Woodlands Special Area of Conservation (SAC) is an international site of conservation importance, designated for its old sessile oak woods. The SAC is outside of the Turbine Site and outside the Application Boundary but has been included as an area of offsite mitigation. To the east of Allt y Rhiw, outside of the woodland habitat, is an area of dense bracken, comprising primarily a bracken

monoculture. The dense bracken is located partly within the boundary of the SAC and extends outside, to the east. To reduce the continuous pressure of bracken on the SAC and facilitate recruitment of woodland saplings, selective bracken control would be implemented along the edge of the SAC and outside of the boundary.

Exchange Land

- 2.62 The Exchange Land forms part of the replacement common land for the Proposed Development and is located to the west of Heol-y-Cyw, and south of Blackmill, in Bryncethin
- 2.63 This area has been identified as replacement common land only but provides an opportunity to deliver biodiversity benefits through enhancement and restoration. Indicative measures have been proposed within the Exchange Land where they provide benefits to biodiversity, the landscape and the community and improvements to land use, ensuring no impediment of common land rights. It should be noted that the extent land available for biodiversity enhancement within the Exchange Land is unknown at the current stage. As a result, this section sets out the potential measures based on the nature of habitats within an area likely to be available. Proposals within the Exchange Land would be subject to change following confirmation of the final extent. Once specific areas are confirmed, mitigation measures will be revised as part of the full DNS application and illustrated on a plan.
- 2.64 Mitigation in the exchange land consists of a series of new and enhanced hedgerows and treelines, rush management and wetland feature creation, invasive non-native species control of Himalayan Balsam, enhancement of broadleaved woodland, and implementation of wildlife boxes.
- 2.65 Biodiversity enhancement measures have been proposed within this area that will support the local community, and benefit the environment, without interfering with common land functions.
- 2.66 The mitigation proposed in these areas is fully outlined in Volume 1, Chapter 6: Terrestrial Ecology of the ES, and Volume 3, Appendix 6.5: Outline Biodiversity Strategy of the ES.

Sustainability

- 2.67 This section outlines the effects of the Proposed Development on sustainability factors such energy demand, waste, use of natural resources, and residues and emissions.
- 2.68 A climate change assessment will not be submitted separately within the ES as sustainability (e.g. energy demand, greenhouse gases, climate change etc) will be captured in the assessment.

Energy Demand

- 2.69 The Proposed Development would supply electrical energy to the distribution network rather than generate demand.

2.70 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).

Vulnerability to Accidents and Disasters

2.71 The EIA Regulations state that an EIA must identify, describe, and assess, in an appropriate manner, the direct and indirect significant effects arising from the vulnerability of the Proposed Development to risks of major accidents or disasters. This means that the EIA must examine any important impacts the Proposed Development might have, both directly and indirectly. Additionally, it must assess how the Proposed Development could be affected by major risks, such as accidents or natural disasters. In short, the EIA looks at both how the Proposed Development affects the environment and how outside dangers could impact the Proposed Development. The objective of such an assessment is to establish whether the Proposed Development increases risks to existing receptors or increases the sensitivity of those receptors to the consequences of the hazard. For example, by introducing new links/pathways between a possible hazard and a receptor.

Summary of the Key Parameters of the Proposal

Table 2.3: Summary of the Key Parameters of the Proposal

Element of Development	Key Parameter for EIA
Site Area	347.97 hectares (ha)
Number of turbines	11
Maximum turbine height	230m
Cable route	10.43km

Construction Methodology

2.72 The details of construction methods, timing, and phasing are necessarily broad at this stage of the Proposed Development. The limits of the assessment, however,

have been set sufficiently wide to allow a robust assessment to be undertaken of a reasonable worst-case scenario.

Phasing of Construction Works

- 2.73 The timing of the Proposed Development would be dependent on securing planning permission and the discharge of planning conditions. It is expected that construction will last 2 years.

Construction Working Hours

- 2.74 All work would be undertaken 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 Sundays or Bank Holidays.
- 2.75 These hours would be subject to agreement with the LPA. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the LPA prior to commencement of the activity, as necessary.

Environmental Management during Construction

- 2.76 Construction would be undertaken in accordance with good practice environmental management procedures that will be set out in more detailed plans and method statements contained within a CEMP to be developed by the contractor. The CEMP will set out the key management measures that contractors would be required to adopt and implement. These measures will be developed based upon those effects identified during the EIA process and set out in the topic chapters of this ES. They will include strategies and control measures for managing the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable.
- 2.77 The CEMP would be prepared during the pre-construction period once a contractor has been appointed. The final CEMP would be submitted to the LPA for approval prior to the commencement of construction works.

Construction Working Areas

- 2.78 Temporary facilities would be required during construction including:
- Temporary offices and welfare facilities;
 - Storage area for materials, fuels, plant and equipment;
 - Waste management areas; and
 - Car parking facilities.
- 2.79 As far as possible, storage areas would be located away from existing properties/dwellings. Such storage areas would be bunded to mitigate any spillages of potential contaminants and would avoid being located in areas of retained vegetation or habitat.

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

Construction Access

2.81 The planning application includes a framework Construction Traffic Management Plan (fCTMP), see Volume 3, Appendix 8.2 of the ES. This document provides information on expected construction vehicle movements and vehicle types, journey considerations for construction and maintenance staff, proposed access junction arrangements, the suitability and details of the proposed haulage route, information on the traffic management measures to be implemented, and details the construction working hours and duration of works.

Construction Vehicles

2.82 The type of construction vehicles would be selected by the contractor prior to and during the construction phase. However, the following vehicles would typically be used during construction:

- Excavators;
- Cranes (for assembly and erection);
- Low loaders (for transport of construction equipment and plant);
- Lorries;
- Tipper lorries; and
- Construction staff vehicles.

2.83 The construction phase is anticipated to last approximately 24 months. During peak activity, heavy goods vehicle (HGV) movements are expected to reach approximately comprising 48 light vehicles and 64 heavy vehicles.

2.84 Further details of predicted traffic flows associated with the construction of the Proposed Development are provided within the fCTMP (Volume 3, Appendix 8.2 of the ES).

2.85 Turbine component delivery will form Abnormal Indivisible Loads (AILs), with each turbine requiring up to ten AILs. Other turbine components will likely be delivered at a similar time but would not be classified as AILs and would be delivered on low loaders, classified as a standard HGV.

2.86 This forecasts that 110 AILs will be required, which will be delivered in convoys of 3 AILs. In total, 37 AIL convoys are forecast.

2.87 A comprehensive Abnormal Loads Transport Management Plan (ALTMP) has been prepared for the application, see Volume 3, Appendix 8.1 ALTMP of the ES. This plan outlines traffic management and mitigation measures designed to mitigate the impact of abnormal load deliveries, which will be agreed upon with LHA and Trunk Road Agency prior to the commencement of works.

Drainage

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

Waste

Construction Waste

- 2.90 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. Excavated materials would be re-used onsite where these deemed suitable for re-use (e.g. as fill materials). Excavated peat is not classed as waste provided that is deemed suitable for a pre-determined use as part of the construction of the Proposed Development or for reinstatement activities. Where not deemed suitable for re-use, site waste would either be transported to a suitable recycling facility or landfill site (if non-recyclable).

- 2.91 Other construction waste streams include municipal waste from welfare facilities, such as food waste, paper, plastics, glass, cardboard, paper, and other typically domestic refuse. Industrial waste chemicals, fuel, oil and polluted water from plant, vehicle washes may also be generated as a result of the proposed development.

Operational waste

- 2.92 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. 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 set out in the SWMP and CEMP.

Decommissioning waste

- 2.93 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 wastewater. 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 and Enhancement Plan.

Use of Natural Resources

- 2.94 The contractors' CEMP will consider the main types and quantities of materials required for the Proposed Development in order to assess potential for sourcing materials in an environmentally responsible way.
- 2.95 The Considerate Constructors Scheme (CCS) includes measures relating to the use of resources, including categories in relation to minimising the use of water.
- 2.96 The construction process would take into account the principles of good practice in soil handling and restoration set out in the following documents, wherever possible, to reduce the possibility of damage to soil:
- Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide; and

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

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

2.98 Further to this, a Peat survey was conducted in December 2024 by RPS. The survey identified a number of small pockets of peat on the Site, however no peat was identified at a depth of over 40cm, in which the peat can be classed as deep peat, which is subject to protection.

Residues and Emissions

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

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

Vulnerability to Accidents and Disasters

2.101 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).

2.102 Consideration of risks to aviation activity is considered within Volume 1, Chapter 13: Aviation, of the ES.

2.103 Vulnerability to accidents and disasters will be considered within the ES on a topic-by-topic basis within each individual chapter.

Fire Risk

2.104 The Proposed Development comprises electrical infrastructure which presents a potential fire risk. 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;
- 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;
- 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 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

- 2.105 The evaluation of flood risk associated with the Proposed Development is provided within the Flood Consequence Assessment (FCA) which is Volume 3, Appendix 2.1 of the ES.

Mechanical failure or blade/ice throw

- 2.106 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.
- 2.107 However, multiple public footpaths and bridleways are in proximity to the proposed wind turbines and much of the Proposed Development site is situated on common land, whereby pedestrian movements are not limited to PRow. 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:
- 2.108 Separation distance: establishing a minimum separation distance between each of the wind turbines and definitive PRow of a turbine blade length 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.

2.109 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 Blaenau Gwent County Borough Council and Caerphilly County Borough Council that warning signs and de-icing systems have been installed.

2.110 The potential effects of the Proposed Development with respect to human health are considered across all EIA chapters.

Operation and Maintenance

2.111 The operational lifetime of the Proposed Development is 50 years. During this period the Proposed Development would largely be automated, with wind turbine operations being managed and monitored via control equipment located within the on-site substation compound. These systems would ensure the safe operation of the Proposed Development, including the implementation of safety measures (e.g. fire suppression, ice detection, emergency cutoff).

2.112 Once operational, the wind farm will be managed remotely and will require only occasional site visits for maintenance, as needed.

Decommissioning

2.113 After the Proposed Development's lifespan of 50 years, it is proposed that the turbines and transformers would be removed. All structures, cabling and transformers would be removed from the Site and recycled or disposed of in accordance with good practice and market conditions at that time.

2.114 The works required for decommissioning of the Proposed Development would be similar in nature to those required during construction.

2.115 A decommissioning and enhancement plan, to include timescales and transportation methods, ecological and landscape enhancements and other environmental improvements, would be developed in consultation the local planning authority, local community and key stakeholders following consent of the DNS application.

References

Bridgend County Borough Council (2024) Local Development Plan 2018-2033.

Department for Communities and Local Government (2021) Planning Practice Guidance. Available at: <https://www.gov.uk/government/collections/planning-practice-guidance>.

DETR (1997) Mitigation Measures in Environmental Statements.

Highways Agency et al., (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08. Available at: <https://www.standardsforhighways.co.uk/>

IEMA (2004) Guidelines for Environmental Impact Assessment. Available at: <https://www.iema.net/>

IEMA (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report. Available at: <https://www.iema.net/>

IEMA (2015a) Environmental Impact Assessment Guide to Shaping Quality Development. Available at: <https://www.iema.net/>

IEMA (2015b) Climate Change Resilience and Adaptation. Available at: <https://www.iema.net/>

IEMA (2016) Environmental Impact Assessment: Guide to Delivering Quality Development. Available at: <https://www.iema.net/>

IEMA (2017) Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available at: <https://www.iema.net/>

IEMA (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach. Available at: <https://www.iema.net/>

The Planning Inspectorate (2019) The Planning Inspectorate: Developments of National Significance, Appendix 3: Environmental Impact Assessment. Available at: <https://www.gov.wales/developments-national-significance-dns-guidance>

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

Welsh Office Circular 11/99: Environmental Impact Assessment (Welsh Office, 1999). Available at: <https://www.gov.wales/planning-guidance-environmental-impact-assessments-circular-1199>

3 NEED AND ALTERNATIVES CONSIDERED

Introduction

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

The Need for the Proposed Development

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

National Grid Future Energy Scenarios (July 2024)

- 3.3 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.
- 3.4 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.
- 3.5 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.
- 3.6 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

- 3.7 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

- 3.8 On 9th February 2021, the Welsh Government set out its legal commitment to achieve net zero emissions by 2050.
- 3.9 This statement highlights the importance of renewable energy generation in achieving net zero targets.

UK Government Net Zero 2050

- 3.10 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, 2020a) was published, setting out the pathway to achieving net zero through the greater reliance on wind and solar energy.
- 3.11 Net Zero 2050 – A Roadmap for the Global Energy Sector (International Energy Agency, 2021) outlines the essential conditions for the global energy sector to reach net-zero carbon dioxide (CO₂) emissions by 2050. The Roadmap calls for scaling up 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.

National Planning Policy Context

- 3.12 PPW Edition 12 (February 2024), Future Wales - the National Plan 2040 (February 2021), and the Technical Advice Notes (TANs) set out the national planning policies of the Welsh Government. TAN 8: Planning for Renewable Energy (July 2005) was revoked after the publication of Future Wales and there is no longer an energy-specific TAN.
- 3.13 PPW paragraph 5.7.14 confirms that the Welsh Government targets for the generation of renewable energy are:
- Wales to generate 70% of its electricity consumption from renewable energy by 2030;
 - One Gigawatt of renewable electricity capacity in Wales to be locally owned by 2030; and
 - New renewable energy projects to have at least an element of local ownership.
- 3.14 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 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.

- 3.15 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.
- 3.16 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.
- 3.17 Future Wales contains two policies (17 and 18) of specific relevance to this project.
- 3.18 **Policy 17** – Renewable and Low Carbon Energy and Associated Infrastructure – expresses strong support for the principle of developing renewable and low carbon energy from all technologies and at all scales to meet our future energy needs. The policy states that in determining planning applications for renewable and low carbon energy development, decision makers must give significant weight to the need to meet Wales' international commitments and our target to generate 70% of consumed electricity by renewable means by 2030 in order to combat the climate emergency.
- 3.19 Policy 17 outlines ten pre-assessed areas where there the Welsh Government has modelled the likely impact on the landscape and has found them to be capable of accommodating development in an acceptable way. There is a presumption in favour of large scale wind energy development in these areas, subject to the criteria in policy 18.
- 3.20 In respect of wind development, Policy 17 states that all proposals should demonstrate that they will not have an unacceptable adverse impact on the environment. It also expects proposals should describe the net benefits the scheme will bring in terms of social, economic, environmental and cultural improvements to local communities. New strategic grid infrastructure for the transmission and distribution of energy should be designed to minimise visual impact on nearby communities.
- 3.21 **Policy 18** – Renewable and Low Carbon Energy Developments of National Significance – deals with Developments of National Significance ('DNS'). It is a criteria-based policy which states that such developments will be permitted (subject to policy 17) and the following:
1. outside of the Pre Assessed Areas for wind developments and everywhere for all other technologies, the proposal does not have an unacceptable adverse impact on the surrounding landscape (particularly on the setting of National Parks and Areas of Outstanding Natural Beauty);

2. there are no unacceptable adverse visual impacts on nearby communities and individual dwellings;
3. 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);
4. there are no unacceptable adverse impacts on national statutory designated sites for nature conservation (and the features for which they have been designated), protected habitats and species;
5. the proposal includes biodiversity enhancement measures to provide a net benefit for biodiversity;
6. there are no unacceptable adverse impacts on statutorily protected built heritage assets;
7. there are no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance;
8. 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);
9. there are no unacceptable adverse impacts on the transport network through the transportation of components or source fuels during its construction and/or ongoing operation;
10. the proposal includes consideration of the materials needed or generated by the development to ensure the sustainable use and management of resources;
11. there are acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration.

3.22 Policy 18 also requires that the cumulative impacts of existing and consented renewable energy schemes should also be considered.

Local Policy Context

3.23 BCBC declared a climate emergency in June 2020 and set up its Climate Emergency Response programme.

Overall Need

3.24 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.

- 3.25 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.
- 3.26 In summary, the benefits of this Wind Development include:
- 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 BCBC, 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.
- 3.27 Overall, the benefits of using wind energy for the generation of electricity are that it is renewable, safe and does not release any gaseous emissions into the atmosphere during operation.

Alternatives Considered

- 3.28 The EIA Regulations 17 3(d) require that an ES should include:
‘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.’
- 3.29 Paragraph 2 of Schedule 4 of the Regulations expands slightly on the information for inclusion in ESs and states:
‘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..’ (Schedule 4 (2))
- 3.30 This section therefore sets out the reasonable alternatives considered and the key reasons for the selection of the Proposed Development site and current layout, taking into account identified design and environmental constraints.

‘Do nothing scenario’

- 3.31 Under the ‘do nothing’ scenario, the Site would continue to be used as a common.

-
- 3.32 The Site would not contribute toward, or provide the benefits of, producing renewable energy for export into the local electricity distribution network and would not help the Welsh and UK Governments to respond to energy security needs, the climate emergency, and reach greenhouse gas reduction and net zero targets by 2050.

Site Selection

- 3.33 The first step in site selection comprises a nationwide search for suitable sites that meet suitable criteria.
- 3.34 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.
- 3.35 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. In assessing the suitability of a site, the following criteria are considered:
1. Technical suitability of the Site for construction and operation
 - a. Topography and ground conditions
 - b. Size
 - c. Orientation
 - d. Accessibility
 2. Grid connection feasibility
 - a. Proximity of nearest point of connection
 - b. Availability of grid capacity at the substation
 - c. Accessibility substation to connect to via cables
 3. Design constraints
 - a. Designations, both national and local level
 - b. Existing land use
 - c. Landscape designations
 - d. Ecological designation
 - e. Heritage designations
 - f. Flood risk
 - g. Neighbouring land uses
 - h. Potential visual receptors
 - i. Presence of Best and Most Versatile (BMV) Agricultural Land.
 4. Site Availability

-
- 3.36 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 development as is the case for the Proposed Development.
- 3.37 For wind energy in Wales, it is important to consider Future Wales The National Plan 2040 (Welsh Government, 2021) Policies 17 Pre-Assessed Areas (PAA) for wind energy, in which the Welsh Government has already modelled the likely impact on the landscape and has found them to be capable of accommodating development in an acceptable way. There is a presumption in favour of large-scale wind energy development (including repowering) in these areas, subject to the criteria in Policy 18.
- 3.38 The location of the Site was selected due to its location within PAA 9, where there is a presumption in favour of large-scale wind energy development.
- 3.39 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 Proposed Development. 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.

Design Evolution

- 3.40 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.
- 3.41 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 several design iterations and refinements, which are summarised in the following sections below.

First Design Iteration (2019)

- 3.42 Initial site investigations and site constraints analyses were undertaken with a focus on providing turbines for landowners interested in collaborating with the scheme. Individually, owned land is shown shaded below with landowner details redacted.
- 3.43 The initial turbine specification was for V136 4MW machines, as access was not confirmed at this stage. 13 Turbines were proposed at this stage.

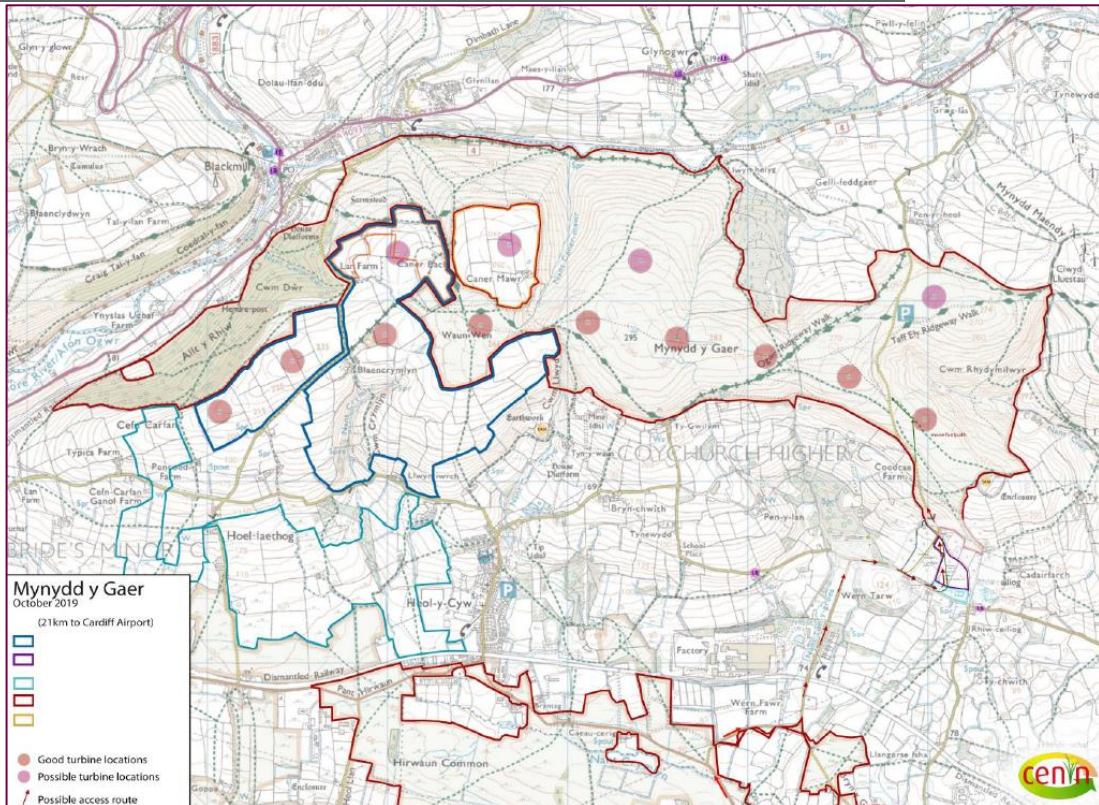


Plate 3.1: Initial Site Layout

Second Design Iteration (2020)

3.44 Turbines were relocated to provide a minimum buffer of 400m from houses, and away from Blackmill Woodlands SSSI to the west and from archaeology to the east.

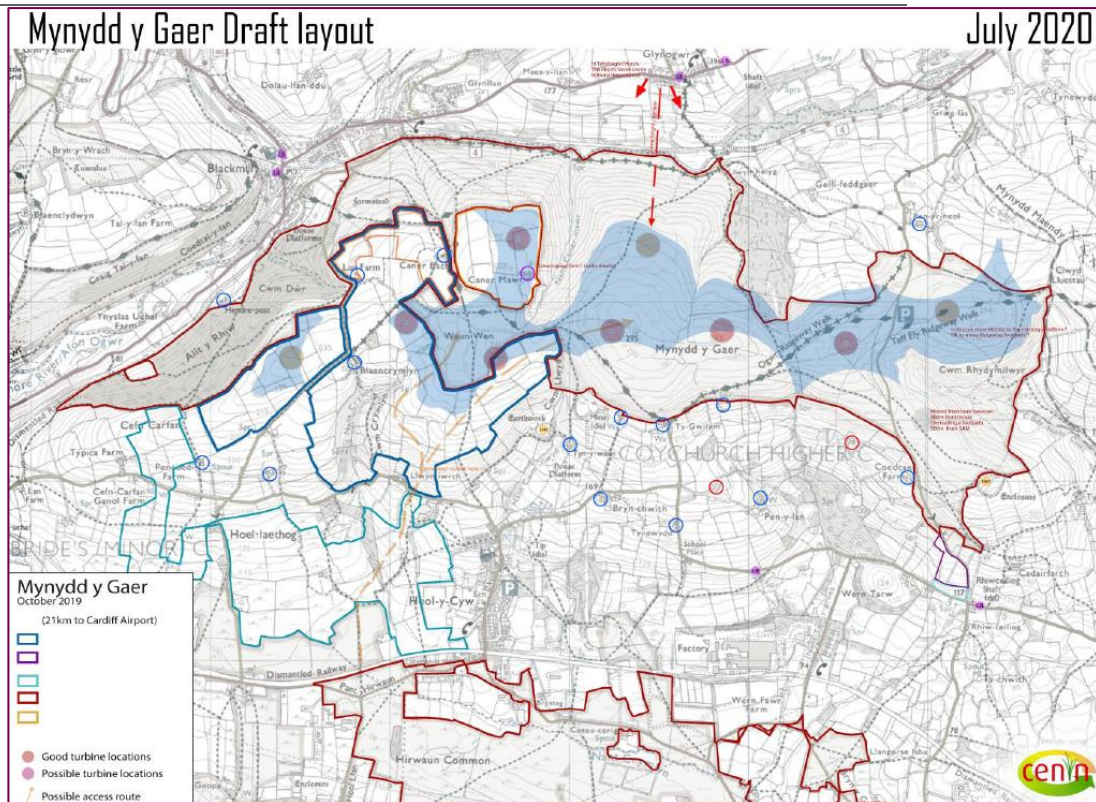


Plate 3.2: Second Site Layout Iteration

Third Design Iteration (2021)

3.45 In 2021, further constraints analysis was completed on:

- Coal high risk areas;
- Distance to airport;
- Peat;
- Linesearch;
- Archaeology;
- Telecoms;

3.46 The Site's relationship to National Development Framework (NDF) was assessed, confirming location of the proposed wind site, as well as the associated Ty'n y Waun Solar scheme in the former Priority Areas for Solar and Wind.

3.47 Following the adoption of Future Wales: The National Plan 2040 as the NDF, it is confirmed that 10 of 11 of the turbines lie within the Policy 17 Pre-Assessed Area for Wind and therefore subject to a presumption in favour of large-scale wind energy development. The Welsh Government has already modelled the likely impact on the landscape in these locations and has found them to be capable of accommodating development in an acceptable way.

- 3.48 The design team investigated if there is any scope to expand to the east. With a 1 km buffer to Taff Ely Wind Farm and a 500m buffer to houses, there were no viable locations that connected with the existing scheme.

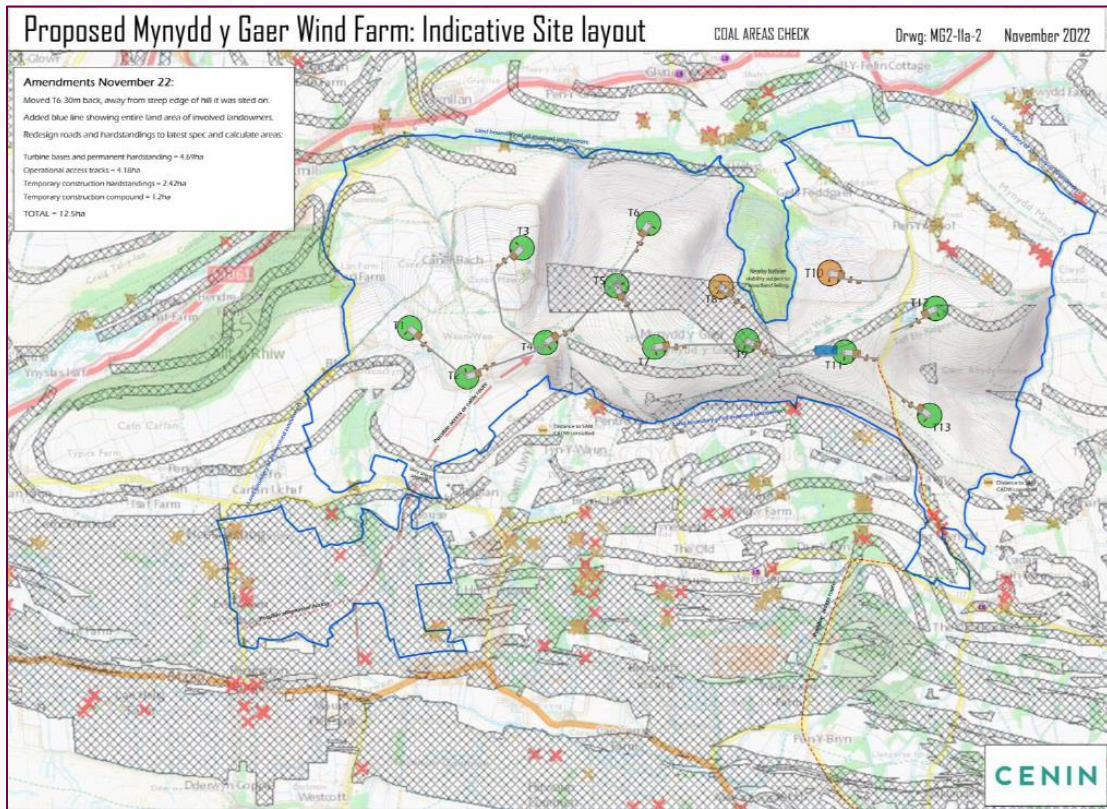


Plate 3.3: Third Site Layout Iteration

Fourth Design Iteration (2022)

- 3.49 At this stage, the Site layout was driven to maximum possible turbine capacity using new V150 machines.
- 3.50 Visuals and wakes were checked using WindPro software.
- 3.51 In terms of access, extensive work was done investigating the most suitable access route. An ownership masterplan with several route options was proposed.

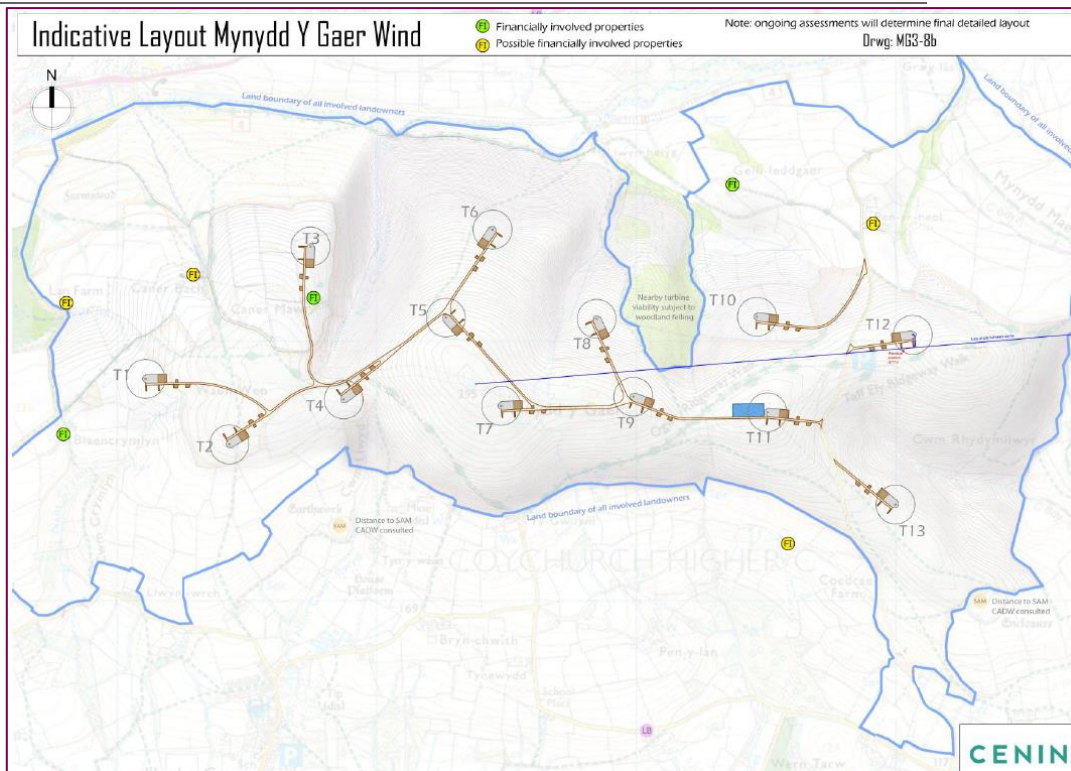


Plate 3.4: Fourth Site Layout Iteration

- 3.52 In 2023, exchange land and mitigation land was identified in the neighbouring the associated Ty'n y Waun Solar Site and formalised (a full plan of exchange land is available in Volume 2, Figure 2.X of the ES).
- 3.53 The access route was finalised from the east past Rockwool.
- 3.54 Incline studies were undertaken with transport company and turbine manufacturers to ascertain 14% max incline.

Fifth Design Iteration (2024)

- 3.55 Findings from ecological studies completed over the previous years dictated areas to avoid such as areas on the common with protected species or peat, T2 was subsequently moved. A 50m buffer added to woodland to protect Goshawks.
- 3.56 The layout overall layout was reduced from 13 to 11 turbines.
- 3.57 Telecoms operators informed the Applicant of exact lines of site for microwaves and UHF beams. The layout was adjusted accordingly to microsite T1, T2, T3, T10 and T11.
- 3.58 Identification of high-pressure gas line required the micro siting of T2 closer to the common.
- 3.59 Windplanner software was used to assess visual impact. Several turbines were reduced from 200m to 180m tip to lessen visual impact from Glynogwr.

- 3.60 Areas of peat damage by 4x4 vehicles was identified. Meeting with commoners about this and how the wind farm will improve security on site and stop off roaders destroying the peat habitat.

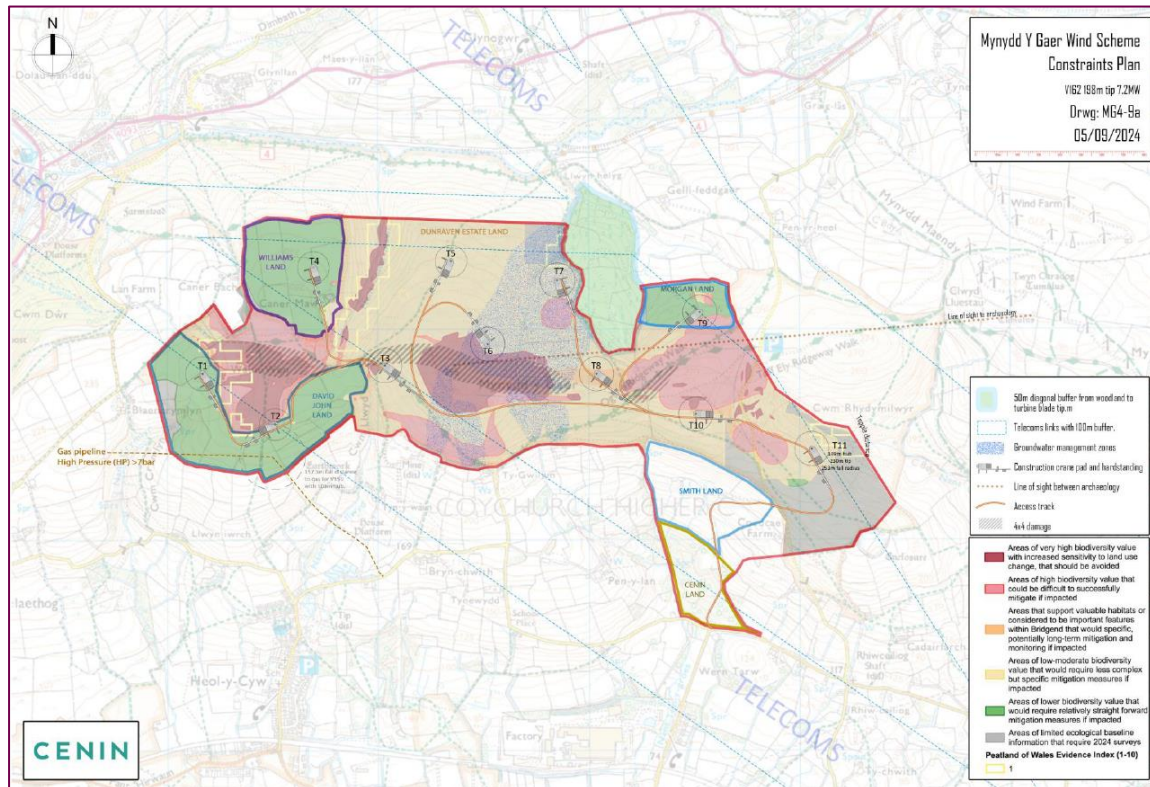


Plate 3.5: Fifth Site Layout Iteration

Sixth Design Iteration (2024)

- 3.61 A site visit was conducted to confirm areas suitable for borrow pits and locations for temporary holding and passing bays.
- 3.62 Updated current specification crane pads substituted on site layout plan.
- 3.63 Grid cable routes confirmed and measured. Grid connection corridor added.
- 3.64 Land owner requested track link to from T1 to his farm to allow future windfarm track use for livestock management over the common.
- 3.65 Electrical infrastructure cabinets added to site layout.
- 3.66 Archaeology consultants flagged sensitive areas affected by change to updated crane pads on hard standings or tracks near T1,4,6 and 9. T9's location was particularly impactful to archaeology.
- 3.67 Re-design adjusted or flipped cranes pads for T1, T4 and T6, being mindful not to encroach on pre-assessed ecologically sensitive areas.
- 3.68 T9's location was changed to avoid archaeology moving approximately 70m to the west. This also reduced the ecological impact of T9 on possible hedgerow habitat.

3.69 The final design iteration including the relocation of T9 was decided (Volume 2, Figure 2.1 of the ES).

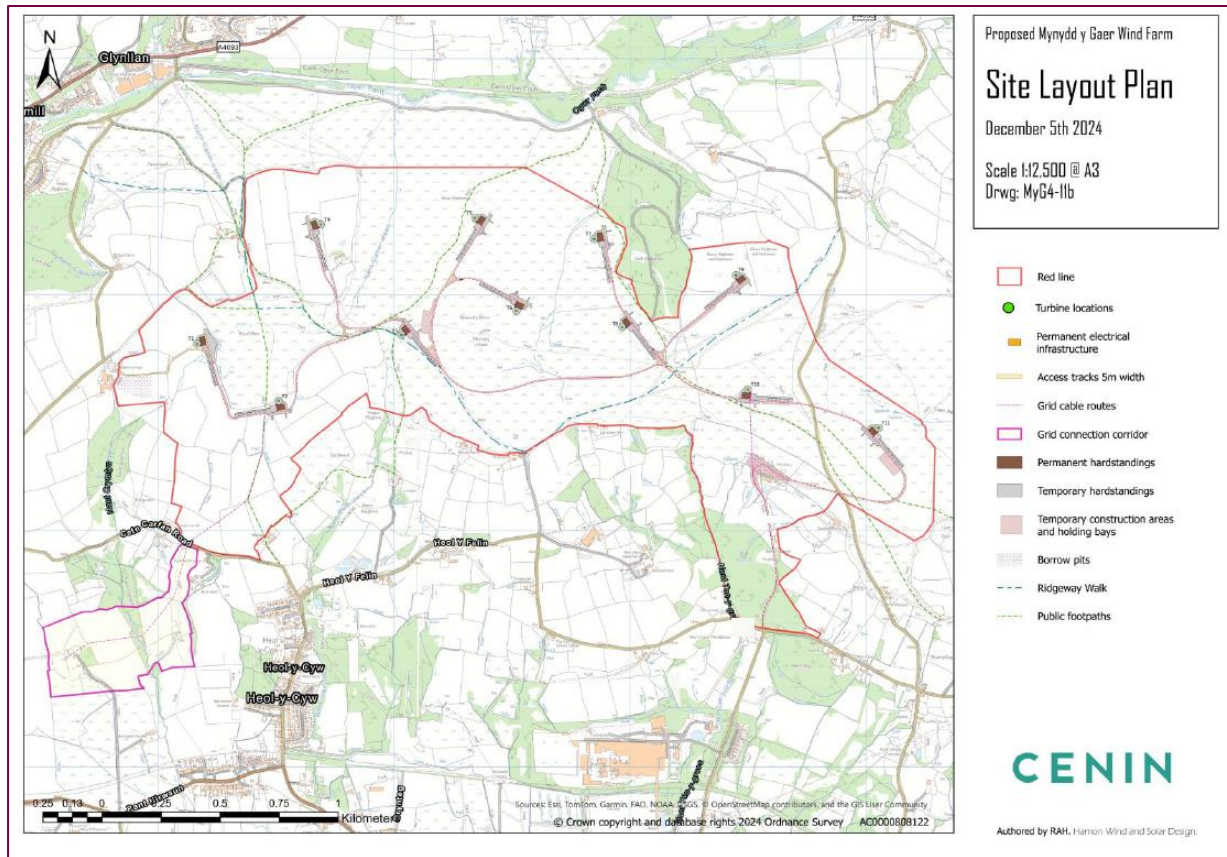


Plate 3.6: Sixth Site Layout Iteration

References

National Grid (NG) (2024) Future Energy Scenarios (FES). [Available online at: Future Energy Scenarios 2024 | National Grid ESO]

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

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

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

4 ENVIRONMENTAL ASSESSMENT METHODOLOGY

Introduction

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

EIA Scoping

4.2 Scoping is the process of identifying the issues to be addressed during the EIA process. Scoping is an important preliminary procedure, which sets the context for the EIA process.

4.3 Regulation 33 of the EIA Regulations allows an applicant to request that PEDW sets out its opinion (known as a Scoping Direction) as to the issues to be addressed in the ES. Whilst there is no formal requirement in the EIA Regulations to seek a Scoping Direction prior to submission of an ES, it is recognised as best practice to do so.

4.4 A Scoping Request was submitted to the Planning Inspectorate (now PEDW) on 30 March 2023. The Scoping Report that comprised this request is included as Appendix 4.1.

4.5 PEDW issued their Scoping Direction on 25 August 2023 and a copy of this is included as Appendix 4.2.

4.6 In line with Regulation 33(7) of the EIA Regulations, formal consultation was undertaken by PEDW with the following bodies:

- Bridgend County Borough Council (BCBC)
- Natural Resources Wales (NRW)
- Transport Directorate, the Welsh Government
- Agricultural Directorate, the Welsh Government
- The Coal Authority
- Health and Safety Executive
- Dŵr Cymru
- South Wales Fire and Rescue Service
- NATS

4.7 Due to the proximity of the site to neighbouring authorities, the following were also consulted:

- Rhondda Cynon Taff County Borough Council (RCTCBC)

-
- Vale of Glamorgan Council (VoG)

4.8 The ES topic chapters provide a summary of the key points raised during Scoping and as a result of any further consultation with both statutory and non-statutory consultees.

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

- Land and Soil (including Peat)
- Aviation and Telecommunications
- Air Quality
- Electromagnetic Interference
- Risks of Major Accidents (including Coal Mining)
- Waste
- Landscape and Visual
- Transport
- Hydrology and Flood Risk
- Geology and Hydrogeology
- Biodiversity
- Ornithology
- Acoustics
- Shadow Flicker
- Socioeconomics

Environmental Assessment Methodology

Relevant EIA Guidance

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

- Welsh Office Circular 11/99: Environmental Impact Assessment;
- Ministry for Housing, Communities and Local Government (2019a) Planning Practice Guidance at <http://planningguidance.planningportal.gov.uk>;
- Department of the Environment, Transport and the Regions (DETR) (1997) Mitigation Measures in Environmental Statements. HMSO;

- Highways Agency et al. (2008) Design Manual for Roads and Bridges, Volume 11, Section 2, Part 5. HA 205/08;
- Institute of Environmental Management and Assessment (2004) Guidelines for Environmental Impact Assessment;
- Institute of Environmental Management and Assessment (2011) The State of Environmental Impact Assessment Practice in the UK. Special Report;
- Institute of Environmental Management and Assessment (2015) Environmental Impact Assessment Guide to Shaping Quality Development;
- Institute of Environmental Management and Assessment (2016) Guide to Delivering Quality Development;
- Institute of Environmental Management and Assessment (2017) Health in Environmental Impact Assessment: A Primer for a Proportional Approach;
- Institute of Environmental Management and Assessment (2020) Climate Change Resilience and Adaptation;
- Institute of Environmental Management and Assessment (2022) Environmental Impact Assessment: Assessing Greenhouse Gas Emissions and Evaluating their Significance; and
- Institute of Environmental Management and Assessment (2023) Environmental Assessment of Traffic and Movement.

4.11 Other topic specific legislation and good practice guidance will be drawn upon as necessary within in each technical chapter of the ES, as applicable.

Key Elements of the General Approach

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

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

- Interrelated effects provides an assessment of the interrelated effects, including receptor-led and project lifetime effects of the Proposed Development; and Methodology and Assessment Criteria

- 4.13 Each topic chapter provides details of the methodology for baseline data collection and the approach to the assessment of effects. Each environmental topic has been considered by a specialist in that area.
- 4.14 Each topic chapter defines the scope of the assessment within the methodology section, together with details of the study area, desk study and survey work undertaken, and the approach to the assessment of effects.
- 4.15 The identification and evaluation of effects have been based on the information set out in Chapter 2 (Project Description) of this ES, EIA good practice guidance documents, and relevant topic-specific guidance where available.

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

- 4.16 The existing and likely future environmental conditions in the absence of the Proposed Development are known as 'baseline conditions'. Each topic-based chapter includes a description of the current (baseline) environmental conditions. The baseline conditions at the Site and within the study area form the basis of the assessment, enabling the likely significant effects of the proposal to be identified through a comparison with the baseline conditions.
- 4.17 The baseline for the assessment of environmental effects is primarily drawn from existing conditions during the main period of the EIA work in the period 2023-2024.
- 4.18 The baseline for the assessment should represent the conditions that will exist in the absence of the Proposed Development at the time that the Proposed Development is likely to be implemented.
- 4.19 Operation of the wind farm is expected to start in 2030. The wind farm is expected to be operational for a period of 50 years.

Limitations of the assessment

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

Mitigation measures adopted as part of the Proposed Development

- 4.21 During the EIA process, environmental issues have been considered as part of an ongoing iterative design process. The process of EIA has therefore been used as a means of informing the design.
- 4.22 The Proposed Development assessed within this ES therefore includes a range of measures that have been designed to reduce or prevent significant adverse effects arising. In some cases, these measures may result in enhancement of

environmental conditions. The assessment of effects has considered measures that form part of the Proposed Development.

4.23 The topic chapters set out the measures that form part of the Proposed Development and that have been considered in the assessment of effects for that topic. These include:

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

Assessment of Effects

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

Sensitivity or Importance of Receptors

4.25 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.

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

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

4.27 Sensitivity is generally described using the following scale:

- High
- Medium
- Low
- Negligible.

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

4.29 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 4.1 below.

Table 4.1: 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

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

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

- Extent
- Duration
- Frequency
- Reversibility

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

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

4.33 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 Project site or because of a complex pathway

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

- High
- Medium
- Low
- Negligible.

4.35 In some cases, topic chapters of the Environmental Statement may also use ‘no change’. Where the magnitude of impact is ‘no change’, no effect would arise.

4.36 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 4.2 below.

Table 4.2: 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.

Significance of Effects

4.37 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.

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

- 4.39 Significance levels are defined separately for each topic. Unless stated otherwise, the assessments consider topic specific guidance, based on the following:
- **Substantial:** Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process with regard to planning consent. These effects are generally, but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer the most damaging impact and loss of resource integrity
 - **Major:** These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process
 - **Moderate:** These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision making if they lead to an increase in the overall adverse effect on a particular resource or receptor
 - **Minor:** These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the 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.
- 4.40 The terms minor, moderate, major, and substantial apply to either beneficial or adverse effects. Effects may also be categorised as direct or indirect; short, medium or long term; permanent or temporary, as appropriate.
- 4.41 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 4.1 below.
- 4.42 Each chapter defines the approach taken to the assessment of significance. Unless set out otherwise within the chapter, topic chapters use the general approach set out in Table 4.1. For some topics, a simplified or quantitative approach is considered appropriate.

Table 4.3: Typical Assessment Matrix

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

Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very high	No change	Minor	Moderate or Major	Major or Substantial	Substantial

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

Further Mitigation and Future Monitoring

4.44 Where required, further mitigation measures have been identified within topic chapters. These 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).

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

Assessment of Cumulative Effects

4.46 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.

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

4.48 RPS note that developments that are built and operational at the time of submission are considered to be part of the existing baseline conditions.

4.49 Operational developments are considered in the assessment of cumulative effects for LVIA. These are 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.

Interrelationships

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

Summary Tables

- 4.51 Summary tables have been used to summarise the effects of the Proposed Development for each environmental topic.

References

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

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

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

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

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

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

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

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

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

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

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

Welsh Office Circular 11/99: Environmental Impact Assessment.

5 Landscape and Visual Impact Assessment (LVIA)

Introduction

- 5.1.1 Landscape and / or Visual effects, associated with a wind farm development, 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.
- 5.1.2 Chapter 5: Landscape and Visual Impact Assessment (LVIA), of the Environmental Statement (ES), considers the potential effects of the proposed Mynydd y Gaer Wind Farm development upon the physical landscape elements and features, landscape character, views and visual amenity within the study area.
- 5.1.3 The LVIA has been undertaken with reference to best practice guidance, as detailed within 'EIA Methodology' section below and completed by Mark Wilson a suitably qualified and experienced Chartered Landscape Architect (CMLI).

Legislative and Policy Context

National Planning Policy Context

- 5.1.4 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).
- 5.1.5 **Table 5.1** source not found. provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of this LVIA , including how and where these have been considered in the ES.

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
<p>Future Wales: The National Plan 2040</p> <p><i>'In relation to landscape and visual matters 'Proposals for renewable and low carbon energy projects (including repowering) qualifying as Developments of National Significance will be permitted subject to policy 17 and the following criteria' Future Wales: The National Plan 2040]</i></p>	<ul style="list-style-type: none"> • there are no unacceptable adverse visual impacts on nearby communities and individual dwellings • <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 proposal 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> • there are acceptable provisions relating to the decommissioning of the development at the end of its lifetime, including the removal of infrastructure and effective restoration • The cumulative impacts of existing and consented renewable energy schemes should also be considered <p>Those criteria in bold above are particularly related to LVIA. In response to this an assessment on local settlement receptors has been carried out as part of the LVIA. 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.</p> <p>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></p>

Summary of policy	Further detail of Policy & how and where considered in the ES
<p>Policy 18 goes on to state that <i>'within PAAs there is a presumption in favour of large-scale on-shore wind energy development and the associated landscape change subject to the criteria in policy 18'</i></p>	<p>This part of the policy infers that even if the level or magnitude of landscape and visual change is judged to be high or even very high–the proposal will be acceptable, subject to criteria listed in Policy 18. The proposal must seek to minimise landscape and visual impact <i>"particularly in close proximity to homes and tourism receptors..... Communities should be protected from Significant cumulative impacts to avoid unacceptable situations"</i></p> <p>Landscape and visual effects from public locations are assessed as part of this LVIA and a separate RVAA has been carried out. A cumulative assessment has been carried out in accordance with best practice including advice in NRW's GN46 and Nature Scot guidance; <i>Assessing the Cumulative Impacts of Onshore Wind Energy Developments;</i>(2012).</p> <p>PAAs are of greater extent than the previous Strategic Search Areas (SSAs) in TAN 8 reflecting the Welsh Government's approach to increasing the amount of energy generated by renewable sources. The PAAs were derived from assessment work by Arup and the Welsh Government and published in 'Assessment of onshore wind and solar energy potential in Wales Stage 1 - Refinement of Priority Areas for Wind and Solar Energy' (2019). Areas of most opportunity (no constraints) and those of varying opportunity (areas containing variable constraints but no fixed constraints) were identified across Wales. The Proposed Development falls within PAA 9 - This is a large area which stretches from Pontarddulais, north of Swansea, in the west to the A470 near Cardiff in the east.</p>
<p>Planning Policy Wales (PPW) Edition 12</p>	
<p>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)</p>	<p><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.</i></p> <p><i>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></p> <p>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 Appendix 5B.</p>

Summary of policy	Further detail of Policy & how and where considered in the ES
PPW 12 also attaches considerable importance to the benefits of good design stating (paragraph 3.10)	<p><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></p> <p>The evaluation scores for the component LANDMAP topic aspect areas in the study area have been reviewed. Local landscape designation eg SLAs and national landscape designations have been used to inform landscape value judgements. See Appendix 5A – methodology for assessing value and Appendix 5B where this has been implemented for assessing landscape value in the landscape reporting framework.</p>
PPW 12 attaches considerable importance to the benefits of renewable energy stating (at paragraph 5.77 and 5.91)	<p><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></p> <p><i>“Local authorities should facilitate all forms of renewable and low carbon energy development...”</i></p> <p>The design evolution of the proposed windfarm has sought to maximise the renewable energy resource within the Site – whilst balancing this with landscape constraints. -See the Overview of Design Development section in this chapter.</p>

Local Planning Policy Context

- 5.1.6 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of this LVIA for the Proposed Development is:
- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024
- 5.1.7 **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
DNP4: Special Landscape Areas (SLAs)	<p><i>Development in SLAs will only be permitted where:</i></p> <p><i>1) It retains or enhances the character and distinctiveness of the SLA;</i></p> <p><i>2) The design of the development reflects the building traditions of the locality in its form, materials and details, and/or assimilates itself into the wider landscape; and</i></p>	<p>SLAs are considered in the landscape baseline and assessment within this Chapter. In particular their perceived local value has been used to inform the level of value when assessing the sensitivity of the landscape character areas which form the landscape reporting framework. The Primary Landscape Qualities and Features in BCBCs <i>Designation of Special Landscape Areas</i>’ and the component</p>

3) *The Proposed Development is accompanied by a Landscape Impact Assessment (LIA), which takes into account the impact of the development and sets out proposals to mitigate any adverse effects.*

Where development is necessary, and could result in a significant landscape impact, a landscaping scheme will also be required and appropriate mitigation and enhancement measures must be provided.

The settings of SLAs will be protected with consideration of the views from those areas to the settlements of the County Borough. New development within settlements must be designed to provide an attractive transition between the urban area and the countryside

LANDMAP Topic Aspect Area citations and in particular the evaluation judgements have been used to inform the value judgements for the LCAs.

The Proposed Development is located within SLA 5 Mynydd y Gaer.

SP13: Renewable and Low Carbon Energy Development

‘Renewable and low carbon development proposals which contribute to meeting national and local renewable and low carbon energy and energy efficiency targets will be permitted where:’

The following parts of section 1 of this policy are particularly related to landscape and visual matters:

- *a) It can be demonstrated that there will be no unacceptable impacts on the natural and historic environment or local communities (such as noise and air pollution) and that no other unacceptable cumulative impacts will arise;*
- *b) The proposal (inclusive of its associated infrastructure) has sought to minimise the landscape and visual impact through its design and micro-siting, particularly where in close proximity to homes and tourism receptors;*
- *c) Proposals make provision for the appropriate restoration and after-care of the land for its beneficial future re-use;*
- *f) There would not be unacceptable impact on the amenity of residential properties or tourist accommodation.*

Section 2 of this policy acknowledges that windfarm development is acceptable within PAAs *‘Landscape considerations have already been taken into account in Future Wales and Criteria 1(b) should not apply to those parts of LSA 8 within Pre-Assessed Area 9.’* Although the policy only identifies the following Local Search Areas (LSAs) LCAs 1 and 8– that are considered suitable

This Chapter of the ES assesses the effects the effects on landscape and visual receptors which include those used by local communities - publicly accessible locations including countryside access, settlements and transport routes. Furthermore a residential visual amenity assessment (RVAA) has been carried out and can be found at Appendix 5D. Cumulative landscape and visual effects are also assessed in this Chapter.

SPG20 has been used to inform the levels of sensitivity to the Proposed Development as a basis for the reporting framework in this LVIA.

The Proposed Development is located in LCA 9 and within PAA 9. Although this area is not cited in policy SP13 as suitable for windfarm development, this Chapter of the ES assesses the landscape and visual impact, including cumulative impacts of the proposed windfarm development on this LCA

for wind energy development. Landscape Character Areas (LCAs)

SP17:
Conservation and Enhancement of the Natural Environment

Development proposals will not be permitted where they will have an adverse impact upon (selected in relation to landscape):

- *The integrity of the County Borough's countryside;*
- *2) The character of its landscape;*

'Areas having a high and/or unique environmental quality will be protected and the following strategically important areas within the County Borough will specifically be protected from inappropriate development which directly or indirectly impacts upon them'

'The weight to be afforded to environmental designations in the determination of relevant planning applications will be based on their statutory or non-statutory status and geographical scale of designation.'

The policy goes on to say *'Major development proposals within Special Landscape Areas should be accompanied by a Landscape Impact Assessment (LIA) which takes into account the effect of the development, including the cumulative impact where appropriate, on the key landscape features, landscape character and qualities and set out proposals to mitigate any adverse effects and enhance positive attributes'*

The BCBC LCAs have been used as the reporting framework within the County Borough. Elsewhere and within the study area other local landscape character assessment LCAs have been used where available. LANDMAP VSAs and Landscape Units have been used as the reporting framework where there are no local level LCAs. See Appendix 5B for further information

DNP1:
Development in the Countryside

All development outside defined settlement boundaries must ensure that the integrity of the countryside is conserved and enhanced. There is a presumption against development in the countryside, except where it is for:

- 8) *Renewable energy projects;*

(selected in relation to the Proposed Development)

The policy goes onto say the following test must be met *'The Plan will ensure protection of the countryside for the economic, social and environmental benefits provided. This is in line with National Planning Policy and Guidance and will be achieved through the promotion of sustainable development within environmental limits.'*

This Chapter assesses the level of effect on numerous landscape and visual receptors and identifies those that are predicted to experience significant effects from the Proposed Development.

DNP8:
Green Infrastructure

Development proposals will be required to integrate, protect and maintain existing green infrastructure assets and to enhance the extent, quality, connectivity and multi-

The embedded mitigation which forms part of this proposal includes improvements to green infrastructure

functionality of the green infrastructure network. Where the loss or damage of existing green infrastructure is unavoidable, appropriate mitigation and compensation will be required

All major developments will be required to submit a Green Infrastructure Assessment

assets. A Green Infrastructure Assessment has been prepared.

Consultation and Engagement

Scoping

- 5.1.8 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.
- 5.1.9 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to this LVIA 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	
Zone of Theoretical Influence - size paragraph ID.16 of the EIA Scoping Direction	Tip and hub height ZTVs have been produced for the search area out to a 45km buffer and 32km buffer in accordance with best practice in NRW GN46. These figures can be found Volume 1 Supporting LVIA Figures 5.1.1 to 5.1.8
Impact on Bannau Brycheiniog National Park (BBNP) and Gower Area of Outstanding Natural Beauty (AONB) <i>now National Landscape</i> - ID.17 of the EIA Scoping Direction	Chapter 5 assesses the landscape and visual impacts on these nationally designated landscapes and also includes assessment on the northern part of Exmoor National Park. Two additional viewpoints (VPs 31 and 32 from the Brecon Beacons National Park have been added to the list of viewpoint receptors since scoping as suggested by NRW.
Pre-assessed area for wind - mapping required - ID.18 of the EIA Scoping Direction	Figure 5.2.3 shows the Pre-assessed areas (PAAs) for wind turbines – Future Wales Policy 18
Cumulative Impacts – ID.19	The cumulative landscape and visual assessment (CLVIA) in Chapter 5 follows guidance in NRW GN 3 and 46 and the guidance in ‘ <i>Assessing the Cumulative Impacts of Onshore Wind Energy Developments</i> ’; Scottish Natural Heritage (2012). Accompanying figures to the CLVIA can be found at Volume 1 Supporting LVIA Figures 5.3.1 to 5.3.18
Landscape character areas (LCA) / Special Landscape Areas (SLA) assessment should go beyond BCBC – ID.20	Chapter 5 assesses the landscape and visual effects on LCAs, LANDMAP topic aspect areas and SLAs within the 32km buffer study area from the Proposed Development and extends beyond those within BCBC. Details of the filtering and selection process of these landscape areas to produce the landscape reporting framework is set out in Appendix 5B and follows NRW GN46. PAC will provide the opportunity to liaise with the relevant local authorities such as RCTCBC mentioned in the EIA Scoping Direction as necessary.
View Ranges - ID.21	NRW raised concern over definitions. Definitions have been updated for Close, Medium, Long distance and can be found in the view ranges section of this Chapter.
Viewpoints - ID.22	Viewpoints have been included within RCTCBC which include ones from high points and near settlements. Fieldwork and assessment has been undertaken for settlements within 10km buffer of the Proposed Development and these include ones within RCTCBC.

Comment	How and where considered in the ES
Viewpoints- Cumulative Impacts - ID.23	Cumulative schemes are listed and assessed within the Cumulative Effects section of this Chapter and the study radius is in accordance with GN46.. Accompanying figures and wireline visualisations can be found at Volume 1 Supporting LVIA Figures 5.3.1 to 5.3.18 and Volume 2 Figures 5.4.1 to 5.4.156
Mapping Viewpoints Table 5.2 – ID.24	The assessment of effects on the 32 representative viewpoints can be found at Appendix 5C. The viewpoint locations can be found at Volume 1 Supporting LVIA Figures 5.1.2 to 5.1.8.
Photomontages and Wire Frame views – ID.25	Photomontages and Wire Frame views have been produced for the 32 viewpoints and can be found at Volume 2 Supporting LVIA Figures 5.4.1 to 5.4.156. These include viewpoints from national landscape designations
Aviation lighting – ID.26	Night time photography has been undertaken for 4 viewpoints. A dark skies mapping figure can be found at Volume 1 Supporting LVIA Figures 5.2.14. Wirelines and photomontages will be provided once the aviation lighting specification has been agreed.
Special Qualities and SPG – ID.27	The special qualities of the LCAs have been used to inform this assessment where available such as within BBNP and BCBC. BCBC's SPG20 'Renewables in the Landscape: Supplementary Planning Guidance' has been used in the assessment, particularly in relation to landscape sensitivity to the Proposed Development see Appendix 5B.
Bridgend County Borough Council	
<i>In addition to the above comments from BCBC which are referred to in the PEDW Scoping Direction document this section identifies further issues raised in relation to landscape and visual matters by BCBC.</i>	
Local Plan policy context	This Chapter has responded to the most relevant policies in the latest Local Plan for BCBC and can be found at the Local Planning Policy Context section.
Landscape and visual susceptibility judgements paragraph 1 p10	The criteria for judging landscape and visual susceptibility are set out in Appendix 5A. The susceptibility has been judged for each of the landscape and visual receptors in Appendices 5B and 5C. PAC will provide the opportunity to liaise with BCBC on this subject as mentioned in the EIA Scoping Direction as necessary
Cumulative assessment paragraph 3 p10	A cumulative assessment has been carried out as part of this Chapter in the Cumulative Effects section.
PAA paragraph 4 p10	The scheme has been reduced from 13 to 11 turbines since Scoping stage. All the turbines are within the PAA apart from T1 which lies some 81m from the western edge of the PAA.

Other consultation

- 5.1.10 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 proposals and LVIA.

Assessment Methodology

Relevant Guidance

- 5.1.11 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,

- 5.1.12 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 Appendix 5A of this Chapter.
- 5.1.13 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 Proposals (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.

Distinction Between Landscape and Visual Effects

- 5.1.14 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:
- 5.1.15 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.
- 5.1.16 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.

Scope of the Assessment

- 5.1.17 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, borrow pits 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

5.1.18 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 seascapes outside the ZTV and visual receptors within these location are proposed to be scoped out of the assessment as the Project would not be visible from these locations and no change to views or character would occur. <i>Not confirmed by PEDW</i>
Marine Character Areas	The marine character area (MCAs) are proposed to be scoped out of the assessment due to their long distance from the Proposed Development which makes it unlikely that they will experience significant effects. <i>Not confirmed by PEDW</i>

Study area

- 5.1.19 The landscape and visual study area hereafter referred to as the study area, was derived from a 45km buffer search area, as measured in all directions from the edge of the Site (red line) boundary. A 32km buffer study area in accordance with Natural Resources Wales (NRW) GN46 was used as the basis for this landscape and visual assessment. Effects on nationally designated landscapes including the Gower National Landscape (NL), Exmoor and Brecon Beacons National Parks which are found beyond or extend beyond 32km were assessed.
- 5.1.20 The location and geographic extent of the study area is presented in the accompanying figures to this chapter.
- 5.1.21 The sensitivity of landscape and visual receptors within the 32 km study area are assessed. Beyond this distance and up to 50km from the development, landscape and visual receptors within National Parks and AONBs are assessed. 'Planning Guidance for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements (2014)' Table 2 Typology and Study Areas advises that a study area of 15km radius be used for turbines greater than 109m to tip. The more recent advice for the size of search areas and study areas in GN46 for assessment of tall structures is 26 to 33km and 26 to 28km respectively for structures between 176 and 225m in height.
- 5.1.22 Natural Resources Wales response at Scoping, requested that the study area be in line with GN46 guidance, but also ensure that the setting to the Brecon Beacons National Park at around 18km to north and the Gower NL to the west

at 30.5km be considered. Additionally, this assessment will include landscape and visual receptors within Exmoor National Park to the south at 36km. It is concluded that a 45km radius study area be used to reflect this request from NRW so that receptors within Welsh and English protected landscapes are considered. **All landscape and visual receptors within a 32km radius will be considered but beyond this distance and out to 45km, only areas within national designation landscapes will be considered. The assessment of representative viewpoints in the most prominent locations beyond 32km and within the Gower National Landscape or Brecon Beacons and Exmoor National Parks provide an indicator as to whether there would be the potential for significant adverse effects.**

View Ranges

- 5.1.23 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

(The descriptive reasonings in this table have been updated following Scoping request from NRW May 2023)

Range	Distance threshold	Reasoning
Close	Less than 3 km	At close range the proposals would appear as dominant to prominent features in views
Medium	Between 3 km and 10 km	In medium range views the proposals could appear as very noticeable to small features.
Long	More than 10 km (to 45km)	In long range views the proposals would read as noticeable small features to barely discernible / negligible features

Assessment Criteria and Assignment of Significance

- 5.1.24 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.
- 5.1.25 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).
- 5.1.26 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.

- 5.1.27 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.
- 5.1.28 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 proposal) 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 Appendix 5A. These factors are determined through a combination of quantitative (objective) and qualitative (subjective) assessment using professional judgement.

Significance of effect

- 5.1.29 The significance of the effect upon landscape and visual receptors has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The judgement of the level of significance is based on the matrix below in **Table 5.7**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement. Definitions for the significance of effect judgements are provided in Table 11 Appendix 5A.
- 5.1.30 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.
- 5.1.31 The significance of effect on landscape, views and visual amenity has been described according to the five-point scale shown in the matrix: Substantial, Major, Medium, Minor, Negligible in addition a Neutral scenario is described in Appendix 5A.
- 5.1.32 In accordance with the relevant EIA Regulations it is important to determine whether the effects, assessed as a result of the Proposed Development, are likely to be significant. Significant landscape and visual effects will be highlighted in the text and in most cases, relate to all those effects that result in a ‘Major’ or ‘Major/Moderate’ effect as indicated in Table 5.10.
- 5.1.33 In some circumstances, ‘Moderate’ levels of effect also have the potential, subject to the assessor’s opinion, to be considered as significant and these exceptions are also highlighted and explained as part of the assessment, where they occur.

-
- 5.1.34 Wind turbines are tall, visible structures and the existence of what would inevitably be a significant effect does not mean that the proposal should be considered 'unacceptable' and consent refused.

Table 5.7: Assessment matrix

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

5.1.35 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.

5.1.36 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

5.1.37 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 proposal 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.

5.1.38 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

5.1.39 This Chapter includes an assessment of cumulative effects of the Proposed Development in association with other proposed wind turbines within a 15km 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 proposal and scoped out. A review of the Cumulative Schemes was undertaken in June 2023 and the following categories were assigned; Operational, Consented, In Planning and In Scoping schemes within a 15km 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).

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

- Scenario 1 – The proposed scheme + Operational
- Scenario 2 - The proposed scheme + Operational, + Consented
- Scenario 3 - The proposed scheme + Operational, + Consented + In Planning / Scoping

Assumptions and limitations of the assessment

5.1.41 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.

5.1.42 The fieldwork and visual assessment were undertaken during winter 2022 and 2024 when deciduous trees were devoid of leaf and summer 2023 and 2024.

Baseline Environment Conditions

Desk studies

5.1.43 A comprehensive desk-based review was undertaken to inform the baseline assessment for this LVIA . The existing studies and datasets referred to as part of the desk-based review for this LVIA are summarised in 5.9 below. For a full set of source documents please see the References section at the end of this chapter.

Table 5.8: 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
Landscape Character Assessment for Bridgend County Borough	Bridgend County Borough Council web site	2013	Land Use Consultants
'Renewables in the Landscape: Supplementary Planning Guidance' SPG 20	Bridgend County Borough Council web site	No information	Bridgend County Borough Council
Landscape Character Assessment for Vale of Glamorgan	Vale of Glamorgan County Borough Council web site	2008	TACP Consultants
Neath and Port Talbot LANDMAP Landscape Assessment	Neath and Port Talbot County Borough Council web site	2004	White Consultants
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

5.1.44 The landscape desk based assessment used for the landscape reporting framework, which draws on the information in table 5.9, can be found at Appendix 5B.

Site-specific surveys

5.1.45 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 5.9**.

Table 5.9: 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	December 2021 to January 2022
Viewpoint photography and fieldwork	Residential Visual Amenity Assessment and check of any change to viewpoints within 10k buffer.	July 2023
Viewpoint photography and fieldwork	Additional viewpoint photography and fieldwork – Brecon Beacons National Park	May 2024
Viewpoint photography and fieldwork	Night time photography and check of any change to viewpoints 15 to 32km	October 2024
Viewpoint photography and fieldwork	360 degree photography for cumulative scheme assessment and check of any change to viewpoints	November / December 2024

- 5.1.46 The landscape and visual receptor baseline descriptions and findings can be found at Appendices 5B and 5C respectively.

Future baseline conditions

- 5.1.47 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.

Windfarm developments within the study area

- 5.1.48 The cumulative landscape and visual impact assessment (CLVIA) in this chapter deals with the future scenarios of the addition of potential windfarm schemes in the 32km buffer study area. Intervisibility of these schemes with the surrounding landscape has been mapped using zone of the theoretical modelling.

Changes in surrounding commercial forestry

- 5.1.49 The felling of commercial plantation forestry in the surrounding landscape could affect the intervisibility between the surrounding landscape and the Site. DataMapWales shows areas of forestry to be felled and date of felling. Parcels or coupes of plantation will be felled in surrounding areas which may increase intervisibility of the Proposed Development on Mynydd y Gaer. However, felling will take the form of partial clearance which limits the potential level of change to the level of openness. https://datamap.gov.wales/maps/new?layer=geonode:nrw_forest_management_coupes#/

Climate Change

- 5.1.50 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.
- 5.1.51 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.

Landscape and Visual Baseline Environment

Landscape Character Baseline

Published Landscape Character Assessments

- 5.1.52 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.

National Landscape Character Areas (NLCA)

- 5.1.53 National Landscape Character Areas (NLCAs) are countrywide and form the broad scale landscape character assessment of Wales. The Site area falls within NLCA 37: 'Cymoedd y De - South Wales Valleys' close to the southern boundary with NLCA 36: 'Bro Morgannwg - Vale of Glamorgan' Much of the 15km study area falls within these two NLCAs.
- 5.1.54 The key characteristics of NLCA 37, of relevance to this LVIA, are as follows:
- *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.*
- *Field boundaries - dry stone walls mark the boundary of common land while fields on lower slopes are bounded by dense hawthorn hedges, interspersed with swathes of*
- *broadleaved woodland. Transport routes restricted to valleys – the intervening topography makes valley to valley travel difficult, except at heads and bottoms of valleys. Occasionally there are roads that climb steeply over passes with dramatic views and ‘hair pin’ bends.*

5.1.55 The key characteristics of NLCA 36 which are relevant to this application proposal include;

- *Mixed agricultural land uses - with predominantly rural character*
- *Small woodlands – mainly to the east. Few large woods.*
- *Mixed field patterns and sizes - with hedgerows and hedgebanks, frequent hedgerow trees.*

LANDMAP – the Welsh landscape baseline

5.1.56 LANDMAP is an “all-Wales Geographical Information System (GIS) based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent dataset” (CCW (now NRW), 2011). It is administered by Natural Resources Wales (NRW) and comprises five spatially related datasets or aspect layers as follows:

- *Geological Landscape: “considers the physical, primarily geological, influences that have shaped the contemporary landscape and identifies those landscape qualities which are linked to the control or influence exerted by bedrock, surface processes, landforms and hydrology”;*
- *Landscape Habitats: “Focuses on recording habitat features, characteristics and their spatial relationships within the context of the wider landscape”;*
- *Visual and Sensory: “Maps landscape characteristics and qualities as perceived through our senses, primarily visually. The physical attributes of landform and land cover, their visible patterns and their interrelationship”;*
- *Historic Landscape: “Landscape characteristics that depend on key historic land uses, patterns and features. Identifies only those classes of historic land uses, patterns and features that are prominent and contribute to the overall historic character of the present landscape.”; and*
- *Cultural Landscape: “Describes the links between landscape and people, from the way in which cultural, or human activity shapes the landscape, to the way in which culture shapes the way we respond to landscape. Focus is on mapping the landscape where it has been, or is being, shaped by a*

particular cultural activity or process, or where it has been directly represented, depicted or described in art, literature or folklore.”. (As at the time of writing this assessment, the published Cultural Landscape Services does not include evaluation information).

- 5.1.57 For each dataset the landscape is divided into discrete geographical units referred to as Aspect Areas. Each is given a unique identification code and is accompanied by a dataset which includes both a description and evaluation of quality and value.
- 5.1.58 Whilst all LANDMAP Aspect Areas have been considered, for the purposes of this Landscape and Visual Impact Assessment the main focus will be on the Aspect Area(s) which would be directly affected by the Proposed Development, i.e. those within which the Site itself is located.
- 5.1.59 As recommended by LANDMAP guidance, this LVIA considers:
- Aspect areas directly affected / ‘hosting’ the Development for Geological Landscape;
 - Aspect areas directly affected / ‘hosting’ the Development for Landscape Habitats;
 - Aspect areas intervisible with the Proposed Development within 15 km for Visual & Sensory;
 - Aspect areas directly affected by the Development and areas intervisible with the Development within 5 km for Historic Landscape; and
 - Aspect areas directly affected by the Development and areas intervisible with the Development within 5 km for Cultural Landscape.
- 5.1.60 Aspect areas for all five aspect layers are mapped in Figures 5.2.4 and 5.2.7 to 5.2.10. The theoretical intervisibility of the Proposed Development is used as a means of identifying which aspects require further assessment and which aspect areas can be scoped out because they are unlikely to experience significant impacts arising from the Proposed Development. This screening exercise is presented in Appendix 5C.

Landscape Character

- 5.1.61 The Bridgend landscape character assessment forms part of the County Borough’s evidence base for supplementary planning guidance on landscape, design and green infrastructure. It defines 14 discrete Landscape Character Areas (LCAs). Their geographical extents are influenced by LANDMAP aspect areas. The site itself is located in the northern part of LCA 9 Hirwaun Common and Surrounding Ridges, which comprises uplands south of Ogmere Valley and to the southeast and southwest the area is flanked by the urban areas of Pencoed and Bridgend respectively.
- 5.1.62 The views and perceptual qualities narrative in the assessment highlights characteristics pertinent to the Proposed Development

- *A strongly rural landscape with an exposed, upland feel on higher ground.*
- *Strong intervisibility between the two ridges, with the white/cream rendered housing of Heol-y-Cyw visible in views from Cefn Hirgoed.*
- *The Rockwool Factory chimney and reservoirs on Hirwaun Common standing out strongly against their muted naturalistic backdrop.*
- *Extensive ridgetop views to the uplands to the north and the south-east coast in clear conditions. Views east from Mynydd y Gaer dominated by wind turbines on Mynydd Maendy (within RCT County Borough).*

5.1.63 'Key landscape sensitivities' listed for this LCA include:

- *Open, unenclosed commons with strong traditions of common land management linked to the local communities.*
- *Large expanses of semi-natural habitat, including species-rich grasslands and wet heath at Brynna a Wern Tarw SSSI.*
- *Bands of wet woodland and tree lines defining enclosed land surrounding the commons.*
- *Nationally important archaeological features, including Iron Age hillforts and medieval pillow mounds.*
- *Strong rural character, with a sense of remoteness on higher ground.*
- *Extensive views from ridges, to the coastline and the nearby uplands of LCA 8.*

Landscape Sensitivity Studies

5.1.64 Bridgend County Borough Council has produced supplementary planning guidance (SPG 20) on 'Renewables in the Landscape', which includes an assessment of landscape sensitivity to wind farms. SPG 20 presents a criteria-based evaluation of sensitivity for each of the 14 LCAs identified in the Bridgend landscape character assessment. Sensitivity to different sizes of wind turbines is assessed.

5.1.65 The SPG assessed 'inherent sensitivity', which is not influenced by the presence of existing or proposed wind energy development. The SPG states that it "*provides an initial indication of the relative landscape sensitivities of different areas*", but that "*it should not be interpreted as a definitive statement on the suitability of a certain location for a particular development*". The SPG notes that individual proposals will be considered on their own merits.

5.1.66 The sensitivity to very large wind turbines 111 to 150m is High and a cluster of 11 to 25 turbines is described as Large in SPG 20.

LCA 9 - Hirwaun Common and Surrounding Ridges specific guidance for development

- *When siting and designing any wind energy developments in this LCA, the generic guidance detailed in Chapter 3 should be taken into account. In addition, within this LCA particular care will need to be taken to ensure:*
- *The role of the landscape's elevated rural skylines as a backdrop to views from Bridgend and Pencoed is protected.*
- *The strong rural character of the landscape is retained.*
- *The exposed, open feel of the higher ground is protected.*
- *The valued semi-natural habitats are protected from development, including areas of broadleaved woodland, open species rich neutral grassland and wet heath.*
- *The significance of the LCA's archaeological features such as Iron Age hillforts and medieval pillow mounds is not affected by the presence of wind turbines.*
- *Opportunities are sought to adopt a Green Infrastructure approach for all development. As well as protecting and enhancing landscape character in line with the guidelines set out in Part 3 of the Landscape Character Assessment, developers should consider multi-functional opportunities associated with supporting biodiversity (see Biodiversity SPG), recreational activities (LDP Policy COM11), agricultural activities, flood mitigation etc.*

5.1.67

Chapter 3 of SPG20, acknowledges that sensitivity to windfarm energy development varies within LCAs. It goes on to list considerations when siting wind farms. The guidance relevant to this proposal is listed below:

- *Site wind energy developments away from dramatic rugged landforms or valued distinct landform features (including prominent headlands).*
- *Seek to avoid areas valued for their remoteness, areas free from human influence and perceived 'untamed' naturalness e.g. the upland moors.*
- *Seek to avoid areas where ground level disturbance affects landscapes that are difficult to restore (e.g. deep peat or bog).*
- *Ensure siting of turbines does not damage the special qualities of the landscape as recorded in the Bridgend Landscape Character Area descriptions.*
- *Significant effects on views from important viewpoints (including views which are integral to the character of conservation areas and recognised /iconic views), popular tourist and scenic routes, and settlements should be avoided where possible or minimised through careful siting.*
- *It is generally less distracting to see a substantial part of a turbine rather than blade tips only – this may be a particular consideration for views from sensitive viewpoints or those frequented by a larger number of viewers.*

- Consider locations in association with business parks and reclaimed, industrial and man-made landscapes where other landscape sensitivities are not compromised.
- Consider the landscape effects of transmission infrastructure when siting development, aiming for sites that will minimise the need for above ground transmission infrastructure. Undergrounding cables may mitigate effects in sensitive locations.
- Consider sites where areas of existing vegetation could screen ground-level features of wind energy developments (such as fencing, tracks and transformers).

SLA 5 Mynydd y Gaer

5.1.68 The Proposed Development is located within SLA5. The primary qualities and features of this landscape stated in BCBC's 'Designation of Special Landscape Areas' is as follows:

'Undulating ridge line landform running east to west up to the attractive upland landscape associated with Mynydd y Gaer some 300 metres AOD. In land use terms it includes the interface between the open uplands and the bounded fields of the lower lying agricultural landscapes. These are often defined by hedgerows with trees. The southern edge of this scarp is dissected by a series of steep sided cwms, such as Cwm Crymlyn, Cwm Llwyd and Nant Ton-y-groes.

Limited areas of woodland or small spinneys although the north western edge of the SLA includes the wooded slopes of Allt y Rhiw, which is designated a Special Area of Conservation (SAC) under the EU Natura 2000 programme, together with Coedtal-y-fan on the western side of the Ogmere Valley which runs down into the Ogmere Valley and the conifer plantations to the west of Gelli-feddgaer. Higher ground is open and exposed which is reflected in the sensory qualities of the area. Its level of exposure is reflected by the presence of the windfarm at Mynydd Hugh, which introduces a visual detractor to the area.

The SLA is traversed by the Ogwr Ridgeway Walk, as well as a range of other footpaths. Along the edge of the SLA, the A4061, B4280 and A4093 roads introduce visual and sensory detractors'.

5.1.69 The above acknowledges that the existing close proximity of the Mynydd Portref and Taff Ely windfarm schemes which are located in the adjoining SLA Mynydd Hugh and Llantrisant Forest, exert a windfarm context and influence over this SLA.

Landscape Reporting Framework

5.1.70 In order to draw conclusions about overall effects on the landscape character of the study area, effects on LANDMAP aspect areas have been summarised according to the landscape character areas (LCAs) into which they fall, as defined by assessments published by Bridgend, Vale of Glamorgan, Neath

Port Talbot County Borough Councils. The Heads of the Valley landscape units (LUs) in the 2014 Gillepies study '*Planning Guidance for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements*' has been used in areas of Blaenau Gwent, Rhondda Cynon Taff and Caerphilly. The Brecon Beacons National Landscape Landscape Character Area have also been used in the reporting framework.

- 5.1.71 Although the Heads of the Valley assessment has partial coverage of the administrative areas of of Blaenau Gwent, Rhondda Cynon Taff and Caerphilly, these administrative authorities have not published landscape character assessments for their respective areas. Therefore the landscape assessment in these areas and outside the extent of LUs, uses the LANDMAP Visual and Sensory aspect areas (VSAAs) assessment. Where the VSAs are of a similar type (CLS level 2), distance and orientation with respect to the Proposed Development at Mynydd y Gaer they have been grouped together for reporting purposes. The list is provided in Appendix 5B.

Visual Baseline

Zone of Theoretical Visibility (ZTV)

- 5.1.72 The ZTV generated to inform this assessment shows the area from which any part of the Proposed Development would be theoretically visible (Figures 5.1.1 to 5.1.8). It was prepared using a view height of 1.7m and 11 origin points to represent the location of the Proposed wind turbines. ZTVs were produced for the blade tip heights and also hub heights of the turbines - above existing ground levels (EGL).
- 5.1.73 The ZTV has been developed based on visual barriers for significant blocks of woodland and settlement. However, the ZTV does not account for visual barriers such as garden vegetation, hedgerows or individual trees and the potential intervisibility with the Proposed Development would, in reality, be less in places. This has been assessed through fieldwork.
- 5.1.74 The colour scale on the ZTV indicates how many origin points would theoretically be discernible. As such, the higher the number of origin points visible. 1 to 3 turbines tips / hubs green, 4 to 7 turbine tips / hubs yellow, 8 to 11 turbine tips / hubs orange. Given the size of the Site, this allows judgements to be made regarding the extent of the Proposed Development that would potentially be discernible and has informed the selection of Representative Viewpoints for the assessment, with a greater propensity to select publicly accessible Representative Viewpoints within areas of potentially higher visibility.

Visual Receptor Groups

Views from Residential Properties

Private Views

- 5.1.75 In the planning system no individual has the right to a view. Assessment of effects from private residences does not form part of the LVIA. The Landscape Institute has provided guidance on assessing private views in *Technical Guidance Note 2/19: Residential Visual Amenity Assessment* (LI TGN 2/19).
- 5.1.76 A Residential and Visual Amenity Assessment (RVAA) determines if the residential visual amenity threshold is breached by the Proposed Development, thereby rendering the property ‘uninhabitable’ or so “*unattractive a place to live that planning permission should be refused*” (Inspector Kingaby, Burnthouse Farm Wind Farm, APP/D0515/A/10/2123739, Inspector’s Report, paragraph 119) (also at paragraph A1.6 of LI TGN 2/19). Inspector Kingaby noted that “*There needs to be a degree of harm over and above identified substantial effect to take a case into the category of refusal in the public interest. Changing the outlook from a property is not sufficient*” (Inspector’s Report, paragraph 120) (also at paragraph A1.7, LI TGN 2/19). The Inspector, in the Langham Wind Farm decision, noted that “*The planning system controls development in the public interest, and not in the private interest. The preservation of open views is a private interest*” (Langham Wind Farm Appeal Decision APP/D2510/A/10/2130539) (also at LI TGN 2/19, paragraph A1.11).
- 5.1.77 A Residential and Visual Amenity Assessment RVAA has been carried out and presented at Appendix 5D

Views from Settlements

- 5.1.78 Table 5.13 below lists the settlements within the study area which fall within the ZTV output and identifies those which require further assessment. In order to focus on potentially significant effects, settlements from which there is no theoretical visibility and settlements beyond 10km from the Proposed Development – where it is unlikely that significant effects would occur are not considered further in this assessment.

Table 5.10: Valley Settlements (within 10km buffer)

River valley	Settlement name	Theoretical Visibility of Development (ZTV coverage)	To be considered as part of the assessment from the anticipated visual effects
Ogwr Fach	Glynllan	Frequent visibility within 1.5km.	Yes
	Glynogwr	Frequent visibility within 1km.	Yes (refer to Viewpoint 7)
	Gilfach Goch / Evanstown	Frequent visibility from the SE part of the settlement only.	Yes (refer to Viewpoint 8)
Ogmore Valley	Sarn/ Bryncethin/	Frequent visibility within 2.5km.	Yes (refer to Viewpoint 4)
	Blackmill	Frequent visibility within 1.5km.	Yes (refer to Viewpoint 6)

Ogwr Fawr	Lewistown/ Pant – yr -awel	Frequent visibility within 2 km..	Yes
	Ogmore Vale	Frequent visibility within 3.5km	Yes
	Nant-y-moel	ZTV output indicates no visibility from this location..	No
	Price Town	ZTV output indicates no visibility from this location..	No
Rhondda Fawr	Tonyrefail	Frequent visibility within 4.5km..	Yes
	Edmonstown	ZTV output indicates no visibility from this location & only on hill above the settlement	No
	Tonypandy Penygraig	ZTV output indicates no visibility from this location..	No
Lynfi	Tondu / Coytrahen	Occasional visibility within 5.5km	No
	Langgynwyd / Cwmfelin	Occasional visibility within 8km	No
Garw	Brynmenyn	Occasional visibility within 4km	Yes
	Betws	Limited occasional visibility on eastern edge, within 4km	Yes
	Llangeinor	ZTV output indicates no visibility from this location..	No
	Pontycymer	ZTV output indicates no visibility from this location..	No

Table 5.11: Lowland Settlements south of Mynydd y Gaer (within 10km buffer)

Lowlands	Settlement name	Theoretical Visibility of Development (ZTV coverage)	To be considered as part of the assessment due to anticipated visual effects
Coity Hinterland	Bridgend	Limited occasional visibility mainly on north eastern edge, over 5km.	Yes
	Heol – y-Cyw	Frequent visibility mainly on north eastern edge, within 1.5km.	Yes (refer to Viewpoint 3)
	Pencoed	Occasional visibility – mainly on northern edge within 3.5km	Yes (refer to Viewpoint 12)
Vale of Glamorgan	Lanharan / Brynna	Patch visibility – within 3km	Yes (refer to Viewpoint 13)
	Brynnau / Dolau	Patch visibility – within 3km	No

Recreational users

5.1.79

Recreational users include receptors for the purposes of this assessment include which user locally promoted trails using PRoW, users of open access land, and users of the National Cycle Routes. These are presented on Figures 5.1.7 and 5.1.8 in relation to the Proposed Development blade tip ZTV. In order to focus on potentially significant effects, routes with very limited theoretical visibility of the turbines and / or beyond 10 km from the Proposed Development are not considered further. There are no National Long Distance

routes that are likely to experience significant effects, such as the Wales Coast Path, so these are not considered further in this assessment.

- 5.1.80 The ZTV has indicated potential intervisibility to the Proposed Development from a number of local trails and public access land, visual receptors of high sensitivity. Representative Viewpoints have, where possible, been located and taken from local trails and public access which fall within the ZTV envelope. The Representative Viewpoints form part the assessment of views from the public access network. It is noted, however, that the potential views of and appreciation of the Proposed Development, from parts of the network would alter as receptors traverse the landscape. Where this is likely, local trails and access land have been walked where possible, but professional judgement (regarding the level of potential intervisibility) has in part been necessarily made.
- 5.1.81 Those trails and access land which fall within the ZTV shadow, that are located within the 15km Study Area have been selected for assessment. Stretches of these PRoW have been grouped which have similar views of the Site. It has not been possible to gain access to the Bridgend Local Authority's PRoW database and the identification codes as it is not made available to the public.

Table 5.12: Locally promoted trails and Open Access Land (within 10km buffer)

Locally Promoted Trails, Open Access Land, National Cycle Routes	
Locally Promoted Trails	
Ogwr Ridgeway Walk	Mynydd y Castel to Mynydd Maendy. Visibility is indicated along much of this trail from Mynydd Margam Forest (refer to Viewpoint 25) to Mynydd Baedan (refer to Viewpoint 24) to Blackmill (refer to Viewpoint 6) across Mynydd Y Gaer (refer to Viewpoint 1) and junction with Taff Ely Ridgeway Walk and finishing at Mynydd Maendy.. Considered in assessment
Taff Ely Ridgeway Walk	Visibility along most of length of this local trail from Mynydd y Gaer (refer to Viewpoint 1) via Mynydd Portref, and Mynydd Meiros, to Garth Hill. Considered in assessment
St Illtyd's Walk	Pockets of theoretical visibility afforded south of Maesteg and to the west of Glyncoirwg. Consider in assessment (refer to Viewpoint 12).
Bridgend Circular Walk	Potential visibility available within close proximity to the M4 and A4061 infrastructure corridors Considered in assessment (refer to Viewpoint 15).
Sky to Sea Walk	Crosses part of the west side of the Site. The ZTV indicates that there would be frequent views of the Proposed Development along much of the route with the 10km buffer – particularly to the south (refer to Viewpoint 12) and higher land to the north west (refer to Viewpoint 10) of the Site. Considered in assessment
Open Access Land and Common	

Mynydd y Gaer Common	Mainly open upland hill / ridge. The Proposed Development is located almost entirely within this area. The Ogwr Ridgeway Walk and Taff Ely Ridgeway Walk cross this Common. Consider in assessment (refer to Viewpoints 1 & 2)
Cefn Hirgoed Common	This Common lies to the north of the M4 and south of Mynydd y Gaer, 2km away at its closest from the Proposed Development. Easily accessible from adjoining settlements such as Pencoed and Sarn. Bridgend Circular walk passes through this Common. The ZTV shadow overlaps with the majority of this Common. Consider in assessment (refer to Viewpoints 3,4,11 and 12).
Mynydd Gilfach Open Access Land	This open access land is partly 'Dedicated Forest' and partly 'Country', on elevated land to the east of Gilfach Goch. 3.5km from the Proposed Development The west facing slopes above Gilfach Goch have the greatest potential intervisibility with the Proposed Development. Consider in assessment (refer to Viewpoint 8).
Mynydd Maendy Forest Open Access Land	Mainly forested upland hill top, 2km away. There is very little opportunity for intervisibility with the Proposed Development – therefore it will not be considered further in this assessment
Ogmore Forest Open Access Land	Southern half is forested and northern half is mainly open in character of this upland open access area, 2.5km away. Consider in assessment (refer to Viewpoint 9)
Pen y Foel Open Access Land	Mainly open upland hill tops, south and south east facing slopes have most overlap with ZTV, under 3km away. The Sky to Sea locally promoted trail, passes through this Open Access Land. Consider in assessment (refer to Viewpoint 10)
Cycle Routes	
NCN 4	Minimal visibility indicated up the Ogmore Valley, greater visibility indicated by the ZTV along Ogwr Fach to Tonyrefail. Passes within the northern edge of Mynydd y Gaer Common. Consider in the assessment.
NCN 883	Section north of Blackmill along the lower parts of Ogwr Fawr The ZTV indicates that there would be partial visibility of the Proposed Development. Consider in the assessment
NCN 884	Section north of Brynmenyn runs up the Garw valley. The ZTV indicates very little potential intervisibility with the Proposed Development and will not be considered further in this assessment.
NCN 885	The ZTV indicates that the Section west of Abergarw would have frequent intervisibility with the Proposed Development. Consider in the assessment

Representative Viewpoints

5.1.82

A number of viewpoints were selected to represent the receptors within the study area, from which to assess the change in views that would result from the project. All viewpoints are situated in publicly accessible locations within the extent of the ZTV, with a range of distances and orientations to the project. The locations of the Representative Viewpoints are shown on Figure 5.1.1 and

the existing panoramas, proposed scheme wirelines and photomontages on Figures 5.4.1 to 5.4.156.

5.1.83 Winter photographs were taken in December 2021 and 2024 and summer photographs in June 2023. Overall visibility was good. Table 5.3 below describes the location of the Representative Viewpoints for this assessment.

Table 5.13: Representative Viewpoints

Viewpoint	Location	Receptor Type/Designation	Viewpoint coordinates BNG Eastings, Northings
Within 5km of the Proposed Development			
1	Mynydd Maendy	Taff Ely Ridgeway Walk	297261.27, 185967.72
2	Mynydd y Gaer	PRoW. Common Land	296825.51, 185344.55
3	Heol y Cyw	Settlement	294527.03, 184049.96
4	Bryncethin	Settlement	291643.7, 184216.84
5	Bryn y Wrach	PRoW. Common Land	291975.41, 186769.02
6	Blackmill	PRoW above settlement	293211.05, 186703.52
7	Glynogwr	A4093 west edge of settlement	295371.41, 187262.04
8	Gilfach Goch	Settlement	298487.91, 189780.24
9	Ogmore Forest	PRoW southern edge Ogmore Forest	294199.88, 188865.42
10	Mynydd Llangeinwyr	PRoW southern slopes of Pen y Foel	292253.53, 188520.36
11	Cefn Hifgoed	PRoW. Common Land	292827.94, 183163.09
12	Pencoed	Settlement	296016.85, 1826080
13	Brynna	Settlement	298920.28, 183837.97
Between 5km and 15km of the Proposed Development			
14	Mynydd William Meyrick	PRoW	295222.53, 192715.29
15	Cefn Gwyngul	Road. Registered Landscape of Historic Interest	301553.98, 196221.62
16	Mynydd y Glyn	Hill top open access	303251.44, 189563.71
17	Mynydd Meio	Rhymney Valley Ridgeway Path	311232.78, 188328.50
18	Llantrisant	PRoW. Common Land	304789.00, 184213.86
19	St Mary Hill Down	PRoW by Trigg point	296221.86, 179203.96
20	Tair Croes Down	PRoW. Common Land	291674.62, 176470.64
21	Wick	Settlement	292488.55, 172186.89

22	Laleston / Trelales	PRoW north west of Laleston	286244.15, 180619.52
23	Kenfig Hill	PRoW. Country Park	284580.41, 182881.59
24	Mynydd Baedon	PRoW close to hill summit	287154.30, 185743.42
25	Mynydd Margam	PRoW. SLA. Registered Landscape of Historic Interest	283296.81, 188665.59
Between 15km and 45km of the Proposed Development			
26	Mumbles Head	Wales Coast Path. Gower AONB	262991.49, 187402.64
27	Pwlldu Head	Wales Coast Path. Gower AONB	256991.99, 186455.64
28	Pen y Fan	Beacons Way Brecon Beacons National Park	301066.14, 221453.37
29	Porlock Common	Exmoor National Park	285416.22, 146407.14
30	Weston-Super-Mare	Settlement	330891.83, 162418.20
31	Cefn Yr Ystrad	Cefn Yr Ystrad, Brecon Beacons National Park	308823, 21368
32	Waun Rydd	Waun Rydd, Brecon Beacons National Park	305857, 220566

Representative Viewpoint 1 – Mynydd Meandy Taff Ely Ridgeway Walk

- 5.1.84 This is an open, elevated and close view within the eastern edge of the proposed Site looking west along the Mynydd y Gaer broad ridge / plateau from Taff Ely Ridgeway Walk. The moorland and grassland habitat of this upland location falls away to the north and south. The smooth profiles and open nature of the adjacent hills combined with the muted colours and gradual transitions in tone of the vegetation create a unified landscape. By contrast the dark, blocks and strips of commercial forestry plantation, such as on Mynydd Maendy, form a distinct mosaic of geometric shapes. The settlement of Gilfach Goch is prominent on the right hand side of the view together wind turbines on the edge of the Taff Ely windfarm can be seen . In the distance to the left of within a network of minor roads linking small settlements and blocks of forestry. In the distance to the middle right of the view, the hill slopes are predominantly rural, comprising grazing with a mix of forestry and moorland on the tops. In the far distance to the middle and left of the view, there are views of the lowland landscape which comprise recognisable forms of woodland including commercial forestry and lowland grazing. Parts of Bridgend and associated development in the Ogmere Valley can be discerned. In the far distance the Severn Estuary can be seen below the horizon.
- 5.1.85 Lighting associated with Bridgend and roads within the Ogmere Valley in the middle distance form the most prominent sources of nighttime lighting within the view. Red warning lights on the turbines at Taff Ely Wind farm on the right of the view together with lighting from Gilfach Goch would also be visible at night.

Representative Viewpoint 2 – Mynydd y Gaer ProW, Common Land

- 5.1.86 This is an open, elevated and close view within the southern eastern edge of the proposed Site looking north west along the Mynydd y Gaer broad ridge from a ProW footpath within Common Land. The moorland and grassland habitat of this upland location dominates the foreground which undulates gently. The moorland landscape gives way to a grazed landscape of stone wall boundary fields in the middle distance and to the right handside of the view where the Taff Ely winfarm is prominent along the Mynydd Maendy ridgeline in the view. By contrast to the left of the view the land falls away to Hirwaun Common where the land use comprises grazing farm and open common, forestry but also energy and transport infrastructure and built forms of Bridgend. There are views through to the Severn Estuary along the Ogmere valley.
- 5.1.87 Red warning lights on the turbines at Taff Ely Wind farm on the righthand side of the view would be prominent. The left of the view, would be dominated by lighting glow from Bridgend and lighting from the dense transport network at night.

Representative Viewpoint 3 - Heol y Cyw, Settlement

- 5.1.88 This mid distance view, within a settlement setting, looks north wards towards the Site, some 1870m away. The foreground is dominated by the houses and main street which runs north wards though the small settlement of Heol y Cyw, climbing to the foothills of Mynedd y Gaer. The south facing slopes of Mynydd y Gaer can be seen rising above the roofline of the houses in the village. Woodland gives way to a moorland landscape with some scattered houses on the mid to upper slopes to the right of the view. The Pant y Wal Wind farm on Mynydd y Aber, which lies well beyond the Site can not be seen from this location.
- 5.1.89 The housing and street lighting in the centre and foreground are the most prominent lighting sources viewed against the dark backdrop of the slopes of Mynydd y Gaer. There are no sources of lighting immediately to the right and left of the housing at Heol y Cyw.

Representative Viewpoint 4 - Bryncethin, Settlement edge PRoW footpath

- 5.1.90 This is an open mid distance view from the eastern edge of Bryncethin, which looks across rough grassland and gorse. The land rises gradually up the west facing slopes of Mynydd y Gaer in the middle and left of the view. The landcover becomes increasingly wooded on the lower lying land on the righthand side of the view. High voltage power lines cross the landscape in the mid distance. Views of the Taff Ely and Mynydd Portref Wind farms on the righthand side of the view and screened by woodland. As well as housing on the edge of Bryncethin, there are scattered farm buildings and properties at Hoel-laethog which can be seen which create a settlement fringe character.

5.1.91 At night there are filtered lights from the scattered, few properties on the slopes of Mynydd y Gaer and immediately the left of the view from housing on the edge of Bryncethin. Otherwise the landscape has little other sources of lighting.

Representative Viewpoint 5 - Bryn y Wrach PRow footpath over Common Land

5.1.92 This is an open mid distance view, some 2.23km to the Site, from a PRow footpath within Common Land, which passes north to south across upland moor Common land at an elevation of approximately 208m, some 30 to 40m lower than the Site. Mynedd y Gaer is situated on the opposite side of the Ogmores Valley, in front of part of the Taff Ely Wind farm. The smooth profiles and open nature of the adjacent hills combined with the muted colours and gradual transitions in tone of the vegetation create a unified landscape. By contrast the dark, blocks and strips of commercial forestry plantation on the north western facing upper slopes of the Ogmores Valley and on much of the skyline, form a distinct mosaic of geometric shapes.

5.1.93 There are very few direct sources of light in this view, apart from a few scattered houses in the near to middle distance. Light glow from Blackmill in the valley bottom and to the right of the view and traffic on the A4061 is likely to be discerned. Red warning lights on the turbines at the Taff Ely Wind farm, which lies partially behind the Site would be prominent against the relatively dark sky.

Representative Viewpoint 6 – Blackmill, PRow Footpath above settlement

5.1.94 This view from the lower valley sides above Blackmill is dominated by the steeply rolling valley sides of the Ogmores Valley, central to the view and valleys of the Ogwr Fawr and Nant Lechyd to the north – left hand side of the view. Housing at Blackmill on the lower valley side and valley bottom is nestled amongst woodland, transitions to grazed pasture fields and moorland and more scattered scrub and trees towards the higher land. Settlement in the valley floor, often with pale tone colours elevations to houses, contrasts with the more wild, upland landscape. Views of the majority of the Taff Ely Wind farm are blocked by the valley landform and vegetation on Mynydd y Gaer.

5.1.95 At night street and house lighting within the sprawling development on the lower valley slopes and floor would be visible and dominate the lower parts of the view. There are a few scattered light sources from houses higher on the valley sides.

Representative Viewpoint 7 – Glynogwr, A4093 western edge of settlement

5.1.96 This is a close open valley view approximately (765m) looking south from a location beside the A4093 on the western edge of the small settlement of Glynogwr, on the lower south facing slopes of the Cwm Ogwr Fach valley. The

foreground falls away to the base of the valley and predominantly grazing pasture farmland. The rounded hill forms of the north facing slopes of Mynydd y Gaer on the opposite side of the valley have a mix of moorland vegetation and field pasture. There is a small area of commercial forestry which appears as a contrasting dark geometric shape on the left of the views. Smaller valleys with seasonal streams run down the slopes opposite this viewpoint. Low voltage overhead power lines are a distinct feature in the foreground of the view.

- 5.1.97 Traffic using the A4093 would form the most prominent source of light at night. Light glow from residential properties of Glyogwr to the far left of the view can also be perceived.

Representative Viewpoint 8 – B4564 PRoW Footpath east of Evanstow (Gilfach Goch)

- 5.1.98 This is an open, mid-distance valley view approximately (3.87 km) looking south from the lower slopes of Mynydd Gilfach. Foreground views are dominated by scrubland rough grassland. The smooth rounded hill forms of Mynydd Maendy on right of the view and more distant views of Mynydd y Gaer dominate the views across the valley. The slopes of Mynydd Maendy are a mixture of grazing pasture fields, moorland and contrasting dark tone of the mixed commercial forestry plantation woodland which drapes over the hill side and hill top. The pale tone and white elevations of the properties of Gilfach Goch are prominent in the view below the forestry.
- 5.1.99 At night light glow from residential properties of Gilfach Goch in the centre right of the view would be the dominant light sources together with traffic using the B4564 below this Representative Viewpoint elevation.

Representative Viewpoint 9 – southern edge Ogmores PRoW, Footpath, Forest

- 5.1.100 This is an expansive open view across pasture fields which extend from the foreground well into the middle distance. In the far distance and central in the view, the land rises to views of upland pasture and moorland of Mynydd y Gaer. Hill sides either side of Cwm Ogwr frame the view and lead the eye to the towards Mynydd y Gaer. Properties with pale tone and white elevations within the higher parts of the settlement of Glynllan stand out in the middle distance. To the far left of the view the dense layout pattern of the wind turbines at Taff Ely are prominent on the skyline.
- 5.1.101 There are a few low intensity light sources visible at night in this otherwise dark landscape, associated with properties at Glynllan and distant red warning lights of the Taff Ely windfarm.

Representative Viewpoint 10 – southern slopes of Pen y Foel PRoW Footpath

- 5.1.102 This is an expansive, elevated open view across pasture fields bounded by stone walls, which dominate and extend from the foreground well into the

middle distance before the land falls steeply away to the Ogmore Valley, before rising up to the Site on Mynydd y Gaer, some 3.19km away. The lighter tones of the Severn Estuary can be seen on the right hand side of the view. Overhead cables cross the landscape in the near middle distance. The slopes of Mynydd y Gaer facing this visual receptor are smooth and gently undulating with a mixture of open moorland and grassland contrasting with the geometric patterns of pasture fields and darker tone commercial forestry plantation woodland. The dense pattern of turbines of the Taff Ely windfarm on the left handside of the view is a prominent feature on the skyline.

- 5.1.103 There are no significant point light sources visible at night in this otherwise dark landscape, apart from the red warning lights of the Taff Ely windfarm, However there is light glow from Bridgend which would be perceived in the centre to right hand side of the view.

Representative Viewpoint 11 – Cefn Hifgoed, PRoW Common Land -

- 5.1.104 This is an expansive, lowland, open view across rough grassland and scrub looking north to north west towards the Site – 2.79km away. This landcover contrasts with the geometric pattern of pasture fields and scattered houses which dominate much of the south facing slopes of Mynydd y Gaer. On the righthandside of the view the upland landcover is typically more moorland in character. The turbines on the centre left part of the skyline are of Pant y Wal Wind farm some 7.6km away.
- 5.1.105 At nighttime, there are several point light sources associated with the scattered houses on the hill side in the mid distance and the red warning lights of the Pant y Wal Wind farm beyond.

Representative Viewpoint 12 – track on northern edge of Pencoed

- 5.1.106 An expansive, lowland approximately 90m AOD, open view across woodland and scrub in the foreground looking north to north west towards the Site – 2.89km away. This wooded landcover gives way to pasture fields with scattered trees and tree groups and moorland towards the upper part of Mynydd y Gaer. This landcover pattern contrasts with the Rockwool Works in the centre left of the view and overhead power lines form strong and prominent built form elements in the middle distance . The existing Taff Ely windfarm can be seen on the ridge line in the centre right of the view. The Pant y Wal lies beyond the Site and not within visual line of sight from this location. Colours are muted and textures varied, with contrast provided by the Rockwool Work and houses in the foreground and scattered throughout the view extending up the slopes of Mynydd y Gaer.
- 5.1.107 At night time, there are numerous point light sources associated with the scattered houses on the hill side in the mid distance and the red warning lights of the Taff Ely Wind farm. There would be some direct lighting sources from the Rockwool Works.

Representative Viewpoint 13 – PRow Bridleway on north side of Brynna

- 5.1.108 This view is taken from rising land within pasture fields looking north west towards the Site, some 2.44km away. The treed hedgerow field boundaries is repeated up the slopes of Mynydd y Gaer and Mynydd Maendy in the near to middle distance and sometime to the visible summits of the gently undulating ridge line of hills. Power lines and pylons mid was up the slope in the view together with the existing wind turbines of the Taff Ely Windfarm on the right hand side of the view are noticeable vertical elements in the an otherwise farmland dominated view.
- 5.1.109 There are very few low intensity domestic light sources visible at night in this otherwise dark landscape. Red warning lights of the Taff Ely windfarm are noticeable and occupy the righthand side of the view.

Representative Viewpoint 14 – Open access land eastern edge of Mynydd William Meyrick forestry plantation

- 5.1.110 This elevated medium range view from the Trig point (517m) has commanding panoramic views southwards to the Site some 6.09km away. The Pant y Wal Wind farm and extension to this Wind farm lies immediately to the south in the fore ground, the turbines dominate the view. Upland moorland grass extends from the foreground to the middle distance before the land falls away the Ogmere Valley and the land cover changes to dark tones of commercial forestry plantations. Across the Ogmere valley, the view looks down slightly on the Site and surrounding hill top of Mynydd y Gaer, where the landcover is a mixture of moorland and upland pasture fields. Beyond Mynydd y Gaer on the right of the view the lowland landscape around Bridgend can be seen stretching to the coast some 20km away.
- 5.1.111 At night, there would be close views of the red warning lights on the turbines at Pant y Wal Wind farm and its extension in the middle side which would be prominent. On the righthand side of the view, light glow from Bridgend would be noticeable.

Representative Viewpoint 15 - Cefn Gwyngul, rural lane, Registered Landscape of Historic Interest

- 5.1.112 This hillside long distance view (11.06km) from an Ordnance Survey marked panoramic viewpoint – looks down the Rhondda Fach valley across steeply falling land with a mix of rough grassland, scrub and deciduous trees. This contrasts with the more geometric outline and dark tones of conifer plantation forestry on the valley side opposite this viewpoint. Housing on the edge of Tylorstown can be seen which adds to the settlement fringe character of the area. The land rises to over 400m before falling to the Rhondda Valley before it then rises up the valley side to the ridge line. The landcover changes from being forestry dominated to moorland to field pasture moving southwards along the valley side. The wind turbines of the Pant y Wal and Fforch Nest Windfarms can be seen clearly above the ridge line to the right of centre of the

view. The north to south folds of the valleys, define the landscape and the main influence on resulting land use pattern and land cover type.

- 5.1.113 At night, street and house lighting within the development below the viewpoint and on the opposies side of the valley would be visible and dominate the lower parts of the view. There are a few scattered light sources from houses higher on the valley sides and light glow from the Rhondda valley floor. The red warning lights of the wind turbines of the Pant y Wal and Fforch Nest Windfarms would be noticeable on the skyline.

Representative Viewpoint 16 – Hill summit, Mynydd y Glyn

- 5.1.114 This is an open, elevated mid distance view (7km) from the Site, looking west south west from cloe to the summit of Mynydd y Glyn. The moorland and grassland habitat of this upland location dominates the foreground and falls away over the crest to the valley below. The valley floor broadens out to the left of the views where the settlement of Tonyrefail can be seen – spreading up the valley sides. The valley sides opposite the view transition from opeen moorland on the right hand side with the Pant y Wan Wind farm, to commercial forestry and then pasture fields fields in the middle distance. From Tonyrefail the land rise to Mynydd Maendy with the Taff Ely and and Mynydd Portref Wind farms running along the ridge line. Views of Mynydd y Gaer are overlapped by this Wind farm. The undulating landform defines the landscape’s land use and landcover with a mixture of natural uplamnd moor, grassland and woodland habitats which blend together in contrast with the distinct contrasting colours and geometric patterns of plantation woodland and field pasture fields. The Cynffig valley emphasises the depth of the view which runs to the coast at Pyle.
- 5.1.115 At night time, there is light glow and point light sources from Tonyrefail and settlements down the Cynffig valley. The red warning lights of the Pant y Wal and Mynydd Portref and Taff Ely Wind farms are noticeable features above the skyline on the right and left of the view respectively.

Representative Viewpoint 17 - Rhydney Valley Ridgeway Path on Mynydd Meio

- 5.1.116 The view overlooks the sweeping valley floor below. Pasture grazing fields in the foreground on the valley side quickly give way to the sprawling development within the Taff valley. Rhydyfelin occupies much of the middle distance on the lower slopes and valley floor. The thick backdrop of deciduous broadleaf woodland becomes more fragmented and divided by pasture field on the higher and less steep ground on the opposite site of the valley. This contrasts with the dark conifer plantation forestry that swathes the valley side further north, above Rhydyfelin. The landform rolls and undulates westwards. Mynydd Portref and Taff Ely Wind farms can be seen consecutively with Mynydd y Gaer behind. The Pant y Wal Wind farm breaks the skyline above the forestry above Rhydyfelin and extends behind the moorland landscape of Mynydd Maes-steg.

5.1.117 At night the dominant light sources will be from the extensive development in the Taff Valley in the near to middle distance. The valley sides are darker but long distance views to the west are frequently punctuated by light sources from settlements such as Tonyrefail. The red warning lights of the Pant y Wal and Mynydd Portref and Taff Ely Wind farms are noticeable features above the skyline.

Representative Viewpoint 18 - Common Land north of Llantrisant

5.1.118 This is an open mid distance view, 7.66km to the Site, from Common Land north the settlement of Lantrisant, which looks west across rough grassland and gorse. Beyond the middle distance in this view the land rises and the landcover changes to pasture fields in the centre of the view associated with Rhiwfeilin, where the West of Rhiwfeilin Fach wind turbine can be seen, set well below the skyline. To the left of the view the dark tone of forestry plantation with swathes Mynydd Garthmaelwg contrasts with the other hills and upland in the view which are of a lighter more muted tone. The Mynydd Portref and Taff Ely Wind farms can be clearly discerned on the ridge line the right of Mynydd Garthmaelwg, on Mynydd Maendy. To the right the upper parts of the Pant y Wal Wind farm can be seen. Although the hilly landform and rural and open character are the defining characteristics of this view, the distant wind farm turbines are a noticeable part of the composition of this view.

5.1.119 There are very few direct sources of light in this view, apart from a few scattered houses like Rhiwfeilin farm in the near distance. Light glow may also be perceived from the settlement of Llantrisant, which is to the left and on lower lying land and out of direct line of sight. Red warning lights on the turbines at the Mynydd Portref and Taff Ely Wind farms, which lie in front the Site would be noticeable against the dark night sky. There are additional aerial warning lights on the Pant y Wal Wind farm on the right hand side.

Representative Viewpoint 19 – PRow near Trigg point, St Mary Hill Down

5.1.120 This is an open, elevated mid distance view (6.18km) from the Site, looking north from to the Trigg point on St Mary Down at 120m AOD. The rough grassland habitat of this locally elevated location dominates the foreground before the land falls away over the crest to the valley below which is dominated by the settlement of Pencoed on the valley floor.. The valley sides opposite the view transition from deciduous woodland and few pasture fields to a more field dominated land use on the south facing slopes of Mynydd y Gaer. The series of high hills beyond Mynydd y Gaer, particularly on the left hand side of the view are a defining feature. The dark tone of the forestry contrasts strongly with the lighter hues of upland moor. Existing man made vertical elements such as the telegraph poles in the foreground, chimney stacks at the Rockwool factory and Mynydd Portref and Taff Ely Wind farms on the skyline on the right of the view, are noticeable component features of the view, but do not dominate it.

5.1.121 At night, street and house lighting within Pencoed below the viewpoint and on the opposite side of the valley would be visible and dominate the lower parts

of the view. There are a few scattered light sources from houses on distant valley sides. The red warning lights of the wind turbines of the Mynydd Portref and Taff Ely Wind farms would be noticeable on the skyline.

Representative Viewpoint 20 – PRow over Common Land, Tair Croes Down

- 5.1.122 This mid distance view, 9.4km from the Site, overlooks down over Bridgend in the broad valley floor below. The land cover of pasture grazing fields in the foreground transitions to scrub and woodland and then the prominent pale tones of the warehouse and large factories on the edge of Bridgend. The mid distance is dominated by Bridgend and extends across the width of the view. The upland landscape beyond is defined by ridges and hills undulating across the skyline. The dark forestry plantations often appear geometric in shape and contrast with the lighter tones and muted colours of more natural landcover of upland moor, grassland, pasture fields and deciduous woodland. The skyline is punctuated by groups of wind farm developments which are located mostly centre and right in the views and include most noticeably, Pant y Wal centre right and Mynydd Portref and Taff Ely Wind farms on the right hand side of the view.
- 5.1.123 At night, street and house lighting within Bridgend below the viewpoint would be visible and dominate the lower middle part of the view. There are a few scattered light sources from houses on distant valley sides beyond Bridgend. The red warning lights of the wind turbines of Pant y Wal centre right and Mynydd Portref and Taff Ely Wind farms on the right hand side of the view would be noticeable on the skyline.

Representative Viewpoint 21 – Rural lane on the edge of Wick

- 5.1.124 This mid to long distance view is some 13.87km away from the Site looking northwards. The pasture field and woodland in the foreground form the defining elements of the view located on a rural lane on the edge of Wick. The land rises in the far distance beyond Bridgend which forms a relatively narrow strip of development in the view. Mynydd y Gaer lies behind the telegraph pole in the immediate foreground of this view. The muted colour of these slopes contrast with Mynydd Maendy where there are geometric dark shapes of forestry plantation interspersed with the lighter and muted tones of upland moor. The Mynydd Portref Wind farm lies slightly closer than the Taff Ely Wind farm to its left and is clearly noticeable on the skyline.
- 5.1.125 At night, street and house lighting and light glow within Bridgend within the middle distance of the viewpoint would be the main lighting sources. There are a few scattered light sources from houses on distant valley sides beyond Bridgend. The red warning lights of the wind turbines of Mynydd Portref and Taff Ely Wind farms on the right hand side of the view would be noticeable on the skyline.

Representative Viewpoint 22 – PRow Footpath, north west of Laleston

- 5.1.126 This mid distance view is 9.48km away from the Site looking north eastwards. Relatively flat arable field defines the foreground of this view from a low lying landscape located above much of Bridgend which is approximately 2.5km away. Although not dominant in this view, due to intervening gently undulating topography and higher elevation of this Representative Viewpoint, it is a very noticeable part of the view. Beyond Bridgend, as the land gradually rises the land appears to be well wooded before rising from the foothills up the hillsides of Mynydd y Gaer centre and right of the view and Mynydd Baedan on the lefthand side of the Ogmores Valley. The landcover here is pasture field farmland with scattered hillside dwellings leading to moorland on the hill tops – which contrasts with darker, often geometric shapes of forestry plantations on Mynydd Baedan and Mynydd Meiros. The skyline is punctuated by groups of wind farm developments on the ridgelines and include most noticeably, Pant y Wal centre left and Mynydd Portref and Taff Ely Wind farms on the right hand side of the view. Together with other vertical power infrastructures of pylons and transmission poles in the near mid distance of these features impart the perception of a landscape of frequently occurring energy related infrastructure.
- 5.1.127 At night, street and house lighting and light glow within Bridgend within the middle distance of the viewpoint would be the main lighting sources. There are a few scattered light sources from houses on the distant valley floor and sides beyond Bridgend. The red warning lights of the wind turbines of Pant y Wal nearest and on the left and more distant Mynydd Portref and Taff Ely Wind farms on the right hand side of the view would be noticeable on the skyline.

Representative Viewpoint 23 – PRow Footpath, within Country Park, Kenfig Hill

- 5.1.128 This is a mid distance elevated view is 9.9km from the Site, looking east, just north of the B4281 at Kenfig Hill. The land falls away in the foreground to a former open cast workings, now restored to grassland and a reservoir, surrounded by scrub and trees. Despite the naturalistic landcover, the man made topography here is noticeable and dominant in the view. Beyond the restored areas the land rises up Mynydd Baedan on the left of the view with a mosaic of contrasting landcover of pasture fields, rough grassland with the Pant y Wal Wind farm and dark geometric forms of forestry on higher ground. The eye is lead down the Ogmores Valley to the muted single tone and colour of upland moor and grassland on the sides of Mynydd y Gaer, with the Taff Ely Wind farm behind the ridge can be seen. In the middle distance and to the right hand side of the view the landcover is contrasting between forestry plantation and pasture field in both colour and form. There are relatively few buildings within this view.
- 5.1.129 At night there are a few scattered light sources from houses on the distant valley floor and sides beyond Bridgend. The red warning lights of the wind turbines of Pant y Wal nearest and on the left and more distant Mynydd Portref and Taff Ely Wind farms on the right hand side of the view would be noticeable on the skyline.

Representative Viewpoint 24 – PRow Footpath, close to Mynydd Baedan summit

- 5.1.130 This is an expansive, elevated open mid distance view, 6.83km from the Site, near the summit of Mynydd Baedan 240m AOD, looking eastwards across pasture fields bounded by hedgerows, which dominate and extend from the foreground well into the middle distance and across the Llynfi valley. The landcover transitions to a mixture of upland moor in the distance and on the higher parts of the valley sides and tops. The muted tones of this landcover contrasts with the dark geometric shapes of commercial forestry. Several turbines on the Pant y Wal Wind farm extension can be seen on the left hand side and the dense turbine layout of the Taff Ely turbines which lie on the right hand side and beyond the Mynydd y Gaer Site and located close to hill tops and on ridgelines. The northern outskirts of Bridgend and scattered dwellings increase the perception of a settlement fringe and housing development influence in an otherwise rural landscape. There are 2 near distance turbines above Coytrahen right of centre in the view.
- 5.1.131 At night there are a few scattered light sources from houses on the distant valley floor and sides including more dense light sources from Bridgend. The red warning lights of the wind turbines of Pant y Wal on the left and more distant Mynydd Portref and Taff Ely Wind farms on the right hand side of the view would be noticeable features on the dark skyline.

Representative Viewpoint 25 – PRow Footpath within SLA and Registered Landscape of Historic Interest Mynydd Margam

- 5.1.132 This is an expansive, elevated (340m AOD) open mid distance view, 11.14km from the Site, viewed from the edge of commercial forestry, looking eastwards across upland rough grassland, which dominates the foreground before descending into the Llynfi valley where there is a mixture of pasture fields woodland and scrub and the light coloured elevations of scattered dwellings and denser patches of development associated with Maesteg. The eye is drawn southwards, down the valley landform of the Llynfi valley towards the coastal lowland landscape. The centre left of the view is characterised by hills including Mynydd y Gaer beyond which the Taff Ely and Mynydd Portref Wind farm turbines are distinct features on the hill tops. There is a perception of settlement fringe and housing development influence in this view in an otherwise rural upland and valley landscape.
- 5.1.133 At night there are a few scattered light sources from houses on the distant valley floor and sides including more dense light sources from southern parts of Maesteg. The red warning lights of the wind turbines of Pant y Wal closer and on the left and the more distant Mynydd Portref and Taff Ely Wind farms on the right hand side of the view would be noticeable features on the dark skyline.

Representative Viewpoint 26 - Wales Coast Path, Mumbles Head, Gower AONB

- 5.1.134 This is a long distance view above the pier at Mumbles Head over Swansea Bay looking east to the Site, 31km away. The view is defined by the expanse of sea. The opposite coast is characterised by development along the coastline stretch from Swansea to the heavy industry at Port Talbot. The land form of hills and valleys form the backdrop to the coastal development. The discernible landcover at this distance is a mix of green and brown muted hues of fields, pasture, woodland lighter tones of upland moor and grass and contrasting darker tones of forestry which stretch up the hill tops. Several wind farm turbines are noticeable vertical elements together with industrial chimney stacks. These are associated with Pen y Cymoedd on the lefthand side of the view and Mynydd Brombil above Port Talbot. The existing windfarms closest to the Site at Taff Ely and Pany y Wal are not discernible in this view.
- 5.1.135 At night time there is a bright and narrow strip of lighting associated with the land uses along the coastline, in particular at Port Talbot. The backdrop of hills behind the coastal development is largely dark at this distance but red warning lights of the wind farms at Pen y Cymoedd and Mynydd Brombil are noticeable. There is lighting glow in the sky due to existing developments in this part of south Wales.

Representative Viewpoint 27 – Wales Coast Path, Pwlldu Head, Gower AONB

- 5.1.136 This is a long distance view from Pwlldu Head looking over headlands and bays and the expanse of Swansea Bay looking east to the Site, 36.8km away. The view is defined by the coastal landform in the foreground and expanse of sea. The hills beyond Swansea and Port Talbot form the long distance backdrop. Existing turbines associated with Pen y Cymoedd on the lefthand side of the view and Mynydd Brombil above Port Talbot are discernible vertical elements. Development on the coastline and the dark and light tones of the landform and different landcovers above are discernible but do not constitute a prominent part of the view. The eye is drawn to existing development of Newton and Langland on the Mumbles peninsular.

Representative Viewpoint 28 – Beacons Way on Pen y Fan, Brecon Beacons National Park

- 5.1.137 This is an elevated long distance view, some 39km from the Site on the long distance trail - Beacons Way on Pen y Fan. The steep and large scale mountain landform are the striking feature of this view. The rugged moorland landcover which dominates the view emphasises the wildness of the view. There are not fields or visible dwellings in the view which adds to the sense of remoteness. The closest intervening wind farm in this view is Mynydd Bwlfa with Maerdy and Pen y Cymoedd behind and to its right, which are not visible in the weather conditions of this image from the viewpoint.

- 5.1.138 At night time the main lighting is in the form of light glow from large settlements to the south such as Bridgend and Swansea. Otherwise this view is defined by its dark sky relatively free of artificial light sources.

Representative Viewpoint 29 – Porlock Common, Exmoor National Park

- 5.1.139 This is an elevated panoramic view from within Exmoor National Park, which overlooks the Severn Estuary to the south Wales coastline approximately 41.6km from the Site. The immediate foreground is dominated by rough grassland of Porlock common, which transitions to fields hedgerows and woodland on steeper valley sides which run north to the sea. The predominant feature is the extent of sea which stretches across the mid distance of the view. In clear conditions, large settlement and industry can be made out on the Welsh coastline, including Swansea and Port Talbot. However, it is difficult at this distance to discern much detail of landcover characteristics, although the landform of the hills and valleys of the hinterland can be perceived.
- 5.1.140 At night time the main light sources will be the faint lighting associated with large settlement and industry on the Welsh Coast is seen as a narrow broken strip within the view.

Representative Viewpoint 30 – Weston-Super-Mare Settlement

- 5.1.141 This is a long distance view above the pier at Weston Super Mare looking north west to the Site, 31km away. The view is defined by the expanse of sea which stretches from the foreground to the middle distance of the view. The opposite coastline is characterised by development along the coastline stretching from Cardiff to Barry. West of Barry the view extends to Nash Point, where the lighthouse is discernible. The landform of hills and valleys form the backdrop to the coastal settlements. The discernible landcover at this distance is a mix of green and brown muted hues of fields, pasture, woodland lighter tones of upland moor and grass and contrasting darker tones of forestry which stretch up the hill tops. The Site lies well beyond the site line of Penarth and Cardiff. The windfarms closest to the Site are not discernible at this distance and in the view.
- 5.1.142 At night time the main lighting is in the form of light glow from the large settlements of Cardiff and Penarth and Barry. There are some warning lights on taller structures associated with the Cardiff dock area. There is no significant lighting sources in the foreground.

Representative Viewpoint 31 – Cefn Yr Ystrad, Brecon Beacons National Park

- 5.1.143 This is an elevated long distance view, some 35.5km from the Site on Cefn Yr Ystrad. The upland landform is the striking landform with rugged moorland landcover dominates the view emphasises its wildness.. There are views over commercial forestry and farmland at lower elevations in the mid distance this separation and contrast adds to the sense of prospect and remoteness. The

closest intervening wind farm in this view is Mynydd Bwlfa on the right, and directly behind the Penrhys Wind farm. It is not possible to discern the Mynydd y Gaer ridge with unaided eye from this distance.

5.1.144 At night time the main lighting is in the form of light glow from large settlements to the south such as Bridgend and Swansea. Otherwise this view is defined by its dark sky relatively free of artificial light sources.

Representative Viewpoint 32 – Waun Rydd, Brecon Beacons National Park

5.1.145 This is an elevated long distance view, some 35.5km from the Site from the south eastern side of Waun Rydd summit. The large scale mountain landform and steep slopes are the striking feature of this view. The rugged moorland landcover which dominates the view emphasises the wildness and remoteness of the view. There are no fields or visible dwellings in the view which adds to the sense of remoteness. The closest intervening wind farm in this view is Mynydd Bwlfa with Maerdy and Pen y Cymoedd behind and to its right, which are not visible in the weather conditions of this image from the viewpoint.

5.1.146 At night time the main lighting is in the form of light glow from large settlements to the south such as Bridgend and Swansea. Otherwise, this view is defined by its dark sky relatively free of artificial light sources

Cumulative baseline

5.1.147 The selection of Cumulative Schemes in this assessment has been based on the guidance in Part 3, Table 2 of ‘Planning Guidance for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements (2014)’. Wind energy developments in the following categories and distances from the Site have been selected:

- Small turbines (25-50 m) within 8 km of the Proposed Development;
- Medium turbines (50-80 m) within 12 km of the Proposed Development;
- Large turbines (80-109 m) within 17 km of the Proposed Development;
- Very large turbines (>109 m) within 32 km of the Proposed Development.

5.1.148 The following categories Operational, Consented, In Planning and Scoping have been assigned to the wind energy developments listed in Table 12 below. Under construction schemes are included in the Consented category.

Table 5.14: Cumulative Schemes

Site Name	Number of Turbines	Blade Tip Height (m)	Planning Status
Newton Down	2	125	Operational
Parc Stormy, Stormy Down	1	100	Operational
Mynydd Brombil Wind Farm	4	100	Operational
West of Rhiwfelin Fach Farm	1	77	Operational
Graig Fatha Farm	1	125	Operational

Penrhys Wind Farm/Ferndale Power Factory	8	80	Operational
Llynfi Afan Renewable Energy Park	3	118	Operational
Pant y wal	10	115	Operational
Fforch Nest Wind Farm pt1	4	115	Operational
Fforch Nest Wind Farm pt2	7	115	Operational
Pant y wal extension	8	125	Operational
Mynydd Portref Wind Farm extension	6	110	Operational
Mynydd Portref	11	75	Operational
Taff Ely Wind Farm	20	54	Operational
Maerdy	8	125	Operational
Kenfig Industrial Estate	1	100	Operational
Llynfi Renewable Energy Park	9	118	Operational
Pen y Cymoedd	76	146	Operational
Mynydd Bwlfa	9	125	Operational
Ffynnon Oer	16	92	Operational
Maesgwyn	13	Unknown	Operational
Maesgwyn Extension	13	Unknown	Operational
Oakdale	2	130	Operational
Penyhreol Farm	1	77	Operational
Pen Bryn Oer	3	110	Operational
Wentloog Environment Centre	1	135	Operational
Gelli-wen Farm	1	77	Operational
Bedwyn Farm	1	86	Operational
Cruglwyn	2	86.5	Operational
Manmoel	5	180	Consented
Twyn Hywel	14	200	Consented
Former Nant-y-Gwyddon Landfill Site	1	122	Consented
Foel Trawsnant	11	145	Consented
Abergorki Wind Farm	3	147	Consented
Headwind Taff Ely Wind Farm (Repowering)	7	110	Consented
Upper Ogmore Wind Farm	7	150	Consented
Pant y Wal (Second extension)	2	125	Consented
Melin Court	5	150	Consented
Mynydd Fforch Dwm	6	180	Consented
Mynydd y Glyn	7	155	Consented
Mynydd Carn y Cefn	8	180	Consented
Llwyncelyn Wind Farm	2	125	Consented
Llwyncelyn Wind Farm - Resubmission	2	131	In Planning
Y Bryn	21	206 & 250	In Planning
Mynydd Bedwellte	9	180	In Planning
Mynydd Maen	13	150	In Planning

Visualisations

5.1.149 Photomontages of the proposed wind farm were prepared for selected viewpoints with reference to methodology recommended in *Visual Representation of Wind Farms; Best Practice Guidance*, Scottish Natural Heritage (2007). The viewpoint locations and visualisations (photomontages and wirelines) are shown on Figures 5.4.1 to 5.4.156.

-
- 5.1.150 The blade movement and yaw angle of the wind turbines both vary depending on wind speed and direction. This assessment assumes that the wind turbine blades would be in motion and facing the viewer. It should be noted that there would be occasions when the rotors would be stationary and viewed from the side or obliquely, both of which would reduce the magnitude of change to visual receptors.

Key Parameters for Assessment

- 5.1.151 The maximum design parameters identified in **Table 5.15** 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 5.15: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Loss landscape character and quality construction and decommissioning of the Proposed Development]	✓	✗	✓	<p>Construction phase</p> <p>Disturbance on the Site due to:</p> <ul style="list-style-type: none"> • creation of construction compound areas, localised earthworks borrow pits, / pads. 42 356 m² • creation of 11 hard standings for turbine blade laydown and turbine platforms each 6507m² • the formation of access track 5m wide 17 531 m long • cable route connection x linm (TBC) • crane and lifting gear for turbine construction 1No @ 230m, 7No @ 198m and 3No @180m <p>Operation and maintenance phase</p> <ul style="list-style-type: none"> • access tracks 5m wide 17 531 m long • presence of turbines in the landscape 1No @ 230m, 7No @ 198m and 3No @180m 	<p>Construction and Decommissioning:</p> <p>The maximum design scenario is represented by the largest footprint earthworks and greatest height/density of lifting gear / cranes and associated construction / decommissioning infrastructure. This would create the largest physical impact and the greatest area of land disturbance.</p> <p>In terms of duration, the maximum design scenario is represented by the sequential construction of the access and turbine laydown and platform areas, as this presents the longest potential construction phase. The maximum construction period is 2years.</p>
Loss landscape character and quality during operation and maintenance of the Proposed Development]	✗	✓	✗	<p>Decommissioning phase</p> <ul style="list-style-type: none"> • removal of construction compound areas, localised earthworks borrow pits, / pads. 42 356 m² • removal of 11 hard standings for turbine blade laydown and turbine platforms each 6507m² • the removal of access track 5m wide 17 531 m long • crane and lifting gear for removal of turbines and decommissioning 1No @ 230m, 7No @ 198m and 3No @180m 	<p>Operational and Maintenance</p> <p>The maximum design scenario is represented by the direct and indirect landscape effects of the 11 operational turbines and footprint of the turbine platforms and access tracks. This would create the largest physical impact and the greatest area of land disturbance.</p> <p>In terms of duration, the maximum design scenario is represented by the anticipated operational life span of the wind farm. The maximum operational period is 50 years.</p>

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Loss of visual amenity – during the construction and decommissioning of the Proposed Development	✓	✗	✓	<p>Construction phase</p> <p>Disturbance on the Site due to:</p> <ul style="list-style-type: none"> • creation of construction compound areas, localised earthworks borrow pits, / pads. 42 356 m² • creation of 11 hard standings for turbine blade laydown and turbine platforms each 6 507m² • the formation of access track 5m wide 17 531 m long • cable route connection x linm (TBC) • crane and lifting gear for turbine construction 1No @ 230m, 7No @ 198m and 3No @180m <p>Operation and maintenance phase</p> <ul style="list-style-type: none"> • access tracks 5m wide 17 531 m long • presence of turbines in the landscape 1No @ 230m, 7No @ 198m and 3No @180m <p>Decommissioning phase</p>	<p>Construction and Decommissioning:</p> <p>The maximum design scenario is represented by the largest footprint earthworks and greatest height/density of lifting gear / cranes and associated construction / decommissioning infrastructure. This would create the largest visual impact and the greatest area of land disturbance.</p> <p>The ZTV extend to 45km buffer from the proposed turbines for the search area and 32km buffer for the study area in accordance with NRW GN46.</p> <p>In terms of duration, the maximum design scenario is represented by the sequential construction of the access and turbine laydown and platform areas, as this presents the longest potential construction phase. The maximum construction period is 2years.</p>

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Loss of visual amenity – during the operation and maintenance phase of the Proposed Development	x	✓	x	<ul style="list-style-type: none"> removal of construction compound areas, localised earthworks borrow pits, / pads. 42 356 m² removal of 11 hard standings for turbine blade laydown and turbine platforms each 6507m² the removal of access track 5m wide 17 531 m long crane and lifting gear for removal of turbines and decommissioning 1No @ 230m, 7No @ 198m and 3No @ 180m 	<p>Operational and Maintenance</p> <p>The maximum design scenario is represented by the visual effects of the 11 operational turbines and footprint of the turbine platforms and access tracks. This would create the largest physical impact and the greatest area of land disturbance.</p> <p>The ZTV extend to 45km buffer from the proposed turbines for the search area and 32km buffer for the study area in accordance with NRW GN46.</p> <p>In terms of duration, the maximum design scenario is represented by the anticipated operational life span of the wind farm. The maximum operational period is 50 years.</p>

^a C=construction, O=operational and maintenance, D=decommissioning

Mitigation and Enhancement Measures Adopted as Part of the Proposed Development

- 5.1.152 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.
- 5.1.153 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').
- 5.1.154 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.
- 5.1.155 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.
- 5.1.156 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.
- 5.1.157 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.
- 5.1.158 Embedded mitigation measures relevant to the assessment of this LVIA are summarised in **Table 5.16** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.
- 5.1.159 It is acknowledged that traditional methods of landscape and visual mitigation, such as screen planting, are ineffective for wind farm development. Mitigation for wind farms is generally limited to the reduction of potential direct effects through detailed siting, and the reduction in adverse aesthetic effects through wind farm design. As part of the design process, the landscape and visual objectives for the Proposed Development have drawn upon the general and LCA-specific guidelines presented in the BCBC SPG on Renewables in the Landscape. The embedded mitigation is described below in Design Evolution.
- 5.1.160 The construction of the turbines and associated infrastructure would follow agreed Construction Method Statements, which would include arrangements for implementation of various aspects of the works to help mitigate potential

adverse impacts. These would form part of the Construction Environment Management Plan (CEMP), which would be adhered to throughout the works. The CEMP would be prepared and agreed post-consent, as described in Chapter 2 Site and Project Description.

5.1.161 Since all mitigation is embedded within the Proposed Development, the following sections report the residual effects on landscape and on visual amenity.

Table 5.16: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
<p>Turbine Site – A range of measures which are principally biodiversity enhancement focused would also mitigate the adverse disruption to the host landscape character area LCA 9 Hirwan Common and Surrounding Ridges. These include:</p> <ul style="list-style-type: none"> • Bracken Management / Acid Grassland Restoration • Turf Translocation and Bristle Bent Dispersal • Wet Heath Restoration • Invasive Non-Native Species Control and Management of Undesirable Species 	<p>A maintenance schedule for the years beyond the initial five years would be produced following the pre-application consultation and in discussion with BCBC and Coity Wallia Commons Trust</p>
<p>Beyond the Turbine Site additional measures which would bring multifunctional benefits are:</p> <ul style="list-style-type: none"> • Bracken Management – East of Blackmill Woodlands SAC • Woodland Conservation Management – Wern Tarw Woodland 	<p>A maintenance schedule for the years beyond the initial five years would be produced following the pre-application consultation and in discussion with BCBC and Coity Wallia Commons Trust</p>
<p>The creation of Exchange Common Land would help to mitigate the loss accessible common land and habitat on Mynydd y Gaer and the host LCA 9 Hirwan Common and Surrounding Ridges.</p> <ul style="list-style-type: none"> • Hedgerow Enhancement • Non-jointed Rush Management • Scrapes, Swales and Drainage Features • Tree Planting and Woodland / Scrub Management 	<p>A maintenance schedule for the years beyond the initial five years would be produced following the pre-application consultation and in discussion with BCBC and Coity Wallia Commons Trust</p>
<p>Controlled access on Mynydd y Gaer by the design and layout of the access routes for the turbines which deter unauthorised off-road vehicle use on the common. The following issues are scoped in to this topic:</p> <ul style="list-style-type: none"> • Entry point design and access off the public highway • Access track and verge design to deter unauthorised vehicular use on Mynydd y Gaer • Footpath improvements to locally promoted trails of Ogwr Ridgeway and Taff Ely Ridgeway and Sky to Sea Walks / Trails within the Site 	<p>This would be secured and achieved through a condition agreed with BCBC in relation to access management on Mynydd y Gaer</p>

Design Evolution

Overview of Design Development

5.1.162 The site selection process and general site design considerations which defined the evolution of the proposed wind farm can be found within Chapter 3: Needs and Alternatives Considered. The following section concentrates on the specific landscape and visual resource issues, which helped to establish the 11 turbine scheme assessed within this ES. The scheme layout has evolved over three main iterations:

- Initial Design (2022)– a 9 turbine layout; 180m to tip height
- Intermediate Design (Feb 2023)– a 13 turbine layout, 180m to tip height (Layout submitted for Scoping)
- Intermediate Design (Jan 2024) - 10 turbine layout, 198m to tip height
- Design Freeze PAC (24th September 2024) – 11 turbine layout various heights 180m to 230m to tip height.

Initial Design

5.1.163 An initial site identification and selection process tbc.

5.1.164 As part of the Initial Design stage, some preliminary input to define key landscape and visual considerations was undertaken to inform the potential layout for a 14 turbine scheme.

Intermediate Design

5.1.165 The 13 turbine, 180m high to tip scheme was considered through a design team meeting in November 2023 and comments that arose through scoping opinion from statutory consultees. Key landscape and visual considerations emerged which included:

- The need to reflect the future pattern of wind farms within the study area, particularly the closest proposed –‘repowering scheme’ at Taff Ely ;where taller 58 to 110m to tip, fewer - 20 to 7 turbines more widely spaced, 90-250m to 340-500m spacing turbines are proposed.
- The need to respect the scale of other consented schemes in the vicinity of the proposal site, providing sufficient separation between wind farms and avoiding visual stacking of turbines;
- The need to reduce effects on the host landscape character LCA 9 Hirwaun Common and Surrounding Ridges and LANDMAP host aspect areas and Mynydd y Gaer Special Landscape Area (SLA).
- The need to reduce effects on residential visual amenity – particularly the settlements of Glynogwr, Glynllan to the north and properties on the southern edge of Hoel y Cyw.to the south of the Mynydd y Gaer ridge. Also several properties in the local vicinity to the Proposed Development

that were considered maybe to be exposed to substantial adverse effects and Residential Visual Amenity Threshold (RVAT) could be reached

5.1.166 Key viewpoint locations were identified following the preparation of a blade tip ZTV:

- Viewpoints 3, 4, 6 and 7 – which represent locations at the nearest surrounding settlements to the proposed windfarm at Hoel y Cyw, Bryncethin, Blackmill and Glynogwr respectively.
- Local high points from surrounding hills within SLA local designations including Viewpoint 10 - Southern slopes of Pen y Foel PRow (280m), Viewpoint 14 - Mynydd William Meyrick (517m) Viewpoint 16 – Mynydd y Glyn (377m), Viewpoint 25 - PRow footpath close to summit of Mynydd Margam (340m).
- Most of the viewpoint locations are within 5km of the Site or in elevated locations within 15km and allow open views of the turbine layout to be analysed. Viewpoints. Further afield and within 45km radius of the Site, viewpoint receptors of high or very high sensitivity within protected landscapes have been selected, including Brecon Beacons National Park (Viewpoints 28, 31 and 32), Exmoor National Park (Viewpoint 29) and The Gower (Viewpoints 26 and 27) - National Landscape (formerly AONB). Additional viewpoints within Brecon Beacons National Park have been assessed at the request of the National Park at Scoping Opinion.
- Wireline modelling from the representative viewpoints and 3D modelling of the proposed turbines was undertaken together with viewpoint photography and used to inform the iterative design development process

Design ‘Chill’ for PAC

5.1.167 The 13, 180m to tip turbine scheme was reduced to 11 turbines, which vary in tip height from 180 to 230m (see turbine specification and schedule below) over a similar geographical area on Mynydd y Gaer. (includes schedule 05.12.2024)

Table 5.17: Turbine specification and location

Name	Hub Height (m)	Rotor Diameter (m)	Tip Height (m)	Easting	Northing
T1	119	162	198	294166	185792
T2	105	150	180	294511	185550
T3	119	162	198	295032	185829
T4	105	150	180	294692	186296
T5	105	150	180	295344	186325
T6	119	162	198	295519	185931
T7	119	162	198	295848	186235
T8	119	162	198	295967	185862
T9	119	162	198	296449	186082
T10	119	162	198	296501	185599

- 5.1.168 The design criteria used to inform the process were as follows:
- A simple and compact form which has a unified appearance. Turbines have been designed to have a similar spacing within the wind farm, to avoid a random appearance;
 - Avoidance of outlier turbines and visual stacking. The organised composition of the wind farm prevents single turbines appearing as separated from the main cluster. Straight lines have been avoided to prevent views of several turbines on the same axis, which is often discordant in the landscape;
 - Relationship of the wind farm to the character, scale, pattern and composition of the landscape. The scale of the wind farm and its shape have been designed to relate well to the scale and shape of the Mynydd y Gaer ridge and surroundings;
 - Minimise the potential effects on local residential receptor groups with at least a 500m buffer around properties.
 - Turbines positions were adjusted to lessen the visual impact on residential receptors at Glynogwr, Glynllan to the north and Hoel y Cyw to the south. This was achieved by moving the turbines away from these settlements, further towards the centre of Mynydd y Gaer. Turbine T12 on the north east side of the proposed windfarm was removed to reduce the scheme's proximity to properties and settlement to the north east.
- 5.1.169 The final, 11-turbine scheme was fixed and assessed for PAC. The layout of the wind farm is cohesive and the size and scale is compact in the landscape.
- 5.1.170 In addition to the turbine layout, the location of wind farm infrastructure has also been considered in the design process. The felling of trees to accommodate the turbines, access tracks and borrow pits has been minimised. The more sensitive habitats on Mynydd y Gaer have been avoided.
- 5.1.171 Exchange Common Land (ECL) is proposed which contributes to the mitigation of the adverse landscape effects that are anticipated. In terms of landscape and visual matter the proposed ECL mitigation includes:
- Alternative high quality public open space for the local community.
 - Landscape restoration in the form of improvements to the habitat with the ECL

Assessment of effects

Introduction

- 5.1.172 This section sets out the effects that would occur during the construction, operation and decommissioning phases.
- 5.1.173 To ensure consistency across the entire ES, the terms effect and impact are defined here. The definitions are drawn from the glossary of the Highways Agency Design Manual for Roads and Bridges, which provides general guidance:
- **Impact:** Change that is caused by an action; for example, land clearing (action) during construction which results in habitat loss (impact);
 - **Effect:** Term used to express the consequence of an impact (expressed as the 'significance of effect'), which is determined by correlating the magnitude of the impact to the sensitivity, of the receptor or resource in accordance with defined significance criteria.
- 5.1.174 Appendix 5A Landscape and Visual Impact Assessment Methodology provides more detail of the assessment process.

Landscape Effects

- 5.1.175 In order to assess the effects on landscape receptors, the landscape reporting framework described in the Landscape Character Baseline in this LVIA has been used.
- 5.1.176 Appendix 5B includes a list of all Landscape receptors within the study area, and presents a scoping and filtering exercise to determine those receptors that have been taken forward for assessment. The filtering process is based on guidance provided in GN46. Landscapes where views of skylines are an important part of their character and scenic quality are of particular focus. Effects on individual landscape receptors are also presented in Appendix 5B.

Landscape Effects During Construction and Decommissioning

- 5.1.177 Localised significant landscape effects are predicted during the construction and decommissioning stages, affecting the site itself and the local area of the host LCA – Hirwaun Common and Surrounding Ridges LCA 9. These relatively short term effects arise from a high level of disturbance within the Site and in particular on the Mynydd y Gaer plateau / VSAA CYNONVS436 Mynydd y Gaer; due to construction activity such as cranes erecting the turbines, localised earthworks, the formation of access routes, temporary construction areas and holding bays, turbine blade laydown areas and turbine hardstanding pads will also be prominent. The widening of existing forestry tracks off the B4280 to allow access for the turbines will be similar in nature to the forestry operations that exist in other plantation landscapes and will be of relatively low impact. Decommissioning operations will be similar in nature and effect to that of the construction phase.

5.1.178 **Significant short term construction and decommissioning impacts are predicted to arise for the same LCAs and VSAs in the operation period below.** Out of the 34 of landscapes which have been assessed using the process described in Appendix 5B which reflects the NRW landscape filtering process in GN46, 12 are predicted to experience significant adverse effects where the ZTV shadow falls. The closer locations, within 7km which are above or close to the elevation of the Mynydd y Gaer plateau will be the most affected by the low level operations cited above. Landscapes from the south and within the lower parts of the valley landscapes to the north and at a lower elevation will experience less intervisibility with these operations.

5.1.179 Due to local topography, construction and decommissioning works will not be widely visible from adjacent landscapes. From the nearby valleys of Ogwr Fawr and Gawr Valley, low level construction activity; localised earthworks, the formation of access routes, temporary construction areas and holding bays, turbine blade laydown areas and turbine hardstanding pads on site will not be seen or be only partially visible. Tall equipment such as cranes, which will primarily be deployed during the turbine erection stage, towards the end of the construction period will be visible. Similarly, landscapes beyond the 10km buffer and to the south east, south and south west at lower elevations to Mynydd y Gaer will experience low or less level of change in relation to these low level activities. Elevated landscapes from the east to the north and west and within the 10km would experience medium or greater levels of change - resulting in significant short term effects.

Landscape Effects During Operation

5.1.180 Criteria which are used to determine the level of effect are set out in Appendix 5A. For the 'host landscape' ie the LCA in which the Proposed Development is located a significant effect is likely to occur for example where valued elements or key characteristics would be lost or substantially altered and the level of impact or change due to the size of the area and scale would result in changes to character that would result in the Proposed Development becoming a key characteristic of the area.

5.1.181 For landscapes beyond the host landscape the nature of existing views, the extent to which views contribute to the character of the landscape and the predicted changes in those views arising from the Proposed Development are the main factors for consideration. Significant effects on the character of 'non-host' landscape character receptors may arise where views of the surrounding area are among the key characteristics of the area and, where the Proposed Development becomes a key feature of these views and significantly affects baseline high or outstanding scenic quality.

5.1.182 The ZTV coverage of the landscapes which have been filtered using GN46, relevant Representative Viewpoint assessment and fieldwork are used to identify those areas within landscape character areas or VSAs with the potential to be affected by the Proposed Development. Therefore, significance of effect judgements in Appendix 5B are for the parts of these landscape areas where the ZTV overlaps only.

- 5.1.183 At the time of drafting this assessment the design and type of aviation warning has not been determined. The assessment of effects would be different if an infrared solution rather than standard lighting was used. Therefore the night time assessment has been deferred.

Effects up to 15km from Mynydd y Gaer

- 5.1.184 Significant effects on landscape receptors are predicted across the Site and host LCA 9 Hirwaun Common Ridge and Surrounding Ridges. The introduction of 11 wind turbines with access tracks and cable connections will result in localised major adverse (significant effects). The open upland common landscape will be altered to one where wind turbines would dominate. Whilst open panoramic views would still be available the introduction of the turbines would partly compromise the scenic quality of the area. The level of impact on the ruralness and remoteness of the LCA is lessened by the fact that the Site adjoins the existing windfarms of Mynydd Portref and Taff Ely. In addition there are pylons and high voltage power lines and large scale existing development at the Rockwool factory, together with scattered farmsteads, houses and small settlement in the LCA – which give the area some existing development context. The proposed turbines are confined to the upland plateau of Mynydd y Gaer and although they dominate here, parts of the steeply sloping slides are less affected as the topography reduces the visibility of all the turbines.
- 5.1.185 The tip and hub height ZTVs for Mynydd y Gaer, fieldwork and visualisations show that the greatest impacts on surrounding landscape character areas and VSAs will be within the 5km buffer distance from the proposed turbines and in most open landscapes. The impact diminishes between 5 and 15km where potential visibility between landscape receptors reduces to the north and west, but moderately extensive intervisibility over the coastal hinterland landscapes to the south. The pattern of intervisibility is more fragmented across the north and east parts of the study area where the landscape is typically a series of settled valley bottoms with steep sides and little intervisibility to a mix of exposed open and wooded upland ridges and plateau landscapes, which have the potential to be more widely impacted.
- 5.1.186 Out of the 34 of landscapes which have been assessed using the process described in Appendix 5B which reflects the NRW landscape filtering process in GN46, 12 are predicted to experience significant adverse effects where the ZTV shadow falls. These are mostly within 7km of the Proposed Development in elevated and open landscapes to the west though to the east and where they would appear as the closest turbines to these landscapes of Mynydd y Gaer, LCA 9 Hirwaun Common and Surrounding Ridges, LCA8 Ogmores Forest and Surrounding Uplands (Bridgend), LCA 6 Mynydd Llangeinwyr Uplands (Bridgend), LCA 7 Ogmores Valley Floor & Lower Slopes (Bridgend), LCA 1 Langwynyd Rolling Uplands (Bridgend), CYNONVS436 - Mynydd Gaer eastern part (Rhondda Cynon Taff), , CYNONVS142 - Mynydd y Glyn and CYNONVS966 - Bettws (Rhondda Cynon Taff) . To the south and south east only, LCA 10 Coity Rural Hinterland (Bridgend), parts of VSA CYNONVS572 – Hendre, (Rhondda Cynon Taff) within 10km of the proposed turbines and the northern parts of LCA 2 Northern Vale Lias Slopes and LCA 10 Upper Thaw

Valley (both Vale of Glamorgan) would experience significant adverse effects and only where the ZTV and fieldwork indicate the potential for visibility of the turbines. These LCAs/VSAAs are also have a high proportion covered by local special landscape area designation.

- 5.1.187 Upland landscapes where skylines are an important part of their character and located to the east round to the north east of the Proposed Development and between 8 and 15km away, where the magnitude of impact is predicted to be no greater than low to medium, would experience no greater than moderate adverse but not significant effects. In these places turbines would appear on the skyline behind and or overlap with existing windfarms at Mynydd Portref and Taff Ely and intervisibility with the proposed scheme would be partly obscured by landform and would not experience significant adverse effects. These include VSAAs CYNONVS572 - Hendre ((Rhondda Cynon Taff) beyond the 10km buffer from the Proposed Development, CRDFFVS003 Garth West and CRDFFVS004 Garth Hill (Rhondda Cynon Taff and Cardiff), and to the north east CYNONVS738 Cefn y Rhondda, CYNONVS141 Ynysbwl (Rhondda Cynon Taff). However, closer (within 10km) elevated landscapes of CYNONVS436 - Mynydd Gaer eastern part (Rhondda Cynon Taff), CYNONVS966 - Bettws (Rhondda Cynon Taff), and parts of CYNONVS572 - Hendre within the 10km buffer would experience a high magnitude of impact due to the proximity of the proposed turbines and the effects would be significant.
- 5.1.188 LCAs to the south and within 15km of Mynydd y Gaer are a mixture of open rolling lowland. mosaic lowland valleys and mosaic rolling lowland (LANDMAP CLS 3 descriptions). The LCAs within 10km would experience moderate adverse effects at worse. LCA 10 Coity Rural Hinterland (Bridgend), parts of VSAAs CYNONVS572 – Hendre, (Rhondda Cynon Taff) within 10km of the proposed turbines and the northern parts of LCA 2 Northern Vale Lias Slopes and LCA 10 Upper Thaw Valley (both Vale of Glamorgan) would experience significant adverse effects. Although moderate adverse effects are predicted for the other LCAs within 10km and south of Mynydd y Gaer - the magnitude of impact is judged to be low to medium in these areas and the effects are not significant. The proposed turbines would appear as prominent to noticeable structures on the skyline from these LCAs beyond Pencoed, Bridgend and the M4 motorway. They will be an addition to the surrounding existing Taff Ely and Mynydd Portref wind farms, which appear on the skyline to the east and partially overlap with the Proposed Development. The character and composition of the skyline would be altered but the proposed turbines would not substantially alter scale and character of the surroundings and the wider setting. The mixed character of these existing developments and farmland, lessens the impact or level of change with the introduction of the proposed turbines.
- 5.1.189 The 15km buffer to the south extends to some highly valued landscapes such as LCA 7 Heritage Coast Hinterland (Vale of Glamorgan) and coastal LCAs which are of medium to high sensitivity to this type of development such as LCA 14 Kenfig Dunes and Coastline (Bridgend). However, the magnitude of impact is judged to be low for these areas – given the long distance nature of

views, intervening rolling lowland topography and reduced geographic extent of intervisibility with the Proposed Development compared to closer LCAs.

- 5.1.190 Landscapes to the west of Bridgend between 5 and 15km and south west from the Proposed Development would experience mostly low to moderate effects at worst which is not significant. LCA 15 Cefn Cribwr Ridge and Settled Farmland (Bridgend) would experience moderate, but not significant effects. Although the proposed turbines would replace the open skyline of Mynydd y Gaer – they would occupy a small part of the skyline from this angle and distance. The proposed turbines would appear as, visible structures which stand out on the skyline to the east north east above Bridgend. The proposed turbines would intensify wind turbine development on this part of the skyline and an addition to the existing similar context of Taff Ely and Mynydd Portref wind farms, which would appear behind and overlap with the proposed windfarm. The Pant y Wal windfarm is situated further north than the proposed windfarm. The existing wind farms provide an existing context which the Proposed Development would contribute to intensifying wind turbine development but would not be substantially uncharacteristic with the attributes of the receiving landscape.

Effects beyond 15km from Mynydd y Gaer

- 5.1.191 Beyond the 15km buffer from the Proposed Development the intervisibility with Mynydd y Gaer becomes more fragmented and restricted to the most open and elevated locations. Often existing intervening and/or closer windfarm schemes will be more prominent on skylines from these LCAs/VSAAs than the proposed turbines at Mynydd y Gaer.
- 5.1.192 The results of the filtering process of landscapes within the study area using guidance in GN46 and detailed in Appendix 5B is shown on figures 5.2.12 and 5.2.13. Most of the filtered landscape areas that are within the 15 to 32km buffer are to the north and north east of Mynydd y Gaer. These areas correspond with elevated open plateaux and ridges with upland moorland and pasture above mixed farming, forestry and settled valleys. The following areas were assessed; VSAA CYNONVS143 – Llanfabon, CYNONVS129 – Mynydd y Grugg, CYNONVS854 Mynydd y Lan, CYNONVS214- Mynydd Lwyd and Mynydd Maen (all Caerphilly) LU 13 - Upland Moorland between Taff and Rhymney Valleys, (Rhondda Cynon Taff) and LUs 18, Mynydd Bedwelte & Associated Uplands, 22 Northern Manmoel Ridge & 24 Mynydd Carn y Cefn & Cefn yr Arail HoV Landscape Units (Bleanau Gwent County Boroughs).
- 5.1.193 Although these landscapes are judged to be of medium to high sensitivity, they are between 17 and 32km from the Proposed Development. They will be an addition to the surrounding context of existing Taff Ely and Mynydd Portref wind farms, and occupy a very small part of the skyline in the direction of Mynydd y Gaer. The existing intervening and nearer windfarm schemes to these landscape receptors such as at Ferndale, Llwynceilyn, Fforch Nest, Pant-y-Wal and Maerdy, which are situated to the west and south west of the LU parts will continue to be the more noticeable turbines in views in these directions. The magnitude of impact is predicted to be negligible and the effects

will be negligible. Therefore, there are no significant landscape effects predicted for these landscapes at these distances from the Proposed Development.

5.1.194 Although the ZTV indicates that there is potential for intervisibility between more distant landscapes to the south east of the Proposed Development, fieldwork and modelling of the proposed turbines has shown that potential visibility is far less likely. The LCAs that fall into this category are beyond generally beyond 17km and include Lower Waycock Valley, Lanfan and Waycock Valley . Dyffryn Area, Cardiff Airport, Rhoose Hinterland, Aberthaw Estuary, Glamorgan Coast Intertidal, Porthkerry Country park, Barry to Aberthaw Cliffs, St Nicholas and Bonvilston Ridge Slopes and St Nicholas and Bonvilston Ridge (all Vale of Glamorgan). Sully Ridge, Estuary Saltmarsh and Rumney Great Wharf and Western Cemetery (all Cardiff). The effects would be no greater than negligible and mostly no effect.

Brecon Beacons National Park

5.1.195 Minor adverse effects are predicted for LCAs 7 and 9 in the Brecon Beacons National Park (BBNP). The high and very high sensitivity of these landscapes mean that even a negligible level of change results in a minor adverse effect. The proposed turbines would be hard to discern at over 25km away particularly when viewing into the sun or where low cloud and mist conditions prevail. Other existing closer wind farm schemes would continue to be the most noticeable. There would be a very slight almost imperceptible intensification of windfarm development in this part of the view from these landscapes.

5.1.196 Special qualities of the BBNP have been published for each LCA and for the whole National Park.

5.1.197 The relevant special qualities of LCA 7 – Central Beacons are:

- *An iconic landscape which forms the centre of the Brecon Beacons National Park. It has exceptionally high scenic quality and a strong sense of place resulting from its elevation, dramatic and distinctive topography, and panoramic views.*
- *High levels of tranquillity due to the landscape's openness, perceived naturalness, low noise and dark skies (the LCA is within the BBNP core dark skies area).... The combination of inaccessibility, landform and absence of settlement gives the central part of the LCA a sense of remoteness.*
- *Main summits and ridges are exceptionally popular walking routes with stunning views.*

5.1.198 The elevated nature of this remote part of the Brecon Beacons allows for far reaching views. The LCA falls beyond 29km from the proposed turbines. They would be barely discernible and only in clear weather on the skyline to the south west. Therefore there would be no discernible change to the quality of views – their openness, sense of remoteness and absence of settlement and development.

5.1.199 The relevant special qualities of LCA 9 - Mynyddoedd Llangatwg & Llangynidr Uplands are:

- *Scenic quality and sense of place resulting from combination of openness, landform, moorland vegetation, archaeology and views to distinctive skylines in other LCAs.*
- *An exceptionally open and exposed landscape. Its landform, and absence of settlement and development give it a sense of tranquillity, remoteness and relative wildness in parts, despite its proximity to settlements to the south. The western part is within the BBNP core dark skies area.*
- *Almost entirely open access land with some footpaths/ bridlepaths enabling access to high quality landscapes and long views over the National Park to the Central Beacons*

5.1.200 The Proposed Development at Mynydd y Gaer would be barely perceptible from this part of the National Park and would not compromise the existing baseline including the quality of the views south wards. Intervening settlement in valleys and existing closer wind farms would remain the most noticeable features in views in this direction.

5.1.201 The relevant National park – wide special qualities are:

- *A National Park offering peace and tranquillity with opportunities for quiet enjoyment, inspiration, relaxation and spiritual renewal.*
- *The Park's sweeping grandeur and outstanding natural beauty observed across a variety of harmoniously connected landscapes, including marvellous gorges and waterfalls, classic karst geology with caves and sink holes, contrasting glacial landforms such as cliffs and broad valleys carved from old red sandstone and prominent hilltops with extensive views in all directions.*
- *In the context of the UK, geographically rugged, remote and challenging landscapes*

5.1.202 The level of tranquillity, quality of extensive views from prominent hilltops and the level of remoteness would not be reduced by the proposed windfarm at Mynydd y Gaer.

The Gower National Landscape

5.1.203 The eastern edge of the Gower - at the Mumbles lies over 31km from the proposed wind farm at Mynydd y Gaer. The proposed turbines would be imperceptible from this location. Night time sky glow caused by light pollution is cited in the Gower AONB Management Plan as an indicator of tranquillity. The existing coastal development including Bridgend, Porthcawl and Port Talbot would remain the dominant source of light glow in views towards the Mynydd y Gaer. The proposed aviation warning lights on the proposed turbines (if specified) would be barely discernible.

Special Landscape Areas (SLAs)

- 5.1.204 The distribution of SLAs within the study area with the tip height ZTV is shown in Figure 5.1.1. and listed below:
- 5.1.205 The SLA local landscape designation has been used to inform value judgements in the landscape assessment. Frequently the SLA boundary does not coincide with the LCA or VSAA boundaries as they are an indicator based on landscape value and quality rather than character. An overview judgement of the amount of SLA(s) coverage of each LCA or VSAA was made in evaluating value in the assessment tables in Appendix 5B. Therefore, the effects on component SLAs are considered as part of the effects on the LCA or VSAA rather than by each SLA. Only the SLAs from the list below which have potential visual intervisibility with the proposed scheme and within the filtered landscape reporting framework are considered.
- 5.1.206 Some of these SLAs contain or adjoin existing windfarms and retain this local landscape designation. Therefore, it can be assumed that a landscape with wind turbines can have sufficiently high levels of scenic quality so as still to be regarded as a SLA.

Table 5.18: SLAs with existing or consented windfarms

SLAs which have potential visual intervisibility with the proposed scheme and within the filtered landscape reporting framework – purple text - are considered in Appendix 5B

SLA Name	Local Authority	Existing / Consented wind turbines present
Mynydd Bedwellty, Rhymney & Sirhowy Sides	Blaenau Gwent	N
St Iltyd Plateau & Ebbw Eastern Sides	Blaenau Gwent	N
Cwm Tyleri & Cwm Celyn	Blaenau Gwent	N
Mynydd Carn-y-Cefn & Cefn yr Arail	Blaenau Gwent	Y
Cefn Manmoel	Blaenau Gwent	Y
Foel y Dyffryn	Bridgend	Y
Northern Uplands	Bridgend	Y
Bryngarw Country Park	Bridgend	N
Merthyr Mawr Warren	Bridgend	N
Kenfig Burrows	Bridgend	N
Porthcawl Coast	Bridgend	N
Mynydd y Gaer	Bridgend	N
Western Uplands	Bridgend	N
Laleston	Bridgend	N
Gelligaer	Caerphilly	N
Rhondda Fawr Northern Cwm & Slopes	Rhondda Cynon Taf	N
Taff Vale Eastern Slopes	Rhondda Cynon Taf	N
Mynydd y Glyn & Nant Muchudd Basin	Rhondda Cynon Taf	Y
Mynydd Hugh & Llantrisant Forest	Rhondda Cynon Taf	Y
Llanharry Surrounds	Rhondda Cynon Taf	N
Llanharry Surrounds	Rhondda Cynon Taf	N
Llantrisant Surrounds	Rhondda Cynon Taf	N
Foel Trawsnant	Neath Port Talbot	Y
Mynydd y Cymmer	Rhondda Cynon Taf	N

SLA Name	Local Authority	Existing / Consented wind turbines present
Llwynceilyn Slopes	Rhondda Cynon Taf	N
Efail Isaf, Garth & Nantgarw Western Slopes	Rhondda Cynon Taf	N
Cwrt-yr-Ala Basin	Vale of Glamorgan	N
Dyffryn Basin & Ridge Slopes	Vale of Glamorgan	N
Nant Llancafarn	Vale of Glamorgan	N
Ely Valley & Ridge Slopes	Vale of Glamorgan	N
Castle upon Alun	Vale of Glamorgan	N
Upper & Lower Thaw Valley	Vale of Glamorgan	N
Cwm Orci	Rhondda Cynon Taf	Y

Effects during decommissioning

- 5.1.207 If complete decommissioning is required, then all of the wind turbines and electrical infrastructure will be removed and any waste arising disposed of in accordance with relevant regulations. Foundations will be broken up and the site reinstated to its original condition or for an alternative use.
- 5.1.208 Activities during decommissioning would be no greater than those occurring during the construction phase and the magnitude of impact and significance of effect would be the same as, or less than, those reported for the construction phase above.

Visual Effects

- 5.1.209 This section sets out the assessment of the significance of the predicted visual effects that will arise as a result of construction activity and the operational scheme.
- 5.1.210 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), as described in the assessment methodology (Appendix A).
- 5.1.211 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 Appendix 5C and has been informed by the visualisations presented for the 32 viewpoints in Figures 5.4.1 to 5.4.156.

Visual Effects During Construction, and Decommissioning

- 5.1.212 During construction and decommissioning phases, significant (moderate) short term effects are predicted to affect visual receptors at locations within 6.3 km of the turbines. These receptors will have views of construction works and disturbance associated with creation of the access tracks, earthworks associated with turbine platforms, blade laydown areas, borrow pits and storage areas and as well as turbine erection. Construction activity (other than turbine erection) is unlikely to be visible from more than 10km, 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.

Visual Effects During Operation

Representative Viewpoints

- 5.1.213 The viewpoint assessment identifies significant visual effects on 15 viewpoint receptors due to the Proposed Development and up to 6.3km from Mynydd y Gaer.
- 5.1.214 Moderate adverse and significant effects were identified for 6 viewpoint locations. Although 2 of these viewpoints 12 and 13, to the southeast of the Proposed Development are considered to have close (less than 3km away) views of the proposed turbines within the context of baseline features including development such as existing wind turbines, other intervening substantial development including the Rockwool factory and / or intervening landform is such that the level of change or impact is considered to be less than high. The composition and character of the view together with the Proposed Development would be an intensification and spread of the existing windfarm context at Taff Ely and Mynydd Portref within these views. The proposed changes to these views would be larger scale turbines than those in the existing view but would be at a moderate variance with the existing view.
- 5.1.215 Within the distance range 5 to 15km only viewpoints 16 (Mynydd y Glyn) and 19 (St Mary Hill Down) would experience moderate adverse and significant effects. Moderate adverse effects (not significant) would be experienced between 5 and 15km by 3 visual receptors to just over 11km at Mynydd Margam and from only the highest points in this distance range. These effects are not considered to be significant as the magnitude of impact is judged to be low to medium. The other viewpoint receptors would experience Minor or less significance of effect in this distance range.
- 5.1.216 Beyond 15km from the development the visual level of impact / change diminishes. The effect on high and very high sensitivity visual receptors within the Brecon Beacons National Park (3 viewpoints), Gower National Landscape (2 viewpoints) and Exmoor National Park (1 viewpoint). The viewpoints within these National landscape designations would experience no greater than negligible adverse to no effects.
- 5.1.217 A summary table for the visual effects on the 32 representative viewpoints is provided in the Summary of Effects section towards the end of this assessment. The following sections summarise the likely effects on different receptor groups across the study area, informed by the findings of the viewpoint assessment.

Group Receptors

Effects on Settlement receptors

- 5.1.218 This section discusses potential effects from locations within settlements from areas with public access where potential intervisibility is predicted by the hub height ZTV and fieldwork and within 7.5km of the Proposed Development. This buffer distance was chosen on the basis of the approximate extent of moderate effects from the representative viewpoint assessment.

Valley Settlements

Ogwr Fach Valley

- 5.1.219 This valley runs west to east climbing from 96m at Glynllan bridge off the A4093 to 216m at Gilfach Goch at the junction with the B4564. There are potentially close views of the Proposed Development which lies immediately to the south of the Valley.

Glynllan

- 5.1.220 The closest proposed turbine is T4 870m from the A4093 on the southern edge of Glynllan. The Taff Ely windfarm on Mynydd Maendy to the east is discernible in views from the settlement. The greatest potential visibility of the proposed turbines would be from parts of Glynllan located at higher ground on the eastern side of the settlement from the A4093 and the recreation ground. The Mynydd y Gaer slopes and ridge dominate views to the south. Susceptibility to windfarm development is judged to be high. The views are valued locally by the community. Overall the sensitivity is medium/high. From most of the settlement, there are largely unrestricted partial and frequent views of most of the turbines. There would be views of up to 7 hub and rotors on the top of Mynydd y Gaer and parts of the rotor blades of the remaining turbines, the change would be large scale but of moderate geographic extent resulting in a High - Medium magnitude of change. Effects are likely to be **Major adverse** (significant)

Glynogwr

- 5.1.221 The closest proposed turbine T5 is 840m the southern edge of Glynogwr. The Taff Ely and Mynydd Portref windfarms on Mynydd Maendy to the east are discernible, but do not dominate views from the settlement. The greatest visibility would be from the A4093 and the churchyard. The Mynydd y Gaer slopes and ridge dominate views to the south. Susceptibility to windfarm development is judged to be high. The views are valued locally by the community. As identified in Viewpoint 7 - Glynogwr, A4093 western edge of settlement, overall the sensitivity is high. From most of the settlement, there would be unrestricted or partial and frequent views of most of the proposed turbines, which would dominate views, resulting in a High magnitude of change. Effects are likely to be **Major adverse** (significant)

Gilfach Goch / Evanstown

- 5.1.222 The closest proposed turbine T9 is 2.4km from the southern edge of Gilfach Goch. The Taff Ely and Mynydd Portref windfarms on Mynydd Maendy to the south are prominent from the A4093, but do not dominate views from the settlement. Susceptibility to windfarm development is judged to be high. The views are valued locally by the community. Housing to the north of the A4093 is lower lying than the road and views of the Proposed Development are restricted by the topography. As identified in Viewpoint 8 - B4564 / PRow Footpath east of Evanstow (Gilfach Goch), overall the sensitivity is high. From most of the settlement, there would be very few views of the proposed turbines. The areas which would experience greatest intervisibility with the proposed turbines would be south of the A4093, which has little development compared to the north, parts of the recreation ground /playing fields at the Gilfach Goch Community Association and higher parts of the settlement at Evanstown. Although the proposed turbines would extend the visual arc of wind turbine development, they would not dominate views to the south. The magnitude of change would vary from no change / negligible to medium. The levels of effect are likely to be **Moderate adverse** for the more exposed places identified above but most settlement receptors would experience **No Change to Minor adverse** effects.

Ogmore Valley

- 5.1.223 This valley runs south to north from 43m AOD at Sarn in the south to 80m AOD at Blackmill. There are potentially close views of the Proposed Development which lies immediately to the east of the Valley

Sarn / Abergarw / Bryncethin / Brynmenyn

- 5.1.224 These settlements are located on the northern side of Bridgend. Buildings are predominantly on the valley floor rather than spreading up the valley sides. This limits their intervisibility with the surrounding landscape including views west towards the Proposed Development. The closest proposed turbine is 2.75km from the eastern side of Bryncethin to T1. The Taff Ely and Mynydd Portref windfarms are generally not seen in views from these settlements. There are few partial views towards the Mynydd y Gaer ridge and only from the higher parts of Brynmenyn and the B4280 on the east side of Bryncethin. As identified in Viewpoint 4 - Bryncethin, Settlement edge PRow footpath, overall the sensitivity is medium. The magnitude of change would vary from no change / negligible to medium. The levels of effect are likely to be **Moderate adverse** for the very few places identified above, on the edge of Bryncethin and higher parts of Brynmenyn but most settlement receptors would experience **No Change to Negligible adverse** effects.

Blackmill

- 5.1.225 The closest proposed turbine T1 is over 1km from Blackmill. The surrounding valley sides and ridges are visible from many parts locations within Blackmill.

As identified in Viewpoint 6 - Blackmill, PROW Footpath above settlement, the susceptibility to windfarm development is judged to be medium- high. The views are valued locally by the community. Therefore the overall the sensitivity is medium/high. The eastern edge of Blackmill and where the settlement spreads up the south facing valley sides, along Craig terrace and the A4061 would have the potential for the most intervisibility with the proposed turbines. There would be filtered and partial views of the upper parts of up to five of the turbines. The magnitude of change would medium and the level of effect would be **Moderate adverse**. Elsewhere and for the majority of this settlement there would be no views of the Proposed Development and receptors would experience **No effects to Negligible adverse** effects.

Ogwr Fawr

- 5.1.226 The valley runs south to north from 80m AoD at Blackmill to 200m at Nant y moel. There are potential views of the Proposed Development to the south.

Lewistown/ Pant – yr -Awel

- 5.1.227 The closest proposed turbine T1 is 2.25km from southern edge of Pant – yr -Awel. The surrounding valley sides and ridges are visible from many parts of these settlements. Most of the settlement occupies the valley floor and lower valley sides. The susceptibility is judged to be medium-high with views being most valued by the local community, rather than visitors or tourists. The overall sensitivity to windfarm development is judged to be medium/high. The local topography screens most of the sides of Mynydd y Gaer. Most intervisibility with Mynydd y Gaer ridge is from the southern part of this built up area. There would be views of the upper parts nacel and rotors of some of the proposed wind turbines from Pant yr awel. Further north at Lewistown the intervening topography would screen more of the turbines and generally only above hub height. The magnitude of change would be small and the level of effect would be **Minor adverse** at worse. Elsewhere and for the majority of these settlements there would be very limited or no views of the Proposed Development and receptors would experience **Negligible adverse** to **No effect**.

Ogmore Vale

- 5.1.228 The closest proposed turbine Ta is 3.6km from the southern edge of the settlement of Ogmore Vale. The valley narrows and the sides are steeper and higher around Ogmore Vale than lower down Ogwr Fawr. Most of the settlement occupies the valley floor and lower valley sides. The susceptibility is judged to be medium-high with views being most valued by the local community, rather than visitors or tourists. The overall sensitivity to windfarm development is judged to be medium/high. Most views of the proposed turbines would be screened by intervening buildings from within Ogmore Vale. There would be very few locations which would have views of the Proposed Development these are concentrated on the southern side of the settlement and open space of the Rugby ground. Modelling of the Proposed Development

indicates the upper parts of up to four turbines could be discerned, which would occupy a very small part of the view beyond the bottom of Ogwr Fach. The magnitude of change would be small and the level of effect would be **Minor adverse** at worse and most of the settlement receptors would experience very few **Negligible adverse** and **No effects**.

Nant-y-moel /Price Town

- 5.1.229 The closest proposed visible turbine T1, is 5.72km away. The valley sides are less high and the settlement less enclosed than at Ogmere Vale. The susceptibility is judged to be medium-high with views being most valued by the local community, rather than visitors or tourists. The overall sensitivity to windfarm development is judged to be medium/high. The twisting valley morphology obscures views of the rest of Ogwr Fach to the south. The existing Pant y wal windfarm to the east is obscured by the side of Ogwr Fawr, although less than 715m away. Only the western side of this settlement would have potential for views of the Proposed Development – and only the upper parts of T1 and T2. Most receptor views from street level would not be able to see the proposed turbines due to intervening housing, vegetation and the intervening valley landform. Consequently, the magnitude of change would be negligible and the level of effect would be **Minor adverse** at worse and most of the settlement receptors would **No effects**.

Rhondda Fawr

- 5.1.230 This valley snakes south to north and lies to the north east of the Proposed Development, with the potential for medium distance views. From the junction of the A4093 and A4233 at Tonyrefail the valley climbs from 117m AoD to 143m at Llwyny pia at Tonypandy.

Tonyrefail

- 5.1.231 The closest proposed turbine T11, is 3.73km from this receptor. Tonyrefail is situated in the relatively broad valley floor with views westwards down the Ogwr Fach valley. There are views of the surrounding valley sides which are typically undeveloped farmland, although there are near views of the existing Taff Ely and Mynydd Portref windfarms from the western side of the settlement such as in the vicinity of the A4093 and B4278 and the Community school. The susceptibility is judged to be medium-high with views being most valued by the local community, rather than visitors or tourists. The overall sensitivity to windfarm development is judged to be medium/high. Although the proposed turbines would extend the visual arc of wind turbine development in places and also appear completely behind the existing turbines in others, particularly in the south western parts of Tonyrefail, they would not dominate views to the west. The magnitude of change would vary from no change / negligible for most of the settlement to low on the western sides of Tonyrefail. The levels of effect are likely to be **Minor adverse** for these more exposed locations identified above but most settlement receptors would experience **Negligible adverse to No Effects**.

Edmonstown / Penygraig /Tonypandy

- 5.1.232 The closest proposed turbine T11, is 5.45km from the southern edge of this receptor. Settlement spreads continuously along the valley floor from Edmonstown to Tonypandy. Views of the surrounding valley sides to the west beyond the settlement edge are dominated by Mynydd Gilfch and Mynydd Pen y graig. However the high proportion of tree cover and dense development restricts views out to the wider countryside from most locations. The susceptibility is judged to be medium with views being most valued by the local community, rather than visitors or tourists. The overall sensitivity to windfarm development is judged to be medium. There would be no views of the Proposed Development from these settlements and therefore **No Effects**.

Cwm Garw

- 5.1.233 This valley winds south to north and lies to the west of the Proposed Development, with the potential for medium distance views. North of Bynmenyn on the A4064 the valley climbs from 63m AoD to 150m at Pontycymer.

Bettws

- 5.1.234 The closest proposed turbine T1 is 3.95km from this receptor. This settlement lies above Cwm Garw at approximately 160m. It is unusual locally in this respect as most settlements lie within the valleys. There are views north from within the settlement to Pen y Foel. Views to the east and towards the Proposed Development are obscured by vegetation and housing. Settlement receptors on the eastern side of Bettws have panoramic views over the hills and valleys landscape with Bryn y Wrach hill the closest high point. Views of the Mynydd y Gaer ridge beyond are obscured by this landform. The existing Ely Taff and Mynydd Portref windfarms are barely discernible in views in this direction beyond Mynydd y Gaer. The susceptibility is judged to be medium-high with views being most valued by the local community, rather than visitors or tourists. The overall sensitivity to windfarm development is judged to be medium/high. Only the eastern side of this settlement, including Bettwys football ground, would have potential for views of the Proposed Development – and only the upper parts of the turbines. These would occupy a small part of the skyline as the Proposed Development would be seen 'side on'. Most receptor views from street level would not be able to see the proposed turbines due to intervening housing, vegetation and the intervening valley landform. Consequently, the magnitude of change would be minor and the level of effect would be **Moderate to Minor adverse** at worse and most of the settlement receptors would experience **No effects**.

Lowland Settlements south of Mynydd y Gaer

Hirwaun Common and Surrounding Ridges

Hoel y Cyw

- 5.1.235 The closest proposed turbine T2 is 830m away from the northern edge of this settlement. However the crest of the Mynydd Y Gaer southern slopes would restrict views of the whole turbines. Where there are gaps between houses and or gaps in vegetation this would allow views of up to 8 of the turbines' nacelles and blades. The Taff Ely and Mynydd Portref windfarms on Mynydd Maendy are not discernible. The greatest visibility of the proposed wind turbines would be from the lower southern edge of the settlement close to Viewpoint 3 'Hoel y Cyw'. Susceptibility to windfarm development is judged to be medium to high. The views are valued locally by the community. As identified in Viewpoint 3 - edge of settlement, overall the sensitivity is high. From most of the southern part of the settlement, there would be restricted or partial occasional views of the upper parts of most of the proposed turbines, which would form a very prominent part of many views, resulting in a High magnitude of change. Effects are likely to be **Major adverse** (significant). As the settlement rises up the sides of Mynydd y Gaer, the intervening topography reduces the amount of visibility of the turbines and there would be a reduced and **Moderate adverse** effect (not significant)

Coity Hinterland

Pencoed

- 5.1.236 The closest proposed turbine T11 is 2.83km away from the northern edge of this settlement. There is frequent tree and woodland cover immediately to the north and west of Pencoed which together with the gently undulating landform significantly restricts views towards the Mynydd y Gaer ridge. Susceptibility to windfarm development is judged to be medium to high. The views are valued locally by the community and overall the sensitivity is medium to high. The greatest visibility of the proposed wind turbines would be from the north eastern edge of the settlement adjacent to the B4280. All the proposed turbines will be seen looking up to the Mynydd y Gaer ridge, and over the sizeable Rockwool factory site with scattered housing and farmland in the middle distance. However, only the upper parts of Turbines T5, T7 and T9 would be seen. The proposed turbines would be perceived as a single grouping and would frequently occupy 90 degree horizontal fields of view for receptors on the northern edge of Pencoed. The proposed turbines would extend wind turbine development along the Mynydd y Gaer ridge skyline from the Taff Ely windfarm. Representative Viewpoint 12 from a track on the northern edge of Pencoed '. Very few properties and places would experience the predicted most adverse effects, on the northern edge of Pencoed, which is judged to be **Moderate adverse**, most parts of Pencoed would experience less than Minor adverse and mostly **Negligible adverse** effects.

Bridgend – eastern suburbs

- 5.1.237 The closest proposed turbine T2 is 3.9km away from Parc Derwen of the north eastern edge of Bridgend. The intervening landscape includes the M4 ‘corridor’ which is fringed by trees and wooded strips and common land beyond with scrub and trees which limit the potential intervisibility with the Proposed Development. The upper parts of most of the turbines will be visible from the eastern side of Parc Derwen and Coity. In most locations within the eastern suburbs of Bridgend the turbines will not be visible. Susceptibility to windfarm development is judged to be medium. The views are valued locally by the community overall the sensitivity is medium. The proposed turbines would be perceived as a single grouping with some stacking towards the centre of the grouping. Relatively few properties and places would experience the predicted most adverse effects which is judged to be **Minor adverse**, most parts of the eastern suburbs would experience less than **Negligible adverse** effects.

Brynna

- 5.1.238 The closest proposed turbine T11 is 2.56km away from the northern edge of Brynna. Brynna lies on the on the south west facing lower slopes of Mynydd y Gaer. The surrounding landscape to the rises up to north west towards Mynydd y Gaer ridge, though fields with very thick wooded boundaries and hedges. This substantially reduces the potential effect from the Proposed Development. Susceptibility to windfarm development is judged to be medium to high from this visual group receptor. The views are valued locally by the community, overall the sensitivity is medium to high. Viewpoint 13 is representative of views of more open views from the north of Brynna. . The proposed turbines would be perceived as a single grouping, with little stacking but some overlap of rotors. The open upland moorland landscape of the eastern end of the Mynydd y Gaer ridge would remain undeveloped ensuring a distinct gap between the Taff Ely and Mynydd y Gaer farms and the Proposed Development. Very few properties and places on the northern edge of Brynna would experience the predicted most adverse effects which are judged to be **Moderate to Minor adverse**, most parts of Brynna would experience **Negligible adverse** effects.

Effects on Recreational users

- 5.1.239 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.

Site – Mynydd y Gaer Open Access Land (430ha total)

- 5.1.240 Much of the Site is identified as Common land with open access rights, and there are several public rights of way crossing the high ground of Mynydd y Gaer. The visual sensitivity of recreational access receptors in the Site is judged to be high, as identified for Viewpoint 1 ‘Mynydd Meandy Taff Ely Ridgeway Walk’ and Viewpoint 2 ‘Mynydd y Gaer ProW – lane junction’, which

are typical proxy visual receptors for this area of Common Land. Walkers using this area will experience a large scale of change in view during the operational phase, due to the presence of wind turbines and access tracks, in near to very near distance views. Effects are likely to be **Major adverse** (significant) as identified for Viewpoint 1 'Mynydd Meandy Taff Ely Ridgeway Walk' and Viewpoint 2 'Mynydd y Gaer ProW – lane junction', Common Land. People walking towards the Proposed Development on nearby footpaths including the locally promoted trails; Ogwr Ridgeway and Taff Ely Ridgeway Walks would experience large scale changes to views within the open upland moorland landscape of the Site.

PRoW within 1.5km

- 5.1.241 People walking and riding on PRoW towards the Proposed Development on nearby footpaths and bridleways will frequently experience large scale changes to views over a large geographical extent within views. There will be **Major adverse** and significant effects on most of the length of PRoW from Bryncethin along the western approach to Mynydd y Gaer as recorded at Viewpoint 4, 'Bryncethin, settlement edge PRoW footpath'. Similarly there will be a high magnitude of change on receptor views along most of the lengths of nearby PRoW, which all have medium sensitivity, approaching the southern facing slopes of Mynydd y Gaer from close by settlements of Heol y Cyw, Rhiwceiliog, Brynna and Lanharan as identified for Viewpoint 13 'PRoW Bridleway on north side of Brynna'.

Effects on Open Access Land with 10km of the Proposed Development

- 5.1.242 There are substantial areas of upland open access land, at a close distance (within 10km) to the Proposed Development. Although some of these areas are covered with mature commercial forestry which restricts visibility of the proposed wind turbines.
- 5.1.243 In order to focus on potentially significant effects, open access land from which there is no theoretical visibility are not considered. Furthermore, open access land with limited visibility from a longer distance; beyond 10 km from the Proposed Development are not considered further in this assessment and only open access areas that are of an elevated open nature within the 10km buffer are considered further. The Representative Viewpoint assessment established that beyond the 5km buffer there would be no significant effects on these receptors and no greater than Moderate adverse effects are predicted between 5 and 10 km. Multiple moderate effects can result in significant effects for group and dynamic receptors. Where representative viewpoints within open access areas have been assessed as likely to experience moderate effects between 5 and 10km buffers, the effects on the surrounding open access land is considered below. The following open landscapes and not areas occupied by commercial forestry within open access areas are likely to experience the greatest levels of change.

Cefn Hirgoed Common (519 ha total)

- 5.1.244 There would be large scale change to views over nearly all Hirgoed Common land. There will be significant adverse effects on these visual receptors as identified at several Viewpoints 3 'Heol y Cyw, Settlement' and Viewpoint 4 'Bryncethin, Settlement edge PRow footpath' on the northern edge of the Common. Viewpoints 11 'Cefn Hirgoed, PRow Common Land' and 12 'Track on northern edge of Pencoed'. The rough grassland and scrub landscape, typical of the landcover on the Common provides no or limited screening of the Proposed Development. Effects are likely to be **Moderate - Major adverse** (significant) from most of this Common land.

Mynydd Gilfach Open Access Land (153 ha total)

- 5.1.245 This is a small area of open access land within the 5km buffer of the Proposed Development. Approximately a third of the area is occupied by woodland. There is public access to the summit of Mynydd Gilfach and exposed south facing slopes towards the Proposed Development. Visual sensitivity is judged to be medium - high as identified for Viewpoint 8 'PRow Footpath east of Evanstow (Gilfach Goch)', which is on the open west facing slopes, above Gilfach Goch. The proposed turbines would be perceived as a single grouping with some stacking and overlap in views. The upper parts of the Taff Ely windfarm would be seen behind the proposed turbines. The presence of the valley floor settlement of Blackmill in the foreground reduces the rural qualities of the views. The scale of visual effect during operation is judged to be moderate and the geographic extent moderate. Given the existing visual baseline context of development and housing the changes to the view will be medium. Effects are likely to be **Moderate adverse** (not significant) from these slopes only.

Ogmore Forest Open Access Land (14 077 ha total)

- 5.1.246 This is a large area of Open Access Land, the southern edge is located 2km from the Proposed Development and extends northwards to the 20km buffer. Approximately half of the area is occupied by woodland which is mostly conifer plantation. There would be large scale change over a wide geographic extent of views from the southern edges of Ogmore Forest only – as identified for Viewpoint 9 ' which is situated close to the southern edge Ogmore Forest on a PRow footpath. The elevated nature of this land and the rough grassland and scrub landscape, typical of the landcover on this upland landscape provide no or limited screening of the Proposed Development. Effects are likely to be **Major adverse** (significant) from the southern edges only of Ogmore Forest within open access land.
- 5.1.247 Further north there are large blocks of woodland, mainly conifer plantation and other windfarm developments such as Pant y Wal close to Viewpoint 14. The areas beyond the 5km buffer would experience far less change to views and consequently the effects would be **Moderate adverse** at worse up to the 10km

buffer from open moorland areas reducing to **Minor and Negligible adverse** (not significant) up to 15km and up to 20km respectively.

Mynydd Llangeinwyr Open Access Land (1730 ha total)

- 5.1.248 This is a large area with predominantly open views because of the low moorland land cover. It's closest point is some 2.5km from the Proposed Development and slopes up initially to a plateau which extends northwards. Pen y Foel open access land extends to the 10km buffer. There would be large scale visual change over a wide geographic extent of views from most of the open access moorland of Pen y Foel for users looking southwards towards the Proposed Development and from higher sections of the Sky to Sea walking trail as identified for Viewpoint 10 'Southern slopes of Pen y Foel PRoW Footpath Sky to Sea Trail'. – which have medium sensitivity. The proposed turbines would be perceived as a single grouping with some stacking and overlap in views. The Proposed Development would be seen as a separate windfarm and distinct from the tightly spaced turbines of the Taff Ely windfarm, Views of Pant y Wal windfarm would be more dominant than the proposed turbines in views between the 5 and 10km buffer. Other man made influences within views, reduce the level of visual change from the Proposed Development for these visual receptors. The scale of visual effect during operation is judged to be large and the geographic extent moderate. The result overall is a medium magnitude of impact. Effects are likely to be **Major adverse** (significant) from south facing slopes of Pen y Foel open access land up to approximately 5km from Mynydd y Gaer before the effect of the land sloping northwards away from Mynydd y Gaer takes effect on reducing available views of the proposed turbines - diminishing the effects to **Moderate and Minor adverse** (not significant) to the 10km buffer.

Bryn y Wrach (114 ha total)

- 5.1.249 Viewpoint 5 is typical of the anticipated visual effects from Bryn y Wrach open access land. The proposed turbines would be perceived as a single grouping with some stacking. The upper parts of the Mynydd Portref and Taff Ely windfarms would be seen behind the Proposed Development and extend wind turbine development along the skyline in easterly and south easterly views. The scale of visual effect during operation is judged to be moderate and the geographic extent moderate. There would be a medium change to the view. The result overall is a medium magnitude of impact. Effects are likely to be **Major adverse** (significant) from most of this relatively small open access land.

Mynydd y Glyn (430 ha total)

- 5.1.250 There would be views of the Proposed Development from approximately 25% of this open access land. Viewpoint 16 is from the summit of Mynydd y Glyn and typical of the higher south west facing views that would be experienced. Views of the proposed turbines would overlap and be behind the Mynydd Portref and Taff Ely windfarms. Given the existing wind turbine context - the scale of visual effect during operation is judged to be low to moderate and the

geographic extent moderate. The result overall is a low medium magnitude of impact. Effects are likely to be **Moderate adverse** on the southwest facing areas only, the majority of this open access land would experience **Minor adverse to No Effects**.

Effects on Locally Promoted Trails within 15km buffer

5.1.251 In order to focus on potentially significant effects, promoted trails from which there is no theoretical visibility are not considered. Furthermore, promoted trails with limited visibility from a longer distance; beyond 10 km from the Proposed Development are not considered further in this assessment. The Representative Viewpoint assessment has sections of promoted trails that are within the 15km buffer that are considered further below. The Representative Viewpoint assessment and fieldwork established that beyond the 10km buffer there would be no significant effects on high sensitivity receptors. There would be occasional moderate adverse effects where views are open and elevated such as Representative Viewpoint 25. However, most effects of Viewpoints are minor adverse or less between 10 and 15km. Multiple moderate effects can result in significant effects for group and dynamic receptors along promoted trails. This is taken into consideration when assessing visual effects on the promoted trails within the 10km buffer.

Ogwr Ridgeway Walk

5.1.252 The ZTV and therefore potential intervisibility with the Proposed Development, overlaps most of the route. The sensitivity for receptors for most of the trail is judged to be high, as identified for Viewpoints 1, 5 and 24 along elevated sections of the trail. The visual sensitivity is judged to be medium – high where it passes close to settlement such as Viewpoint 6 at Blackmill. The section between Cytrahen (Llynfi Valley) to Mynydd Maendy is within the 5km buffer of the Proposed Development and will potentially have close views of the proposed turbines, along much of its length. The turbines will be less visible from the lower parts of the Llynfi, Cwm Ogwr Fawr and Ogwr Fach valleys and on slopes that face away from the Proposed Development. Walking eastwards from the Llynfi Valley to Blackmill which has close views and less than 5km, the scale and geographic extent of the Proposed Development would be noticeably greater than the existing baseline situation, which has frequent views of the Mynydd Portref and Taff Ely wind farms. Existing woodlands will block or limit views of the proposed turbines on short sections; a 700m stretch near East Side at Bettws and 800m section along Craig Tal-y-Fan west of Blackmill. For these stretches the change will be negligible and the effect will be **Minor adverse** (not significant). For most of the trail within the 5km buffer, the magnitude of change is judged high. The effects are likely to be mostly **Major adverse** (significant).

5.1.253 The section west of Cwm Ogwr Fach between 5 and 15km from the Proposed Development, is also considered to be of high sensitivity as assessed for Representative Viewpoint 24 at high elevations of Mynydd Baedan. Walking east along the stretch of this trail, the Proposed Development will be seen

in front of the existing baseline wind farm schemes at Mynydd Portref and Taff Ely for much of the time. The Proposed Development would generally not extend the horizontal view of wind farm development in these mid to long distance views and only increase the intensification of wind turbines in these views. The magnitude of change between 5 and 15km is judged to be low - medium and the effects are likely to vary from **Minor to Moderate adverse** at worse which is not significant.

Taff Ely Ridgeway Walk

5.1.254 The ZTV indicates intervisibility with the proposed wind turbines, occurs for most of the route, from Mynydd y Gaer to the Taff Valley, at the 15km buffer edge from the Proposed Development. Travelling east to west, most of the 5.5km stretch of this trail within the 5km buffer potentially has close views of the Proposed Development walking westwards. Receptor sensitivity for most of the trail is judged as high, as identified for Viewpoint 1. Walkers have very close views of the existing wind farms at Mynydd Portref and Taff Ely, in front of and adjacent to the Proposed Development. The proposed scheme would be seen through and beyond these turbines. The change to views would be an increase in geographic spread and intensification of wind energy development on views of the upland landscape. For most of the trail within the 5km buffer, the magnitude of impact is judged vary between medium and high and the effects are likely to be **Moderate to Major adverse** (significant). There will also be stretches where there are east facing valley slopes where walkers would experience no change or see the upper parts of the turbines - in these locations which account for approximately a fifth of the route there would be effectd would be **Moderate to Minor of less** (not significant)

5.1.255 The section of the Taff Ely Ridgeway Walk which falls between the 5 and 10k buffers passes though Lantrisant Forest and Lantrisant settlement. The ZTV indicates very little visibility with the Proposed Development apart from where the route traverses the non wooded parts of the side of Gwern-y-Moel – to the east Lantrisant. There is approximately 2.5km stretch west of Garth Hill between 12 and 14km away which has views of the proposed turbines. At this distance the proposed turbines would appear to increase the geographic extent / spread of wind turbines in views slightly to the south of Mynydd Portref and Taff Ely windfarms. Additionally the turbines at Pant y Wal would be seen to the north on Mynydd Maes-teg. The proposed turbines would form an increasingly smaller part of westward facing views and the magnitude of change would reduce futher to negligible. Overall, the magnitude of impact is judged low to negligible and the effects are likely to be **Minor to Negligible adverse** (not significant) at worse and occasionally **No Change** (not significant).

St Illtyd's Walk

5.1.256 This route lies to the west and falls between the 10 and 15km buffers from the Proposed Development. The ZTV and fieldwork indicate that there is limited potential intervisibility with the proposed turbines, as much of the route falls

within the large areas of Mynydd Margam forestry. Where there are more open and elevated sections allowing views eastwards at Foel y Dyffryn and to the north of Moel Ton -Mawr; the sensitivity is judged to be high as identified for Viewpoint 25. At these distances the proposed turbines would appear slightly closer and increase the geographic horizontal extent of wind turbines to the south of Mynydd Portref and Taff Ely windfarms. Additionally views would include turbines at Pant y Wal on Mynydd Maes-teg. Overall, Most of the route would not experience changes greater than small leading to **Negligible to Minor adverse effects** (not significant). However there are a very few places where the magnitude of change is judged medium and the effects are likely to be **Moderate adverse** (not significant) at worse for these more exposed areas.

Bridgend Circular Walk

- 5.1.257 This route links settlements and villages within a 3km radius of Bridgend. Most of the Circular Walk lies between 5 and 10km of the Proposed Development with the potential for mid distance views of the proposed new turbines. There is a high proportion of the ZTV which overlaps with the route. The sections where direction of travel is north-westwards, towards the proposed turbines, will have the potential for greatest change to views. These sections include Pen y Fal to Sarn and Pant y Pyllau. The route passes through rolling farmland and settlement - the focus of visual receptors will be on settlement edge and farmland in near views but also the backdrop of the Mynydd y Gaer and Mynydd Maendy ridges. The proposed turbines would appear closer than the existing Mynydd Portref and Taff Ely windfarms on Mynydd Maendy and increase the geographic scale and spread of wind turbines to the west in views. As identified for Viewpoint 11 - Cefn Hifgoed, PRoW on Common Land, which lies close to this section of the Circular Walk, visual receptor sensitivity is judged to be medium - high. The level of change from the Proposed Development, given the existing context of frequent views of settlement and development in the foreground and existing wind turbines on the skyline varies from low to medium. Consequently the effects are likely to be **Moderate adverse** (not significant) at worse for this stretch on the north / north east side of Bridgend.
- 5.1.258 On the south east side of Bridgend travelling north, the route passes close to the industrial estate at waterton before crossing the M4. As identified by Viewpoint 20 - PRoW over Common Land, Tair Croes Down, very close to this section of the Circular Walk, the sensitivity is judged to be medium. The level of change due to the Proposed Development, given the existing context settlement fringe land use and close views of industrial warehouse development in the foreground and existing wind turbines on the skyline varies from low. Consequently the effects are likely to be predominantly **Minor adverse** (not significant) for this stretch on the east and south east side of Bridgend. On the west side of Bridgend the effects are likely to be **Negligible adverse to No Effect** (not significant)

Sky to Sea Walk

- 5.1.259 The ZTV indicates intervisibility with the proposed wind turbines, occurs for most of the route, from St Mary Church in the south to Mynydd Tyrewydd commercial forest in the north, across the 15km buffer from the Proposed Development. To the south of Mynydd y Gaer the views looking north would look up towards the Proposed Development on the skyline. The ZTV indicates that there is potential; for intervisibility with the turbines for most of the route to the south. Most of the stretch within the 5km buffer would have close views of the Proposed Development walking northwards over lowland farmland with scattered housing and small settlements. Receptor sensitivity on this part of the trail is judged as medium where it runs on rural lanes, as identified for Viewpoint 3, Heol y Cyw, Settlement and Viewpoint 12 - Track on northern edge of Pencoed. Both Viewpoints lie close to the line of the trail. Where it runs on sections of ProW footpath through farmland and moorland the sensitivity is high. The proposed turbines would appear closer than the existing Mynydd Portref and Taff Ely windfarms and increase the geographic scale and horizontal spread of wind turbines in views to the west. Although approaching from the north west along the trail from Pen y Foel towards Ogmere Valley would run through a less developed landscape with upland moor characteristics, the level of change would be similar to receptors approaching from the south. Viewpoint 10 is representative of the level of effect from upland locations within the 5km buffer. Overall within the 5km buffer the change would be large and the effects are likely to be mostly **Major adverse** (significant). Where the trail snakes along the north facing sides of the Ogmere Valley and the lower Cwm Garw Valley slopes the proposed turbines are less visible and the change is judged to be – medium, and consequently the effects are likely to be **Moderate adverse** (not significant) at worst for these less exposed areas.
- 5.1.260 Potential visibility of the the Proposed Development is more patchy beyond the 5km buffer. To the south of the Proposed Development and moving northwards from St Mary Church on the 15km buffer boundary to the M4 on the 5km boundary, the Sky to Sea trail passes through lowland pasture fields and small settlements of St Hilary, Aberthin, Llansanor, Graig Penllyn. Visual receptor views are most likely focused on the surrounding rolling farmland landscape, with scattered small woodland. The Mynydd y Gaer and Mynydd Maendy ridges form the backdrop to views. The existing Taff Ely, Mynydd Portref and Pant y Wal windfarms are discernible but not dominant in views. The Proposed Development would intensify wind energy development in front of the Pant y Wal windfarm and extend the horizontal geographic extent of wind turbines westwards along Mynydd y Gaer. As identified in Viewpoint 19 near the Trigg point, St Mary Hill Down, which lies close to this trail, visual sensitivity for this trail is judged as medium - high. The magnitude of change would be noticeable but would not introduce a new form of development given the context of existing turbines on the skyline and is judged as varying from medium to low. Although the existing turbines are smaller than the proposed ones, they are densely spaced compared with the proposed turbine layout. Consequently the effects between 5 and 10km are likely to be **Moderate**

adverse (not significant) at worse and beyond 10km **Minor adverse** (not significant) at worse.

- 5.1.261 To the north of the Proposed Development and moving southwards from Mynydd Tynewydd on the 15km buffer boundary to Pontycymer close to the 5km boundary, the Sky to Sea trail passes through commercial forestry from 15k to 10km and the ZTV indicates that there would be minimal intervisibility with the proposed turbines. Between 10 and 5km the trail passes through more open upland moor landscape, sparsely populated compared with the adjoining valley settlement. The focus of the Ordnance Survey viewpoint at Bwlch y Clawdd is directed to the east and north - away from the Proposed Development. The route passes along the Mynydd Llangeinwyr ridge with a high point of 530m. Existing views to the west and south west encompass the Pant y Wal, Mynydd Portref and Taff Ely windfarms, the Proposed Development would increase the 'arc' of wind turbines to the south south west in views from this ridge. Views directly south moving round to the east on the line of the trail would not be affected by the proposed new turbines. Overall for this section, The magnitude of change would be noticeable but would not introduce a new form of development given the context of existing turbines on the skyline and is judged as varying from medium to no change. Although the existing turbines are smaller than the proposed they are densely spread compared with the proposed turbine layout. Consequently the effects between 5 and 10km are likely to be **Moderate adverse** (significant) and beyond 10km **Negligible adverse** (not significant) at worse but predominantly **No Change** where the trail passes through forestry.

Effects on National Cycle Network (NCN) Routes within 15km buffer

NCN 4

- 5.1.262 NCN 4 is a 698km route between London and Fishguard in west Wales. As identified in the visual baseline section, receptors moving east to west along this 11km section of NCN4, from Tonyrefail to Ogwr Fach and Blackmill, would potentially have close views of the Proposed Development, to the west and south of this cycle route. As identified for Viewpoints 6 and 7, receptors on the cycle route would have similar levels of sensitivity – judged to be medium. The level of change due to the Proposed Development will vary along the route but will be greatest and most visible east of Gynogwr along a 1.5km section of dismantled railway, before the cyclist route drops in elevation and views towards the proposed turbines become more obscured by the north facing slopes of Mynydd y Gaer. The views of an open ridge of Mynydd y Gaer from this 1.5km section will change to one with large scale wind turbine and the effect will be **Major adverse** (significant). Further west the existing densely spaced wind turbines at Taff Ely will be seen in front of the proposed turbines. Although there would be an intensification of wind energy development in these views there would be generally little horizontal spread of turbines in views approaching the Ogwr Fach valley and the change will be commensurately less than the above more exposed 1.5km section and mostly low, resulting in a **Minor adverse** (not significant) effect.

5.1.263 Approaching from the west on NCN 4 the near views, within the 5km buffer will not experience levels of change greater than medium due to the fact that the new proposed turbines will be viewed in the context of existing settlement within the Ogwr Fach and Ogmere Valleys and the presence of the existing Taff Ely, Mynydd Portref windfarms in the direction of views. The resulting level of effect will be no greater than **Moderate adverse** (significant). Further west although the ZTV indicates visibility of the Proposed Development from 12.5km to the 5km buffer the level of change is judged as low to medium due to the fact that the new proposed turbines will be viewed in the context of existing settlement of north Bridgend and the presence of the existing Taff Ely, Mynydd Portref windfarms and Pnt y Wal in the direction of views. The resulting level of effect will be no greater than **Moderate adverse** (not significant) and mostly **Minor adverse** (not significant).

NCN 883

5.1.264 NCN 883 is a 7km route between Nant y moel (12km from the Proposed Development) and Blackmill. Visual receptors moving north to south along this route which follows the valley bottom of Ogwr Fawr. Much of the route passes through linear settlement and housing including Ogmere Vale, in close proximity to the A4061. The focus of views for receptors travelling north to south will be on the immediate developed surroundings but also, the backdrop of the Mynydd y Gaer ridge. The greatest visual change will be experienced on the section within the 5km buffer of the Proposed Development, where the sections of the twisting valley landform allow direct views towards the proposed turbines. Frequently, the views of proposed turbines are blocked by the intervening steep side landform and vegetation either side of the cycle route or there only partial views of the proposed scheme. Consequently, only a short stretch less than 600m north of Blackmill will experience a high level of change and therefore the effects are likely to be mostly **Major adverse** (significant) on this section. For the majority of this route the varying valley side landform which restricts views will result in effects from **No Change to Minor adverse** (not significant).

NCN 88

5.1.265 NCN 88 is a proposed coastal cycle route between Newport, Cardiff, Bridgend and Margam Country Park. The 6.5km stretch within the 15km buffer study area falls mainly between 10 and 15km from the Proposed Development, from Broughton to the junction with NCN 888 at Ewenny. As identified for Viewpoint 21 - Rural lane on the edge of Wick, a short distance off the route of NCN 88 the sensitivity of this group receptor is judged as medium. The ZTV overlaps with the majority of the route but fieldwork has shown that due to intervening vegetation especially allond the verges of NCN heavily restrict potential visibility of the proposed turbines. At this distance from the Proposed Development the turbines would appear closer and slightly larger but less densely spaced than the existing neighbouring Taff Ely, Mynydd Portref windfarms. Where there are gaps in the roadside trees and hedgerow with views to the Mynydd y Gaer and Mynydd Maendy ridgelines the extent of wind turbine development would

increase westwards and occupy a wider field of view than in the baseline situation. Overall the mid to long distance views and lack of intervisibility with the proposed turbines means that the change is Negligible and the resulting effect is no more than **Minor adverse** (not significant).

NCN 888

- 5.1.266 NCN 888 is a route from Lantwit Major on the coast to Ewenny. The stretch within the 15km buffer study area falls mainly between 10 and 15km from the Proposed Development, utilising existing rural lanes. The ZTV overlaps with the majority of the route but fieldwork has shown that due to intervening vegetation especially along the verges of NCN heavily restrict potential visibility of the proposed turbines. The change and overall effect would be very similar to receptors using the near by NCN 88 and no greater than **Minor adverse** (not significant).

Effects on Transport Routes

- 5.1.267 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 15 km from the Proposed Development are not considered further in this assessment. The assessment focuses on roads where the ZTV has a high proportion of overlap.

A4093 Section from Blackmill to Hendreforgan

- 5.1.268 This 6.21km section of A4093, from Hendreforgan (junction with the B4564) to Blackmill, would potentially have close but oblique side views of the Proposed Development, to the west and south of this A road route. Representative Viewpoints 6 (Blackmill) and 7 (Glynogwr), receptors are located close to and on this road. These rural A road receptors are judged to be of medium to low sensitivity to this type of development. The level of change due to the Proposed Development will vary along the route. Much of the route is lined with treed hedgerow but there are more open sections such as from Hendreforgan to the western approaches to Glynogwr, before the road drops in elevation and with more treed hedgerow either side of the road and views towards the turbines become more obscured by the north facing slopes of Mynydd y Gaer. The more open views of the open ridge of Mynydd y Gaer from this section will change to one with large scale wind turbines and the effect will be **Moderate adverse** (not significant). However most of the route would not experience this magnitude of change because of the restricted views from the road and the effect would be **Negligible adverse** to **No Change** (not significant).

B4280 Section from Bryncethin to Pencoed

- 5.1.269 This B4280 runs from its junction with the A473 in the east to the junction with the A4016 at Bryncethin and a total of 6.4km. and runs below the lower south

facing slopes of Mynydd y Gaer. The road receptors have close oblique side views towards the proposed turbines ridge which are predominantly open views across farmland to the southern slopes of Mynydd y Gaer. On the eastern approaches to Bryncethin the views become more restricted and closed in by the adjoining trees and treed hedges either side of the road. These rural B road receptors are judged to be of medium to low sensitivity to this type of development. The level of change due to the Proposed Development will vary along the route. The more open oblique views of the open ridge of Mynydd y Gaer from most of this road will change to one with large scale wind turbines and the effect will be **Moderate adverse** (not significant). Some more enclosed sections near Bryncethin would not experience this magnitude of change and the effect would be **Negligible adverse to No Change** (not significant).

A4061 Section from Blackmill to Treorchy

- 5.1.270 This is 15km section between Blackmill and Treorchy. Visual receptors moving north to south along this road which follows the valley bottom of Ogwr Fawr would not experience any visual changes. These rural A road receptors are judged to be of medium to low sensitivity to this type of development. The greatest visual change will be experienced on the section within the 5km buffer of the Proposed Development, where the sections of twisting valley landform allow direct views towards the proposed turbines. Frequently, the views of proposed turbines are blocked by the intervening steep side landform and vegetation either side of the road or there only partial views of the proposed scheme. Consequently, only a short stretch less than 600m north of Blackmill will experience a high level of change and therefore the effects are likely to be mostly **Moderate adverse** (not significant) on this section. For the majority of this route the varying valley side landform which restricts views will result in effects from **No Change to Minor adverse** (not significant)

M4 Motorway Junction 33 Capel Llanilfern to Junction 36 Sarn

- 5.1.271 This 22km section of the M4 stretches across about two thirds of the 15km buffer study area to the south of Mynydd y Gaer would medium distance oblique side views the south facing slopes of Mynydd y Gaer. From junction 33 to 34 the views north westwards towards the turbines are obscured by trees and woodland immediately north of this section of motorway. The views from junction 34 to 35 northwards towards the proposed turbines are frequently blocked by treed verges and there would be occasional glimpses of the proposed turbines but the section between Llanharry and Pencoed (junction 35) offers more open views towards the proposed windfarm. From junction 35 to 36 the views become more restricted and screened by mature roadside trees. These motorway receptors are judged to be of low sensitivity to this type of development. The greatest level of change will be for the 3.4km section between Llanharry and Pencoed which would be medium and the effect **Minor adverse** (not significant). However most of the route would not experience this magnitude of change because of the restricted views from the road and the effect would be **Negligible adverse to No Change** (not significant).

Pre-Assessed Areas (PAAs) in relation to Mynydd y Gaer

5.1.272 The planning policy context section earlier in this assessment summarises Planning Policy Wales (PPW) policies 17 and 18 in relation to renewable energy development. These policies infer that large scale windfarm development of turbines up to 250m to tip are acceptable in principle, within PAAs, subject to the criteria in policy 18. The proposal at Mynydd y Gaer falls within PAA 9. This is a large area which stretches from Pontarddulais, north of Swansea, in the west to the A470 near Cardiff in the east.

Development of PAAs and their relevance to this proposal

5.1.273 The development of the PAAs was a two stage process. *‘The Stage 1 work considered nationally designated landscapes (i.e. National Parks and AONBs) as fixed constraints to the development of large scale wind and solar energy development and these designations were excluded from the Priority Areas for Refinement identified in stage 1. These appeared on the stage 1 maps as areas of least opportunity.*

5.1.274 *LANDMAP Visual and Sensory aspect areas for which the overall evaluation was Outstanding or High, and Historic Landscapes were considered as variable constraints. These appeared on the stage 1 maps as areas of varying opportunity.*

5.1.275 *The Priority Areas for Refinement identified in stage 1 built on these categories, focusing in on the areas of greatest opportunity, where no constraints were present ‘*

5.1.276 The Stage 2 assessment focused on

- *Consideration of the visual setting of nationally designated landscapes*
- *Using LANDMAP to consider the potential sensitivity of landscapes*
- *Review of sensitivity and capacity studies already undertaken*

5.1.277 Although there are predicted to be significant local landscape and visual effects from the Proposed Development at Mynydd y Gaer, its location in PAA 9 and PPW policies 17 and 18 **indicate that wind turbine development of this size and nature is acceptable here in principle**. The Stage 2 refinement process quoted above includes using constraints of potential intervisibility with nationally designated landscapes and LANDMAP VSAs and Historic Landscape aspect areas (HLAAs) that are evaluated as high and/or outstanding and renewable energy landscape sensitivity studies including SLAs. Although the Site falls within a VSAA and a HLAA, evaluated as high and high sensitivity in Bridgend’s SPG20 renewable energy study and within a SLA – this does not mean that the proposed windfarm would result in a reduction in the evaluation levels or the level of scenic quality such that it would change these evaluation levels or result in the area not having SLA status. Wind farms are found in other areas with high/ outstanding VSAA evaluation and covered by SLA including the Mynydd y Gaer SLA which hosts the existing Taff Ely and Mynydd Portref wind farms. The density of wind turbines of the

Taff Ely scheme will be reduced with the consented development of the Headwind Taff Ely Re-powering scheme in the Mynydd y Gaer VSAA. It is predicted that the VSAA will be a windfarm landscape but it will still be possible to experience the scenic and special qualities listed for the host LCA 9 as follows:

- 5.1.278 *‘The sensitive features of this landscape, as recorded in the LCA description, include the open enclosed commons with a strong rural character and extensive views, large areas of semi-natural habitat and woodland and the presence of nationally important archaeological features. Some of these could be affected to some degree by wind energy development.’*
- 5.1.279 Views out from the LCA will be similar to the baseline especially from the edges of the Mynydd y Gaer plateau as the turbine locations have been located away from the plateau edges. The turbine locations have avoided the most sensitive habitats and archaeological elements and site lines between historic features. The VSAA as a whole could be considered to be a windfarm landscape, currently. It is argued that more efficient land use and less landscape and visual impact results by the replacement of fewer but taller turbines at Taff Ely and the choice to propose fewer but taller turbines and less construction pads and access tracks in the proposal on the western part of Mynydd y Gaer which is the subject of this LVIA. Less vertical structures that result from lower density turbine development allows visual receptors to experience less interrupted intervisibility with the surrounding landscape and within the host landscape than denser turbine arrangements.

Future monitoring

- 5.1.280 No future monitoring is required as a consequence of the assessment of landscape and visual matters.

Cumulative Effects

The Assessment of Cumulative Effects

- 5.1.281 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.
- 5.1.282 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.

5.1.283 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:

- 5.1.284 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;
- 5.1.285 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:
 - 5.1.286 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;
 - 5.1.287 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
 - 5.1.288 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.
- 5.1.289 Details of the methodology for assessing cumulative landscape and visual effects are provided in Appendix 5A.

Cumulative Schemes:

5.1.290 The following schemes are considered in the cumulative assessment within the 32km buffer from the proposed scheme:

Table 5.19: List of Cumulative Windfarm schemes

Site Name	Number of Turbines	Blade Tip Height (m)	Planning Status
Newton Down	2	125	Operational
Parc Stormy, Stormy Down	1	100	Operational

Mynydd Brombil Wind Farm	4	100	Operational
West of Rhiwfelin Fach Farm	1	77	Operational
Graig Fatha Farm	1	125	Operational
Penrhys Wind Farm/Ferndale Power Factory	8	80	Operational
Llynfi Afan Renewable Energy Park	3	118	Operational
Pant y wal	10	115	Operational
Fforch Nest Wind Farm pt1	4	115	Operational
Fforch Nest Wind Farm pt2	7	115	Operational
Pant y wal extension	8	125	Operational
Mynydd Portref Wind Farm extension	6	110	Operational
Mynydd Portref	11	75	Operational
Taff Ely Wind Farm	20	54	Operational
Maerdy	8	125	Operational
Kenfig Industrial Estate	1	100	Operational
Llynfi Renewable Energy Park	9	118	Operational
Pen y Cymoedd	76	146	Operational
Mynydd Bwllfa	9	125	Operational
Ffynnon Oer	16	92	Operational
Maesgwyn	13	Unknown	Operational
Maesgwyn Extension	13	Unknown	Operational
Oakdale	2	130	Operational
Penyhreol Farm	1	77	Operational
Pen Bryn Oer	3	110	Operational
Wentloog Environment Centre	1	135	Operational
Gelli-wen Farm	1	77	Operational
Bedwyn Farm	1	86	Operational
Cruglwyn	2	86.5	Operational
Manmoel	5	180	Consented
Twyn Hywel	14	200	Consented
Former Nant-y-Gwyddon Landfill Site	1	122	Consented
Foel Trawsant	11	145	Consented
Abergorki Wind Farm	3	147	Consented
Headwind Taff Ely Wind Farm (Repowering)	7	110	Consented
Upper Ogmores Wind Farm	7	150	Consented
Pant y Wal (Second extension)	2	125	Consented
Melin Court	5	150	Consented
Mynydd Fforch Dwm	6	180	Consented
Mynydd y Glyn	7	155	Consented
Mynydd Carn y Cefn	8	180	Consented
Llwyncelyn Wind Farm	2	125	Consented
Llwyncelyn Wind Farm - Resubmission	2	131	In Planning
Y Bryn	21	206 & 250	In Planning
Mynydd Bedwellte	9	180	In Planning
Mynydd Maen	13	150	In Planning

Introduction

5.1.291 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. This part of the assessment is referred to as scenario 1 – ie the proposed scheme and the operational schemes and has been undertaken and reported in the landscape assessment Appendix 5B and for the viewpoints (90 degree horizontal field of view) in Appendix 5C.

5.1.292 Scenario 2 is the cumulative assessment of the proposed scheme, operational schemes and consented schemes (which also include those in construction). Scenario 3 is the cumulative assessment of the proposed scheme, operational schemes, consented schemes and in planning schemes. The cumulative landscape and visual assessment for both these scenarios can be found in Appendices 5B and 5C.

5.1.293 A series of turbine tip height ZTV figures have been produced for operational, consented and in planning schemes (which includes scoping stage applications) in combination with the proposed scheme in figures 5.3.2 to 5.3.18. The ZTV extents for the cumulative schemes are hatched **light blue** and the proposed scheme hatched **yellow**. Areas are hatched **green** where there is the possibility of views both the cumulative schemes and the proposed scheme. The cumulative schemes have been grouped up into similar geographic locations and distances in relation to the proposed scheme to help an appreciation of which locations of cumulative schemes have greatest and least visual overlap with the proposed scheme.

Cumulative Landscape Effects

5.1.294 This section considers the cumulative landscape effects for scenarios 2 and 3. The 34 landscapes assessed for scenario 1, i.e. the proposed scheme with operational schemes as part of the baseline has been assessed previously in this chapter. Of the 34 landscapes assessed in scenario 1, 12 areas are predicted to experience significant effects in parts where the tip height ZTV for the proposed scheme falls and there is potential for intervisibility between the landscape receptor and the proposed scheme (see summary table at the end of this chapter). The indirect effects on landscape assess the following character attributes described in Bridgend County Borough's (BCBC) SPG 20 - '*Renewables in the Landscape*':

- Skylines
- Intervisibility with adjacent landscapes key views and vistas,
- Scenic and perceptual aspects

5.1.295 The landscapes that have been assessed have been selected based on guidance provided in GN46. Detail of this filtering process can be found in Appendix 5B. The focus for cumulative landscape assessment has been where the proposed scheme is predicted to result in a moderate or greater level of significance of effect.

Scenario 2:

- 5.1.296 In scenario 2, with the addition of the consented schemes, 7 of these 12 areas are predicted to have additional cumulative effects which result in the combined cumulative schemes having an equal (type 1 cumulative effect) or greater contributing effect (type 3 cumulative effect) to the overall level of significance rather than the proposed scheme. These landscapes will either have consented windfarm schemes within or close to and within 3km of them. For 6 of the areas the cumulative schemes will become the ones that have the greater effect. For example, VSAA CYNONVS142 Mynydd y Glyn where the Mynydd y Glyn consented windfarm is located is predicted to experience a greater effect which is attributable to this cumulative scheme rather than the proposed scheme (type 3 cumulative effect). on the following
- 5.1.297 Additionally, 2 new areas within the 15km buffer of the proposed scheme, are predicted to experience significant adverse effects where previously the introduction of the proposed scheme is not expected to result in a significant effect. These are VSAs CYNONVS966 - Bettws (Rhondda Cynon Taff), the combined VSAs of CYNONVS572, CRDFVS003, & CRDFVS004 - Hendre, Garth West, Garth Hill (all in Rhondda Cynon Taff). These areas are to the east of the proposed scheme where the introduction of the consented windfarm scheme at Mynydd y Glyn is predicted to contribute the greatest influence on the level of effect locally.
- 5.1.298 The consented Headwind Taff Ely Wind Farm (Repowering) scheme which is immediately adjacent and to the east of the proposed scheme, would result in the replacement of 20, 54m high to tip turbines with fewer but taller 7, 110m high to tip ones. On balance this is predicted to result in a neutral level of change on landscape receptors which have intervisibility with the scheme.
- 5.1.299 The consented and operational schemes within 15km of the proposed scheme are located in landscapes to the north west round to the east. The cumulative schemes in these landscapes will generally have the greater contributing effect to the level of significance. There are no cumulative consented schemes to the south west and south. For these areas the proposed scheme will remain the closest scheme with the greatest indirect effects.

Scenario 3:

- 5.1.300 The addition of the in planning schemes into the cumulative assessment for scenario 3 would result in 3 additional LCAs – LCA 15 (VoG) Cefn Cribwr Ridge and Settled Farmland, LCA 4 (N&PT) – Coedhirwaun and LCA 5 (N&PT) – Coedhirwaun and Open Scarp Tops that would experience significant cumulative effects (type 4 cumulative effect) where there wasn't one in scenarios 1 and 2. For LCA 1 Langwynyd Rolling Upland, where a significant adverse effect is predicted due to the proposed scheme having the greatest contributing influence in scenarios 1 and 2, in scenario 3, when the in planning schemes are included, the cumulative schemes would have the most influence (type 3 cumulative effect). These areas are to the west of the proposed scheme and the magnitude of change would be particularly influenced by the proximity

of the in planning Y Bryn windfarm, 21, 206 and 230m high to tip turbines – which would alter the previously undeveloped skyline and scenic quality in the direction of views towards Mynydd Margam where Y Bryn would be located.

Cumulative Visual Effects

Viewpoint receptors

- 5.1.301 The cumulative assessment for the 32 Representative Viewpoints can be found at Appendix 5C. There is a summary table of cumulative visual effects towards the end of this assessment, which shows whether the significant effects are more or less attributable to the cumulative schemes in views in combination and in succession compared to the Proposed Development.
- 5.1.302 Windfarms are an established and widespread land use in the study area. The effects of proposed scheme in the baseline context of operational windfarms within 90 degree views, where the proposed scheme is central to the view, has already been assessed. For 15 Representative Viewpoints there will be a significant effect. These viewpoints are within 7km of the proposed scheme.

Scenario 1:

360 degree views

- 5.1.303 Successive or repetitive views are where two or more developments may be viewed from a single viewpoint successively as the viewer turns their head or swivels through 360°. Due to the widespread nature of windfarm development in the study area many of the viewpoints include views of other windfarms.
- 5.1.304 The following section provides commentary on the effects that the cumulative schemes have on the 11 viewpoints are judged to experience significant effects attributable mainly to the proposed scheme in succession with the cumulative operational schemes and the 4 viewpoints from where the cumulative operational schemes have an equal or greater effect on visual amenity than the proposed scheme.
- 5.1.305 Viewpoints 1 and 2 are situated on Mynydd y Gaer plateau and have very close views of the existing cumulative schemes of Taff Ely and Mynydd Portref in easterly views. Although these turbines are smaller than the ones in the proposed scheme they are more numerous and at a much greater density. There are close distance views of Mynydd Portref and Fforch Nest windfarms in northerly views. There are no views of windfarms in southerly views apart from the 3 turbines at Parc Stormy and Newton Down in mid distance views. The proposed scheme would lead to these receptors being more surrounded by wind turbines, and the existing wind farm context in 360 degree views reduces the level of change. A significant effect from the Proposed Development is predicted in addition to the significant effects attributed to these other cumulative schemes, **type 1 significance of effect**.
- 5.1.306 Viewpoints 8, 9 and 10 are located to the north of Mynydd y Gaer in valley and upland locations, within 5km of the Proposed Development. There are views

of the proposed scheme adjacent to the existing upland viewpoints cumulative schemes of Taff Ely and Mynydd Portref in southerly views. There are typically close views of parts of cumulative schemes in other view directions including most notably the operational schemes at Pant y Wal and Fforch Nest. A significant effect from the Proposed Development is predicted in addition to non significant or less significant effects attributed to these other cumulative schemes, therefore mostly **type 2 significance of effect**. The exception is viewpoint 14, less than 7km away, which has very close views beyond 90 degrees of the Pant Y Wal scheme and the significant effect is predominantly attributed to this cumulative operational scheme, **type 1 significance of effect**.

- 5.1.307 Viewpoints 3, 11 and 12 are located to the south of Mynydd y Gaer and at lower elevations within the context of medium to large settlements and farmland and overall and more developed feel than north of Mynydd y Gaer. There are typically close to close – medium distance views (up to 5km) that will experience significant effects. There are views of the proposed scheme adjacent to the cumulative schemes of Taff Ely and Mynydd Portref in northerly views. Receptors further south gain views of the upper parts of cumulative existing schemes of Pant y Wal and Fforch Nest behind the proposed scheme. South and south westerly views contain middle distance views of the three turbines at Newton Down and Parc Stormy. Otherwise in other view directions to the south east and west there are no turbines. A significant effect from the Proposed Development is predicted in addition to non significant or less significant effects attributed to these other cumulative schemes, therefore mostly **type 2 significance of effect**.
- 5.1.308 Viewpoint 13 is located to the east Mynydd y Gaer in valley and upland locations, approximately 3km from the Proposed Development. There are views of the proposed scheme behind and or partially overlapping and through the cumulative operational schemes of Taff Ely and Mynydd Portref in westerly views. There are also views of the cumulative operational schemes at Pant y Wal and Fforch Nest to the north west. The proposed scheme would lead to intensification and slightly wider spread of wind turbines in views. Views of turbines are in narrower fields of view than views from the north and south and therefore less impact on 360 degree views. A non significant effect from the Proposed Development is predicted in addition to the significant effects attributed to these other cumulative schemes and a combination of, **type 3 significance of effect**.
- 5.1.309 Viewpoints 4, 5 and 6 are located to the west of Mynydd y Gaer in mixed land use lowland landscape locations, within 5 km of the Proposed Development. There are views of the proposed scheme in front of and or partially overlapping the cumulative operational schemes of Taff Ely and Mynydd Portref in easterly views. There are also middle distance views of the cumulative operational schemes at Pant y Wal and Fforch Nest and long distance ones to Llyni and Pen y Cymoedd schemes to the north east. Views of turbines are in narrower fields of view than views from the north and south and therefore less impact on 360 degree views. A significant effect from the Proposed Development is

predicted in addition to the effects attributed to these other cumulative schemes, therefore mostly **type 2 significance of effect**.

Scenario 2

- 5.1.310 In this scenario when the consented cumulative schemes are included in the assessment, considering the 15 viewpoints above, 8 viewpoints will experience significant effects attributable mainly to the proposed scheme in succession with the cumulative operational and consented schemes. However 7 viewpoints will experience significant effects where the cumulative operational and consented schemes will have an equal or greater effect on visual amenity than the proposed scheme.
- 5.1.311 Viewpoints 1 and 2 are very close to the consented Headwind Taff Ely Wind Farm (Repowering) scheme which is immediately adjacent and to the east of the proposed scheme, and would result in the the replacement of 20, 54m high to tip turbines with fewer but taller 7, 110m high to tip ones. On balance this is predicted to result in a neutral level of change on these visual receptors.
- 5.1.312 In the case of viewpoints 5 and 6 located to the west of Mynydd y Gaer the addition of the near by consented cumulative schemes of Pant y Wal second extension, Upper Ogmore and Foel Trawsant will have an equal contributing effect where previously the proposed scheme had the greater influence, **type 1 significance of effect**.
- 5.1.313 Viewpoints 14,15 and 16 are predicted to experience significant cumulative effects which are mainly attributable to the close proximity in views of the consented schemes of Upper Ogmore in the case of viewpoints 14, at Mynydd y Glyn at viewpoint 16, and a combination of both these consented schemes for viewpoint 15 - all **type 3 significance of effect**.

Scenario 3

- 5.1.314 In this scenario the in planning schemes (including those at scoping stage) are included in the cumulative assessment. 8 viewpoints are judged to experience significant effects attributable mainly to the proposed scheme in succession with the cumulative operational, consented and in planning schemes. There are 9 viewpoints where the cumulative operational, consented and in planning schemes have an equal or greater effect on visual amenity than the proposed scheme.
- 5.1.315 Viewpoints 24 and 25 are predicted to experience significant visual effects attributable to the introduction of the in planning scheme at Y Bryn - which will be seen in close views to these two receptors.

Group Receptors

- 5.1.316 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 scheme are assessed in this section. This is in order to predict how much of an influence the proposed scheme 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 Appendix 5C is used to inform the judgements.

Cumulative Effects on Locally Promoted Trails within 15km buffer

Ogwr Ridgeway Walk

- 5.1.317 The assessment for this linear receptor of the proposed scheme within the 5km buffer, walking in an easterly direction or amongst the Proposed Development on the Mynydd y Gaer plateau – will be a high magnitude of change and the effects are likely to be mostly **Major adverse** (significant).
- 5.1.318 Scenario 1: Although there will be almost continuous very close and close sequential views of Mynydd Portref and Taff Ely operational schemes in combination but behind and overlapping with the proposed scheme the level of effect is largely attributable to the proposed scheme. Additionally there will be frequent sequential views of Pant y Wal and Fforch Nest schemes in close distance views to the north. Therefore a **type 2 significant effect** is predicted.
- 5.1.319 Scenario 2: In addition to the above there would be almost continuous views of the new consented Taff Ely scheme (less but higher turbines which replace the existing) and Mynydd Portref in easterly views. Also, there would be views of the consented schemes of small Pant y Wal second extension, Upper Ogmored and Foel Trawsant. The sequential level of effect is largely attributable to the proposed scheme. Therefore, a **type 2 significant effect** is predicted.
- 5.1.320 Scenario 3: There would be no additional In Planning schemes in sequential views travelling eastwards and there would be almost continuous views of the cumulative schemes above. However in westerly views there would be middle distance sequential views of the In Planning - Y Bryn windfarm scheme. The sequential level of effect is largely attributable to the proposed scheme. Therefore, a **type 2 significant effect** is predicted.

Taff Ely Ridgeway Walk

- 5.1.321 The assessment for this linear receptor in relation to the proposed scheme within the 5km buffer, walking in an easterly direction or amongst the Proposed Development on the Mynydd y Gaer plateau – will be largely a high magnitude of change and the effects are likely to be mostly **Moderate to Major adverse** (significant).
- 5.1.322 Scenario 1: Although there will be almost continuous very close and close sequential views of Mynydd Portref and Taff Ely operational schemes in combination but in front and overlapping with the proposed scheme, the level of effect is largely attributable to the cumulative schemes. Additionally, there will be frequent sequential views of Pant y Wal and Fforch Nest schemes in close distance views to the north. Therefore a **type 1 significant effect** is predicted.

- 5.1.323 Scenario 2: In addition to the above there would be almost continuous views of the new consented Taff Ely scheme (less but higher turbines which replace the existing) and Mynydd Portref in easterly views. Also, there would be views of the consented schemes of small Pant y Wal second extension, Upper Ogmore and Foel Trwasnant. The sequential level of effect is largely attributable to the operational and consented cumulative schemes. Therefore, a **type 1 significant effect** is predicted.
- 5.1.324 Scenario 3: In addition to the above cumulative schemes, there would be middle distance sequential views of the In Planning - Y Bryn windfarm scheme from the section of this route on the Mynydd y Gaer plateau but no views of this cumulative scheme from other sections. The sequential level of effect is largely attributable to the operational and consented cumulative schemes and occasionally from the In Planning Y Bryn scheme. Therefore, a **type 1 significant effect** is predicted.

Sky to Sea Walk

- 5.1.325 The ZTV indicates intersibility with the proposed wind turbines, occurs for most of the route, from St Mary Church in the south to Mynydd Tyrewydd commercial forest in the north, across the 15km buffer from the Proposed Development. The assessment for the this linear receptor walking towards the proposed scheme within the 5km buffer would be mostly large and the the effects are likely to be mostly **Major adverse** (significant). The effects would be reduced along stretches within Ogmore Valley and Cwn Garw to not significant. Elsewhere and beyond 5km the effects will diminish and not be significant.
- 5.1.326 Scenario 1: Although there will be almost continuous close sequential views of Mynydd Portref and Taff Ely operational schemes in combination with the proposed scheme but behind and overlapping it in easterly views the level of effect is largely attributable to the proposed scheme. Additionally there will be frequent sequential views of Pant y Wal and Fforch Nest schemes in close distance views to the north, which will have a greater effect than the Proposed Development. Therefore a **type 2 significant effect** is predicted for most of the route within the 5km buffer, but type **type 1 significant effect** is predicted where the Pant y Wal windfarm is closer to this dynamic receptor.
- 5.1.327 Scenario 2: In addition to the above there would be almost continuous views of the new consented Taff Ely scheme (less but higher turbines which replace the existing) and Mynydd Portref in easterly views. Also, there would be views of the consented schemes of small Pant y Wal second extension, Upper Ogmore and Foel Trwasnant. The sequential level of effect is largely attributable to the proposed scheme. Therefore a **type 2 significant effect** is predicted for most of the route within the 5km buffer, but type **type 1 significant effect** is predicted where the Pant y Wal windfarm is closer to this dynamic receptor.
- 5.1.328 Scenario 3: In addition to the above cumulative schemes, there would be middle distance sequential views of the In Planning - Y Bryn windfarm scheme from the section of this route on the Mynydd y Gaer plateau and Mynydd

Llangeinwyr but more limited views of this cumulative scheme from other lower and wooded sections. The sequential level of effect is largely attributable to the operational and consented cumulative schemes and occasionally from the In Planning Y Bryn scheme. Therefore a **type 2 significant effect** is predicted for most of the route within the 5km buffer, but type **type 1 significant effect** is predicted where the Pant y Wal and Y Bryn windfarm is closer to this dynamic receptor.

Cumulative Effects on National Cycle Network (NCN) Routes within 5km buffer

NCN 4

- 5.1.329 The assessment for this linear receptor of the proposed scheme states that the level of change due to the Proposed Development will vary along the route but will be greatest and most visible east of Gynogwr along a 1.5km section of dismantled railway, before the cyclerroute drops in elevation and views towards the proposed turbines become more obscured by the north facing slopes of Mynydd y Gaer. The views of the open ridge of Mynydd y Gaer from this 1.5km section will change to one with large scale wind turbine and the effect will be **Major adverse**.
- 5.1.330 Scenario 1: For the above 1.5km section, there will be almost continuous close sequential views of Taff Ely operational scheme in combination to the west of the proposed scheme and there will be frequent sequential views of Pant y Wal and Fforch Nest schemes in close distance views to the north. The level of effect is largely attributable to the proposed scheme. Therefore a **type 2 significant effect** is predicted.
- 5.1.331 Scenario 2: In addition to the above there would be almost continuous close sequential views of the new consented Taff Ely scheme (less but higher turbines which replace the existing) and Mynydd Portref in easterly views. Also, there would be views of the consented schemes of the small Pant y Wal second extension, Upper Ogmoredale and Foel Trwasnant. The sequential level of effect is largely attributable to the proposed scheme. Therefore a **type 2 significant effect** is predicted for most of this 1.5km section of route NCN 4 within Cwm Ogwr Fach.
- 5.1.332 Scenario 3: There would be no additional In Planning schemes in sequential views travelling along this 1.5km stretch of the NCN4. The sequential level of effect is largely attributable to the proposed scheme. Therefore, a **type 2 significant effect** is predicted.

Inter-related effects

- 5.1.333 Inter-relationships are the impacts and associated effects of different aspects of the Transmission Assets on the same receptor. These are as follows.
- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the windfarm development (construction, operation and maintenance, and decommissioning), to

interact to potentially create a more significant effect on a receptor group than if just one phase were assessed in isolation.

- Receptor led effects: Assessment of the scope for all relevant effects across multiple topics to interact, spatially and temporally, to create inter-related effects on a receptor.

5.1.334 The assessment presented herein draws upon information presented within other topic assessments within this Onshore ES. Equally, the LVIA also informs other impact assessments. This interaction between the impacts assessed within different topic-specific chapters on a receptor is defined as an 'inter-relationship'.

5.1.335 There is an interrelationship with the following topics:

- historic environment;
- ecology; and
- recreation.

Table 5.20: Summary of likely significant inter-related effects

Description of impact	Phase			Likely significant inter-related effects	Significance
	C	O	D		
Landscape impacts - potential change to landscape character	✓	✓	✓	<p>The potential effect is directly in relation to the scale and size of development proposed, the geographic extent of impact, and the distance and context factors in relation to the receptor. The scale of potential effects on landscape character is likely to be high in relation to the wind turbines which diminishes with distance from them. The scale of effects will also increase through the construction phase due to the nature of the impact and the increased land required for temporary construction compounds, access and earthworks including borrow pits, reduced during operation and maintenance, decreasing further through the decommissioning phase.</p> <p>Although this indicates that there is a potential lengthening of the temporal effect, across the project lifetime, the effects on landscape character resources are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.</p>	No change resulting from inter-related assessment.
Receptor-led effects					
<p>There will be direct effects on the host landscape character are LCA9 Hirwaun Common and Surrounding Ridges resulting in, some temporary and some long term loss of historic landscape character, habitats and adverse impact of recreational access. The LANDMAP approach to landscape classification brings together other environmental topics of historic landscape and landscape habitat assessment. These elements together with recreational access have been used to inform the baseline value and susceptibility judgements in this LVIA.</p> <p>Whilst the assessment of effects on character includes land that contains heritage assets, effects on heritage assets and their settings are considered within Volume 1, Chapter 9: Historic Environment of the ES. The Proposed Development will be located within The LCA 9 Hirwaun Common and Surrounding Ridges, resulting in temporary or long term significant adverse effects on landscape character. The location of extant historic features has been respected in the micro siting of the turbines to avoid disturbance to the features themselves and or associated site lines.</p> <p>Whilst the assessment of effects on character includes land that contains ecological assets effects on flora and fauna within habitats is considered within Volume 1, Chapter 6: Ecology of the ES. The construction and operation of the windfarm at Mynydd y Gaer will change the existing upland grazing farmland and moorland of LCA 9 Hirwaun Common and Surrounding Ridges resulting in some temporary and some long term loss of habitats. The micrositing of the turbines has sought to avoid areas of higher ecological value. The impacts will result in some localised major adverse effects on landscape character, which is significant.</p> <p>Whilst the assessment of effects on visual receptors includes people using recreational assets, effects on public open space and PRow are considered within Volume 1, Chapter 16: Agricultural land use and recreation of the ES. Users of the PRow, and locally promoted Ogwr Ridgeway Trail and open access common land in close proximity to the Site will gain open views of the construction activities and operational wind turbines, resulting in some major adverse temporary and long term effects, which is significant.</p>					

Summary of landscape and visual effects

- 5.1.336 The tables at the end of this section present a summary of the potential effects, on landscape and visual receptors.
- 5.1.337 There is a presumption in favour of windfarm development within Pre assessed areas (PAAs) as set out in Policies 17 and 18 of the Future Wales Plan. Crucially, the proposed scheme falls within PAA 9. This assessment has shown that although there are predicted to be some significant landscape and visual effects, these will be relatively local and confined to some receptor locations within 7km of the Proposed Development. There would be no significant effects on national landscape designations which fall partially within the 45km buffer from the Proposed Development. The nearest National Park to the Site is the Brecon Beacons National Park, which lies approximately 19.5km to the north at its nearest point. The northern edge of Exmoor National Park lies some 36km to the south from the nearest proposed wind turbine. There would be very little to no intervisibility between the proposal and these national parks. The closest National Landscape (formerly known as an Area of Outstanding Natural Beauty) is the Gower which is 30.5km to the west. There is almost no potential intervisibility with the Proposed Development and this national designation. This assessment concludes that the landscape and visual effects would be no greater than negligible adverse within the Gower National Landscape, Exmoor National Park and minor adverse at worse from some southern and most elevated parts of the Brecon Beacons National Park. Additionally, the proposed scheme would not be as visible as other existing operational or cumulative proposed windfarm schemes from these landscapes. The special qualities of the Brecon Beacons Landscape Character Areas (LCAs) assessed would not be altered or reduced significantly. The National Park special qualities of the level of tranquillity, quality of extensive views from prominent hilltops and the level of remoteness would not be reduced by the proposed windfarm at Mynydd y Gaer.
- 5.1.338 Although the Proposed Development falls within Special Landscape Area (SLA) 5 Mynydd y Gaer, it would be located within the context of the existing Taff Ely and Mynydd Portref windfarms, in the adjoining SLA, Mynydd Hugh and Lantrisant Forest. The landscape effects are described in Appendix 5B as part of the assessment on the host LCA 9 Hirwaun Common and Surrounding Ridges. It is acknowledged that there will be a major adverse effect on this SLA and LCA. An undeveloped open, upland ridge landscape would be replaced by 11 large wind turbines. Whilst open panoramic views would still be available the introduction of the turbines would partly compromise the scenic quality of the area. However, public access would be maintained as would the Ogwr Ridgeway Walk long distance trail and other footpaths. Receptors would still be able to appreciate the long distance panoramic 360 degree views. The embedded mitigation includes improvements to the component landscape habitats and the creation of an area of exchange common land to the south to mitigate loss of common from the proposed turbine development. Micro siting design of the turbine layout has respected habitats, site lines between historic features on the plateau and sought to minimise the impacts on residential

visual amenity. The residential visual amenity assessment (RVAA) can be found at Appendix 5D.

- 5.1.339 The tip and hub height ZTVs for the Proposed Development at Mynydd y Gaer, fieldwork and visualisations show that the greatest impacts on surrounding landscape character areas and Visual and Sensory Aspect Areas (VSAAs) will be within the 7km buffer distance from the proposed turbines and in most open landscapes. The impact diminishes between 5 and 15km where potential visibility between landscape receptors reduces to the north and west, but moderately extensive intervisibility over the coastal hinterland landscapes to the south. LCAs and where a local level character assessment is not available, VSAAs and Landscape units (LUs) in the 32km study area have been used to produce the 'landscape reporting framework'. The pattern of intervisibility is more fragmented across the north and east parts of the study area where the landscape is typically a series of settled valley bottoms with steep sides and little intervisibility to a mix of exposed open and wooded upland ridges and plateaux landscapes, which have the potential to be more widely impacted.
- 5.1.340 Out of the 34 of landscapes which have been assessed using the process described in Appendix 5B which reflects the NRW landscape filtering process in GN46, 12 are predicted to experience significant adverse effects where the ZTV shadow falls. These are mostly within 7km of the Proposed Development in elevated and open landscapes to the west though to the east and where they would appear as the closest turbines to these landscapes. An important local characteristic is that the existing wind farms, especially in close proximity to Mynydd y Gaer provide an existing context which the Proposed Development would contribute to, by intensifying wind turbine development and intervisibility on the skylines from surrounding landscapes but would not be substantially uncharacteristic with the attributes of these receiving landscapes. The scale of change and potential adverse effects on scenic quality is less than if there were no wind farms as part of the baseline.
- 5.1.341 Most of the landscape areas that are within the 15 to 32km buffer are to the north and north east of Mynydd y Gaer. These areas correspond with elevated open plateaux and ridges with upland moorland and pasture above mixed farming, forestry and settled valleys. None of these are predicted to experience significant adverse effects.
- 5.1.342 The viewpoint assessment identifies that there will be significant visual effects on 15 viewpoint receptors due to the Proposed Development in combination with operational cumulative schemes and up to 6.3km from Mynydd y Gaer.
- 5.1.343 Moderate adverse and significant effects were identified for 6 viewpoint locations. Although 2 of these viewpoints, 12 and 13 to the southeast of the Proposed Development, are considered to have close (less than 3km away) views of the proposed turbines within the context of baseline features including development such as existing wind turbines, other intervening substantial development including the Rockwool factory and / or intervening landform is such that the level of change or impact is considered to be less than high. The composition and character of the view together with the Proposed Development would be an intensification and spread of the existing windfarm

context at Taff Ely and Mynydd Portref within these views. The proposed changes to these views would be larger scale turbines than those in the existing view but would be at a moderate variance with the existing view.

- 5.1.344 Moderate adverse effects but not significant, would be experienced between 5 and 15km by 3 visual receptors to just over 11km at Mynydd Margam and from only the highest points in this distance range. These effects are not considered to be significant as the magnitude of impact is judged to be low to medium. The other viewpoint receptors would experience minor or less significance of effect in this distance range.
- 5.1.345 Visual effects on group receptors are inherently variable in nature. Settlement group receptors within a 10km buffer of the Proposed Development were considered. The edges of settlements closest to the proposed turbines are likely to experience the greatest levels of change. Parts of Glynogwr, Glynllan, Gilfach Goch / Evanstown and southern parts of Hoel y Cyw are expected to experience significant adverse effects. Glynogwr, Glynllan and Hoel y Cyw were taken forward for residential visual amenity assessment (Appendix 5D). None of the properties within these settlements are predicted to reach the residential visual amenity threshold (RVAT). PPW Policy 18 states that proposals for renewable energy projects will be permitted subject to there being '*no unacceptable adverse visual impacts on nearby communities and individual dwellings*'. This assessment concludes that although there are some significant adverse visual effects on local residential areas these are within 2km of the Proposed Development. None of the effects are so unacceptable so as to reach RVAT – where it would potentially affect 'living conditions' or residential amenity. The low lying nature of the local valley settlements, particularly those in valley running south to north means that views are frequently restricted and obscured by the intervening valley sides. To the south of Mynydd y Gaer there are large areas of population such as Bridgend, Sarn, Pencoed, Llanharan and Llantrisant within 7km. Most residents in these locations would experience very little change due to views of Mynydd y Gaer being obscured by a combination of neighbouring development and intervening topography and vegetation.
- 5.1.346 PPW Policy 18 also states that, '*the cumulative impacts of existing and consented renewable energy schemes should also be considered.*' Scenario 2 of the cumulative landscape and visual assessment (CLVIA) in this chapter has assessed this series of windfarm developments. In addition the CLVIA includes assessment of schemes in planning or at scoping stage referred to as Scenario 3. The majority of the cumulative baseline is made up of wind farms that are already in operation, which forms part of the the assessment in Scenario 1, in the landscape and visual assessment. As more windfarms are present in the landscape in some cases these will have the greater contributing influence to the level of effect. In Scenario 1, 12 LCAs / VSAs are predicted to experience significant effects. In scenario 2, with the addition of the consented schemes, 7 of these 12 areas are predicted to have additional cumulative effects which result in the combined cumulative schemes having an equal (type 1 cumulative effect) or greater contributing effect (type 3 cumulative effect) to the overall level of significance rather than the proposed

scheme. These landscapes will either have consented windfarm schemes within or close to and within 3km of them. Additionally, 2 new areas within the 15km buffer of the proposed scheme, are predicted to experience significant adverse effects where previously the introduction of the proposed scheme is not expected to result in a significant effect. The consented and operational schemes within 15km of the proposed scheme are located in landscapes to the north west round to the east. These cumulative schemes in these landscapes will generally have the greater contributing effect to the level of significance. There are no cumulative consented schemes to the south west and south. For these areas the proposed scheme will remain the closest scheme with the greatest indirect effects.

- 5.1.347 In Scenario 3, with the addition of the in planning schemes into the cumulative assessment this would result in 3 additional LCAs in the west of the 15km buffer experiencing significant effects. This would be attributable to the 2 schemes at Y Bryn and Foel Trawsnant.
- 5.1.348 Regarding visual matters, In Scenario 1, 90 degree views where the proposed scheme is central to the view, 15 viewpoints are predicted to experience significant effects. In 360 degree in succession views, 11 viewpoints are judged to experience significant effects attributable mainly to the proposed scheme and the 4 viewpoints from where the cumulative operational schemes have an equal or greater effect on visual amenity than the proposed scheme.
- 5.1.349 In Scenario 2 when the consented cumulative schemes are included in the assessment, considering the 15 viewpoints above, 8 viewpoints will experience significant effects attributable mainly to the proposed scheme in succession with the cumulative operational and consented schemes. However 7 viewpoints will experience significant effects where the cumulative operational and consented schemes will have an equal or greater effect on visual amenity than the proposed scheme.
- 5.1.350 In Scenario 3, the in planning schemes (including those at scoping stage) are included in the cumulative assessment. 8 viewpoints are judged to experience significant effects attributable mainly to the proposed scheme in succession with the cumulative operational, consented and in planning schemes. There are 9 viewpoints where the cumulative operational, consented and in planning schemes have an equal or greater effect on visual amenity than the proposed scheme. These 2 additional viewpoints, are predicted to experience significant effects from the Y Bryn and Foel Trawsnant in planning schemes.
- 5.1.351 In terms of group receptors – those predicted to experience significant effects from the proposed scheme were assessed as part of the cumulative assessment. The locally promoted trails of Ogwr Ridgeway, Taff Ely Ridgeway and Sky to Sea Walks would experience significant effects. In Scenarios 2 and 3 with additional consented and subsequently, in planning schemes the effects would be more equally attributable between the proposed scheme and the cumulative schemes with the addition of the Pant y Wal extension and Headwind Taff Ely Repowering schemes.

-
- 5.1.352 The only national cycle route predicted to experience would be a 1.5km section of NCN4. The proposed scheme would continue to be the most attributable scheme to the level of effect in Scenarios 2 and 3.

Table 5.21: Summary Tables of potential landscape and visual effects.

Landscape Receptors

There is a variety of levels of magnitude of impact across whole landscape character areas (LCAs). The judgements below reflect the predicted worst case potential effects where the ZTV shadow falls. Appendix 5B contains the full landscape assessment of effects. The Construction and Decommissioning phases are shorter in duration but the levels of effect are similar to those at the Operational phase. Significant effects are those in bold and purple in the table below.

Landscape Character Areas - LCAs for Bridgend (B), Vale of Glamorgan (VoG), Neath and Port Talbot (N&PT) local authorities and Landscape Unit - LUs Heads of the Valleys study by Gillespies (HoV); *Planning Guidance for Wind Turbine Development: Landscape and Visual Impact Assessment Requirements*. have been used as the reporting framework. Elsewhere where there are no published character assessments Visual and Sensory Aspect Areas - VSAs have been used. Level of effect is adverse unless otherwise stated. Rhondda Cynon Taff (RCT), Caerphilly (C), Bleanau Gwent (BG)

Ref	Name	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Host LCA – Operational Phase (duration is long term)								
LCA 9 (B)	Hirwaun Common and Surrounding Ridges (Bridgend) (Host LCA)	Medium	Medium to High	Medium to High	Large	Moderate	High	Major adverse
Landscape receptors within 15km of the Proposed Development – Operational Phase (duration is long term)								
LCA 8 (B)	Ogmore Forest and Surrounding Uplands (Bridgend)	Medium to High	Medium to High	Medium to High	Moderate	Moderate	Medium	Moderate to Major
LCA 6 (B)	Mynydd Llangeinwyr Uplands (Bridgend)	Medium to High	Medium to High	Medium to High	Moderate	Moderate	Medium	Moderate to Major
LCA 7 (B)	Ogmore Valley Floor & Lower Slopes (Bridgend)	Medium	Medium	Medium	Moderate	Low	Medium	Moderate
LCA 4 (B)	Bettwys Settled Farmland (Bridgend)	Medium	Low to Medium	Medium	Moderate	Moderate	Medium	Moderate
LCA 3 (B)	Llynfi & Garw Uplands and Forestry (Bridgend)	Medium	Medium	Medium	Low	Low	Low	Minor to Moderate
LCA 10 (B)	Coity Rural Hinterland (Bridgend)	Medium	Medium	Medium	Moderate	Moderate	Medium	Moderate
LCA15 (B)	Cefn Cribwr Ridge and Settled Farmland (Bridgend)	Medium	Medium	Medium	Moderate	Small	Low to Medium	Moderate

Ref	Name	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
LCA11 (B)	Merthyr Mawr Farmland, Warren and Coastline (Bridgend)	Medium	Medium to High	Medium to High	Low	Low	Low	Minor to Moderate
LCA12 (B)	Newton Down and Limestone Plateau (Bridgend)	Medium	Medium	Medium	Low	Low	Low	Minor to Moderate
LCA1 (B)	Langwynyd Rolling Uplands (Bridgend)	Medium to High	Medium to High	Medium to High	Low to Moderate	Low	Low to Medium	Moderate
LCA 14 (B)	Kenfig Dunes and Coastline (Bridgend)	Medium	High	Medium to High	Low	Low	Low	Moderate
LCA 13 (B)	Porthcawl Coastline and Settled Farmland (Bridgend)	Medium	Medium	Medium	Low	Low	Low	Minor
CYNONVS436 (RCT)	Mynydd Gaer eastern part (Rhondda Cynon Taff)	Medium	Medium	Medium	Large	Large	High	Moderate to Major
CYNONVS142 (RCT)	Mynydd y Glyn (Rhondda Cynon Taff)	Medium	Medium	Medium	Low to Moderate	Moderate	Medium	Moderate
CYNONVS966 (RCT)	Bettws (Rhondda Cynon Taff)	Medium	Medium	Medium	Low to Moderate	Moderate	Medium	Moderate (hill summits above Tonyrefail and Coedely) Moderate elsewhere
CYNONVS738 & CYNONVS141 (RCT)	Cefn y Rhondda & Ynysbwl (Rhondda Cynon Taff)	Low to Medium	Low to Medium	Low to Medium	Low to Moderate	Low to Moderate	Low to Medium	Minor to Moderate
CYNONVS572, CRDFFVS003, CRDFFVS004	Hendre, Garth West, Garth Hill & (Rhondda Cynon Taff)	Medium	Medium to High	Medium to High	Low to Moderate	Low to Moderate	Low to Medium	Moderate beyond 5km and Moderate within 5km
LCA 2 (VoG)	Northern Vale Lias Slopes (Vale of Glamorgan)	Medium	Medium	Medium	Low to Moderate	Moderate	Medium	Moderate south western parts and Moderate north eastern parts
LCA 8 (VoG)	Lias Plateau (Vale of Glamorgan)	Medium	Medium	Medium	Low to Moderate	Low	Low	Minor

Ref	Name	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
LCA 10 (VoG)	Upper Thaw Valley (Vale of Glamorgan)	Medium	Medium to High	Medium to High	Low to Moderate	Low to Moderate	Low to Medium	Moderate
LCA 13 (VoG)	Ystradowen Lowland Valleys (Vale of Glamorgan))	Medium	Medium	Medium	Low to Moderate	Low to Moderate	Low to Medium	Minor to Moderate
LCA 14 (VoG)	Hensol Forest (Vale of Glamorgan)	Low to Medium	Medium	Medium	Negligible	Negligible to small	Negligible	Negligible
LCA 12 (VoG)	Ogmore Down (Vale of Glamorgan)	Medium	Medium to High	Medium to High	Low	Low	Low	Moderate
LCA 11 (VoG)	Norton Down (Vale of Glamorgan)	Medium	Medium to High	Medium to High	Low	Low	Low	Minor to Moderate
LCA 7 (VoG)	Heritage Coast Hinterland (Vale of Glamorgan)	Medium	High	Medium to High	Low	Low	Low	Minor to Moderate
LCA 4 (N&PT)	Coedhirwaun (Neath & Port Talbot)	Medium	Medium	Medium	Low	Low	Low	Minor to Moderate
LCA 5 (N&PT)	Coedhirwaun and Open Scarp Tops (Neath & Port Talbot)	Medium to High	Medium	Medium to High	Low	Low	Low	Moderate
Landscape receptors between 15 and 32km of the Proposed Development – Operational Phase (duration is long term)								
CYNONVS143	Llanfabon	Medium	Medium to High	Medium to High	Negligible to Low	Negligible to Low	Negligible to Low	Negligible to Minor
CYNONVS129(C), CYNONVS854(C), CYNONVS214(C)	Mynydd y Grugg Mynydd y Lan Mynydd Lwyd and Mynydd (all Caerphilly)	Medium	Medium to High	Medium to High	Negligible to Low	Negligible	Negligible to Low	Negligible to Minor
LU 13 (HoV)	Upland Moorland between Taff and Rhymney Valleys – HoV Landscape Units (Rhondda Cynon Taff)	Medium	Medium to High	Medium to High	Negligible	Negligible to Low	Negligible	Negligible
LUs 18, 22 & 24	Mynydd Bedwelte & Associated Uplands, Northern Manmoel Ridge & Mynydd Carn y Cefn & Cefn yr Arail HoV Landscape Units (Bleanau Gwent County Boroughs)	Medium	Medium to High	Medium to High	Negligible to Low	Negligible	Negligible	Negligible
LCA 7 (BBNP)	Central Beacons (Brecon Beacons National Park)	Very High	Very High	Very High	No Change to Negligible	Negligible	No Change to Negligible	Minor

Ref	Name	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
LCA 9 (BBNP)	Mynyddoedd Llangatwg & Llangynidr (Brecon Beacons National Park)	Very High	High	High to Very High	No Change to Negligible	Negligible	No Change to Negligible	Minor

Representative Viewpoint Receptors

The effects during the construction phase are assessed up to the 15km distance buffer from the Proposed Development. Beyond 15km the low level elements including localised earthworks, the formation of access routes, temporary construction areas and holding bays, turbine blade laydown areas and turbine hardstanding pads of the construction will not be visible. The cranes and lifting gear erecting the turbines would be potentially visible but not considered to result in a short term negligible effect and not assessed further.

Viewpoint	Location	Receptor Type/Designation	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Within 5km of the Proposed Development – Construction & Decommissioning Phases (duration is short term)									
1	Mynydd y Gaer	Taff Ely Ridgeway Walk (SLA)	High	Regional	High	Large	Large	High	Major adverse
2	Mynydd y Gaer	PRoW. Common Land (SLA)	High	Regional	High	Large	Large	High	Major adverse
3	Heol y Cyw	Settlement	Medium-High	Local Community	Medium	Large	Large	High	Major adverse
4	Bryncethin	Settlement	Medium-High	Local Community	Medium-High	Large	Moderate	Medium	Moderate – Major adverse
5	Bryn y Wrach	PRoW. Common Land	High	Local Community	High	Moderate	Moderate	Medium	Moderate – Major adverse
6	Blackmill	PRoW above settlement	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Moderate adverse
7	Glynogwr	A4093 west edge of settlement	Medium-High	Local Community	Medium-High	Large	Large	High	Major adverse
8	Gilfach Goch	PRoW east of Settlement	Medium	Local Community	Medium	Moderate	Moderate	Medium	Moderate adverse
9	Ogmore Forest	PRoW southern edge Ogmore Forest	High	Local Community	High	Moderate	Large	Medium - High	Major adverse

Viewpoint	Location	Receptor Type/Designation	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
10	Mynydd Llangeinwyr	PRoW south slopes of Pen y Foel (SLA)	High	Regional	High	Large	Moderate	Medium - High	- Major adverse
11	Cefn Hifgoed	PRoW. Common Land	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Moderate adverse
12	Pencoed	Track on north side of Settlement	Medium	Local Community	Medium	Moderate	Moderate	Medium	Moderate adverse
13	Brynna	PRoW north side of Settlement (SLA)	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Moderate adverse
Between 5km and 15km of the Proposed Development – Construction Phase & Decommissioning Phases (duration is short term)									
14	Mynydd William Meyrick (SLA)	PRoW / Open Access land	Medium-High	Regional	High	Low - Moderate	Moderate	Low - Medium	Moderate adverse
15	Cefn Gwyngul	Road. Registered (Landscape of Historic Interest)	Medium	Local Community - Regional	Medium-High	Negligible - Low	Low	Negligible - Low	Minor adverse
16	Mynydd y Glyn	Hill top open access (Landscape of Historic Interest & SLA)	High	Regional	High	Low - Moderate	Moderate	Medium	Moderate adverse
17	Mynydd Meio	Rhymney Valley Ridgeway Path	Medium - High	Regional	Medium - High	Low	Low	Low	Minor adverse
18	Llantrisant	Lane through Common Land (SLA)	Medium	Local Community - Regional	Medium	Negligible	Low	Negligible	Negligible adverse
19	St Mary Hill Down	PRoW by Trigg point (SLA)	Medium	Local Community - Regional	Medium - High	Moderate	Moderate	Medium	Moderate adverse
20	Tair Croes Down	PRoW. Common Land	Medium	Local Community - Regional	Medium - High	Low - Moderate	Moderate	Low - Medium	Moderate adverse
21	Wick	Lane on edge of Settlement	Medium	Local Community	Medium	Low	Low	Low - Medium	Minor - Moderate adverse
22	Laleston / Trelales	PRoW north west of Laleston (SLA)	Medium	Local Community - Regional	Medium - High	Low - Moderate	Low	Low - Medium	Moderate adverse

Viewpoint	Location	Receptor Type/Designation	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
23	Kenfig Hill	PRoW. near Country Park	Medium	Local Community	Medium	Low - Moderate	Low	Low - Medium	Minor - Moderate adverse
24	Mynydd Baedon	PRoW close to hill summit (SLA)	High	Regional	High	Moderate	Low	Low - Medium	Moderate adverse
25	Mynydd Margam	PRoW. SLA. Registered Landscape of Historic Interest	High	Regional	High	Low	Low	Low	Minor - Moderate adverse
Between 15km and 45km of the Proposed Development – Construction Phase & Decommissioning Phases (duration is short term)									
26	Mumbles Head	Wales Coast Path. Gower AONB/NL	Very High	National	Very High	No Discernible Change	No Discernible Change	No Change	No Effects
27	Pwlldu Head	Wales Coast Path. Gower AONB/NL	Very High	National	Very High	No Discernible Change	No Discernible Change	No Change	No Effects
28	Pen y Fan	Beacons Way - Brecon Beacons National Park	Very High	National	Very High	Barely Discernible Change	Barely Discernible Change	Negligible to No Change	Negligible - No Effect
29	Porlock Common	Exmoor National Park	High	National	High	No Change - Negligible	No Change - Negligible	No Change - Negligible	Negligible
30	Weston-Super-Mare	Above pier at Settlement edge	Low Medium	Local Community	Medium	No Change - Negligible	No Change - Negligible	No Change - Negligible	Negligible - No Effect
31	Cefn Yr Ystrad	Brecon Beacons National Park	High	National	High	Barely Discernible Change	Barely Discernible Change	No Change - Negligible	Negligible - No Effect
32	Waun Rydd	Brecon Beacons National Park	High	National	Very High	Barely Discernible Change	Barely Discernible Change	No Change - Negligible	Negligible - No Effect

Viewpoint	Location	Receptor Type/Designation	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Within 5km of the Proposed Development – Operational Phase (duration is long term)									
1	Mynydd y Gaer	Taff Ely Ridgeway Walk (SLA)	High	Regional	High	Large	Large	High	Major adverse
2	Mynydd y Gaer	PRoW. Common Land (SLA)	High	Regional	High	Large	Large	High	Major adverse
3	Heol y Cyw	Settlement	Medium-High	Local Community	Medium	Large	Large	High	Major adverse
4	Bryncethin	Settlement	Medium-High	Local Community	Medium-High	Large	Moderate	Medium	Moderate – Major adverse
5	Bryn y Wrach	PRoW. Common Land	High	Local Community	High	Moderate	Moderate	Medium	Moderate – Major adverse
6	Blackmill	PRoW above settlement	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Moderate adverse
7	Glynogwr	A4093 west edge of settlement	Medium-High	Local Community	Medium-High	Large	Large	High	Major adverse
8	Gilfach Goch	PRoW east of Settlement	Medium	Local Community	Medium	Moderate	Moderate	Medium	Moderate adverse
9	Ogmore Forest	PRoW southern edge Ogmore Forest	High	Local Community	High	Moderate	Large	Medium - High	Major adverse
10	Mynydd Llangeinwyr	PRoW south slopes of Pen y Foel (SLA)	High	Regional	High	Large	Moderate	Medium - High	Major adverse
11	Cefn Hifgoed	PRoW. Common Land	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Moderate adverse
12	Pencoed	Track on north side of Settlement	Medium	Local Community	Medium	Moderate	Moderate	Medium	Moderate adverse
13	Brynna	PRoW north side of Settlement (SLA)	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Moderate adverse
Between 5km and 15km of the Proposed Development – Operational Phase (duration is long term)									

Viewpoint	Location	Receptor Type/Designation	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
14	Mynydd William Meyrick (SLA)	PRoW / Open Access land	Medium-High	Regional	High	Low - Moderate	Moderate	Low - Medium	Moderate adverse
15	Cefn Gwyngul	Road. Registered (Landscape of Historic Interest)	Medium	Local Community - Regional	Medium-High	Negligible - Low	Low	Negligible - Low	Minor adverse
16	Mynydd y Glyn	Hill top open access (Landscape of Historic Interest & SLA)	High	Regional	High	Low - Moderate	Moderate	Medium	Moderate adverse
17	Mynydd Meio	Rhymney Valley Ridgeway Path	Medium - High	Regional	Medium - High	Low	Low	Low	Minor adverse
18	Llantrisant	Lane through Common Land (SLA)	Medium	Local Community - Regional	Medium	Negligible	Low	Negligible	Negligible adverse
19	St Mary Hill Down	PRoW by Trigg point (SLA)	Medium	Local Community - Regional	Medium - High	Moderate	Moderate	Medium	Moderate adverse
20	Tair Croes Down	PRoW. Common Land	Medium	Local Community - Regional	Medium - High	Low - Moderate	Moderate	Low - Medium	Moderate adverse
21	Wick	Lane on edge of Settlement	Medium	Local Community	Medium	Low	Low	Low - Medium	Minor - Moderate adverse
22	Laleston / Trelales	PRoW north west of Laleston (SLA)	Medium	Local Community - Regional	Medium - High	Low - Moderate	Low	Low - Medium	Moderate adverse
23	Kenfig Hill	PRoW. near Country Park	Medium	Local Community	Medium	Low - Moderate	Low	Low - Medium	Minor - Moderate adverse
24	Mynydd Baedon	PRoW close to hill summit (SLA)	High	Regional	High	Moderate	Low	Low - Medium	Moderate adverse
25	Mynydd Margam	PRoW. SLA. Registered Landscape of Historic Interest	High	Regional	High	Low	Low	Low	Minor - Moderate adverse
Between 15km and 45km of the Proposed Development – Operational Phase (duration is long term)									
26	Mumbles Head	Wales Coast Path. Gower AONB/NL	Very High	National	Very High	No Discernible Change	No Discernible Change	No Change	No Effects

Viewpoint	Location	Receptor Type/Designation	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
27	Pwlldu Head	Wales Coast Path. Gower AONB/NL	Very High	National	Very High	No Discernible Change	No Discernible Change	No Change	No Effects
28	Pen y Fan	Beacons Way - Brecon Beacons National Park	Very High	National	Very High	Barely Discernible Change	Barely Discernible Change	Negligible to No Change	Negligible - No Effect
29	Porlock Common	Exmoor National Park	High	National	High	No Change - Negligible	No Change - Negligible	No Change - Negligible	Negligible
30	Weston-Super-Mare	Above pier at Settlement edge	Low Medium	Local Community	Medium	No Change - Negligible	No Change - Negligible	No Change - Negligible	Negligible - No Effect
31	Cefn Yr Ystrad	Brecon Beacons National Park	High	National	High	Barely Discernible Change	Barely Discernible Change	Negligible to No Change	Negligible - No Effect
32	Waun Rydd	Brecon Beacons National Park	High	National	Very High	Barely Discernible Change	Barely Discernible Change	Negligible to No Change	Negligible - No Effect

Group Receptors

Settlement	Location	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Settlements – Operational Phase (duration is long term)								
Glynllan	Ogwr Fach Valley	High	Local Community	Medium - High	Large	Moderate	Medium - High	Major adverse
Glynogwr	Ogwr Fach Valley	High	Local Community	High	Large	Large	High	Major adverse
Gilfach Goch / Evanstown	Ogwr Fach Valley	Medium-High	Local Community	Medium	Large	Large	High	Major adverse
Sarn / Abergarw / Bryncethin/ Brynmenyn	Ogmore Valley	Medium-High	Local Community	Medium-High	Large	Moderate	Medium to No Change	Moderate adverse (very few) to Negligible or No Effects for most
Blackmill	Ogmore Valley	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium to No Change	Moderate adverse (very few) to Negligible or No Effects for most

Settlement	Location	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Lewistown/ Pant – yr -awel	Ogwr Fawr	Medium-High	Local Community	Medium-High	Moderate	Low	Small to No Change	Minor adverse (few) to Negligible or No Effects for most
Ogmore Vale	Ogwr Fawr	Medium-High	Local Community	Medium-High	Low	Low	Small to No Change	Minor adverse (very few) to Negligible or No Effects for most
Nant-y-moel /Price Town	Ogwr Fawr	Medium-High	Local Community	Medium-High	Low	Low	Small to No Change	Minor adverse (very few) to Negligible or No Effects for most
Tonyrefail	Rhondda Fawr	Medium-High	Local Community	Medium-High	Low	Low	Small to No Change	Minor adverse (few) to Negligible or No Effects for most
Edmondstown / Penygraig / Tonypandy	Rhondda Fawr	Medium	Local Community	Medium	No Change	No Change	No Change	No Effects
Bettws	Cwn Gawr	Medium-High	Local Community	Medium-High	Moderate	Low	Medium to Small to No Change	Moderate to Minor adverse (few) to Negligible or No Effects for most
Hoel y Cyw	Hirwaun Common and Surrounding Ridges	Medium-High	Local Community	Medium-High	Large (from southern part of settlement) Large (northern part)	Large (from southern part of settlement) Low (northern part)	High (southern part) Small (northern part)	Major adverse (southern part) Moderate to Minor adverse (northern part)
Pencoed	Coity Hinterland	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium (northern edge) Small to No Change (for other parts)	Moderate adverse (northern edge) Minor to No Effects (for other parts)
Bridgend – eastern suburbs	Coity Hinterland	Medium	Local Community	Medium	Low	Low	Small (eastern edge) Negligible to No Change (for most)	Minor adverse (eastern edge) Negligible to No Effect (for most)

Settlement	Location	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Brynna	Coity Hinterland	Medium-High	Local Community	Medium-High	Moderate	Low	Small to Medium (northern edge) Negligible to No Change (for other parts)	Minor - Moderate adverse (northern edge) Negligible to No Effect (for most)

Dynamic Receptors	Location	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Recreational Users (Open Access and PRoW)– Operational Phase (duration is long term)								
Open Access	Mynydd y Gaer	High	Regional	High	Large	Large	High	Major adverse
PRoW	within 1.5km of Mynydd y Gaer	High	Regional	High	Large	Large to Moderate	Moderate to High	Major adverse few Moderate adverse for most
Common	Cefn Hirgoed	Medium-High	Local Community	Medium-High	Large	Moderate	Medium	Moderate – Major adverse
Open Access	Mynydd Gilfach	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Moderate adverse (few) to Negligible or No Effects for most
Open Access	Ogmore Forest north to 15km buffer	Medium-High	Regional	High	Large to No Change	Large to No Change	High to No Change	Major adverse within 2.5km 5 to 15km occasional Moderate. Negligible or No Effects for most
Open Access	Mynydd Llangeinwyr	High	Regional	High	Large to No Change	Large to No Change	High to No Change	Major adverse within 5km, 5 to 10km to occasional Moderate. Negligible or No Effects for most

Dynamic Receptors	Location	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
Open Access	Bryn y Wrach	Medium-High	Local Community	Medium-High	Moderate	Moderate	Medium	Major adverse few Moderate adverse for most
Open Access	Mynydd y Glyn	High	Regional	High	Moderate to No Change	Moderate to No Change	Medium to No Change	Moderate adverse (some) to Negligible or No Effects for most
Promoted Walk / Trail	Ogwr Ridgeway	High	Regional	High	Large to Low	Large to Low	High (within 5km) Medium to Low (5 to 15km)	Major adverse mostly (within 5km) Moderate to Minor (5 to 15km)
Promoted Walk / Trail	Taff Ely	High	Regional	High	Large to Low	Large to Low	High (within 5km) Medium to No Change (5 to 15km)	Moderate to Major adverse mostly (within 5km) Moderate to No Effect (5 to 15km)
Promoted Walk / Trail	St Illtyd's	High	Regional	High	Low to No Effect	Low to No Effect	Low to No change (mostly) Medium (very few)	Negligible adverse effects mostly – Moderate adverse very few
Promoted Walk / Trail	Bridgend Circular	High	Regional	High	Moderate to No Change	Moderate to No Change	Medium to No Change	Moderate adverse north / north east side of Bridgend Minor to No Effect on remaining sections
Promoted Walk / Trail	Sky to Sea	High	Regional	High	Large to Negligible	Large to Negligible	High for most (within 5km) Medium for most (5 to 10km) Negligible for most (10 to 15km)	Major adverse for most (within 5km) Moderate adverse for most (5 to 10km) Negligible adverse for most (10 to 15km)

Dynamic Receptors	Location	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
National Cycle Routes (NCNs) and road network– Operational Phase (duration is long term)								
NCN 4	Pontypridd to Mynydd Castell	Medium	Regional	Medium	Moderate to Negligible – No Change	Low to Negligible - No Change	Low for most (within 5km) Negligible for most (5 to 15km)	Minor adverse for most (within 5km)
NCN 883	Cwm Ogwr Fawr	Medium	Regional	Medium	Large to Negligible – No Change	Large to Negligible – No Change	High for most (within 2km) Negligible for most (2 to 7km)	Major adverse (within 2km) Minor to No Change (2 to 7km)
NCN 88	Cefn Hirgoed	Medium	Regional	Medium	Low to Negligible - No Change	Low to Negligible - No Change	Low for most	Minor adverse for most
NCN 888	Llanmaes - Ewenny	Medium	Regional	Medium	Low to Negligible - No Change	Low to Negligible - No Change	Low for most	Minor adverse for most
A4093	Blackmill to Hendreforgan	Low	Regional	Low	Moderate to No Change	Moderate to No Change	Medium (open sections) to No Change (enclosed sections)	Moderate adverse for open sections Negligible to No Effect for enclosed sections
B4280	Bryncethin to Pencoed	Low -Medium	Regional	Medium - Low	Moderate to No Change	Moderate to No Change	Medium (open sections) to No Change (enclosed sections)	Moderate adverse for open sections (mostly) Negligible to No Effect for enclosed sections (few)
A4061	Blackmill to Treorchy	Low	Regional	Low	Large to Negligible – No Change	Large to Negligible – No Change	High for most (within 2km) Negligible for most (2 to 7km)	Moderate adverse (within 2km) Negligible to No Change (2 to 7km)
M4	Jnc 33 Capel Llanilfern to Junction 36 Sarn	Negligible	National	Low	Moderate to No Change	Moderate to No Change	Medium (Llanharry and Pencoed)	Minor adverse (Llanharry and Pencoed)

Dynamic Receptors	Location	Susceptibility	Value	Sensitivity	Scale	Geog. Extent	Magnitude of Impact	Level of Effect
							Negligible to No Change (other sections)	Negligible to No Change (other sections)

Cumulative Assessment –

Definitions of types of cumulative effects (see Appendix 5A for cumulative assessment methodology and Appendix 5C for detailed assessment of cumulative effects on each Representative Viewpoint). Significant cumulative effects that on balance are mainly attributable to the proposed scheme are highlighted **bold and purple**.

- **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.**

Cumulative Assessment – Landscape Receptors

- If the Proposed Development is the main contributing effect to a significant effect **purple and bold text is used**
- If the cumulative schemes are the main contributing effect to a significant effect **black bold text is used**
- If the Proposed Development does not result in a significant effect or is not the most contributing influence together with cumulative schemes **grey regular text is used**

Ref	Name	Level of Effect Scenario 1	Scenario 1 Proposed scheme + Operational	Scenario 2 Proposed scheme + Operational, + Consented	Scenario 3 Proposed scheme + Operational, + Consented + In Planning + Scoping
Host LCA – Operational Phase (duration is long term)					
LCA 9 (B)	Hirwaun Common and Surrounding Ridges (Bridgend) (Host LCA)	Major adverse	Significant	Significant (Type 2)	Significant (Type 2)
Landscape receptors within 15km of the Proposed Development – Operational Phase (duration is long term)					
LCA 8 (B)	Ogmore Forest and Surrounding Uplands (Bridgend)	Moderate to Major	Significant	Significant (Type 2) in south Significant (Type 3) - in north	Significant (Type 2) in south Significant (Type 3) - in north
LCA 6 (B)	Mynydd Llangeinwyr Uplands (Bridgend)	Moderate to Major	Significant	Significant (Type 2) in south Significant (Type 3) - in north	Significant (Type 2) in south Significant (Type 3) - in north
LCA 7 (B)	Ogmore Valley Floor & Lower Slopes (Bridgend)	Moderate	Significant	Significant (Type 2) in south Significant (Type 3) - in north	Significant (Type 2) in south Significant (Type 3) - in north
LCA 4 (B)	Bettwys Settled Farmland (Bridgend)	Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 3 (B)	Llynfi & Garw Uplands and Forestry (Bridgend)	Minor to Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)

Ref	Name	Level of Effect Scenario 1	Scenario 1 Proposed scheme + Operational	Scenario 2 Proposed scheme + Operational, + Consented	Scenario 3 Proposed scheme + Operational, + Consented + In Planning + Scoping
LCA 10 (B)	Coity Rural Hinterland (Bridgend)	Moderate	Significant	Significant (Type 2)	Significant (Type 2)
LCA15 (B)	Cefn Cribwr Ridge and Settled Farmland (Bridgend)	Moderate	Not significant	Not significant (Type 4)	Significant (Type 4)
LCA11 (B)	Merthyr Mawr Farmland, Warren and Coastline (Bridgend)	Minor to Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA12 (B)	Newton Down and Limestone Plateau (Bridgend)	Minor to Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA1 (B)	Langwynyd Rolling Uplands (Bridgend)	Moderate	Significant	Significant (Type 2)	Significant (Type 3)
LCA 14 (B)	Kenfig Dunes and Coastline (Bridgend)	Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 13 (B)	Porthcawl Coastline and Settled Farmland (Bridgend)	Minor	Not significant	Not significant (Type 4)	Not significant (Type 4)
CYNONVS436 (RCT)	Mynydd Gaer eastern part (Rhondda Cynon Taff)	Moderate to Major	Significant	Significant (Type 1)	Significant (Type 1)
CYNONVS142 (RCT)	Mynydd y Glyn (Rhondda Cynon Taff)	Moderate	Significant	Significant (Type 3)	Significant (Type 3)
CYNONVS966 (RCT)	Bettws (Rhondda Cynon Taff)	Moderate (hill summits above Tonyrefail and Coedely)	Significant	Significant (Type 3)	Significant (Type 3)

Ref	Name	Level of Effect Scenario 1	Scenario 1 Proposed scheme + Operational	Scenario 2 Proposed scheme + Operational, + Consented	Scenario 3 Proposed scheme + Operational, + Consented + In Planning + Scoping
		Moderate elsewhere			
CYNONVS738 & CYNONVS141 (RCT)	Cefn y Rhondda & Ynysbwl (Rhondda Cynon Taff)	Minor to Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
CYNONVS572, CRDFFVS003, & CRDFFVS004 (RCT)	Hendre, Garth West, Garth Hill (Rhondda Cynon Taff)	Moderate beyond 10km Moderate within 10km	Not significant beyond 10km Significant within 10km	Not significant (Type 4) Significant (Type 3)	Not significant (Type 4) Significant (Type 3)
LCA 2 (VoG)	Northern Vale Lias Slopes (Vale of Glamorgan)	Moderate south western parts Moderate north eastern parts	Not significant in south west Significant in north east	Not significant (Type 4) Significant (Type 2)	Not significant (Type 4) Significant (Type 2)
LCA 8 (VoG)	Lias Plateau (Vale of Glamorgan)	Minor	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 10 (VoG)	Upper Thaw Valley (Vale of Glamorgan)	Moderate southern parts Moderate northern parts	Not significant in south Significant in north	Not significant (Type 4) Significant (Type 2)	Not significant (Type 4) Significant (Type 2)
LCA 13 (VoG)	Ystradowen Lowland Valleys (Vale of Glamorgan))	Minor to Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 14 (VoG)	Hensol Forest (Vale of Glamorgan)	Negligible	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 12 (VoG)	Ogmore Down (Vale of Glamorgan)	Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 11 (VoG)	Norton Down (Vale of Glamorgan)	Minor to Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)

Ref	Name	Level of Effect Scenario 1	Scenario 1 Proposed scheme + Operational	Scenario 2 Proposed scheme + Operational, + Consented	Scenario 3 Proposed scheme + Operational, + Consented + In Planning + Scoping
LCA 7 (VoG)	Heritage Coast Hinterland (Vale of Glamorgan)	Minor to Moderate	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 4 (N&PT)	Coedhirwaun (Neath & Port Talbot)	Minor to Moderate	Not significant	Not significant (Type 4)	Significant (Type 4)
LCA 5 (N&PT)	Coedhirwaun and Open Scarp Tops (Neath & Port Talbot)	Moderate	Not significant	Not significant (Type 4)	Significant (Type 4)
Landscape receptors between 15 and 32km of the Proposed Development – Operational Phase (duration is long term)					
CYNONVS143	Llanfabon	Negligible to Minor	Not significant	Not significant (Type 4)	Not significant (Type 4)
CYNONVS129(C), CYNONVS854(C), CYNONVS214(C)	Mynydd y Grugg Mynydd y Lan Mynydd Lwyd and Mynydd Maen (all Caerphilly)	Negligible to Minor	Not significant	Not significant (Type 4)	Not significant (Type 4)
LU 13 (HoV)	Upland Moorland between Taff and Rhymney Valleys – HoV Landscape Units (Rhondda Cynon Taff)	Negligible	Not significant	Not significant (Type 4)	Not significant (Type 4)
LUs 18, 22 & 24	Mynydd Bedwelte & Associated Uplands, Northern Manmoel Ridge & Mynydd Carn y Cefn & Cefn yr Arail HoV Landscape Units (Bleanau Gwent County Boroughs)	Negligible	Not significant	Not significant (Type 4)	Not significant (Type 4)

Ref	Name	Level of Effect Scenario 1	Scenario 1 Proposed scheme + Operational	Scenario 2 Proposed scheme + Operational, + Consented	Scenario 3 Proposed scheme + Operational, + Consented + In Planning + Scoping
LCA 7 (BBNP)	Central Beacons (Brecon Beacons National Park)	Minor	Not significant	Not significant (Type 4)	Not significant (Type 4)
LCA 9 (BBNP)	Mynyddoedd Llangatwg & Llangynidr (Brecon Beacons National Park)	Minor	Not significant	Not significant (Type 4)	Not significant (Type 4)

Cumulative Assessment – Representative Viewpoint Receptors

Definitions of types of cumulative effects (see Appendix 5A for cumulative assessment methodology and Appendix 5C for detailed assessment of cumulative effects on each Representative Viewpoint). Significant cumulative effects that on balance are mainly attributable to the proposed scheme are highlighted **bold and purple**.

- **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 **is a greater level of effect than for either development individually; the combined effect however, may be assessed as either significant or not significant.**

Viewpoint	Location	Receptor Type/Designation	Significance of effect	Scenario 1 90 degree	Scenario 1 360 degree	Scenario 2 90 degree	Scenario 2 360 degree	Scenario 3 90 degree	Scenario 3 360 degree
1	Mynydd y Gaer	Taff Ely Ridgeway Walk (SLA)	Major adverse	Significant	Significant (Type 1)	Significant (Type 2)	Significant (Type 1)	Significant (Type 2)	Significant (Type 1)
2	Mynydd y Gaer	PRoW. Common Land (SLA)	Major adverse	Significant	Significant (Type 1)	Significant (Type 2)	Significant (Type 1)	Significant (Type 2)	Significant (Type 1)
3	Heol y Cyw	Settlement	Major adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
4	Bryncethin	Settlement	Moderate – Major adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
5	Bryn y Wrach	PRoW. Common Land	Moderate – Major adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 1)	Significant (Type 2)	Significant (Type 1)
6	Blackmill	PRoW above settlement	Moderate adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 1)	Significant (Type 2)	Significant (Type 1)
7	Glynogwr	A4093 west edge of settlement	Major adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
8	Gilfach Goch	PRoW east of Settlement	Moderate adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
9	Ogmore Forest	PRoW southern edge Ogmore Forest	Major adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
10	Mynydd Llangeinwyr	PRoW south slopes of Pen y Foel (SLA)	Moderate - Major adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
11	Cefn Hifgoed	PRoW. Common Land	Moderate adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
12	Pencoed	Track on north side of Settlement	Moderate adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)

Viewpoint	Location	Receptor Type/Designation	Significance of effect	Scenario 1 90 degree	Scenario 1 360 degree	Scenario 2 90 degree	Scenario 2 360 degree	Scenario 3 90 degree	Scenario 3 360 degree
13	Brynna	PRoW north side of Settlement (SLA)	Moderate adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
14	Mynydd William Meyrick (SLA)	PRoW / Open Access land	Moderate adverse	Not Significant	Significant (Type 3)	Significant (Type 3)	Significant (Type 3)	Significant (Type 3)	Significant (Type 3)
15	Cefn Gwyngul	Road. Registered (Landscape of Historic Interest)	Negligible – Minor adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Significant (Type 4)	Not Significant (Type 4)	Significant (Type 4)
16	Mynydd y Glyn	Hill top open access (Landscape of Historic Interest & SLA)	Moderate adverse	Significant	Significant (Type 2)	Significant (Type 3)	Significant (Type 3)	Significant (Type 3)	Significant (Type 3)
17	Mynydd Meio	Rhymney Valley Ridgeway Path	Minor adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
18	Llantrisant	Lane through Common Land (SLA)	Negligible adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
19	St Mary Hill Down	PRoW by Trigg point (SLA)	Moderate adverse	Significant	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)	Significant (Type 2)
20	Tair Croes Down	PRoW. Common Land	Moderate adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
21	Wick	Lane on edge of Settlement	Minor to Moderate adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
22	Laleston / Trelales	PRoW north west of Laleston (SLA)	Minor to Moderate adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
23	Kenfig Hill	PRoW. near Country Park	Minor to Moderate adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)

Viewpoint	Location	Receptor Type/Designation	Significance of effect	Scenario 1 90 degree	Scenario 1 360 degree	Scenario 2 90 degree	Scenario 2 360 degree	Scenario 3 90 degree	Scenario 3 360 degree
24	Mynydd Baedon	PRoW close to hill summit (SLA)	Moderate adverse	Significant	Not Significant (Type 4)	Significant (Type 4)	Not Significant (Type 4)	Significant (Type 4)	Significant (Type 4)
25	Mynydd Margam	PRoW. SLA. Registered Landscape of Historic Interest	Minor - Moderate adverse	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Significant (Type 3)
26	Mumbles Head	Wales Coast Path. Gower AONB/NL	No Effects	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
27	Pwlldu Head	Wales Coast Path. Gower AONB/NL	No Effects	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
28	Pen y Fan	Beacons Way - Brecon Beacons National Park	Negligible to No Change	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
29	Porlock Common	Exmoor National Park	Negligible	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
30	Weston-Super-Mare	Above pier at Settlement edge	Negligible	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
31	Cefn Yr Ystrad	Brecon Beacons National Park	Negligible to No Change	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)
32	Waun Rydd	Brecon Beacons National Park	Negligible to No Change	Not Significant	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)	Not Significant (Type 4)

References

- 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 Proposals* (Landscape Institute, September 2019);
- Technical Guidance Note 02/21: Assessing landscape value outside national designations* (Landscape Institute, May 2021);
- Welsh Government; (February 2021) '*Future Wales The National Plan 2040*'
- Welsh Government; and Arup (March 2019) '*Assessment of onshore wind and solar energy potential in Wales Stage 1 - Refinement of Priority Areas for Wind and Solar Energy*'
- Natural Resources Wales (NRW); National Landscape Character Areas <https://naturalresources.wales/evidence-and-data/maps/nlca/?lang=en> (accessed May 2023)
- Natural Resources Wales (NRW) *LANDMAP Information Guidance Note 1. LANDMAP and Special Landscape Areas*; Natural Resources Wales (2017);
- LANDMAP Guidance Note 3 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)
- 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* Natural Resources Wales
- Landscape Sensitivity Assessment Guidance for Wales Guidance Note 17*; Natural Resources Wales v 1.1 (2023)
- Land Use Consultants LUC (2013) *Landscape Character Assessment for Bridgend County Borough*; Bridgend County Borough Council

TACP Consultants (2008) Designation of Landscape Character Areas; Vale of Glamorgan County Borough Council

White Consultants (2004): Neath and Port Talbot LANDMAP Landscape Assessment; Neath and Port Talbot County Borough Council

Fiona Fyffe Associates (2012) Brecon Beacons National Park Landscape Character Assessment

Bridgend County Borough Council SPG20 '*Renewables in the Landscape: Supplementary Planning Guidance*'

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

Nature Scot; *Assessing the Cumulative Impacts of Onshore Wind Energy Developments*; (2012)

Nature Scot; *Siting and Designing Wind Farms in the Landscape. Version 3*; (2017)

Nature Scot; *Visual Representation of Wind Farms. Version 2.2* (2017)

Design Commission for Wales; *Designing for Renewable Energy in Wales (Draft Consultation April 2023)*

6 Terrestrial Ecology

6.1 Introduction

- 6.1.1 This chapter presents the assessment of potential impacts and effects on ecological receptors as a result of the Proposed Development.
- 6.1.2 This chapter is based upon ecological survey and assessment work that has been obtained to date to provide an accurate representation of all ecological features likely to be present within the Application Boundary.
- 6.1.3 This chapter provides the following:
- Relevant legislation, policy and guidance;
 - The assessment methodology;
 - Baseline conditions
 - Embedded and additional mitigation adopted as part of the Proposed Development;
 - An assessment of the impacts and effects of the Proposed Development
 - A summary of the likely significant effects;
 - A summary of cumulative effects with other development proposals.
- 6.1.4 The information presented in this document is based upon ecological surveys and assessments within the Application Boundary between 2021 and 2024. It has been prepared as per Chartered Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment (CIEEM, 2018).

6.2 Legislative and Policy Context

Legislation

- 6.2.1 The following legislation relates specifically to ecology and has been considered where relevant:
- Environment (Wales) Act 2016;
 - The Conservation of Habitats and Species Regulations 2017 (as amended);
 - The Wildlife and Countryside Act 1981 (as amended);
 - The Countryside and Rights of Way (CROW) Act 2000;
 - The Protection of Badgers Act 1992;
 - The Hedgerow Regulations 1997;
 - The Well-being of Future Generations Act (Wales) 2015.

National Planning Policy Context

6.2.2 The key national planning policy documents relevant to the assessment of Terrestrial Ecology for the Proposed Development are as follows:

- **Future Wales: The National Plan 2040** (Welsh Government, 2021), including Policy 17: Renewable, Low Carbon Energy and Associated Infrastructure and Policy 18: Renewable and Low Carbon Energy Developments of National Significance, Policy 9 – Resilient Ecological Networks and Green Infrastructure; and
- **Planning Policy Wales Edition 12** (Welsh Government, 2024), including relevant supplementary Technical Advice Notes (TANs), Circulars and Policy Clarification Letters (PCLs).

6.2.3 **Table 6.1** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of Terrestrial Ecology including how and where these have been considered in the ES.

Table 6.1 Summary of national planning policies

Summary / Key Area of Policy	How and where considered in the ES
Future Wales: The National Plan 2040	
Policy 9 – Resilient Ecological Networks and Green Infrastructure	Measures to maintain and enhance ecosystem resilience and incorporate green infrastructure gains is set out in Volume 3, Appendix 6.6 Outline Biodiversity Strategy. The ecosystem approach has formed an important part of the design approach to the Proposed Development.
Planning Policy Wales Edition 12	
Section 6.2, paragraph 6.2.11 – Integrating Green Infrastructure and Development	As above, forms an important part of the design approach to the Proposed Development. Measures to maintain and enhance ecosystem resilience and incorporate green infrastructure is set out in Appendix 6.6 Outline Biodiversity Strategy.
Section 6.4, paragraph 6.4.3 – Biodiversity and Ecological Networks	As above, forms an important part of the design approach to the Proposed Development. Measures to maintain and enhance ecosystem resilience and incorporate green infrastructure is set out in Volume 3, Appendix 6.6 Outline Biodiversity Strategy.
TAN 5 – Nature Conservation and Planning	
Section 4.- 2 Pre-application Discussions	EIA scoping responses provided by specialist consultees have been considered. A pre-PAC discussion has been held with BCBC's biodiversity manager.
Section 5 – Development Affecting Designated Sites and Habitats	No direct impacts on designated sites are anticipated. An assessment of the Proposed Development's impact on statutory designated sites is summarised in section 1.6 of this chapter and set out in detail within Volume 3, Appendix 6.5 Shadow Habitats Regulations Assessment: Appropriate Assessment. No adverse effect on the integrity of any international designated sites has been concluded. Embedded mitigation measures would prevent indirect impacts to international, national and non-statutory designated sites.

Section 6 – Development Affecting Priority Habitats and Species	The Proposed Development design has avoided direct impacts to all priority habitats identified as part of ecological survey and assessment work. Indirect impacts would be controlled through embedded mitigation. Where practicably possible direct impact to priority species have been reduced following embedded design measures. Mitigation to further reduce direct and indirect impacts to both priority habitats and species are referred to in section 1.6 of this chapter and in more detail in Appendix 6.6 Outline Biodiversity Strategy.
---	---

Local Planning Policy Context

6.2.4 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of Terrestrial Ecology for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024
- **Supplementary Planning Guidance – SPG07 Trees and Development** - adopted in January 2008
- **Supplementary Planning Guidance – SPG19 Biodiversity and Development** - adopted in July 2014

6.2.5 **Table 6.2** provides a summary of the provisions contained within the local plan and supplementary planning guidance relevant to the assessment of Terrestrial Ecology including how and where these have been considered in the ES.

Table 6.2 Summary of relevant local planning policy

Policy	Summary of policy	How and where considered in the ES
SP17: Conservation and Enhancement of the Natural Environment	Development should seek to maintain, and, wherever possible, enhance the landscape quality as part of the natural environment within the County Borough Areas having a high and/or unique environmental quality will be protected.	Measures to avoid habitats as part of the development design have included reducing impacts on acid grassland, safeguarding and restoring wet heath, avoiding other mire habitats and minimising tree loss. The measures set out in Volume 3, Appendix 6.6 Outline Biodiversity Strategy, and Appendix 6.10 Green Infrastructure Statement
DNP5: Local and Regional Nature Conservation Sites	Protection of Local Nature Reserves (LNR) and Sites of Importance for Nature Conservation (SINC)	Direct and indirect impacts on SINCs are avoided through embedded measures, as set out in section 1.7 and 1.8.
DNP6: Biodiversity, Ecological Networks, Habitats and Species	The need for development and the need to protect existing habitats and species which contribute to the general biodiversity of the County Borough	Development design has maximised the protected of valuable and sensitive habitats, promoting restoration of unfavourable habitats and ensuring areas temporarily lost are reinstated.
DNP7: Trees, Hedgerows and Development	Seeks to ensure that suitable trees, whether they are protected by legislation or not, are retained and protected on any development site	Tree loss has been avoided where practicably possible as part of the Proposed Development. A small proportion of the trees within Wern Tarw Woodland (0.20ha) are to be cleared to facilitate the Proposed

Development's haul road. The trees are a combination of mature and semi-mature trees. No ancient or veteran trees are to be removed, and the wider woodland would be protected and restored. The measures are set out in Volume 3, Appendix 6.6 Outline Biodiversity Strategy, and Volume 3, Appendix 2.2 Green Infrastructure Statement

DNP8: Green Infrastructure

Seeks to ensure Bridgend's green infrastructure assets are valued, protected, enhanced and managed through a green infrastructure network

Acid grassland, wet heath and ancient woodland restoration is proposed as part of the Proposed Development. The measures and objectives for restoration and enhancement are set out in Volume 3, Appendix 6.6 Outline Biodiversity Strategy, and Volume 3, Appendix 2.2 Green Infrastructure Statement

6.3 Consultation and Engagement

Scoping

- 6.3.1 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.
- 6.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to Terrestrial Ecology are listed in **Table 6.3**, including how and where these have been considered in the ES.

Table 6.3 Summary of scoping responses relevant to Terrestrial Ecology

Scoping Reference and Topic	How and where considered in the ES
PEDW	
ID.51 Amendments to Preliminary Ecological Appraisal (PEA)	The 2021 PEA was updated following the update to the Proposed Development. Update is in Volume 3, Appendix 6.1 Preliminary Ecological Appraisal Update and Appendix 6.2 Habitat Baseline - Ancillary Development
ID.53 Maps, drawings and illustrations	All supporting figures and plans are within Volume 2 of the ES.
ID.61 Otters	Targeted surveys of suitable watercourses within and in proximity to the Proposed Development footprint were undertaken in 2024. The ecological baseline pertaining to otters is set out in Section 6.6 of this chapter.
ID.67 PEA survey recommendations	The recommended further surveys set out in previous PEA have been undertaken to support the Proposed Development where appropriate, including habitat surveys outwith the Proposed Development footprint. The ecological baseline is set out in Section 6.6 of this chapter and Volume 3, Appendix 6.3 Protected and Notable Species.
Natural Resources Wales	
ID.52 Requirement for ES to include description of natural resources and wildlife interests within and in the vicinity of the Proposed Development	Descriptions of the ecological baseline are set out in Section 6.6 of this chapter and in more detail in Volume 3, Appendix 6.1 Preliminary Ecological Appraisal Update, Appendix 6.2 Habitat Baseline - Ancillary Development, Volume 3, Appendix 6.3 Protected Species Report and Volume 3, Appendix 6.2 Bat Activity and Collision Risk Assessment.
ID.54 Assessment of adjacent land parcels	Areas within and in proximity to the footprint of the Proposed Development have been assessed. Areas further afield have also been assessed where appropriate based on the nature of the ecological receptor. Assessment information is set out in Section 6.6 of this chapter.
ID.55 Grassland Fungi – further surveys	Grassland fungi studies have been undertaken between 2023 and 2024 which include records searches, eDNA sampling and supplementary fruitbody walkovers. The ecological baseline pertaining to grassland fungi is set out in Section 6.6 of this chapter.

Scoping Reference and Topic	How and where considered in the ES
ID.57 Bats – insufficient detectors	Updated bat activity surveys were undertaken in 2024, covering the turbine locations or appropriate locations in proximity to turbine locations. The ecological baseline information pertaining to bats is set out in Section 6.6 of this chapter. Findings of the surveys are within Volume 3, Appendix 6.4 Bat Activity and Collision Risk Assessment.
ID.58 Bats – in tree habitats and their modification	No trees with roosting suitability are to be removed or felled as part of the Proposed Development. The ecological baseline information pertaining to bats is set out in Section 6.6 of this chapter.
ID.59 Bats – ecobat tool	The Ecobat tool has been offline since 2022 and is unavailable for use in assessing the collision risk of bats at turbines. An alternative approach has been taken for assessing collision risk in line with standard guidance and professional judgement. The findings are set out in Volume 3, Appendix 6.4 Bat Activity and Collision Risk Assessment.
ID.60 Great crested newt – presence / likely absence surveys	All suitable waterbodies for great crested newt within a 500 m buffer have been surveyed. The ecological baseline pertaining to great crested newts is set out within Section 6.6 of this chapter.
ID.63 Water voles – agreement of water vole surveys not being required	Information to support the scoping out of water vole is set out within Section 6.6 of this chapter.
ID.64 General impact assessment	The impact assessment as considered those ecological receptors that are considered important and are able to experience significant effects as part of this ES. Measures to avoid, mitigation and restore impacts to biodiversity are included within this ES and set out in more detail in Volume 3, Appendix 6.6 Outline Biodiversity Strategy.
Bridgend County Borough Council	
ID.56 Protected species impact assessments – Blackmill Woodland SAC / SSSI	The Proposed Development has been updated since the EIA scoping direction. The previous turbine layout has since been updated, which includes the re-siting of a turbine further from Blackmill Woodlands SAC. An assessment of the Proposed Development against the Habitats Regulations are summarised in Section 6.6 of this chapter and within Volume 3, Appendix 6.5 Shadow Habitats Regulations Assessment.

Other consultation

- 6.3.3 Following the EIA scoping, consultation and engagement with Bridgend County Borough Council has been undertaken. RPS contacted Bridgend County Borough Council's ecology department in October 2024 to arrange a visit to the Proposed Development site. A teleconference was arranged instead on 17th December 2024. The teleconference included the Applicant, the RPS ecology and planning teams and Bridgend County Borough Council's biodiversity manager.
- 6.3.4 The approach and findings of the ecological survey and assessment work were summarised on the teleconference, including the proposed measures for delivering biodiversity mitigation, restoration and enhancement. The comments made by Bridgend County Borough Council during the teleconference are set out in **Table 6.4** below.

Table 6.4 Additional Consultation

Comment	How and where considered in the ES
Bridgend County Borough Council	
Updates to habitat and protected and notable species surveys that were undertaken prior to the EIA scoping direction	All relevant survey work was updated. The ecological baseline pertaining to the relevant biodiversity features are in Section 1.6 of this chapter. Findings of all ecological surveys and assessments undertaken to date are within Volume 3, Appendices 6.1 – 6.4.
Requirement for a dormouse licence as part of proposed works within Wern Tarw Woodland	A dormouse EPS licence application would be prepared and submitted to Natural Resources Wales. Outline measures are included within Volume 3, Appendix 6.6 Outline Biodiversity Strategy which include embedded measures to reduce disturbance, and sympathetic measures a part of woodland restoration.

6.4 Assessment Methodology

Relevant Guidance

- 6.4.1 The assessment of Terrestrial Ecology 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 chartered Institute of Ecology and Environmental Management and Assessment (CIEEM) Guidelines for Ecological Impact Assessment (CIEEM, 2018).

Scope of the Assessment

- 6.4.2 Taking into account the scoping and other consultation, **Table 6.5** summarises the issues considered as part of this assessment. It should be noted that the impacts and effects within this chapter have been altered slightly given the elapsed time since the EIA Scoping and the amendments to the Proposed Development design.

Table 6.5 Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Vehicular movement, earthworks, site and vegetation clearance	Alteration and/or degradation of international and nationally designated sites
Landtake for turbines and associated infrastructure	Permanent and temporary loss of Priority Habitats and Ancient Woodland
	Alteration and/or degradation of Priority Habitats and Ancient Woodland
	Habitat loss and fragmentation disrupting connectivity, species migration, dispersal and breeding
Vehicular movement, earthworks, site and vegetation clearance	Direct injury and mortality of protected and/or notable species
	Disturbance and displacement of protected and notable species including visual, noise and vibration and lighting
Operation and maintenance	

Site maintenance	Disturbance from operational use including noise and vibration, visual and lighting;
Rotation of turbine blades	Direct injury and/or mortality of protected and/or notable species

6.4.3 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 6.6**. It should be noted that the issues scoped out of the assessment differ slightly to the

Table 6.6 Issues scoped out of the assessment

Issue	Justification
Permanent and temporary loss of common and widespread habitats	Common and widespread habitats are unable to experience significant effects given their abundance and conservation status within Wales and the United Kingdom (UK). Habitats such as intensively managed grassland, grazing pasture and dense bracken are not considered to be important in the context of the Proposed Development and as such can be scoped out.
Alteration and degradation of common and widespread habitats	Common and widespread habitats are unable to experience significant effects given their abundance and conservation status within Wales and the UK. Habitats such as intensively managed grassland, grazing pasture and dense bracken are not considered to be important in the context of the Proposed Development and as such can be scoped out.
Disturbance to common and widespread species of flora and fauna	Common and widespread species of flora and fauna are unable to experience significant effects given their abundance within Wales and the UK. Species such as common grassland vascular plants, common and widespread species of amphibian
Disturbance and displacement to water vole	Given the lack of records and absence of habitat and features suitable for water vole, it is concluded that water vole are absent from the Application Boundary and as such are unable to be impacted by the Proposed Development.
Disturbance and displacement to great crested newt	Based on the lack of desk study records and the confirmation that great crested newt are likely absent from the Application Boundary (based on presence / likely absence surveys), it is concluded that great crested new are unable to experience significant effects as a result of the Proposed Development

Study areas

6.4.4 The Terrestrial Ecology study areas (hereafter referred to as the Study Areas) were identified in 2021 and refined in 2024 to inform the extent of the updated PEA, further ecological surveys and this chapter.

6.4.5 The Study Areas comprise a number of different distance buffers per ecological receptor. The Study Areas extend from the 'Survey Area', which has been defined based on the extent of habitat surveys that have been undertaken between 2023 and 2024. The habitat surveys covered the

Proposed Development footprint in its current design layout, a previous design layout and an additional 100m buffer.

6.4.6 The following study areas were considered for the purpose of this ES:

- Within 15 km of the Survey Area for statutory designated sites
- Within 2 km of the Survey Area for non-statutory designated sites;
- Within 2 km of the Survey Area for priority habitats and ancient woodland;
- Within 2 km of the Survey Area for protected and notable species, extending to 5 km for bats;
- Within the Application Boundary for the purposes of habitat and further ecological surveys;

6.4.7 These Study Areas have been developed based on standard good practice produced by CIEEM (CIEEM, 2017), (CIEEM, 2020) and (CIEEM, 2018) in addition to professional judgement and to ensure the potential Zone of Influence (Zol) for the Proposed Development are appropriately covered.

6.4.8 The Zol for the Proposed Development is the area over which ecological features may be affected by biophysical changes because of the activities associated with Proposed Development (CIEEM, 2018).

6.4.9 The location and geographic extent of the Study Areas are presented in Volume 2, Figures 6.1 to 6.4.

6.5 Assessment Criteria and Assignment of Significance

6.5.1 The following section explains the criteria used to assess the importance of ecological receptors and the criteria used to predict the likely significant environmental effects on the identified receptors within the Survey Area during construction and operation of the Proposed Development.

Criteria for Evaluating Importance

6.5.2 Ecological receptors identified in the baseline surveys have been evaluated following CIEEM Guidelines for Ecological Impact Assessment (2024). Ecological receptors identified as important were subject to detailed assessment and are termed Important Ecological Features (IEFs). Receptors considered common, widespread and/or unthreatened by the Proposed Development were scoped out of any further evaluation within this chapter.

6.5.3 The geographical scale of importance for statutory and non-statutory designated sites is assigned based on their designation. For example, internationally designated sites and Ramsar sites are considered of international importance, because they are designated on the basis of supporting habitats and / or species which are of importance for nature conservation at an international / European level. Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR) are of 'National'

importance because they are designated for supporting habitats, species, and other features of importance for nature conservation at a UK level.

- 6.5.4 The geographical scale of importance for habitats and species is assigned with reference to all designations or policy provisions that apply. For example, Priority Habitats as identified by the provisions of Section 7 of the Environment (Wales) Act 2016, are considered of particular importance to the conservation of biodiversity in Wales. That is not to say that all Priority Habitats are considered of 'National Importance'. Extents of such habitats that form an appreciable part of the Welsh resource, would however be considered of 'National Importance'.
- 6.5.5 The same approach applies to protected or otherwise notable species. For example, great crested newt *Triturus cristatus* is recognised as a priority for nature conservation at a European (International) level, by way of their identification as a European Protected Species (EPS) under the Habitats Regulations. Very large populations that make up an appreciable proportion of the European population might rightly be identified as of 'International Importance'. Smaller populations that are not exceptional or remarkable in the locality they occur and do not contribute particularly to the maintenance of wider populations would be of lesser importance.
- 6.5.6 The geographical scale of importance for habitats and species is therefore subjective, with the following factors taken into account:
- Legal protection;
 - National and local planning policy;
 - Distribution including relative to the Proposed Development footprint;
 - Conservation status (i.e., is the habitat/species common and widespread, or rare with a highly localised distribution); and
 - Historical trends (where available).
- 6.5.7 For the purposes of this assessment, ecological features of 'Local' importance or higher are assessed as being IEFs that can therefore experience significant effects. Ecological features of 'site/negligible' importance are not considered sufficiently important to experience significant effects and are not assessed as being IEF and therefore do not fit into a geographical scale. This includes common and widespread species and habitats that are not of conservation interest and are valued lower than those at the Local level and hence cannot experience significant effects. Professional judgement is used to determine if an effect is significant or not in relation to its importance, sensitivity and the magnitude of effects.
- 6.5.8 As per best practice guidance, it is not necessary in an assessment to address all ecological features with potential to occur, and instead attention should be focused on those that are of relevance (CIEEM, 2024). Guidance makes it clear that it is unnecessary to 'carry out detailed assessment of ecological features that are sufficiently widespread, threatened and resilient to project impacts and will remain viable and sustainable'. This does not mean that certain ecological features have been overlooked and appropriate measures

to safeguard biodiversity more widely have been considered as part of the Proposed Development and not excluded.

6.5.9 Where possible, the importance of ecological features identified within the Survey Area, have been defined by the geographical frame of reference in **Table 6.7** below.

Table 6.7 Geographical Scale of Importance

Value	Definition
International (Europe)	>1% of the European community species population/area of habitat extent. Internationally designated sites such as a SAC or a site meeting the criteria for international designations.
National (United Kingdom/Wales)	>1% of the Welsh or British species population/area of habitat extent. A nationally designated site such as a SSSI or National Nature Reserve (NNR) or a site meeting the criteria for national designations.
Regional (South East Wales)	Sites which do not meet the criteria for SSSI selection but are of greater than county level importance A considerable population or assemblage of internationally designated species such as those listed on Annex II of the Habitats Directive or species referred to in SSSI guidelines but do not meet the criteria of national importance.
County (Bridgend)	Ancient woodland and non-statutory designated sites such as Sites of Importance for Nature Conservation (SINC) Section 7 Priority Habitats or populations of Priority Species that have experienced decline, are sensitive to land use change and considered an appreciable part of the County resource Considerable populations of species listed in Red Data Lists or Biodiversity Action Plan (BAP) on account of their rarity or localisation in the County, particularly those that have an unfavourable or unknown conservation status in their natural range
Local	Local Nature Reserves (LNR) Section 7 Priority Habitats or populations of Priority Species that are present in considerable sizes or numbers and are relatively widespread. Local Biodiversity Action Plan (LBAP) priorities, where they occur in sufficient abundance to maintain the local resource. Common and widespread habitats and species occurring to a greater extent or number than would be expected within the footprint of the Proposed Development
Site/Negligible (within the footprint of the Proposed Development)	Common and widespread habitats and species that do not occur in population numbers or levels beyond those within the Application Boundary Urban features, bare ground and areas of modified land

6.5.10 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.

- 6.5.11 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.
- 6.5.12 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.

Criteria for Evaluating Potential Impacts

- 6.5.13 An understanding of how ecological features will respond to the Proposed Development is required to determine the magnitude of any likely effects which may arise through construction or operation. It is only necessary to describe in detail the effects which are likely to be significant and impacts/effects which are unlikely to occur, or if they did happen would unlikely be significant, can be scoped out (CIEEM, 2018).

Receptor Value and Sensitivity

- 6.5.14 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 6.8** below. Sensitivity criteria is often associated with geographical importance as part of EIAs, as an example Special Areas of Conservation which are internationally important ecological receptors would be assessed as being of very high sensitivity. It should be noted that
- 6.5.15 **Table 6.8** below assigns the sensitivity criteria used in this assessment to the appropriate level of geographical importance.

Table 6.8 Sensitivity criteria

Sensitivity	Associated Geographical Importance	Definition
Very High	National / International	Very high importance and rarity, international scale, very limited potential for substitution.
High	Regional	Species in remote areas, away from human disturbance which would result in a long-lasting reaction to a disturbance event. Habitats which are considered to have a slow recovery time and could not re-establish quickly or depend on certain land functions to prosper.
Medium	County	Species which are tolerant to human activity which result in a short-term reaction to a disturbance event. Habitats which are considered to have a moderate recovery time.

Low	Local	Species which are regularly subject to human disturbance which result in a brief reaction to a disturbance event. Habitats which are considered to have a quick recovery time and could readily establish.
Negligible	Site / Negligible	Very low importance, common and widespread

Magnitude of impact

- 6.5.16 The magnitude of an impact refers to the size, intensity, or volume and should be quantified where possible in absolute or relative terms. For example, exact areas of habitat loss or percentage of species population decline (CIEEM, 2024). Table 8.4 defines the four levels of magnitude used in this assessment; these are generally considered to be adverse unless stated otherwise.
- 6.5.17 The criteria for defining magnitude in this chapter of the ES is outlined in **Table 6.9** below.

Table 6.9 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

- 6.5.18 CIEEM (2024) states that duration is defined in the relative context of ecological traits, such as the lifecycle of a species. The duration of an activity may differ from the duration of the resulting effect caused by the activity. **Table 6.10** defines the timescales used within this assessment.

Table 6.10 Duration of Impact

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.

Frequency and Timing

- 6.5.19 The resulting effect of an impact is influenced by the number of times an activity occurs (CIEEM, 2018). For example, a vehicle driving across sensitive habitat; one vehicle may have a slight impact but the habitat may recover, however, frequent vehicle passes will significantly degrade the habitat to the point where it may not recover and be permanently lost.

Reversibility

- 6.5.20 An impact from which recovery is not possible within a reasonable timescale or there is no chance of action to implement successful mitigation, the impact is classed as irreversible. An impact from which spontaneous recovery or with which recovery is possible through successful mitigation is classed as reversible. It should be noted that in some cases the same action can cause impacts which are both irreversible and reversible (CIEEM, 2018).

Significance of Effect

- 6.5.21 The significance of the effect upon Terrestrial Ecology has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment uses the EIA matrix as presented in **Table 6.11**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 6.5.22 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.

6.5.23 This approach has been applied as it can help visualise levels of significance for a layperson, however, in keeping with CIEEM guidelines, professional judgement is also applied, using the criteria discussed above, to the individual ecological receptors identified to determine their sensitivity and significance within this assessment. **Table 6.11** describes the significance of each effect in EIA terms. Effects categorised as moderate or major significance are evaluated as significant under EIA Regulations, whilst those categorised as minor or negligible significance are evaluated as not significant.

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
Very High	Negligible	Minor	Moderate or Major	Major	Major

6.5.24 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.

Notes, assumptions and limitations of the assessment

- 6.5.25 Updated habitat and vegetation surveys in 2023 and 2024 targeted a smaller area within the current Application Boundary. As the Proposed Development footprint covers a proportion of the area within the Application Boundary, it was considered unnecessary to cover the whole area.
- 6.5.26 The Application Boundary has been revised several times since EIA scoping stage, with various elements of the Proposed Development (including secondary consents) falling within and outside of the boundary. For clarity, the Ancillary Development Areas refers to areas within and outside of the Application Boundary but exclude the footprint of Turbines 1 – 11 and access tracks between turbines.
- 6.5.27 The grid connection routes would be constructed using horizontal directional drilling (HDD) techniques. As a result, it is assumed that landtake associated with HDD would be restricted to relatively minor areas at each end of the route(s), with minimal vegetation clearance. It is assumed that this would exclude the need to remove trees and woodland. Impacts on Terrestrial Ecology from the construction of grid connection routes have not been assessed in this chapter, as it is assumed that they would not lead to significant adverse effects.
- 6.5.28 A search for waterbodies potentially suitable for great crested newt within a 500m search area was undertaken in 2022 using a previous Application Boundary. Whilst the current Application Boundary has changed and now incorporates all waterbodies identified, it is not considered to have an impact on the validity of the waterbody search and results of targeted surveys. This is because the Application Boundaries do not represent the actual areas of direct or indirect impact.
- 6.5.29 Impacts and effects on Terrestrial Ecology from biodiversity measures within replacement common land have not been included within this assessment. Whilst indicative measures for the area identified for replacement common land have been set out in the OBS, the full extent of these measures are unknown. When these measures are confirmed, they will be given due consideration within the Terrestrial Ecology ES chapter at full submission stage.
- 6.5.30 It should be noted that the geographical scale of importance and the impacts and effects have been refined since submission of the EIA scoping. EIA scoping typically sets out a high-level assessment at an early stage of a Proposed Development design. As the Proposed Development has progressed, available baseline data has provided confidence in scoping certain receptors out. Additionally, the importance of receptors within a county

context was deemed a suitable inclusion. This refinement does not affect the results of the impact assessment.

- 6.5.31 The assessment methodology within this chapter differs slightly to that within other chapters of the ES. Whilst this chapter remains pursuant to EIA regulations, the impact assessment has been set out per ecological receptor rather than per impact type. This present a clearer view of how the receptors specific to this assessment could be impacted.

6.6 Baseline Environment Conditions

Desk study

- 6.6.1 Desk-based assessments have been undertaken to support data collection for the Proposed Development. Desk-based assessments have included multiple requests for historic biodiversity records, made to South East Wales Biodiversity Records Centre (SEWBRc).
- 6.6.2 A search for records of designated sites and protected and notable species was requested within a 2 km search area of a previous iteration of the Proposed Development's Application Boundary, in 2021. The request included non-statutory designated sites, Ancient Woodland, Priority Habitats and Species, internationally and nationally protected species, species protected by planning policy and species of local conservation interest. An updated request was made in September 2024 and included a request for the same information, which was further extended to include records of bats within 5km. Additionally, records of grassland fungi was obtained from Glamorgan Fungus Group to support the assessment of CHEGD¹ fungi.
- 6.6.3 Freely available spatial datasets from DataMapWales were accessed to search for Priority Habitats, waterbodies and information on peat. Full desk study information on protected and notable species are presented in Volume 3, Appendix 6.1 – Preliminary Ecological Appraisal Update.
- 6.6.4 Statutory and non-statutory designated sites are set out in **Tables 6.12** and **6.13** below. The distances summarised in both tables below are within the respective Study Areas as listed in section 6.4.6 and as illustrated in Volume 2, Figure 6.2 and Figure 6.3.

¹ Clavarioid, Hygrocybe, Entoloma, Geoglossum, Dermoloma – notable British fungi associated with grasslands.

Designated Sites

Table 6.12 Statutory Designated Sites within 15 km of the Survey Area

Designated Site	Designation(s)	Distance from Survey Area	Qualifying Features
Blackmill Woodlands	SAC, SSSI	0.27	<p>Broadleaved deciduous woodland.</p> <p>A good example of old sessile oak woods at the Southern extreme of the habitats range. These woodlands have a long cultural history of management, reflected in the distinctive gnarled appearance of the trees.</p>
Brynna a Wern Tarw	SSSI	0.70	<p>An extensive area of mixed, species-rich lowland grassland, including significant areas of marshy and dry neutral grassland.</p>
Glaswelltiroedd Cefn Cribwr / Cefn Cribwr Grasslands	SAC	6.92	<p>Annex I habitats are the primary reason for site designation: <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinia caeruleae</i>), of which the site is one of the main UK strongholds.</p> <p>Important species associated with the meadows at this site include the nationally rare viper's-grass, and the nationally scarce soft-leaved sedge. The site also includes the heathy sub-type with cross-leaved heath, as well as other forms with a strong representation of grasses, rushes, and sedges.</p> <p>Annex II species present as a qualifying feature: Marsh fritillary butterfly.</p>
Dunraven Bay	SAC	13.85	<p>The Annex II species shore dock is the primary reason for the selection of this site.</p> <p>The steep and inaccessible nature of the sea cliffs provides a relatively secure environment for the species, which is expected to play an important role in the recolonization dunes and beach-heads along the Bristol Channel.</p>

Kenfig	SAC	13.93	<p>An area renowned for its extensive dune systems which supports nationally important predominantly species-rich dune habitats.</p> <p>Annex I habitats listed as primary reasons for designation:</p> <ul style="list-style-type: none"> – Fixed coastal dunes with herbaceous vegetation ('grey dunes'), such as red fescue, and lady's bedstraw; – Dunes with <i>Salix repens</i> ssp., <i>argentes</i> (<i>Salicion arenariae</i>); – Humid dune slacks; and – Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. <p>Annex II species listed as primary reasons for designation:</p> <ul style="list-style-type: none"> – Petalwort <i>Petalophyllum ralfsii</i> – Fen orchid <i>Liparis loeselii</i>
Cardiff Beech Woods	SAC	14.15	<p>Annex 1 habitat present as the main qualifying feature is <i>Asperulo-Fagetum</i> beech forests with the site supporting one of the largest concentrations of this habitat in Wales. The woods show mosaics and transitions to other types including more acidic beech <i>Fagus sylvatica</i> woodland, oak, and ash. Notable specie of ground flora includes wild garlic, sanicle, birds-nest orchid, and yellow birds-nest.</p> <p>Annex I habitats presenting as qualifying features are the <i>Tilio-Acerion</i> forests of slopes, screes</p>

Table 6.13 Non-Statutory Designated Sites within 2 km of the Survey Area

Designated Sites	Designation	Distance from Survey Area	Qualifying Features
Blaencrymlyn	SINC	18	A steep-sided valley with the Nant Crymlyn stream flowing down the center. The site largely comprises broad-leaved semi-natural woodland. Ground flora species assemblage's indicative of older woodlands. Moderately diverse semi-improved grassland is located to the north of the site.
Glynogwr woods	SINC	328	The site is made up of a mosaic of habitats along the Oqwr Fach valley. The ancient semi-natural woodland with its assemblage of indicator species, marshy grassland and unpolluted river with unmodified banks provide the site its qualifying features.
Gelli-Feddgaer Wood	SINC	355	The main feature of this site is a small broadleaved semi-natural woodland with a canopy of mature oak, and local ash, alder with a dense understory of hazel, bramble <i>Rubus fruticosus</i> , and hawthorn. To the north and east of the site is marshy semi-improved acid grassland with dominant sharp-flowered rush and purple moor-grass and a moderate diversity of associated grasses and herbs.
Dre-Fach	SINC	492	The Nant Crymlyn flows through this site bordered by alders. The site consists of broad-leaved woodland and a large extent of wet woodland consisting of oak, alder, ash and grey willow. To the east fields supporting diverse marshy grassland vegetation including devil's-bit scabious, marsh pennywort, greater tussock-sedge, and <i>Sphagnum</i> mosses.
Heol-y-Cyw (east)	SINC	538	A mix of woodland, semi-improved grassland, marshy grassland and scrub. The wet woodland present contains a high proportion of alder, oak, and ash while the woodland on the dry ground is mainly oak and hazel. To the east damp acid grassland and marshy grassland supporting a number of indicator species such as devil's-bit scabious, purple moor-grass, and meadow thistle.

Heol-y-Cyw (west)	SINC	567	A small block of broad-leaved woodland with a canopy of mature oak and an understory of Hazel. Marsh/marshy grassland dominated by grey willow, and ground flora including hemlock water dropwort. The site also contains semi-improved neutral grassland, and dense continuous scrub.
Rockwool Grounds	SINC	698	Marsh / marshy semi-improved grassland, Broad-leaved seminatural woodland and wet woodland habitats with ditches, pools and marshy areas. The main woodland canopy species include oak, downy birch, grey willow, alder, hazel and hawthorn.
Wern Fawr/Fernbank	SINC	709	Marsh/marshy grassland, broad-leaved semi-natural woodland with a canopy consisting of oak, downy birch, and hazel, dense continuous scrub. Standing water, and limestone pavement are also present.
Glynllan West	SINC	775	The site consists of damp scrubby woodland dominated by alder, ash and grey willow close to the Nant Lechyd stream. Areas of drier woodland feature oak, downy birch, and Hazel. Open areas of marshy grassland are dominated by purple moor-grass, tufted hair-grass, devil's-bit scabious, and greater tussock-sedge. Areas of semi-improved grassland and dense bracken are also present.
Cwm Dimbath	SINC	782	Broad-leaved woodland along the line of the Nant Lechyd stream. The northern area contains semi-natural broad-leaved woodland with dominant sessile oak with spares upland oak woodland ground flora and abundant mosses such as <i>Rhytidiadelphus loreus</i> and <i>Dicranum majus</i> . A damp flush in the area supports the locally uncommon <i>Leucobryum glaucum</i> . The southern section of wetter woodland supports oak, ash, rowan, hazel, with ground flora including remote sedge, enchanter's nightshade. Opposite leaved golden saxifrage and <i>Sphagnum</i> mosses. In the north-eastern part of the site lies a mosaic of acid grassland and marshy grassland.
Hendir-Uchaf	SINC	865	Damp semi-improved and marshy grasslands with high proportions of rushes. Woodlands and hedge boundaries contain pedunculate oak and hazel. There is a small marshy area on site with grey willow and downy birch.

Cefn Hirgoed	SINC	1332	Large site of common land consisting of acid grassland, wet marshy grassland/rush pasture with purple moor-grass, areas of bracken and continuous scrub. A small area of woodland containing pedunculate oak, hazel, and hawthorn.
Hirwaun Common	SINC	1492	Large common land area with a variety of habitats including neutral grassland, marshy grassland, scrub, dense bracken and small areas of woodland.
Bryn y wrach	SINC	1526	Most of this site lies within an area of common land supporting a mosaic of bracken, acid grassland, and semi-improved acid grassland. Frequent species include common bent, sweet vernal-grass, crested dog's-tail and red fescue. A few areas of marshy grassland are dominated by purple moor-grass and soft rush with a moderate diversity of associated species including some devil's-bit scabious, cross-leaved heath and bog asphodel.
Nant Crymlyn	SINC	1662	Damp semi-improved grassland, locally grading into marshy grassland and scrub. Several parts support dense rushes, and patchy purple moor-grass and devil's-bit scabious. Much of the grassland is made up of tall wetland plants such as hemlock water-dropwort and meadowsweet. The site borders hedgerows and a stream corridor with alder and hazel and a good number of woodland ground flora species.
Pant-yr-Awel	SINC	1697	A linear site following the course of the Ogwr Fawr river and a disused railway track. Most of the site is semi-natural broad-leaved woodland containing ash, alder, and pedunculate oak with scattered sessile oak. There are localised areas with a reasonably diverse woodland ground flora including bluebell. Areas of semi-improved grassland dominated by Japanese knotweed and Indian balsam. A small area of marshy grassland is also present and is dominated by purple moor-grass and soft rush with a range of other wetland plants.
Pant Farm/Hirwaun Common	SINC	1876	The site is made up predominantly of rush dominated pasture, with areas of dense gorse scrub and bracken. Wet ditches and small watercourses are also present.

Brynau Gwynian	SINC	1893	The site forms a small part of the Brynna a Wern Tarw SSSI and contains marshy grasslands, neutral grasslands and areas of broad-leaved woodland and heath.
----------------	------	------	---

6.6.5 More than 100 ancient woodland parcels were identified within the 2 km Study Area. This included 91 parcels of ancient semi-natural woodland (ASNW), eight restored ancient woodland sites (RAWS), and five plantations on ancient woodland sites (PAWS). The closest ancient woodland was of a PAWS referred to as Wern Tarw Woodland, located within the Application Boundary. Ancient woodland parcels are displayed on Figure 6.3 of Volume 2.

6.6.6 Six Section 7 Priority Habitat types were also identified as part of the desk study. This included broad Priority Habitats such as dwarf shrub heath, acid grassland, mixed deciduous woodland and hedgerows. Purple moor grass and rush pasture, acid grassland, hedgerows and mixed-deciduous woodland were all identified within the Application Boundary. Priority habitat types identified as part of the desk study are illustrated on Figure 6.4 within Volume 2 of the ES.

Field surveys

6.6.7 A series of field surveys were undertaken to inform the baseline assessment for Terrestrial Ecology. A summary of the surveys undertaken to inform this chapter of the ES are provided in **Table 6.14** below.

6.6.8 Multiple habitat surveys have been undertaken within the Application Boundary since 2021. The most recent was an NVC survey undertaken in July 2024 to update the vegetation community composition within the Proposed Development footprint, and to inform an updated Preliminary Ecological Appraisal.

6.6.9 Volume 3, Appendix 6.1 Preliminary Ecological Appraisal Update provides a factual assessment of the ecological baseline relevant to the Proposed Development. This has been used to identify those ecological features which could be subject to significant effects and hence are likely to be relevant to the Proposed Development.

Table 6.14 Summary of field surveys undertaken

Survey type	Purpose of survey	Date undertaken
Phase 1 Habitat	To ascertain the broad habitat composition within Application Boundary and assess their suitability for protected and notable species	July 2021, June 2024
National Vegetation Classification	To ascertain the vegetation communities within and in proximity to turbine areas and access roads	June 2023 and July 2024
Bat Activity	To determine the levels of bat activity in proximity to turbine locations	April – October 2022, May – October 2024

Bat Emergence	To ascertain the presence or likely absence of roosting bats within structures	August – September 2024
Badger and Otter	To assess suitable habitats for the presence or likely absence of resting places, natal dens and setts	January 2024, September 2024
Dormouse	To ascertain the presence or likely absence of dormice within suitable wooded features in proximity to the haul road, within the Application Boundary	August – September 2024
Great Crested Newt	To ascertain the presence or likely absence of great crested newt in suitable habitat within and outside of the Application Boundary	May – June 2022, May 2023, May 2024
Grassland Fungi	To ascertain the assemblage of grassland fungi at proposed turbine locations and understand (if possible) the maturity of individuals in select habitats within the Application Boundary, to inform appropriate biodiversity measures	December 2023, September – October 2024

Habitats

- 6.6.10 A Phase 1 habitat survey of the Proposed Development’s previous Application Boundary was undertaken in 2021 to characterise the broad habitats across the Mynydd y Gaer area. The habitat baseline has been updated since the initial habitat survey, with a series of NVC surveys and an updated habitat walkover to reconfirm the broad habitat types. The NVC surveys and the updated habitat walkover covered the former Proposed Development layout, the current Proposed Development layout and a 100m buffer. In addition, habitat surveys have been undertaken of the grid connection routes, the haul road and an area identified for replacement common land (referred to as the Replacement Land). These three areas are referred to as Ancillary Development Areas.
- 6.6.11 The Application Boundary comprises primarily common land typical of an upland landscape, with upland habitats, namely acid grassland, bracken, bracken mosaics, heathland and mire vegetation communities present in the largest extents. Wooded features are present nearer boundary limits and comprise broadleaved woodland, hedgerows, scattered scrub and scattered trees.
- 6.6.12 Several watercourses, primarily narrow streams, run to the north and to the south of the upland within the Application Boundary. The northern watercourses flow into the Ogwr Fach, a large watercourse outside of the Application Boundary. Waterbodies and ephemeral pools are also present within the Application Boundary. Most of the Mynydd y Gaer common is unenclosed, whilst stone walls, fences and other boundary features are present outside of the common, primarily in the north west, west and north east.
- 6.6.13 The broad habitats above were further separated into a total of 20 vegetation communities. Acid grassland, mire and mire affiliated habitats were the most prevalent vegetation types within the Survey Area, with three acid grassland, four mire, and one more affiliated community identified.

6.6.14 Whilst a targeted GWDTE survey has not been undertaken, the vegetation communities have been assigned a precautionary GWDTE level as per the Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems (SEPA, 2017). This information has been included in the tables below regardless of the WFD status of the underlying groundwater, which has been assessed as 'Poor'. Hydrology related information is set out in Volume 1, Chapter 15: Geology and Hydrogeology of this ES and Volume 3, Appendix 2.1 Flood Consequence Assessment.

6.6.15 A table summarising the extent of broad habitat types and vegetation communities within and in proximity to the Proposed Development footprint, including ancillary development areas are listed in **Table 6.15** and **6.16** below. The tables comprise estimated areas, lengths and where applicable the relevant conservation status information.

Table 6.15 Broad Habitat and Vegetation Communities within the Survey Area (inside the Application Boundary)

Habitat or Vegetation Type	Conservation Status and Notable Designations/Associations	GWDTE Category	Area (ha) / Length (km)
Broad Habitat Types			
B1.1 - Acid grassland - unimproved	N/A	N/A	17.28 ha
B5 - Marsh/marshy grassland	N/A	N/A	1.80 ha
B4 – Improved Grassland	N/A	N/A	3.05 ha
C1.1 - Bracken - continuous	N/A	N/A	10.95 ha
D1.1 - Dry dwarf shrub heath	Section 7	N/A	0.08 ha
Vegetation Communities			
U3 <i>Agrostis curtissii</i> grassland	N/A	N/A	6.37 ha
U4a <i>Festuca ovina</i> - <i>Agrostis capillaris</i> grassland	N/A	N/A	42.75 ha
U5 <i>Nardus stricta</i> – <i>gallium saxatile</i> grassland	N/A	N/A	0.17 ha
U20 Dense bracken	N/A	N/A	28.21 ha

MG6 - <i>Lolium perenne</i> - <i>Cynosurus cristatus</i> grassland	N/A	N/A	18.17 ha
MG7 – <i>Lolium perenne</i> ley	N/A	N/A	7.55 ha
M6a - <i>Carex echinata</i> – sphagnum mire	Section 7	High	0.08 ha
M15 - <i>Tricophorum</i> – <i>Erica tetralix</i> wet heath	H4010 Northern Atlantic wet heaths with <i>Erica tetralix</i>	Moderate	15.23 ha
M21 - <i>Narthecium</i> – sphagnum valley mire	N/A	High	0.10 ha
M23 - <i>Juncus acutiflorus</i> rush pasture	Section 7	High	2.44 ha
M25 - <i>Molinia caerulea</i> - <i>Potentilla erecta</i> mire	Section 7	Moderate	8.63 ha
M25 - U3 <i>Ulex gallii</i> mosaic	N/A	Moderate	1.20 ha
M25 - H8 <i>Ulex gallii</i> mosaic	N/A	Moderate	0.28 ha
S19 - <i>Eleocharis palustris</i> pond margin	N/A	N/A	0.01 ha
W21 - <i>Crataegus monogyna</i> hedge	Section 7	N/A	0.2 (km)
OV21c - Spare ruderals	N/A	N/A	0.11 ha
OV24 - <i>Urtica dioica</i> herbs	N/A	N/A	0.04 ha

Table 6.16 Habitats and Vegetation Community Types within Wern Tarw Woodland, Grid Connection Routes and the Haul Road (inside the Application Boundary)

Habitat or Vegetation Type	Conservation Status and Notable Designations/Associations	GWDTE	Area / Length
A1.1.1 - Semi-natural broadleaved woodland	Section 7	N/A	0.51 ha
A2.1 – dense scrub	N/A	N/A	0.66
B1.2 - Acid grassland – Semi-improved	N/A	N/A	0.44 ha

B5 - Marsh/marshy grassland	N/A	N/A	1.9 ha
B4 / B6 – Improved and species-poor semi improved grassland	N/A	N/A	5.01 ha
C1.1 / B1 - bracken / acid grassland mosaic			0.40 ha
C1.1 - Dense bracken	N/A	N/A	1.15 ha
Hardstanding	N/A	N/A	0.17 ha
W6 – <i>Alnus glutinosa</i> – <i>Urtica dioica</i> woodland	PAWS	Moderate	0.19 ha
W7 - <i>Alnus glutinosa</i> – <i>Fraxinus excelsior</i> – <i>lysimachia nemorum</i> woodland	PAWS	N/A	0.07 ha
W10 - <i>Quercus robur</i> – <i>Pteridium aquilinum</i> – <i>Rubus fruticosus</i> woodland	PAWS	N/A	0.24 ha
W6/W10 - <i>Alnus glutinosa</i> - <i>Urtica dioica</i> woodland/ <i>Quercus robur</i> - <i>Pteridium aquilinum</i> - <i>Rubus fruticosus</i> woodland Mosaic	PAWS	N/A	0.08 ha

- 6.6.16 Full habitat information and vegetation community descriptions are described in Volume 3, Appendix 6.1 Preliminary Ecological Appraisal Update. All broad habitat and vegetation communities are displayed on Figure 6.4 and Figure 6.5 in Volume 2 of the ES.
- 6.6.17 The habitats within Wern Tarw Woodland (encompassing part of the proposed haul road) have suitability to support a range of protected and notable species namely badger, otter and breeding birds. Similarly, the northern part of the haul road comprises grassland habitats suitable for reptiles, amphibians and breeding and wintering birds. The suitability of these habitats for species of fauna are set out in the relevant species groups below.
- 6.6.18 Notwithstanding the unfavourable condition of Wern Tarw Woodland, parts of the site are considered irreplaceable and noteworthy in Welsh policy (PPW, 2024) and it is considered to be of up to county importance.
- 6.6.19 Given that wet heath is a vegetation community sensitive to land use change and is declining across the UK, with many communities in Wales considered to be unfavourable, they are considered to be of up to county importance.

6.6.20 Whilst acid grassland habitats are not particularly scarce or rare within Wales, particularly the U4 community, when taken together (specifically U3, U4 and U5) the extent of habitats could be considered as being up to local importance.

Bats

6.6.21 The desk study confirmed records of at least four species of bats within 2km of the Survey Area from the last ten years: noctule *Nyctalus noctula*, brown long-eared *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus*.

6.6.22 A further six species have been recorded within 5km of the Survey Area: serotine *Eptesicus serotinus*, lesser horseshoe *Rhinolophus hipposideros*, Brandt's bat *Myotis brandtii*, Daubenton's bat *Myotis daubentonii*, whiskered bat *Myotis mystacinus* and Natterer's bat *Myotis nattereri*.

6.6.23 A record comprising three roosts was identified just outside of the Application Boundary at Ty-Gwilym. The record comprises three roosts of more than 40 bats. This included a noctule roost, a soprano roost and a common pipistrelle roost.

6.6.24 Records of roosts of the following species were identified in the desk study between 2km and 5km away: common pipistrelle, soprano pipistrelle, brown long-eared and an unspecified pipistrelle. The roost records included likely maternity roosts of soprano pipistrelle, brown long-eared and unspecified pipistrelle bats.

Roosts

6.6.25 The ground level tree assessment (GLTA) concluded there were no trees with roosting suitability within 200m of any of the proposed turbine locations. The roost recorded within the desk study just outside of the Application Boundary is more than 500m from the nearest turbine.

6.6.26 Emergence surveys of structures at Caner Mawr Farm in the northwest of the Application Boundary in 2024 confirmed they were not used by roosting bats.

6.6.27 The proposed haul road follows an existing track through Wern Tarw Woodland. A GLTA of trees in 2024 found no potential roost features on any trees within 20 m of the Proposed Haul Road.

6.6.28 The proposed grid connection route A and Replacement Land both contain some trees of a size and age that could contain potential roosting features. No works are proposed within the Replacement Land that would affect bat roosts and as a result no surveys pertaining to bats were undertaken. Cable installation along the grid connection routes would be implemented via HDD. No trees will be directly or indirectly affected and therefore no surveys pertaining to bats were carried out.

6.6.29 A detailed breakdown of bat activity at each turbine location is provided in Volume 3, Appendix 6.4 Bat Activity and Collision Risk Assessment.

Foraging and Commuting

- 6.6.30 A detailed breakdown of bat activity at each turbine location is provided in Volume 3, Appendix 6.4 Bat Activity and Collision Risk Assessment.
- 6.6.31 The combination of transect surveys and remote static recording identified the following bat species using habitats within the Application Boundary:
- Common pipistrelle;
 - Soprano pipistrelle;
 - Noctule;
 - Bown long-eared;
 - Lesser horseshoe; and
 - *Myotis* sp.
- 6.6.32 Automatic ID using Kaleidoscope software and British Trust for Ornithology's (BTO) Acoustic Pipeline indicated the possible presence of Daubenton's, whiskered, Brandt's and Natterer's bat although these were not confirmed with manual analysis due to the recognised difficulty in separating *Myotis* sp. from sonograms.
- 6.6.33 As a precaution it is assumed that these four *Myotis* sp. utilise areas within the Application Boundary at least infrequently.
- 6.6.34 A relatively small number of calls of *Nyctaloid*² and *Nyctalus* sp. had intermediate characteristics between species. No definitive calls of Leisler's or serotine bats were identified in any of the surveys and the *Nyctaloid* and *Nyctalus* sp. calls are considered likely to be noctule.
- 6.6.35 No definitive recording of Nathusius' pipistrelle *Pipistrellus nathusii* were made and given the very small number of intermediate calls, and the very large number of common pipistrelle calls recorded, the ambiguous pipistrelle calls are considered very likely to be common pipistrelle.
- 6.6.36 Grey long-eared bat is very rare in Britain with a very restricted distribution and no known local records. Long-eared bats recordings are therefore assumed to be brown long-eared bats.
- 6.6.37 The proposed haul road and the southern part of grid connection route B pass through Wern Tarw Woodland. This habitat has higher suitability for foraging bats than the more exposed and elevated areas in proximity to the turbines.
- 6.6.38 The proposed grid connection route A and Replacement Land both contain marshy grassland with hedgerows and broadleaved woodland and are expected to be used by commuting and foraging bats. No habitat disturbance

² Defined in this ES as a group of larger bat species that use open landscapes to hunt and have low echolocation frequencies, specifically noctule, Leisler's and serotine (Roswag et al., 2025). The grouping has been used where sonograms are difficult to separate.

or loss which could affect bats will occur in these areas as a result of Proposed Development and bat activity surveys were not undertaken.

Bat Activity - Haul Road

- 6.6.39 All the species listed in the bat species assemblage were recorded at the northern and southern ends of the proposed haul road.
- 6.6.40 Bat activity at the northern end of the proposed haul route was very low. Common pipistrelle was the most frequently recorded species followed by soprano pipistrelle, then noctule. In total these three species made up ~76% of all passes. The median bat passes per night (BPPN) for all species at the northern end of the proposed haul road route was 0 indicative of the very low levels of activity for all species.
- 6.6.41 Bat activity was much higher at the southern end of the proposed haul road. Common pipistrelle and soprano pipistrelle made up ~93% of passes with median activity levels indicating frequent and regular activity. Other species were recorded infrequently.

Bat Activity – Turbines and Access Infrastructure

- 6.6.42 The evaluation has taken into account the levels of bat activity and associations with specific habitats/features as well as the distribution and abundance of suitable foraging habitats, flight-lines and overall connectivity in the surrounding landscape.
- 6.6.43 In the context of the wider local area and region the Proposed Development footprint has relatively low suitability as bat foraging habitat, comprising reasonably exposed open habitats at an elevation mostly 250m above sea level.
- 6.6.44 There are some localised features offering potential bat foraging habitat and / or flight lines. In relation to the proposed turbine locations, habitats of potentially higher value for foraging bats are hedgerows and drystone walls in the grasslands around Turbine 9, scattered linear scrub beside Turbine 1, a drystone wall beside Turbine 2, and a drystone wall beside Turbine 4.
- 6.6.45 All species were recorded at all proposed turbine locations except lesser horseshoe which was not recorded at Turbine 4 and Turbine 6; and unspecified *Nyctalus* sp. which were not recorded at Turbine 6.
- 6.6.46 Remote static recording at the proposed turbine locations in 2024 recorded all species within the total site assemblage. A summary of bat activity recorded by species across all remote recording locations is presented in **Table 6.17**.

Table 6.17 Summary of bat activity at the proposed turbine locations in 2024 (combined)

Species	Total Passes	Proportion of Calls	No of nights recorded (of 60)	Max. bppn (across all detectors)	Median bppn (across all detectors)	Mean bppn (across all detectors)
Common pipistrelle	7701	61.02%	42	808	20.50	128.35
Noctule	2449	19.41%	49	255	23.00	40.82
Soprano pipistrelle	1236	9.79%	29	276	0.00	20.60
Nyctaloid	362	2.87%	28	56	0.00	6.03
Myotis sp.	298	2.36%	34	33	1.00	4.97
Nyctalus sp.	289	2.29%	31	62	1.00	4.82
Brown long-eared	231	1.83%	28	57	0.00	3.85
Lesser horseshoe	45	0.36%	20	7	0.00	0.75
Common / Nathusius' pipistrelle	9	0.07%	4	3	0.00	0.15

6.6.47 All the species recorded within the Application Boundary were detected during the 2022 transect surveys. Low levels of bats activity were recorded during the transect surveys with only 657 bat passes recorded across all the transect survey visits. Common pipistrelle was the most frequently recorded species (60.1% of all passes) followed by noctule (16% of all passes) and soprano pipistrelle (14% of passes). Lesser horseshoe, brown long-eared, *Myotis* sp. and Nyctaloid bats each made up between 1.4% and 2.1% of calls with only occasional sporadic passes.

6.6.48 The levels of activity were broadly equivalent between the east and west transects. Activity on the east transect was concentrated along the woodland edge adjoining the northern boundary of the Site with the highest levels of activity in April. Bat activity was more widely spread along the west transect with a mid-summer peak in June.

Common Pipistrelle

6.6.49 Common pipistrelle was the most frequently recorded species with high activity at the southern end of the proposed construction haul road, peaking in June and July and along the coniferous woodland edge adjacent to the northern boundary of the Application Boundary.

6.6.50 Common pipistrelle was the most frequently recorded species within Wern Tarw Woodland with relatively high activity at the southern end of the proposed haul road with activity peaking in June and July.

6.6.51 Common pipistrelle is widespread and common in all geographies in South Wales and the UK (BCT, 2023) and with an estimated Welsh population of 297,000 (Matthews *et al.*, 2018). There is a long-term increase in the UK population although population trends in Wales are inconclusive (BCT, 2024).

6.6.52 With a maximum activity of 800 bppn, a median of 20.5 bppn and a mean of 128.35 bppn the level of common pipistrelle activity is considered to be of local importance.

Soprano Pipistrelle

6.6.53 Soprano pipistrelle activity during transect surveys was relatively low with peaks in July and October and concentrated along the coniferous woodland edge, in the north of the Application Boundary.

6.6.54 Soprano pipistrelle was the second most frequently recorded species along the proposed haul road and mainly focused at the southern end with peak activity in June and July.

6.6.55 Soprano pipistrelle was the third most frequently recorded species at proposed turbine locations. Activity peaked in autumn with lower activity levels in summer and much lower in spring.

6.6.56 Soprano pipistrelle is widespread and common in all geographies in South Wales and the UK (BCT, 2023) with an estimated Welsh population of 478,000 (Matthews *et al.* 2018) and a long-term increase in the UK population although population trends in Wales are inconclusive (BCT, 2024).

6.6.57 With a maximum activity of 276 bppn, a median of 0 bppn and a mean of 20.60 bppn the level of soprano pipistrelle activity is considered to be of up to local importance.

Noctule

6.6.58 Noctule activity during transect surveys was relatively low and focussed on the off-site woodland with peak activity recorded in July.

6.6.59 Noctule was the third most frequently recorded species during the proposed haul road (along with brown long-eared bat), although activity was relatively low. Peak activity was recorded in June.

6.6.60 Noctule was the second most frequently recorded species across the proposed turbine locations, making up just over 19% of total passes.

6.6.61 Noctule is classified as 'widespread in many geographies in South Wales, but not abundant in all' (Reason and Wray, 2023). Noctule is widespread across the UK with a stable population and a population of 91,000 in Wales. (Mathews *et al.* 2018).

6.6.62 The maximum activity of noctule was 265 bppn, a median of 23 bppn and a mean of 40.82 bppn. For undefined *Nyctalis* sp. (i.e. those within the Nyctaloid group) there was a maximum of 56 bppn, a median of 0 bppn and a mean of 6.3 bppn.

6.6.63 The level of noctule / *Nyctalis* sp. activity is considered to be of local importance.

Brown Long-eared

- 6.6.64 Brown long-eared was recorded rarely across all surveys. Activity during transect surveys and on the proposed haul road was very low with too few passes to conclude any significant patterns. At proposed turbine locations there was some seasonal pattern with low activity in spring and much higher activity in summer and autumn.
- 6.6.65 Brown long-eared occurs throughout most of the UK, widespread across all geographies in South Wales (Reason and Wray, 2023) with a stable long-term population across the country (BCT, 2024), with an estimated population of 96,600 in Wales (Matthews *et al.* 2018).
- 6.6.66 The maximum level of activity was 57 bppn, a median of 0 bppn and a mean of 3.85 bppn. Brown long-eared is considered to be of up to local importance.

Myotis sp.

- 6.6.67 Myotis bats were recorded rarely across all surveys with too few passes to conclude any seasonal pattern. *Myotis* sp. activity at turbine locations peaked in summer with comparatively lower activity in autumn and even less activity in spring.
- 6.6.68 The maximum level of activity was 33 bppn, a median of 1 bppn and a mean of 4.97 bppn. *Myotis* sp. are considered to be of importance at a local level.

Lesser Horseshoe

- 6.6.69 Lesser horseshoe was recorded rarely across all surveys with too few passes to conclude any seasonal pattern.
- 6.6.70 Lesser horseshoe is classified as having a 'rare or restricted distribution in South Wales' (Reason and Wray, 2023). It is a rare species in the UK and largely confined to Wales and Southwest England, with long-term increasing population trends in Wales (BCT, 2024). The estimated population in Wales is 30,900 (BCT, 2017).
- 6.6.71 The species was rarely recorded during the transect surveys. A total of 45 passes were recorded during remote recording surveys. A peak of 7 bppn was recorded with a mean of less than 1 bppn and a median of 0. Lesser horseshoe is considered to be important at up to a local level.

Overall Species Assemblage

- 6.6.72 Following the assessment method set out in the Bat Mitigation Guidelines (Reason and Wray, 2023) the assemblage of species recorded in the Application Boundary comprises three species that are widespread across South Wales (common pipistrelle, soprano pipistrelle; and brown long-eared); between two and five species that are widespread in South Wales but not abundant across the entire region (noctule and up to four *Myotis* sp); and one species that has a restricted distribution (lesser horseshoe).

- 6.6.73 Using the rarity criteria presented in the Bat Mitigation Guidelines the species assemblage in the Application Boundary scores between 11 – 17. The maximum possible score for South Wales (and south-west England) is 41. Therefore the Application Boundary score equates to between 27% and 41.5% of the maximum possible score.
- 6.6.74 Scores of between 45% and 55% of the maximum score for the region are considered to have county importance. Therefore the recorded species assemblage is considered to be of local importance

Otter

- 6.6.75 A total of three records of otter were identified as part of biodiversity records provided by SEWBReC within the 2 km Study Area. The closest record was located 1.03 km from the Survey Area along the Ogwr Fach.
- 6.6.76 The aquatic habitat within the Application Boundary is mostly sub-optimal for otter, given the large, open expanse across the Mynydd y Gaer common. Aquatic habitat with the potential to be used by otter comprises a series of watercourses that flow downstream to the north and south of the highest point of the common. A total of eight watercourses were surveyed for otter, most of which were narrow channels, either heavily vegetated by bracken and bramble or exposed. The southern limits of three watercourses in the south, namely Nant Crymyln, Nant Cwm-Llwyd and Nant Ton-y-Groes provided sufficient cover for otters to create resting places or to commute through the landscape, though water levels were fairly shallow and unlikely to provide an ideal source for foraging.
- 6.6.77 Terrestrial habitat for otter is restricted to woodlands at the southern limits of the Application Boundary, with much of the more optimal habitat extending beyond the boundary. These habitats include the wooded corridor lining Nant Crymyln and Wern Tarw Woodland (which surrounds Nant Ton-y-Groes), with Blackmill Woodlands in the west and the northern limits of the woodland to the west of Gelli Feddgaer, north of the Application Boundary. No evidence of otter was recorded during targeted surveys of suitable habitat.
- 6.6.78 It is likely that the local otter population would use the Ogwr Fach and Ogmores River to forage and for the purposes of resting place provision given their size, habitat mosaics and suitability for supporting fish and invertebrate prey items, with wooded habitats either side being used for breeding. Given the steep nature of most of the watercourses upstream of the Ogwr Fach, the dense bracken vegetation and disturbance at the Mynydd y Gaer common, it is unlikely that otters would frequent areas within and in proximity to the Proposed Development footprint.
- 6.6.79 Otter numbers have declined in Wales since 2010, with occupancy of sites falling from 90% to 70% between 2015 and 2019 (Keen and Chadwick, 2021). Otter is an EPS and is listed on BCBC's local biodiversity action plan. As a result, otter has been assessed as being of local importance.

Badger

- 6.6.80 There were no records of badger in the biodiversity records provided by SEWBRReC within the Study Area, in the last 10 years.
- 6.6.81 Habitat suitable for badger is limited to the southern and north-eastern limits of the Application Boundary and restricted to wooded habitats and grassland field borders outside of the common. Whilst badgers may commute and/or forage within acid grassland / bracken habitats within the Application Boundary, it is likely that their activity is restricted to those grasslands proximal to woodland, hedgerows and scrub, particularly in the west, south and south east. Wern Tarw Woodland (partially within the Application Boundary) and Blaencrymlyn SINC outside the Application Boundary offer optimal cover for badger and provide opportunities for sett creation. If badger clans are present within the wider landscape, it is likely that they would commute between woodlands in the south, through improved pasture and along field borders in the west of the Application Boundary, to improved pasture in the north, and woodland beyond the Application Boundary.
- 6.6.82 No badgers, evidence of setts or signs were recorded as part of the badger surveys undertaken in 2024. Mammal paths were identified, however, given the presence of sheep and cattle across the Application Boundary and the presence of public rights of way, mammal paths are likely to be created by domesticated animals and/or humans. Badgers are not considered to be important in the context of the Proposed Development.

Dormouse

- 6.6.83 Six records of dormouse were identified as part of biodiversity data obtained from SEWBRReC within the Study Area. The closest record was located 1.5 km to the east of the Survey Area.
- 6.6.84 Suitable habitat for dormice within Application Boundary is limited to broadleaved woodland, namely Wern Tarw Woodland in the south east. Whilst scrub and hedgerow habitats are present within the Application Boundary, these features are either sparse, or are present on the edges of the Application Boundary. There is no wooded connectivity between suitable wooded habitats in the south and wooded features in the north/north east. Wern Tarw Woodland comprises features that would facilitate summer nesting, commuting and foraging. Hibernation nesting suitability within Wern Tarw Woodland is less suitable given the damper conditions, though tree roots may offer opportunities to build hibernation nests away from inundated soils.
- 6.6.85 To ascertain the presence or likely absence of dormice within Wern Tarw Woodland, nest tubes were deployed in August 2024 and checked in September 2024. Two dormice and an empty dormouse nest were recorded within the woodland.
- 6.6.86 Dormouse numbers are rapidly declining across the UK, with recent numbers indicating that it is a species vulnerable to extinction (People's Trust for Endangered Species, 2022). Dormouse is an EPS, Section 7 species and

listed on the BCBC's Local Biodiversity Action Plan, as a result dormouse is considered to be of up to county importance.

Amphibians

- 6.6.87 A total of 83 records of amphibians were identified as part of biodiversity records provided by SEWBReC within the Study Area. These included records of palmate newt *Lissotriton helveticus*, common frog *Rana temporaria*, and common toad *Bufo bufo*. No records of great crested newt were identified as part of the desk study.
- 6.6.88 Aquatic habitat for amphibians is present within the Application Boundary, in the form of four waterbodies (Waterbodies 1-4) and scattered ephemeral pools. Terrestrial habitats adjoining the waterbodies comprise tussocky acid grassland, bracken mosaics, purple moor-grass and rhos pasture and dwarf shrub heath.
- 6.6.89 Four potentially suitable waterbodies were identified within and up to 500m from a previous Application Boundary. Habitat Suitability Index (HSI) assessments undertaken in 2022 and 2023 assessed three of the waterbodies as being poor (Waterbody 1, 3 and 4) and one waterbody as being below average (Waterbody 2) as per HSI criteria. The results of the HSI assessments for each waterbody are included within Volume 3, Appendix 6.3 Protected and Notable Species. The waterbodies are displayed on Volume 2, Figure 6.5.
- 6.6.90 Given the scattered nature of the waterbodies within the Application Boundary, their setting within grazed grasslands and limited availability of specific habitat preferences for great crested newt, aquatic habitat is largely sub-optimal for this species. Waterbodies are likely to be colonised by great crested newt if they allow for successful display and comprise suitable macrophytes for egg laying, surrounding cover for migration/dispersal and hibernaculum. However, these waterbodies could be used by common and widespread species of amphibians.
- 6.6.91 Conventional surveys and eDNA sampling was undertaken on all identified waterbodies. Smooth newts, common frog and common toad were identified in Waterbody 2 during conventional surveys, no other amphibians were recorded. Negative results for great crested newt eDNA were returned for all waterbodies as part of the laboratory analysis of eDNA. Great crested newt are considered likely absent from the Application Boundary and as a result are considered to be of less than local importance.

Reptiles

- 6.6.92 Four species of reptile were identified as part of the desk study search, with a total of 86 records identified including adder *Vipera berus*, common lizard *Zootoca vivipara*, grass snake *Natrix Helvetica* and slow worm *Anguis fragilis*.

- 6.6.93 The Application Boundary comprises pockets of suitable habitat for all four common species of reptile³, primarily bracken mosaics, and tussocky acid grassland that could be used for refuge with open areas used for basking. Wet heath, valley mires and other mire communities offer additional suitability for grass snake and adder.
- 6.6.94 No incidental observations of reptiles were identified as part of survey and assessment work, though it is assumed that reptiles could be present within the Application Boundary given the suitability of habitats present. Whilst reptiles are unlikely to experience significant effects, they have been precautionarily assessed in this EclA as being of local important.

Grassland Fungi

- 6.6.95 The data provided by SEWBReC provided records of over 200 fungi species within 250m of the Proposed Development's previous Application Boundary, between 1975 and 2021.
- 6.6.96 Additional information provided by the Glamorgan Fungus Group comprised 225 species of fungi recorded within the data search area between 2014 and 2019. This data was divided into 48 fungi samples in 2014, 57 samples in 2015, 46 samples in 2016, 59 samples in 2017 and 15 in 2019.
- 6.6.97 Combining all desk study datasets based on fruitbody surveys (SEWBReC and Glamorgan Fungus Group) the waxcap group were most abundant, with more than 20 species identified. This number includes species recorded within the Application Boundary and up to 250m outside.
- 6.6.98 As part of targeted grassland fungi sampling and surveying between 2023 and 2024, a total of 42 CHEGD species were identified. The waxcap group were the most abundant, with 18 species identified across five genera. Many of the species identified as part of field work are common and widespread across the UK, with many commonly recorded in South East Wales (Dunkelman and Wood, 2020). Additionally, many of the species identified were only present in certain areas. Nine species were identified as red listed as per the International Union for Conservation of Nature (IUCN), which include eight vulnerable (VU) species and one endangered (EN), though only one of these red listed species was identified on the Preliminary Assessment of Red Listed Species in the United Kingdom (Evans et al. 2006). There is currently no recently published or official red list of CHEGD species in Wales or the UK.
- 6.6.99 Waxcaps and other CHEGD species are typically associated with grasslands that are low in sulphur and phosphate content with a relatively well-formed non-vascular plant layer. CHEGD species can be found in a variety of conditions across Wales, including acidic and calcareous grasslands with some species more resilient to agriculturally managed grasslands (Griffith and Roderick, 2008).

³ Excluding the two rare reptiles species restricted to southern parts of the UK

- 6.6.100 The Application Boundary comprises a number of grassland vegetation types suitable for supporting grassland fungi, most notably acid grassland vegetation communities, principally the vegetation community U4 - *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland. These communities are widespread across the landscape and are grazed by sheep providing the ideal conditions for fungi to proliferate.
- 6.6.101 Relatively limited information is available on the association of CHEGD communities and bracken. It is not a habitat that is normally identified as being of importance to CHEGD species and does not feature in the scope/evaluation of the notable fungal assemblages in recent literature (Bosanquet *et al.* 2018).
- 6.6.102 When combining all datasets from the Mynydd y Gaer area⁴ which includes targeted sampling and surveying for the Proposed Development, desk study records and Natural Resources Wales' eDNA sampling the total number of CHEGD species eclipses 70. This includes an area of more than 3 km wide ranging from Waun Wen in the west to Taff Ely Ridgeway in the east, and includes areas comprising a range of different habitats. The full dataset is set out in Volume 3, Appendix 6.2 Protected and Notable Species.
- 6.6.103 Whilst the sampling results are noteworthy in relation to the number of Red Listed Species recorded, it should be noted that IUCN criteria assess the conservation status of species on a global scale and whilst it takes account of the distribution across countries, it does not fully consider local or regional abundance. A species assessed as vulnerable or endangered by the IUCN criteria may be locally or frequently abundant within a given region and/or widespread across an area. An example is pink waxcap *Porpolomopsis calyptriformis* which is regionally common in the west of the UK, particularly in South East Wales and parts of England, but far scarcer in Europe, North America and Asia (Dunkelman and Wood, 2021, English Nature, 2004).
- 6.6.104 When considering the criteria set out in the Guidelines for the Selection of Biological SSSIs (Bosanquet *et al.* 2018), fungi assemblages within the Mynydd y Gaer landscape (Application Boundary and up to 250m) could be assessed as of national importance. An important item to note is that the SSSI guidelines are based purely on fruitbody numbers and do not consider the diversity that could be obtained from eDNA sampling. The guidelines state:
'Selection thresholds are based on fungal fruitbody data but not on mycelial DNA survey data. Thresholds should therefore only be applied to site species lists derived from fruitbody records. In future, criteria and thresholds for mycelial DNA surveys and studies should be developed'
- 6.6.105 Another important note is that SSSI guidelines refer to ecologically coherent assemblages rather than development boundaries. As a result, the SSSI guidelines are not directly comparable to the data obtained as part of the fungi studies for the Proposed Development. Moreover, given that CHEGD status is

⁴ Waun Wen, Mynydd y Gaer Common, North West of Cwm Rhydymilwyr

based mostly on fruitbody records it is reasonable to assume that a variety of CHEGD species are under recorded across the UK.

- 6.6.106 Notwithstanding this, it is clear that ecologically coherent assemblages are present across the Application Boundary based on studies undertaken to date. Given the distribution and abundance information obtained, these assemblages are considered to be restricted to ‘hotspots’, with key locations being considerable extents of grazed acid grasslands in the north east and the central part of Mynydd y Gaer. Considering these hotspots in the context of the Proposed Development footprint and taking into account the limitations within SSSI guidelines, fungi are considered to be of regional importance.

Vascular Plants

- 6.6.107 The desk study identified 82 records of protected and notable vascular plants, of which 11 records were of bluebell *Hyacinthoides non-scripta*, the only native protected plant identified in the Study Area.
- 6.6.108 Populations of a diverse array of vascular plants occur within the Survey Area, mostly associated with mire, mire affiliated and heathland communities. No red listed vascular plants were identified as part of the NVC and habitat surveys within the Application Boundary, though some plants were considered to be less common in the context of Wales. Small cudweed *Filago minima* and white-beaked sedge *Rynchospora alba* are less common vascular plants in Wales that were recorded in localised areas within the Application Boundary as part of these surveys. Bristle bent was also identified within acid grassland.
- 6.6.109 Whilst bristle bent is not identified on the Red List of Vascular Plants of Wales (Dines, 2008) it is a scarce plant in Wales, only being identified in 16 hectads⁵ across South Wales. Given its scarcity, bristle bent is assessed as being of county importance.

Future baseline conditions

- 6.6.110 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.
- 6.6.111 It is expected that that the ecological baseline will remain unchanged in the short term (at least the next five years) in the absence of the Proposed Development. It is also anticipated that the management of areas within the Application Boundary will continue as they are and will include the grazing of acid grassland on Mynydd y Gaer common, and management of select habitats near Waun Wen. Bracken spread and colonisation is likely to continue, with the affected areas of acid grassland and dwarf shrub heath

⁵ A 10 km x 10 km square area used for collating vascular plant data

becoming unfavourable and outcompeted. Complete loss of parcels of these habitats is possible in the long term.

- 6.6.112 Mire affiliated vegetation communities such as wet heath and other, damper parts of the Mynydd y Gaer common are also likely to experience continuous decline in the short term given the repeat damage caused by vehicles illegally traversing the area. Soil erosion would continue, as would the increase in vegetation loss. Invasive non-native species would continue to disperse, colonising new areas.
- 6.6.113 It is also anticipated that the surrounding woodlands, particularly Wern Tarw Woodland would continue to be left unmanaged, resulting in the prolonged decline of woodland health and the spread of invasive non-native species within and outside of the woodland. This would be primarily a result of increased shading of the understory and ground flora due to continuous spread of Himalayan balsam, maturing trees of similar size and age and denser canopies. The conditions of Wern Tarw Woodland are likely to reduce even further, with eventual loss of ancient woodland features in the long term. Additionally, coniferous trees within and in proximity to the Application Boundary will continue to self-seed and spread across the northern parts of Mynydd y Gaer common.
- 6.6.114 Climate change is likely to alter the composition and distribution of species of some taxon groups in the long term (over the next 50-100 years). Research suggests that several groups, which are relevant to areas within the Application Boundary would be subject to change. It is likely that range expansion and a northward shift in the distribution of some species and taxon groups would occur. Additionally, weather patterns could lead to soils losing moisture which may cause complete drying of watercourses, waterbodies and mire habitats particularly in the summer months, with unpredictable rain patterns and extreme weather events leading to local flooding.

Important Ecological Features

- 6.6.115 **Table 6.18** lists the Important Ecological Features (IEF) taken forward impact assessment. Where a receptor has not been identified in the table below it has been assessed as not being able to experience significant effects as a result of Proposed Development impacts. This is based on professional judgement and has been assessed based on its limited geographical importance (i.e. of site importance or below) or likely to be absent from the Application Boundary.

Table 6.18 Important Ecological Features

Receptor	Description	Value	Sensitivity ⁶
Blackmill Woodlands SAC	An ancient woodland and SSSI underpinned by an international designation, located 480 m from the point of nearest construction activity	International	Very High
Blaencrymlyn SINC	Designated for its wooded features. The SINC is located approximately 40 m from the nearest point of likely construction activity.	County	Medium
Wern Tarw Woodland (Plantation on Ancient Woodland Site)	A post-industrial PAWS in unfavourable condition, with remnants of mining operations.	County	Medium
M15 - <i>Tricophorum</i> – <i>Erica tetralix</i> wet heath	Wetland vegetation listed on Annexe 1 of the Habitats Directive and has experienced fragmentation in Wales. Dependent on underlying and surface hydrology, with some areas considered to be in unfavourable condition	County	Medium
Acid Grassland Communities	A common and widespread habitat typical of unenclosed, grazed upland landscapes. One of the most abundant habitats within the Application Boundary.	Up to Local	Low
Otter	A European Protected Species, listed on Section 7 and has experienced population decline in Wales since 2017. Present in the wider landscape, though unlikely to frequent areas within the Application Boundary given open nature of habitats.	Local	Low
Commuting and Foraging Bats – Common pipistrelle and soprano pipistrelle	Bats using features across the landscape in proximity to proposed turbine locations	Local	Low
Commuting and Foraging Bats – Noctule (including <i>Nyctalus</i> sp. and <i>Nyctaloid</i>)	Bats using features across the landscape in proximity to proposed turbine locations	Up to County	Medium
Commuting and Foraging Bats – <i>Myotis</i> sp.	Bats using features across the landscape in proximity to proposed turbine locations	Up to Local	Low

⁶ Sensitivity levels have been adapted based on the nature of the feature and associated impacts (such as increased sensitivity to land use change or vulnerability to turbine collision)

Commuting and Foraging Bats – Brown long-eared, and lesser horseshoe bat	Bats using features across the landscape in proximity to proposed turbine locations	Up to Local	Low
Dormouse	A European Protected Species, listed on Section 7 and declining in Wales. Confirmed to be present within Wern Tarw Woodland, part of which falls within the Application Boundary.	County	Medium
Reptiles	Common and widespread species assumed to be present within the wider landscape, within areas of acid grassland/bracken, likely to be more frequent to the southern and eastern limits of the Application Boundary, particularly within dwarf shrub heath mosaics and valley mire habitats. All four species of reptile regularly occurring in Wales are listed on Section 7.	Local	Low
Bristle Bent	A scarce vascular plant in South Wales. A primary component in the U3 acid grassland vegetation community found within the Application Boundary.	County	Medium
Grassland Fungi	A diverse assemblage of CHEGD species identified across the Application Boundary, primarily made up of waxcaps and present within ecological coherent assemblages in select areas.	Regional	High

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

- 6.7.1 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.
- 6.7.2 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').
- 6.7.3 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.
- 6.7.4 Implementation of embedded mitigation relied upon in the assessment would be secured by DNS consent. Compliance of the Proposed Development with the Outline Design Principles, and through compliance with relevant environmental management plans (CEMP, OEMP and OBS). In keeping with Planning Policy Wales (PPW, 2024), Future Wales, BCBC's local policies and incorporating the DECCA⁷ framework, the Proposed Development has taken an ecosystems approach. Sensitive habitats (e.g. wet heath, rhos pasture) would be avoided (as far as practicably possible) and are losses minimised, and damaged habitats/features in unfavourable condition (wet heath, ancient woodland) are safeguarded and where possible proposed for restoration to maximise their extent. The ecosystems approach aims to maintain the diversity and extent of ecosystems, enhance the baseline condition, and connect the landscape, with the objective of increasing resiliency. Ecosystem functioning is an important natural process enabling wildlife and humans to prosper and is dependent on habitats being in appropriate conditions. The Welsh Government's step-wise approach has been implemented when considering ecological receptors, a summary of its application is within the Green Infrastructure Statement (Volume 3, Appendix 10).
- 6.7.5 Where practicably possible, infrastructure has been sited on areas of lower biodiversity value such as improved grassland and areas of dense bracken, and where feasible access tracks have been sited along existing bare ground, existing tracks or designed to avoid areas of higher value. As part of the iterative design process of the Proposed Development, turbines that were originally sited within areas of sensitive habitats (specifically mire habitats) such as Turbine 2 and Turbine 6 have been relocated into habitats of lower biodiversity value (specifically improved pasture and bracken). Several turbines have also been removed from the scheme. Additionally, turbines are

⁷ Diversity, Extent, Condition, Connectivity and Adaptability as devised by Natural Resources Wales

located more than 50m from key habitat features for bats (woodland, scrub, hedgerows) as set out in NatureScot guidance (NatureScot, 2022). Turbines have also been sited away from all flowing watercourses. Surface water run off, drainage and other water related mitigation is set out in The Flood Consequence Assessment (Volume 3, Appendix 2.1). This includes Sustainable Drainage Systems (SuDS) and environmental best practice.

- 6.7.6 Construction related activities would be implemented pursuant to environmental best practice measures as set out within a Construction Environmental Management Plan (CEMP). Precautionary Working Methods to prevent accidental damage to habitats and mortality to protected and or notable species during construction would also be set out in a CEMP. A bespoke soil management and soil resource plan would be produced to ensure sensitive handling and storage of soil, particularly topsoil and soils associated with ancient woodland.
- 6.7.7 Habitats modified as a result of temporary construction and not required for the operation of the Proposed Development, such as construction compounds and crane pads would be restored as soon as possible during the construction period. Except for turbine bases and access tracks, all vegetation removed for the construction phase would be reinstated in their original locations within the Proposed Development footprint, facilitating natural re-colonisation of vegetation communities. Where bracken habitats are removed as part of temporary works the ground would be reinstated with the aim of facilitating the establishment of acid grassland, in keeping with the restoration objectives of the Proposed Development.
- 6.7.8 Permanent loss has been restricted to areas of lower biodiversity value as far as practicably possible, particularly improved pasture, bracken and acid grassland. Areas of higher value, that are to be lost permanently (primarily the U3 acid grassland community) would be re-created within the Proposed Development footprint, in proximity to areas of loss.
- 6.7.9 Wind farm maintenance and associated activities would be subject to an Operational Environmental Management Plan (OEMP) during the operational stage. An OEMP would include environmental best practice measures to prevent pollution, though it is anticipated that the operational phase would be very low risk in terms of pollution incidents. The OEMP would also include measures to prevent accidental encroachment into sensitive habitats and features in proximity to the Proposed Development footprint.
- 6.7.10 Consideration has been given to further or '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.
- 6.7.11 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.

- 6.7.12 A draft strategy has been devised which sets out the outline avoidance, minimisation, mitigation/restoration and enhancement measures proposed for implementation during all stages of the Proposed Development. The necessary outline measures at the current stage of the Proposed Development are in Volume 3, Appendix 6.6 Outline Biodiversity Strategy, referred to as the OBS in this chapter. The OBS sets out all measures referred to above including the necessary aims and objectives of each proposal.
- 6.7.13 Both embedded and additional mitigation measures relevant to the assessment of Terrestrial Ecology are summarised in **Table 6.19** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 6.19 Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	Nature of mitigation	How the measure will be secured
Embedded mitigation		
Construction Environmental Management Plan / Precautionary Method of Works	Environmental best practice such as pollution prevention, dust minimisation and precautionary working methods to prevent injury and/mortality to protected and/notable species.	Secured through a condition of the DNS
Soil Management Plan	Sensitive management, storage and reuse of soils across Proposed Development footprint.	Secured through a condition of the DNS
Operational Environmental Management Plan	Environmental best practice measures such as pollution prevention during operation.	Secured through a condition of the DNS
Habitat reinstatement (Outline Biodiversity Strategy)	Reinstatement of grassland habitats lost temporarily to the Proposed Development footprint. Reinstatement of specific habitats and turfs.	
Tertiary Mitigation		
European Protected Species Licence for Dormouse	Sensitive working measures, appropriate work scheduling and compensatory habitat provision to maintain the favourable conservation status of the dormouse in Bridgend.	Application to be submitted to Natural Resources Wales
Further/Additional mitigation		

Turbine curtailment (Outline Biodiversity Strategy)	Bespoke curtailment strategy to reduce impacts on commuting and foraging bats	Secured through a condition of the DNS
Habitat restoration and management (Outline Biodiversity Strategy)	Management of bracken to restore acid grassland habitats and reinstate grassland lost permanently to benefit grassland and fungi. Conservation management and restoration of unfavourable ancient woodland	Secured through a condition of the DNS

6.8 Assessment of potential impacts and effects

6.8.1 The impacts of the construction and operation phases of the Proposed Development have been assessed. The potential impacts arising from the construction, operation and maintenance phases of the Proposed Development are set out below. This includes impacts arising from construction and operation of the turbines, construction of access tracks and the haul road.

6.8.2 It should be noted that impacts and effects during the decommissioning stage are considered to be similar or no worse than during construction and have therefore not been separately considered during this chapter of the ES. Moreover, it is considered that an accurate assessment of the effects arising from decommissioning cannot be undertaken at this stage given the temporal nature.

6.8.3 This section sets out Proposed Development stages and the associated impacts and resultant effects, per receptor.

Blackmill Woodlands SAC

Construction phase

6.8.4 No direct impacts on Blackmill Woodlands SAC and its qualifying features are anticipated as a result of the Proposed Development. The Proposed Development is located over 400m to the east of SAC boundary, with the nearest point of construction related activity anticipated to be at or near Turbine 1.

6.8.5 Indirect impacts as a result of construction related activities could lead to the alteration and/or degradation of the qualifying features of the SAC, through pollution incidents and spread of invasive non-native species. Pollution incidents could lead to surface water runoff into a ditch just north of Turbine 1. The ditch is connected to the Nant Cwm-Dwr to the west of Turbine 1, which flows through the SAC. Pollutants within the watercourse could reach the SAC and lead to a alteration of the surrounding soil chemistry, resulting in the degradation of the qualifying features.

- 6.8.6 Additionally, the spread of invasive non-native species during construction could enable the dispersal of Himalayan balsam to new areas, through transport of contaminated soil.
- 6.8.7 The Habitats Regulations Assessments report (Volume 3, Appendix 6.5 Shadow Habitats Regulations Assessment) concluded no significant effect on the integrity of Blackmill Woodlands SAC with the inclusion of best practice construction measures. This includes measures such as pollution prevention (such as those included within Guidelines for Pollution Prevention 6 (NRW, SEPA and NIEA, 2023) to prevent effects associated with hydrological impact pathways, remedial measures to intercept chemical spills and sensitive soil management.
- 6.8.8 Biodiversity measures are proposed to the east of Blackmill Woodlands SAC, outside of the SAC boundary. The proposed measures as set out in the OBS (Volume 3, Appendix 6.6) target dense bracken habitats only. Whilst there could be an opportunity to target the qualifying features of the SAC, the scope of these would be agreed with BGBC and Natural Resources Wales. The proposed measures within the OBS are not considered to give rise to significant adverse effects.

Significance of the effect

- 6.8.9 Given that embedded mitigation measures would sufficiently reduce indirect impacts on Blackmill Woodlands SAC it is predicted that there would be a **negligible effect**, which is **not significant**.

Blaencrymlyn SINC

- 6.8.10 No direct impacts are anticipated on Blaencrymlyn SINC. The Proposed Development footprint is located outwith the SINC boundary. Whilst the nearest point of Blaencrymlyn SINC to the Proposed Development (specifically the proposed location of a borrow pit) is 20 m, no wooded features or other qualifying interests of the SINC would be directly impacted. The site of the proposed borrow pit is located within improved pasture, associated with Blaencrymlyn Farm to the west of the Application Boundary.
- 6.8.11 Alteration and degradation of the habitat features of the SINC could occur as a consequence of construction activity at or in proximity to the borrow pit and Turbine 1. Pollution incidents at Turbine 1 could lead to surface water run off into the Nant Blaencrymlyn, which is a watercourse that flows through Blaencrymlyn SINC. Surface water run off could transport pollutants into the Nant Crymlyn, altering water chemistry, and soil chemistry of the surrounding woodland features, leading to decline in watercourse and woodland health. Similarly, accidental pollution events could occur within the area proposed for the borrow pit, causing surface water run off into features of the SINC.
- 6.8.12 With embedded measures such as environmental best practice as part of a CEMP, to include pollution prevention, dust minimisation, remedial measures to intercept chemical spills and sensitive soil management, it is predicted that direct and indirect impacts would be avoided.

Significance of the effect

- 6.8.13 On the basis that the sensitivity of the receptor is medium, and the magnitude of the impact would be sufficiently mitigated by embedded measures (i.e. no change), it is predicted that there would be a **negligible effect** on Blaencrymlyn SINC and thus **not significant**.

Wern Tarw Woodland – PAWS

Construction phase

- 6.8.14 Direct Impacts to Wern Tarw Woodland PAWS are anticipated as a result of the Proposed Development's haul road. The haul road is an offline section located in the south east of the Application Boundary. The haul road design largely follows an existing hardstanding track within Wern Tarw Woodland. To facilitate the transport of turbines to their proposed locations, the hardstanding track is to be reinforced and partially widened in select locations. As part of the haul road design, parts of Wern Tarw Woodland are to be removed to ensure that route is suitable for use by vehicles required to transport the turbines. Based on overlaid plans, it is estimated that 0.2 ha of ancient woodland is to be permanently lost to facilitate the haul road. The sections of Wern Tarw Woodland to be lost comprise woodland vegetation communities primarily associated with alder, specifically W6 *Alnus glutinosa* – *Urtica dioica* and W7 *Alnus glutinosa* – *Fraxinus excelsior*. Veteran trees and mature broadleaved trees not within the haul road alignment would be retained and protected as part of the Proposed Development's embedded measures.
- 6.8.15 Additionally, indirect impacts from construction related activities such as vehicular movement, earthworks and soil movement could lead to the alteration and degradation of ancient woodland beyond the haul road alignment. Though, with embedded measures such as environmental best practice as part of a CEMP, to include pollution prevention, dust minimisation, remedial measures to intercept chemical spills and sensitive soil management, it is predicted that indirect impacts would be reduced.

Significance of the effect

- 6.8.16 On the basis that the sensitivity of the receptor is medium and the magnitude of the impact is medium, it is assessed that there will be a **moderate adverse effect** on Wern Tarw Woodland PAWS in the absence of mitigation which is considered to be **significant**.

Additional mitigation and residual effect

- 6.8.17 It is anticipated that the final haul road layout would be designed to avoid as much of the ancient woodland as practicably possible. Wern Tarw Woodland covers an area of at least 8 ha. The current estimated loss of the PAWS is 0.2 ha, this represents a small proportion of the woodland as a whole. As set out in the OBS (Volume 3, Appendix 6.6), conservation management of Wern Tarw Woodland (within the Applicant's control) is to be implemented as part of

the Proposed Development, which would include retaining, reusing and restoring ancient woodland soils and ground flora, selective/sympathetic management of trees and long-term control of invasive non-native species. Whilst the permanent loss of the PAWS is considered to be irreversible, the proposed conservation management measures are expected to restore the whole woodland to its former ancient semi-natural condition in the long-term, ultimately mitigating the permanent loss of features within the woodland. Tree loss through construction of the haul road would be replaced within the wider Wern Tarw Woodland where appropriate, pursuant to the woodland replacement ratio as set out in PPW 12⁸.

- 6.8.18 Taking the additional mitigation into account as set out in the OBS into account, it is predicted that the effect would be no more than **minor adverse** in the medium-term and **not significant**.

Operational phase

- 6.8.19 Vehicular activity will be restricted to the reinforced hardstanding track during the operational phase, which would be used intermittently for the purposes of turbine maintenance only. All site personnel would be briefed on the measures set out in an OEMP, primarily the required pollution prevention measures. As a result, no adverse effects as from operational impacts are predicted.

- 6.8.20 As set out in the OBS (Volume 3, Appendix 6.6), control of invasive non-native species is expected to reduce the pressure on native woodland flora. Sympathetic management through thinning and coppicing would introduce a diverse woodland structure, benefiting the canopy, understory and ground layer. Brown earth soils would be retained and reused, particularly in areas not currently designated as ancient woodland. Undesirable species such as non-native trees, butterfly-bush *Buddleja davidii* and bracken would be managed accordingly.

Significance of the effect

- 6.8.21 On the basis that the sensitivity of the receptor is medium and the magnitude is medium, the restoration and enhancement measures set out in the OBS are predicted to lead to a **moderate beneficial** effect on Wern Tarw Woodland. The effect would be experienced in the long-term, and considered to be **significant**.

M15 - *Trichophorum* – *Erica tetralix* wet heath

Construction phase

- 6.8.22 No permanent or temporary landtake of wet heath communities is anticipated as part of the construction phase. The Proposed Development layout has

⁸ Woodland replacement ratio as per PPW 12, section 6.4.42 states that at least three trees of a similar type and compensatory size planted for every 1 lost

avoided sensitive wetland habitats and vegetation communities through sensitive development design.

6.8.23 Whilst indirect impacts from vehicular movement, earthworks and site clearance could lead to the alteration and/or degradation of wet heath, embedded measures would sufficiently reduce these impacts. Embedded measures would include use of bog mat trackways (where appropriate) and environmental best practice as part of a CEMP, with no adverse effects predicted. Best practice measures would include pollution prevention, dust minimisation, remedial measures to intercept chemical spills and sensitive soil management.

6.8.24 The construction phase would lead to the reduction in offroad vehicles illegally traversing the Mynydd y Gaer common given the restrictions associated with live construction sites. As a result, direct anthropogenic pressure and disturbance of the wet heath community in the centre of the Mynydd y Gaer common would cease for the duration of the construction period. This would enable the vegetation to regenerate naturally, albeit slowly.

Significance of the effect

6.8.25 On the basis that the sensitivity of the receptor is medium and the magnitude of the impact is low, it is assessed that there would be a **minor beneficial** effect, and **not significant**.

Operational phase

6.8.26 On completion of construction, measures to uphold the avoidance of damage to the wet heath community is proposed. At the current stage, these measures are not final but include a number of measures to deter off-road vehicles from damaging the Mynydd y Gaer common. As set out in the OBS, potential measures include the use of temporary barriers or fencing demarcating the wet heath community to prevent encroachment into the damaged area. The fencing/barrier measures would be designed in a way as to enable the Coity Wallia Board of Conservators and Coity Wallia Commoners Association to exercise their rights over the land whilst preventing future damage. CCTV and associated warning signs would be installed to inform monitoring measures.

6.8.27 With the above measures in place, the wet heath community would be able to continue re-generating naturally, with the aim of restoring favourable conditions.

Significance of the effect

6.8.28 On the basis that the sensitivity of the receptor is medium and the magnitude is medium, the restoration measures set out in the OBS are predicted to lead to a **moderate beneficial** effect on the wet heath community. The effect would be experienced in the long-term, and is considered to be **significant**.

Acid Grassland Communities

Construction phase

- 6.8.29 The acid grassland communities within the Survey Area comprise a series of U4, U3 and U5. Direct impacts on acid grassland as a result of the construction of turbine infrastructure and access tracks is anticipated to lead to permanent and temporary loss, particularly vegetation communities U4 - *Festuca ovina* - *Agrostis capillaris* grassland and to a lesser extent U3 - *Agrostis curtisii* grassland. It is estimated that 1.70 ha of U4 - *Festuca ovina* - *Agrostis capillaris* grassland and 0.36 hectares of U3 - *Agrostis curtisii* grassland would be lost permanently to turbine infrastructure and access tracks.
- 6.8.30 Temporary loss of acid grassland as a result of construction compounds, cranepads and associated temporary works is estimated to be 3.41 ha, which includes 2.71 ha of U4 - *Festuca ovina* - *Agrostis capillaris* grassland and 0.70 of U3 - *Agrostis curtisii* grassland. Total habitat loss of acid grassland habitats is estimated to be 5.47 hectares. This represents a relatively small proportion of the extent of acid grassland within the Survey Area, the total of which is estimated to be more than 65 ha and a much smaller extent within Bridgend. Temporary and permanent habitat loss is considered to be reversible.
- 6.8.31 Where U3 - *Agrostis curtisii* grassland located on areas proposed for permanent development, turfs will be lifted, stored and translocated to prepared receptor areas during the construction phase. Receptor areas will comprise bare ground adjoining retained U3 grassland and this would minimise the extent of permanent loss. Turf translocation will be supplemented by the collection and sowing of bristle bent seed from the seedbank of retained vegetation.
- 6.8.32 Ground subject to temporary habitat loss would be reinstated on completion of construction. This would include the replacement of sensitively stored acid grassland soils following procedures detailed in the Proposed Development's soil management plan. Given that acid grassland is relatively straight forward to create (particularly on existing acid soils) it is anticipated that the habitat would re-establish across temporarily disturbed areas in the short term.
- 6.8.33 A number of turbines are proposed within bracken dominated habitats. Whilst bracken offers opportunities for wildlife when it forms patchy mosaics with acid grassland, it can rapidly outcompete other habitats, leading to monocultures. As set out in the OBS (Volume 3, Appendix 6.6), bracken habitats lost temporarily due to construction compounds, crane pads and other temporary works would be reinstated and managed as acid grassland. It is estimated that 1.57 ha of bracken subject to temporary loss would be reinstated to enable the regeneration of acid grassland.

Significance of the effect

- 6.8.34 It predicted that there would be a **negligible effect** as a result of construction impacts, that is considered to be **not significant**. This is based on the low sensitivity of the receptor and the relative low magnitude of impact.

Operational phase

- 6.8.35 No adverse effects are anticipated on acid grassland as a result of the operational phase. Whilst vehicular activity is anticipated for turbine maintenance, this is likely to be intermittent. All site personnel would be briefed on the environmental best practice measures within the OEMP.
- 6.8.36 Selected bracken habitats across the Application Boundary that are not subject to loss from the Proposed Development would be controlled to create acid grassland/bracken mosaics and deliver a net increase in grassland habitats.
- 6.8.37 The total permanent grassland loss, including improved pasture as well as acid grassland (as set out in section 1.8.28) is estimated to be 2.67 ha as a result of the Proposed Development. To ensure a net benefit for biodiversity is achieved, a minimum of 3 ha of bracken dominated habitat would be controlled across the Application Boundary.
- 6.8.38 It is predicted that the areas of acid grassland lost temporarily during construction and reinstated at the end of the construction phase would fully establish at the start the operational phase. Similarly, translocated U3 - *Agrostis curtisii* grassland would have also established during the construction period. Targeted bracken control to restore Mynydd y Gaer common's former acid grassland habitats would lead to establishment of acid grassland communities in the medium-term, ultimately delivering a net increase in grassland habitats.

Significance of the effect

On the basis that the sensitivity of the receptor is low and the magnitude of change is medium, the restoration and enhancement measures set out in the OBS (Volume 3, Appendix 6.6) are predicted to lead to a **minor beneficial** effect in the medium term, which is **not significant**.

Bristle Bent

Construction phase

- 6.8.39 Bristle bent forms the component part of the acid grassland community U3. The estimated total area of U3 - *Agrostis curtisii* grassland within the Survey Area is 6.37 ha. Whilst the Proposed Development's iterative design process has avoided as much of the U3 habitat as practicably possible, it is estimated that 1.06 hectares would be directly impacted through habitat loss. As referred to in section 1.8.28 and 1.8.29, this loss comprises 0.70 ha of temporary loss and 0.36 of permanent loss. Whilst it is nearly impossible to quantify the loss of individual bristle bent plants, it is assumed that the 0.36 area proposed to be removed comprises more than 80% bristle bent, given its tendency to grow in dense tussocks.
- 6.8.40 As part of the Proposed Development's soil management plan, soil and vegetation forming part of the U3 - *Agrostis curtisii* community that would be excavated to facilitate temporary construction areas at Turbine 8 and 10 would

be sensitively stored, and reinstated upon completion of turbine construction. It is anticipated that the 0.70 ha lost temporarily would be fully restored in the short-medium term, with soils being reinstated towards the end of construction. As set out in the OBS (Volume 3 Appendix 6.6), the method of site clearance for the U3 - *Agrostis curtisii* community would include the excavation of turfs to enable translocation of bristle bent communities. Turfs from areas proposed for permanent loss would be translocated to bare ground areas during the construction phase to ensure the bristle bent community is retained.

- 6.8.41 Indirect impacts as a result of pollution incidents could lead to the alteration and degradation of the U3 - *Agrostis curtisii* community particularly in relation to areas outside of Turbine 8 and Turbine 10. Given that bristle bent is the component part of the U3 - *Agrostis curtisii* community, degradation of this community would reduce the number of bristle bent plants.
- 6.8.42 The Proposed Development's embedded measures, such as pollution prevention and other environmental best practice measures forming part of the CEMP would sufficiently reduce the potential for indirect impacts to occur. Additional measures such as Precautionary Working Methods would be implemented. These methods would be implemented to ensure accidental encroachment into sensitive habitats is avoided, and to highlight the importance of certain habitats across the Proposed Development footprint, specifically the U3 - *Agrostis curtisii* community.
- 6.8.43 Direct and indirect impacts on bristle bent are considered to be short-term and reversible.

Significance of the effect

- 6.8.44 On the basis that the sensitivity of the receptor is medium and the magnitude is low, direct impacts are expected to lead to a **minor adverse** effect in the short term, which is considered to be **not significant**.

Operational Phase

- 6.8.45 Impacts on bristle bent during the operational phase are predicted to be very low risk given that activities would be restricted to intermittent vehicular activity for the purposes of turbine maintenance. All site personnel would be briefed on the environmental best practice measures within the OEMP which would reduce the potential for pollution incidents and accidental encroachment to occur.
- 6.8.46 Following reinstatement of soils the translocation of turves supplemented by spread of collected bristle bent seed, U3 - *Agrostis curtisii* communities would have re-established at the end of the construction phase. There is also potential for further dispersal of bristle bent into other areas of disturbed ground based on this species being an early coloniser of bare ground where the soil conditions are suitable.

Significance of the effect

- 6.8.47 As there is likely to be no change in the site environment during the operational phase, it is predicted that there would be a **negligible effect**, which is **not significant**.

Bats

Construction Phase

- 6.8.48 Temporary and permanent habitat loss to accommodate turbine cranepads and access roads will be a very small proportion of suitable bat foraging habitat within the Application Boundary. The layout has been designed to avoid the most sensitive habitats and habitat loss would largely be limited to grassland and dense bracken. Therefore, there would be a negligible effect on foraging bats as a result of habitat loss during construction.
- 6.8.49 There would be no nighttime working and therefore no disturbance of bat foraging habitat or flight lines from the use of artificial lighting.
- 6.8.50 Several linear features would be affected during construction with permanent and temporary short-term loss of drystone walls and defunct species-poor hedgerows (see 6.8.47 above).
- 6.8.51 With the retention of nearby linear features within a wider network, the temporary loss of linear features would not result in significant severance of connectivity with the Application Boundary. Bats would be expected to adopt alternative flight lines using nearby retained hedges and drystone walls. The overall effect is therefore likely to be temporary displacement of bats over short distances with no loss of overall connectivity.
- 6.8.52 With the exception of Turbine 1, permanent habitat loss of linear features would comprise gaps up to 10m in width as a worst-case scenario to accommodate access roads. The gaps are likely to be gated to retain a hard boundary and continuity of the linear features. These small gaps would not create significant barriers to their use by bats for foraging or commuting.
- 6.8.53 Whilst the linear scattered scrub at Turbine 1 (approximately 0.11m) would be temporarily impacted based on the current parameters of the Proposed Development, the OBS (Appendix 3, Volume 6.4) proposes the possibility of reducing the vegetation of this habitat to limit the risk of collision. As a result, the permanent removal of 116 m of linear scattered scrub at Turbine 1 would potentially impact on bat foraging, with the partial loss of a foraging resource. Some displacement of foraging bats to nearby habitat would be expected. Surveys indicate that the species likely to be affected are common and soprano pipistrelle, noctule and *Myotis* sp. Brown long-eared and lesser horseshoe bat were both recorded rarely.
- 6.8.54 The potential impact during the construction phase would vary between species.
- Medium magnitude of impact on soprano pipistrelle (low sensitivity),

- Low magnitude of impact on common pipistrelle (low sensitivity),
- Negligible magnitude of impact on noctule (medium sensitivity),
- Low magnitude of impact on *Myotis* sp. (low sensitivity) and
- Negligible magnitude of impact on brown long-eared and lesser horseshoe (both low sensitivity).

Significance of the effect

- 6.8.55 The maximum impact would result in a negative effect predicted to be no more than **minor adverse** for all bat species, which is **not significant**.

Operational Phase

Commuting and Foraging Bats

- 6.8.56 During operation, rotating turbines would present a risk to bats foraging and commuting through areas within the Application Boundary, either through direct collision with the turbine blades, or through barotrauma (damage to the lungs caused by changes in air pressure).
- 6.8.57 The turbine locations have been designed to avoid the most sensitive habitats including those typically considered to be of high value for foraging and commuting bats such as woodland, scrub and hedgerows, and which therefore have the highest risk of collision.
- 6.8.58 The NatureScot guidance (2021) provides a calculation to determine the minimum buffer distance between the feature and the turbine base taking into account maximum rotor diameter, hub height and height of the feature. This has been used where necessary to define minimum buffers from each turbine.
- 6.8.59 Turbine 9 is close to a potential high-risk feature (a hedgerow). The buffer between the hedgerow and the turbine base will be 69m, comfortably greater than the recommended 59m buffer based on the calculation.
- 6.8.60 Turbines 2 to 11 are located over 100m from the nearest high-risk habitats which is significantly greater than the recommended buffer based on the calculation
- 6.8.61 Turbine 1 is situated adjacent to a line of scattered scrub, which, taking a precautionary approach is potentially a high-risk feature (though the feature comprises scattered bramble and bracken vegetation). The option of removing the scrub permanently to provide a minimum buffer distance has been assumed in assessing the construction impact on foraging and commuting bats at Turbine 1. With a feature height of 1.5m above ground level the buffer from the turbine base would be 58m based on the calculation in the NatureScot guidance (2021).
- 6.8.62 There remains the potential for bats to be harmed through collision or barotrauma.
- 6.8.63 Guidance published by NatureScot (2021) provides a method of quantifying collision risk based on several factors including project size, suitability of on-

site habitats, levels of bat activity at the site and the relative abundance and collision risk of different bat species.

- 6.8.64 Understanding of bat behaviour around wind turbines is limited. There is evidence of bats actively approaching wind turbines (Horn *et al.*, 2006, Cryan *et al.*, 2014) but it is not clear that this applies to all species. In the UK there is evidence for common pipistrelle being attracted to turbines in contrast to soprano pipistrelle which showed a neutral response being neither repelled nor attracted (Reason *et al.* 2021). Research suggests that most bat fatalities at UK windfarms are common pipistrelle, soprano pipistrelle and noctule bats (Mathews *et al.*, 2016).
- 6.8.65 In accordance with the NatureScot guidance (2021) the collision risk assessment has been undertaken for high collision risk species, specifically: common pipistrelle, soprano pipistrelle and noctule. All other species recorded were classed as ‘low’ collision risk.
- 6.8.66 A Habitat Risk Assessment was undertaken of each turbine location as part of the Initial Site Risk Assessment which forms part of the Collision Risk Assessment within Volume 3, Appendix 6.4 Bat Activity and Collision Risk. The Habitat Risk Assessment quantifies the habitat suitability in proximity to each proposed turbine location.
- 6.8.67 Habitat risk was assessed independently for each turbine location with ‘low’ habitat risk for Turbines 3, 5, 7, 8 10 and 11 and ‘moderate’ habitat risk for Turbines 1, 2, 4, and 9.
- 6.8.68 The Ecobat activity levels have been derived to inform the collision risk assessment and indicate relative activity compared to similar exposed onshore windfarm sites with limited features of high value for foraging and commuting bats.
- 6.8.69 The Ecobat activity levels for an upland landscape are considered to be an overestimate of activity levels compared to sites with more suitable features such as lowland grassland, woodland scrub, hedgerows and riparian habitat which is more likely to support higher levels of bat activity.
- 6.8.70 Full details of the assessment of activity levels, and site risk are provided in Volume3, Appendix 6.4 Bat Activity and Collision Risk Assessment.
- 6.8.71 The results of the assessment of relative bat activity levels compared to reference projects is shown in **Table 6.20** which gives the Ecobat activity categories for each species recorded at each turbine across all seasons.

Table 6.20 Average Ecobat activity levels across all seasons in 2024

Turbine	Common pipistrelle	Soprano pipistrelle	Nyctaloid	Nyctalus sp.	Noctule	Brown long-eared	Myotis sp.	Lesser horseshoe
1	H	H	M	L	H	M	M	L
2	H	M	M	L	H	M	M-H	L
3	M	L-M	M	L-M	H	M-H	L	L-M

4	H	M	H	H	H	M	L-M	nil
5	L-M	L-M	M-H	L-M	H	M	L	L
6	L-M	L-M	M	nil	H	M	L	nil
7	L	L	M	L	H	M	L	L-M
8	L-M	nil	H	M	H	M	L	L
9	H	M-H	M	M	H	M-H	L-M	L-M
10	L-M	L	L-M	L	H	L-M	L	L
11	M	M	L-M	L	H	M	L	L

Activity categories: L = Low, L=M = Low-moderate, M = Moderate, M-H = Moderate-high, H = High.

- 6.8.72 The Ecobat activity relative levels (High, Moderate and Low) are also based on nights when bats are recorded and therefore do not fully account for nights when bats are not active. This has been taken into account when considering the magnitude of the impact.
- 6.8.73 Common pipistrelle is considered to have a ‘high collision risk’ and an overall ‘medium population vulnerability’ to collision in Wales (NatureScot, 2021). For common pipistrelle the Ecobat activity levels were high at Turbines 1, 2, 4 and 9, moderate at Turbines 3 and 11, and low-moderate at Turbines 5, 6, 8 and 10. Across all the turbine locations common pipistrelle activity peaked in summer with much lower activity in spring and even lower activity in autumn.
- 6.8.74 Soprano pipistrelle is considered to have a ‘high collision risk’ and an overall ‘medium population vulnerability’ to collision in Wales (NatureScot, 2021). For soprano pipistrelle Ecobat activity levels were high at Turbine 1, moderate-high at Turbine 9, moderate at Turbines 2, 4 and 11, low-moderate at Turbines 3, 5 and 6 and low at Turbines 7 and 10. Soprano pipistrelle was not recorded at Turbine 8.
- 6.8.75 For noctule, Ecobat activity categories were high at all locations. Noctule is considered to have a ‘high collision risk’ and an overall ‘high population vulnerability’ to collision in Wales (NatureScot, 2021).
- 6.8.76 Brown long-eared is considered to have a ‘low collision risk’ and an overall ‘low population vulnerability’ to collision in Wales (NatureScot, 2021). Brown long-eared was detected at all turbine locations with Ecobat activity levels of moderate-high at Turbines 3 and 9, moderate at Turbines 1, 2, 4, 5, 6, 7 and 11, and low-moderate at Turbine 10.
- 6.8.77 *Myotis* sp. (all species) are considered to have a ‘low collision risk’. Their population vulnerability to collision in Wales differs between species. Daubenton’s and Natterer’s bats have an overall ‘low population vulnerability’, while Brandt’s and Whiskered bat have an overall ‘medium population vulnerability’ to collision in Wales (NatureScot, 2021). *Myotis* bats were recorded at all turbine locations with moderate-high activity at Turbine 2,

moderate activity at Turbine 1, low-moderate activity at Turbines 4 and 9, and low activity at Turbines 3, 5, 6, 7, 8, 10 and 11.

6.8.78 Lesser horseshoe bats are considered to have a ‘low collision risk’ and an overall ‘low population vulnerability’ to collision in Wales (NatureScot, 2021). Lesser horseshoe bat was recorded very rarely at proposed turbine locations with low-moderate activity at Turbines 3, 7 and 9, low activity at Turbines 1, 2, 5, 8, 10 and 11, and no activity at Turbines 4 and 6.

6.8.79 A summary of the collision risk assessment for high collision risk species is given in **Table 6.21**.

Table 6.21 Summary of bat collision risk assessment for high collision risk species (following guidance by NatureScot, 2021).

Turbine	Site Risk	Pipistrelle (Common)		Pipistrelle (Soprano)		Noctule	
		Activity Level	Overall Risk	Activity Level	Overall Risk	Activity Level	Overall Risk
1	Medium (3)	H (5)	High (15)	H (5)	High (15)	H (5)	High (15)
2	Medium (3)	H (5)	High (15)	M (3)	Medium (9)	H (5)	High (15)
3	Low (2)	M (3)	Medium (6)	L-M (2)	Low (4)	H (5)	Medium (10)
4	Medium (3)	H (5)	High (15)	M (3)	Medium (9)	H (5)	High (15)
5	Low (2)	L-M (2)	Low (2)	L-M (2)	Low (4)	H (5)	Medium (10)
6	Low (2)	L-M (2)	Low (4)	L-M (2)	Low (4)	H (5)	Medium (10)
7	Low (2)	L (1)	Low (2)	L (1)	Low (2)	H (5)	Medium (10)
8	Low (2)	L-M (2)	Low (4)	NIL	NIL (0)	H (5)	Medium (10)
9	Medium (3)	H (5)	High (15)	M-H (4)	Medium (12)	H (5)	High (15)
10	Low (2)	L-M (2)	Low (4)	L (1)	Low (2)	H (5)	Medium (10)
11	Low (2)	M (3)	Medium (6)	M (3)	Medium (6)	H (5)	Medium (10)

Significance of effect

6.8.80 In the absence of additional mitigation, the potential impact on each species is set out below.

6.8.81 The sensitivity of both pipistrelle species is low and the magnitude of the impact is considered to be high. As a result, the effect is predicted be up to **moderate adverse**, which is considered to be **significant**.

6.8.82 For noctule which has a high population vulnerability in Wales (NatureScot, 2021). The sensitivity of noctule is medium and the magnitude of the impact is high. The effect would be up to **major adverse** significance, which is considered to be **significant**.

- 6.8.83 The *Myotis* sp. relevant to the Application Boundary have low population vulnerability. *Myotis* sp. have low sensitivity, and the magnitude of the impact is predicted to be low. The effect would be no more than **minor adverse**, which is considered to be **not significant**.
- 6.8.84 Both brown long-eared and lesser horseshoe bat have low population vulnerability. The sensitivity of both species is low and the magnitude of the magnitude of impact is also predicted to be low. As a result, it is predicted that the effect would be up to no more than **minor adverse**, which is **not significant**.
- 6.8.85 Further mitigation is proposed alongside the embedded mitigation to minimise potential impacts on bats from turbine operation. A summary of measures are provided in the OBS (Volume 3, Appendix 6.6), but in summary would comprise the following measures.
- 6.8.86 At all turbines the blades would be feathered while idling (blades would be pitched parallel to the wind direction to reduce rotation speed below 2 rpm), which has been shown to reduce fatality rates by up to 50% compared to normal idling (NatureScot, 2021).
- 6.8.87 At turbines with high collision risk for at least one species (Turbines 1, 2, 4 and 9), smart curtailment would be employed in the first season with turbine blades curtailed between May and September where the conditions are suitable for bat commuting and foraging activity, (10° C or higher and wind speed of less than 6 m/s at nacelle height).
- 6.8.88 For all subsequent seasons at Turbines 1, 2, 4 and 9, acoustic monitoring systems would be employed. These would automatically detect bat activity and relay this information to the automated turbine control system to curtail turbine rotation when bat activity is detected. The curtailment regime would be agreed with BCBC and Natural Resources Wales but would be likely to entail the use of acoustic monitoring systems from before sunset to sunrise between May and October inclusive.
- 6.8.89 Potential impacts on foraging and commuting bats would be monitored in the first three years of operation to assess the effectiveness of curtailment. Monitoring would follow NatureScot guidance (2021) with remote static recording in spring, summer and autumn at high risk turbine locations. Casualty searches would also be undertaken alongside the remote static recording.

Additional mitigation and residual effect

- 6.8.90 The proposed curtailment regime is expected to significantly reduce the number of fatalities of all bat species. Monitoring and when necessary, refinement of the curtailment regime would ensure potential impacts are minimised. In this context the impact at the population level for all bat species would be permanent, adverse and of no more than low magnitude.
- 6.8.91 For common pipistrelle, soprano pipistrelle and noctule it is considered curtailment would be sufficiently robust to ensure the magnitude of impact is

low, which would lead to no more than a **minor adverse** effect and **not significant**.

- 6.8.92 For all other bat species which are not predicted to experience a significant effect, it is considered curtailment would reduce the magnitude of the impact to negligible, resulting in no more than a **negligible effect** which is **not significant**.

Otter

Construction phase

- 6.8.93 No signs or evidence of otter was identified during the field surveys undertaken within the Application Boundary. Whilst it is anticipated that the construction phase would remove a proportion of the habitats within the Application Boundary, these habitats are sub-optimal for otter and are unlikely to be relied upon by otter populations. Suitable habitats are located along the northern and southern limits of the Application Boundary and would be largely protected from direct impacts, with the exception of a relatively minor area of Wern Tarw Woodland.
- 6.8.94 Though it is acknowledged that Wern Tarw Woodland/Nant Ton-y-Groes, Nant Crymlyn and Nant Cwm-Llwyd provide suitable habitats for otter, there is an abundance of better suited aquatic and associated terrestrial habitat within and along larger watercourses to the north and west of the Application Boundary (e.g. Ogmore River and Ogwr Fach). Otters have sizeable home ranges as identified in the Ecology of the European Otter (Chanin, 2003) covering 25 – 50 km of river channels. The Ogmore River and Ogwr Fach are more likely to support resting places and provide greater foraging resource than the headwaters and terrestrial habitat in proximity to the Proposed Development footprint.
- 6.8.95 Noise, vibration and visual disturbance could disturb otter from using both terrestrial and aquatic habitat along the edges of the Application Boundary. This includes construction related activities at Turbine 1, Turbine 7 and the haul road.
- 6.8.96 Disturbance could lead to otters abandoning any newly created resting places or natal dens within woodland habitats in proximity to Nant Crymlyn, Nant Cwm-Llwyd and Wern Tarw Woodland. Though, these wooded areas are more than 300 m from the Proposed Development footprint (with the exception of Wern Tarw Woodland) and are unlikely to be significantly disturbed. Should otters use wooded features within Wern Tarw Woodland, it is likely that they would inhabit wooded features in the north west, proximal to Nant Ton-y-Groes. Moreover, as otters are largely nocturnal animals (Roos et al., 2015) movements are unlikely to coincide with construction related activities given that construction is to take place within daylight hours.
- 6.8.97 Embedded mitigation such as pollution prevention measures would prevent pollution incidents and run off into the watercourses within the Application Boundary. Additionally, remedial measures to intercept chemical spills and

sensitive soil management to appropriately store soil away from watercourses would sufficiently mitigate indirect impacts on otter. Any disturbance to otter would be short-term.

Significance of the effect

- 6.8.98 On the basis that the sensitivity of the receptor is low and the magnitude of the impact is predicted to be low, it is assessed that construction related impacts would lead to a **negligible effect** on otter, which is **not significant**.

Operational phase

- 6.8.99 No direct impacts on otters are anticipated as a result of the operational phase. Noise and visual stimuli such as vehicular activity for the purposes of turbine maintenance could lead to the disturbance of commuting and foraging otters, though given that maintenance is likely to take place in the day and would be restricted to turbine locations and access tracks only, otters are unlikely to be affected. Otters are less likely to use habitats in proximity to turbines and so noise disturbance is unlikely to be of a magnitude that would significantly affect the conservation status of the otter in the local area. Moreover, all turbines are more than 500m away from Ogmore River and Ogwr Fach, which are key areas of aquatic habitat for otter within Bridgend.
- 6.8.100 All site personnel would be briefed on the measures included within the OEMP to ensure pollution incidents are avoided.

Significance of the effect

- 6.8.101 On the basis that the sensitivity of the receptor is low and the magnitude of the impact is low, it is assessed that there would be a **negligible effect** on otter which is **not significant**.

Dormouse

Construction phase

- 6.8.102 Dormouse presence was confirmed in Wern Tarw Woodland as part of dormouse surveys undertaken in 2024. An occupied dormouse nest was recorded in a tube in the north of Wern Tarw Woodland with an adult and a juvenile recorded. An empty nest was recorded within a tube in the south of the woodland, on the woodland edge. As a result, dormice are assumed to be present throughout the woodland.
- 6.8.103 Whilst the proposed haul road occupies a relatively small area within the Application Boundary, the construction activities could lead to the direct injury and/or mortality of dormice. Construction activities could also lead to the destruction and/or damage to resting places as a result of earthworks and vegetation removal. This would include impacts to both summer and hibernating dormice. Dormice could also be indirectly impacted as a result of the transport of turbines, and other anthropogenic disturbance such as the

presence of site clearance personnel. It is predicted that direct impacts would be short-term, with effects lasting no more than one breeding season and would be fully reversible.

6.8.104 Direct habitat loss as a result of the haul road is estimated to lead to the permanent loss of 0.2 ha of suitable woodland habitats, though this would include both woodland and woodland edge habitat, along the existing track.

6.8.105 Dormouse populations would be temporarily displaced into adjacent suitable habitat in the short-term. There is plenty of habitat suitable for displaced dormouse individuals in the wider Wern Tarw Woodland and connected woodland to the south east of the Application Boundary. Given that dormice are known to live in low densities, it is likely that relatively low numbers of dormice are present within Wern Tarw Woodland. It is also likely that the population of dormice commuting, foraging and breeding within Wern Tarw Woodland would also utilise habitats in the wider landscape. Given the relatively small area of suitable habitat to be lost, displacement of dormice would not cause an impact on the carrying capacity of habitats outside of Wern Tarw Woodland, as displaced individuals are likely to stay within the woodland. As per the dormouse conservation handbook, second edition (Bright, P., Morris, P. and Mitchell-Jones, 2006) 50 dormice per nine ha of woodland is considered to be well within the carrying capacity of woodland habitats.

6.8.106 Tertiary mitigation in the form of an EPS licence would ensure a sensitive and sympathetic approach is taken to construction of the haul road, including timing of the cutting back of vegetation outside of peak breeding period and timing the excavation and disturbance of the woodland soils outside the hibernation season. Timing the vegetation clearance outside of these periods would reduce impacts to breeding success and ensure the long-term favourable conservation status of the dormouse is maintained. All clearance works would be supervised by an Ecological Clerk of Works (ECoW).

Significance of the effect

6.8.107 On the basis that the sensitivity of the receptor is medium and the magnitude of the impact is predicted to be low, and taking into account the implementation of species protection, it is assessed that construction related impacts would lead to a **minor adverse** effect on dormice, which is considered to be **not significant**.

Operational phase

6.8.108 Direct impacts on dormouse during the operational phase would be restricted to the activities associated with the conservation management of Wern Tarw Woodland. As set out in the OBS (Volume 3, Appendix 6.6), woodland management and restoration to include selective thinning, coppicing and invasive species control would be implemented across the Applicant's landholding. These measures could lead to the mortality and/or injury of dormouse individuals and the damage and/or destruction of nests, ultimately bringing about the decline in the local population of dormouse. Additionally,

indirect impacts such as increased footfall and noise and visual impacts could lead to the disturbance and displacement of dormouse individuals within the woodland.

- 6.8.109 As part of the EPS licence for dormice, the conservation management of Wern Tarw Woodland would be undertaken sympathetically to ensure the conservation status of the dormouse is maintained. This would include timing the conservation management to appropriate periods as set out in section 1.8.60, such as outside the peak breeding period and prior to hibernation. Dependent on the type of measure, the methodology and area in which the measures is implemented, conservation management timing could be relaxed where it is assessed that effects on dormice are considered to be minor or negligible. The impacts from conservation management would be long-term. Whilst effects would be adverse in the immediate short-term, they would become beneficial in the medium-long term.

Significance of the effect

- 6.8.110 On the basis that the sensitivity of the receptor is medium and the magnitude of the impact is low, it is assessed that there would be a **minor beneficial** effect on dormice that is considered **not significant**.

Reptiles

Construction phase

- 6.8.111 Whilst no reptile surveys have been undertaken, it is assumed that based on the desk study data and habitats within the Application Boundary reptiles could be present within the Application Boundary. Reptiles could potentially make use of tussocky acid grassland habitats, acid grassland/bracken mosaics, dwarf shrub heath and wetland habitats. These habitats provide opportunities for basking, foraging, commuting.
- 6.8.112 Vehicular movement, bracken clearance and earthworks during the construction phase, has the potential to lead to the mortality and/or injury of reptiles. This would include areas around Turbines 3, 5, 6, 7, 8, 10 and 11 and associated access tracks. Earthworks and site clearance would also reduce the availability of suitable reptile habitat within the Application Boundary disturbing and displacing individuals. Though, this would be limited to acid grassland and acid grassland/bracken mosaics only as dwarf shrub heath and wetland habitats would be avoided.
- 6.8.113 The resulting effects of construction activities would be avoided and mitigated as part of embedded measures, as set out in the OBS (Volume 3, Appendix 6.6). This would include sensitive clearance strategies (including timing) and good housekeeping (appropriate site close down at the end of each day). Excavations in areas proximal to the turbines referred to above would take place outside of the hibernation period. Vegetation clearance would be subject to hand searching by an ECoW before being subject to a two-stage cut. This would allow reptiles to move out of the area should they be present. Where

practicably possible, vegetation clearance would be undertaken outside of the nesting bird season. These measures would be included within a Precautionary Method of Works Document forming part of a CEMP.

- 6.8.114 Whilst construction activity and habitat loss would lead to the displacement of reptiles in the short-term, they would be displaced into adjacent suitable habitat. There is plenty of suitable habitats and features for reptiles outside of the Proposed Development footprint, within the Application Boundary. Additionally, all suitable habitats lost as a result of construction would be reinstated in the short-medium term.

Significance of the effect

- 6.8.115 On the basis that the sensitivity of the receptor is low and the magnitude of the impact is low, it is predicted that there would be a **negligible effect** on reptiles, which is **not significant**.

Operational phase

- 6.8.116 Impacts on reptiles during operation would largely be restricted to the habitat restoration measures, specifically the control of bracken dominated habitats. Bracken control could lead to mortality and /or injury of reptiles. Additionally, bracken control and its restoration to acid grassland could lead to the displacement of reptiles.
- 6.8.117 Bracken control would be far less intrusive than earthworks associated with the construction stage and would be undertaken in stages which would enable reptiles to move away from the area. Moreover, bracken control would be targeted to selected areas of dense vegetation. Whilst bracken could offer opportunities for reptiles, dense stands covering large areas are unlikely to be used frequently. Bracken control is expected to be carried out over a long-term period (i.e. several years), it would be eventually open acid grassland habitats and new mosaics for reptiles to bask and forage, introducing increased diversity to the Mynydd y Gaer common.
- 6.8.118 All bracken control would be undertaken sympathetically to ensure the risk to reptiles is reduced.

Significance of the effect

- 6.8.119 On the basis that the sensitivity of the receptor is low and the magnitude of the impact is negligible, it is predicated that there would be a **negligible effect** on reptiles, which is **not significant**.

Grassland Fungi

Construction phase

- 6.8.120 The main impact pathway between grassland fungi and the Proposed Development is the localised loss of grassland as a result of turbine installation and access track construction. Excavation of Grassland soils would lead to the

disturbance, degradation and damage of mycelium, and ultimately fungal death. Whilst the Proposed Development design has avoided key areas of grassland fungi as far as practicable through the siting of turbines and access tracks away from suitable habitats, a relatively small proportion of the total extent of habitat supporting the fungal assemblage would be lost. Whilst this would lead to damage to mycelium within the soil, it would not lead to the loss of a particular species from the Application Boundary. Whilst the resilience of mycelium in CHEGD species has not been widely studied, the individual tubular cells of fungal mycelium (hyphae), particularly of *Agaricomycetes*⁹ possess repair and damage control properties (Porter and Naleway, 2022).

- 6.8.121 To combat the disturbance and damage to mycelium within soils at turbine locations and access tracks, a soil management and resource plan would be prepared as part of the Proposed Development, as referred to in the OBS (Volume 3, Appendix 6.6). This would include sensitive handling and storage of topsoil (and subsoil, where appropriate) from turbine locations and excavation of turves to be translocated, primarily areas of grazed acid grassland along the access tracks. Turf would be handled sensitively, and contamination of the excavated turfs would be restricted as far as practicably possible, though it is acknowledged that the soil chemistry may be altered following excavation and receptor sites (for storage) would be partly disturbed. Taking stuff off-site for storage would lead greater risk to the mycelium within the soil.
- 6.8.122 Whilst turf translocation for grassland fungi has not been widely implemented or studied, evidence suggests that there are opportunities for translocation to be effective if done appropriately. A study published in 2022 studying the before and after results of translocated turf indicated that overall CHEGD fungi had declined and other non-CHEGD fungi had colonised (Detheridge and Griffith, 2022), though waxcap species remained in the soil. The translocated turf had remained ex-situ for a minimum of 30 months. The study concluded with recommendations of honing storage techniques, reducing the storage time of soil ex-situ and maximising the amount of turf to be translocated for future translocation.
- 6.8.123 Given that soil reinstatement at the Proposed Development would likely take place from 12-14 months after construction begins, CHEGD fungi in stored soil would be ex-situ for 50% less time than the translocation study referred to in 1.8.76. Soil excavated from turbines, would be reinstated in proximity to turbines, near their original locations.
- 6.8.124 Additionally, alteration and degradation of habitats outside of the Proposed Development footprint could occur as a result of construction activity from machinery encroaching into neighbouring habitats. Marked tracks would ensure vehicles do not move into adjacent habitats, and there would be promotion of the awareness of the sensitivity of these habitats and the

⁹ Largely comprising 'mushroom' fungi and allies

implementation of working methods designed to reduce the extent of soil disturbance.

Significance of the effect

- 6.8.125 On the basis that the sensitivity of the receptor is high and the magnitude of the impact is medium, it is assessed that there would be a **moderate adverse** effect, which is **significant**.

Additional mitigation and residual effect

- 6.8.126 Whilst the sensitive handling of fungi would aim to reduce the disturbance to mycelium across the Proposed Development footprint, it is acknowledged that soil damage at some turbine locations, would lead to the loss of the fungal resource permanently, though as previously stated, this would not mean loss of a species. To mitigate the loss of areas supporting CHEGD fungi, long term bracken control would be implemented in selected areas within the Application Boundary. The bracken control would be twofold, to reinstate permanently lost grassland habitats and to restore the landscape back to acid grassland in the long term, with the aim of creating and maintaining the conditions required for CHEGD fungi to proliferate. Manual control of bracken would then open up grassland for grazing animals, which would enable the vascular plant layer to develop. The effect would be experienced in the long-term given that some CHEGD species can take many years to colonise an area.
- 6.8.127 Taking the additional mitigation into account, it is assessed there would be a **minor adverse** residual effect, which is **not significant**.

Operational phase

- 6.8.128 Whilst no further negative impacts to soil would occur as a result of operation, alteration and degradation could occur during maintenance activity. However, with the OEMP in place, including awareness of maintaining soil integrity in neighbouring habitats, it is unlikely that maintenance operations would directly or indirectly impact grassland fungi.
- 6.8.129 In the long-term, areas of controlled bracken would allow acid grassland to be restored and grazed, increasing the potential for CHEGD fungi to proliferate. Whilst studies indicate that fungi can take multiple decades to colonise an area, it is predicted that mycelium already present in the soil would readily colonise new areas of acid grassland.

Significance of the effect

- 6.8.130 On the basis that the sensitivity of the receptor is high and there would be no change in the short-medium term, it is assessed that there would be a **negligible** effect on grassland fungi, with a **minor beneficial** effect experienced in the long-term, considered to be **not significant**.

Future monitoring

6.8.131 The future monitoring proposed as part the assessment of Terrestrial Ecology chapter is set out in **Table 6.22** below.

Table 6.22 Future monitoring commitments

Measure adopted	How the measure will be secured
Pre-construction and post-development surveys for bats	Secured through a condition of the DNS
Monitoring of the dormouse population within Wern Tarw Woodland	Secured through a European Protected Species licence from Natural Resources Wales
Monitoring of proposed habitat restoration measures within Wern Tarw Woodland	Secured through a condition of the DNS
Monitoring of proposed bracken management areas (for acid grassland and grassland fungi)	Secured through a condition of the DNS

6.8.132 A summary of the outline monitoring measures at the current stage are set out in the OBS (Volume 3, Appendix 6.6).

6.9 Cumulative Effects

6.9.1 The assessment of cumulative effects for Terrestrial Ecology has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. As part of the assessment, all moderate-large scale operational, recently consented and recently submitted energy developments were considered. This includes wind energy schemes over three turbines and solar developments ranging from 10 MW upwards. Where a plan or project has not been subject to EIA, or impact assessment information is not available it has not been considered as part of the cumulative effects assessment.

6.9.2 Guidance states that assessments should focus on the most significant cumulative impacts and conclude with a clear assessment of those which are likely to influence decision making. As a result, any wind farm developments of fewer than three turbines (small scale wind energy proposals) were excluded from the cumulative assessment. This is due both to the lack of quantitative environmental information which usually exists in the public domain for such small-scale developments, and also due to the low likelihood that significant adverse effects would be predicted.

6.9.3 The basis for which cumulative effects are assessed depends upon the ecology of the species or habitat considered. Bats are most prone the effects posed by additional wind farm developments due to the distances travelled by select species (typically up to 10 km) and the cumulative risks to bat assemblages as a result of collision with wind turbines. Best practice measures regarding buffer distances of turbines from woodland edges to minimise impacts on commuting and foraging bats reduces the potential for a cumulative impact to occur.

-
- 6.9.4 Only the potential for significant cumulative operational effects upon bat species are considered within this assessment. The potential for the Proposed Development to contribute to significant cumulative effects upon all other ecological receptors is not considered likely, due to short term nature of construction works, intermittent activity during operation and maintenance, and the measures adopted as part of the OBS (Volume 3, Appendix 6.6).
- 6.9.5 As per NatureScot guidance (2021) a review of available EIA information for other wind energy schemes located within 10km of the Proposed Development site is set out in **Table 6.23** below.

Table 6.23 List of other large scale energy projects considered within 10 km

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Headline Summary and Assessment of Effects
Headwind Taf Ely	Operational	1.07	A seven turbine wind farm with a tip height of 110	<p>The most abundant species recorded during activity surveys was of common pipistrelle which accounted for more than 60% of calls during the static recording. Low numbers of <i>Nyctalus</i> sp. were encountered and a single lesser horseshoe call was identified.</p> <p>The bat survey work presented in the ES confirms that during that low levels of bat activity were recorded for all species identified. Given the low levels of activity and the exposed landscape of the development site the overall effects on bat species were assessed as negligible and not significant.</p>
Taf Ely	Operational	1.16	A 20 turbine wind farm with a tip height of 54	<p>The overall assessment indicated that bats would experience limited impacts as a result of the scheme. It was noted that serotine, noctule and soprano pipistrelle were present in a roost in the woodland adjacent to the development site. As a result of limited impacts which were not considered significant, no operational mitigation was designed for the scheme. This was based on bat foraging habitat preference and low levels of bat activity across the site.</p>

Mynydd Portref	Operational	1.70	An 11 turbine wind farm with tip heights of 75m and 86m	The results of bat surveys presented in the development's ES confirms that during the survey season bat activity was restricted to relatively low levels (made up of 4 species). The ES concluded that no significant effects on bats would result and no operational mitigation was designed.
Tyn y Waun Solar	Awaiting Construction	2 km	40MW solar park and ancillary development	Bats were scoped out of the ES. As a result, a cumulative assessment cannot be undertaken for this scheme.
Pant y Wal Pant y Wal Extension Fforch Nest Wind Farm Pant y Wal Second Extension	Operational	3.80 4.49 4.43	A series of wind farm schemes that have been extended: A 10 turbine wind farm with a tip height of 115m A 12 turbine wind farm with a tip height of 125 A four turbine wind farm with a tip height of 115m A two turbine wind farm with a tip height of 125 m	The wind turbines for Pant y Wal and its associated extensions are located in Bridgend's uplands. Relatively low activity was recorded at the site in 2014 as part of the Pant y Wal Extension, with only three species recorded. The assessment concluded that no significant effects were anticipated on bats as result of collision risk and barotrauma. The second extension recorded relatively low activity levels for most of the site, with the exception of a static detector referred to as Static Detector D. More than 4000 calls were registered by common pipistrelle. Static Location D was positioned along the edge of a coniferous woodland. No ES was undertaken for the second extension. No operational mitigation was required for collision risk.

Mynydd y Glyn	Awaiting Construction	6.98	A seven turbine wind farm with a tip height of 115m	Common pipistrelle was the most abundant species recorded during activity surveys. Common pipistrelle calls equated to 88 percent of all bat passes (5.94 passes per hour on average). The collision risk assessment for the scheme concluded that the overall assessment for all seven turbines was low for all high risk species. The ES predicted that there would be negligible effects on county bat populations. Mitigation in the form of feathering of turbines was proposed at all seven turbines.
Court Colman Solar Park	Operational	8 km	20 MW solar park Inc. Switchroom, Fencing & Cameras, Landscaping & Assoc. Works	Potential for impacts on bats were considered unlikely, with a residual impact of negligible to positive. The assessment concluded that there would be no impacts on bat habitats.
Upper Ogmore Wind Farm	Operational	8.33	A seven turbine wind farm with a tip height of 150m	Relatively low activity levels of Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle, noctule, Leisler's bat and serotine were recorded during surveys in 2019. The overall risk to all species of bat recorded was assessed as low. All turbines will be feathered to reduce rotation speed while idling as a precaution. No significant effects on bats were predicted.

Llynfi Afan Renewable Energy	Operational	9.25	A 12 turbine wind farm with a tip height of 118 m	<p>The activity surveys which were undertaken over the course of four years recorded a relatively low number of bats, with common and soprano pipistrelle, noctule and <i>Myotis</i> sp recorded. Transect surveys concluded that only one commuting corridor was apparent which was used more frequently than other habitats. Other habitats were open and exposed.</p> <p>No collision risk was undertaken for the scheme but low risk of harm to bats was concluded. Final scheme design adopted 50m turbine buffer from edge of forestry plantations, with areas where high levels of bats would be avoided. The ES predicted that there would be a slight adverse effect (not significant) on bats due to the presence of noctule and as a result, operational mitigation did not form part of the assessment. All other impacts and effects were considered to be negligible on bats.</p>
------------------------------	-------------	------	---	---

Cumulative effects assessment

- 6.9.6 As a result of changes in site conditions, survey data and weather patterns, direct comparison of bat survey results from different wind energy schemes is challenging. Where studies on bats at wind energy schemes within 10km of the Proposed Development have been completed they report fairly similar outcomes.
- 6.9.7 *Pipistrellus* sp. are referenced as the species with highest activity levels. Low activity is usually recorded in areas where habitat features are sub-optimal, whilst localised areas of the development sites experienced greater levels of activity, usually aligned to features that are typically favoured by commuting and foraging bats, specifically wooded features, hedgerows and watercourses.
- 6.9.8 Cumulative wind energy schemes and their bat survey outcomes within 10km of the Proposed Development indicates that bat activity across the South Wales uplands is relatively low, with collision risk reported as being low. It is clear that most, if not all bat features (considered to be of value) have been avoided as part of the turbine layouts based on survey data and risk assessments (where available). There are no reported significant residual effects on bats and overall effects on bat species listed in Table 19. Effects were either assessed as low or negligible and not significant for the windfarms in isolation or in combination with other developments.
- 6.9.9 Taf Ely, Taf Ely Headwind and Mynydd Portref pose the greatest risk of cumulative effects on bats in combination with the Proposed Development given their large numbers of turbines and proximity to the Application Boundary. Whilst Jones et al. (2009) reports that loss or modification of flight paths (barrier effects) have not been identified at consented wind farms, the primary cumulative effects of multiple wind farms are considered to be increased collision risk.
- 6.9.10 The impact assessment for the Proposed Development has concluded that operational impacts on bats could give rise to significant effects on bats in the absence of additional mitigation. Whilst embedded mitigation has ensured that all turbines (except for Turbine 1) are more than 50 m away from key habitat features, a curtailment scheme has been proposed to avoid collisions with select turbines and prevent significant residual effects. The curtailment scheme would cover those turbines where the collision risk for high-risk species has been assessed as high.
- 6.9.11 the Taf Ely, Taf Ely Headwind and Mynydd Portref windfarms identified relatively low levels of bat activity across a much smaller species assemblage and vastly open landscapes. The assessments concluded that the risk of collision was low. Moreover, the curtailment scheme as set out in the OBS (Volume 3, Appendix 6.6) would sufficiently mitigate the impacts of collision at the Proposed Development. Given the above, it is predicted that there would be no significant adverse effects as a result of cumulative impacts. Whilst the impact may remain minor adverse, it is not considered significant.

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 ecological effects, mitigation and monitoring

Important Ecological Feature and predicted effect	Phase ^a C O	Predicted Effects	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effects (following further mitigation)	Proposed monitoring
Blackmill Woodlands SAC	✓		C: Negligible	High	Negligible	N/A	None	
Blaencrymlyn SINC	✓		C: Negligible	Medium	Negligible	N/A	None	
Wern Tarw Woodland PAWS	✓ ✓	C: Permanent habitat loss C: Alteration and/or degradation of features	C: Medium	Medium	Moderate adverse, significant	Conservation Management of Woodland	C: Minor adverse, not-significant	Monitoring of restoration measures
		O: Alteration and/or degradation of features O: Woodland restoration	O: Medium		Moderate beneficial, significant	No additional mitigation beyond the proposed conservation management	O: None	As above
Wet Heath	✓ ✓	C: Alteration and/or degradation C: Regeneration of vegetation	C: Low	Medium	Minor beneficial, not significant	N/A	C: None	

			O: Regeneration of vegetation	O: medium		Moderate beneficial, N/A significant		O: None	Monitoring the success of wet heath restoration proposals
Acid Grassland	✓ ✓	C: Temporary and permanent loss	C: Low	Low		Negligible, not significant	N/A	C: None	
		O: Restoration of former acid grassland	O: Low			Minor beneficial, not significant	N/A	O: None	Monitoring of acid grassland restoration
Bristle Bent	✓ ✓	C: Habitat loss	C: Low	Medium		Minor adverse, not significant	N/A	C: None	As above
		C: Alteration and/or degradation							
		O: Alteration and / or degradation	O: No change			Negligible, not significant	N/A	O: None	
Commuting and Foraging Bats – Soprano pipistrelle	✓ ✓	C: Partial habitat loss of linear features	C: Medium	Low		C: Minor adverse, not significant	N/A	C: None	None
		O: Collision risk with turbines	O: High	Low		O: Moderate adverse, significant	Smart curtailment in year 1 followed by acoustic monitoring controlled	O: Minor adverse, not significant	Monthly recording at turbine locations.

						curtailment in subsequent years			
Commuting and Foraging Bats – Common pipistrelle	✓	✓	C: Partial habitat loss of linear features	C: Low	Low	C: Minor adverse, not significant	N/A	C: None	None
			O: Collision risk with turbines	O: High	Low	O: Moderate adverse, significant	Smart curtailment in year 1 followed by acoustic monitoring controlled curtailment in subsequent years	O: Minor adverse, not significant	Monthly recording at turbine locations.
Commuting and Foraging Bats – Noctule	✓	✓	C: Partial habitat loss of linear features	C: Negligible	Medium	C: Minor adverse, not significant	N/A	C: None	None
			O: Collision risk with turbines	O: High	Medium	O: Major adverse, significant	Smart curtailment in year 1 followed by acoustic monitoring controlled curtailment in subsequent years	O: Minor adverse, not significant	Monthly recording at turbine locations.
	✓	✓	C: Partial habitat loss of linear features	C: Low	Low	C: Minor adverse, not significant	N/A	C: None	None

Commuting and Foraging Bats – *Myotis* sp.

O: Collision risk with turbines	O: Low	Low	O: Minor adverse, not significant	No targeted mitigation for <i>Myotis</i> sp. but smart curtailment in year 1 followed by acoustic monitoring controlled curtailment in subsequent years	O: Negligible, Monthly recording not significant at turbine locations.
---------------------------------	--------	-----	-----------------------------------	---	--

Commuting and Foraging Bats – Brown long-eared

✓ ✓ C: Partial habitat loss of linear features	C: Negligible	Low	C: Negligible, not significant	N/A	C: None None
O: Collision risk with turbines	O: Low	Low	O: Minor adverse, not significant	No targeted mitigation for brown long-eared but smart curtailment in year 1 followed by acoustic monitoring controlled curtailment in subsequent years	O: Negligible, Monthly recording not significant at turbine locations

✓ ✓ C: Partial habitat loss of linear features	C: Negligible	Low	C: Negligible, not significant	N/A	C: None
--	---------------	-----	--------------------------------	-----	---------

Commuting and Foraging Bats – Lesser horseshoe

		O: Collision risk with turbines	O: Low	Low	O: Minor adverse, not significant	No targeted mitigation for lesser horseshoe but smart curtailment in year 1 followed by acoustic monitoring controlled curtailment in subsequent years	O: Negligible effect, not significant	Monthly recording at turbine locations
Otter	✓ ✓	C: Disturbance from visual stimuli	C: Low	Low	C: Negligible, not significant	N/A	C: None	
		O: Disturbance from visual/aural stimuli	O: Low		O: Negligible, not significant	N/A	O: None	
Dormouse	✓ ✓	C: Mortality/injury	C: Low	Medium	C: Minor adverse, not significant	N/A	C: None	Monitoring requirements as per EPS licence
		C: Disturbance from acoustic / visual / aural stimuli						
		O: Disturbance from visual/aural stimuli	O: Low		O: Minor beneficial, not significant	N/A	O: None	As above

			O: Increase in habitats suitable for foraging and nesting						
Reptiles	✓ ✓	C: Mortality/injury	C: Low	Low	C: Negligible, not significant	N/A	C: None	Monitoring of acid grassland restoration	
		C: Disturbance / displacement							
		O: Mortality/injury	O: Low		O: Negligible, not significant	N/A	O: None		
		O: Disturbance / displacement							
Grassland Fungi	✓ ✓	C: Permanent habitat loss	C: Medium	High	C: Moderate adverse, Significant	Bracken control of select areas to restore soil conditions for increased grassland fungi colonisation	C: Minor adverse, not significant	Monitoring acid grassland restoration to ascertain fungal diversity	
		C: Alteration and/or degradation of suitable habitat							
		O: Alteration and/or degradation of suitable habitat	O: Low		O: Negligible in the short-medium term, minor beneficial, not significant in long-term	Bracken control of select areas to restore soil conditions for increased grassland fungi colonisation	Minor beneficial, not significant	As above	
		O: Restoration of better soil conditions							

^a C=construction, O=operational and maintenance

6.11 References

- Bosanquet, S. D. S., Ainsworth, A. M., Cooch, S.P., Genney, D. R. & Wilkins, T. C. 2018. Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 14 Non-lichenised Fungi. JNCC, Peterborough. British Standard (2012). BS 5837:2012: Trees in Relation to Design, Demolition and Construction – Recommendations.
- Bat Conservation Trust (2018) State of The UKs Bats 2017. Bat Conservation Trust, London.
- Bat Conservation Trust (2024) National Bat Monitoring Programme Annual Report 2023. Bat Conservation Trust, London.
- British Standard (2013) BS 42020:2023 Biodiversity: Code of Practice for Planning and Development.
- Bright, P., Morris, P. and Mitchell-Jones, T (2006) The dormouse conservation handbook. Second Edition. English Nature.
- CIEEM (2017) Guidelines for Preliminary Ecological Appraisal, 2nd edition. Chartered Institute of Ecology and Environmental Management, Winchester.
- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.3. Chartered Institute of Ecology and Environmental Management, Winchester.
- CIEEM. (2019). Advice Note on the Lifespan of Ecological Reports and Surveys. CIEEM. (2020). Guidelines for Accessing, Using and Sharing Biodiversity Data in the UK. 2nd Edition. Chartered Institute of Ecology and Environmental Management. Winchester, UK.
- CIEEM. (2020). Guidelines for Accessing, Using and Sharing Biodiversity Data in the UK. 2nd Edition. Chartered Institute of Ecology and Environmental Management. Winchester, UK.
- Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London. ISBN-978-1-7395126-0-6
- Countryside and Rights of Way Act 2000. Available at [Countryside and Rights of Way Act 2000 \(legislation.gov.uk\)](https://www.legislation.gov.uk/ukpga/2000/85) [Accessed 01-08-2024].
- Detheridge, A. P. and Griffith, G. W. (2021). Standards, methodology and protocols for sampling and identification of grassland fungus species. Natural England Commissioned Reports, Number NECR374.
- Detheridge, A. P. and Griffith, G. W. (2022) eDNA analysis of fungal populations in waxcap fungi from soil samples collected at Severalls Hospital site before and after sward translocation. Aberystwyth University.
- Dines (2008) A Vascular Plant Red Data List for Wales. Plantlife International. Salisbury.

- Environment (Wales) Act 2016. Available at [Environment \(Wales\) Act 2016 \(legislation.gov.uk\)](https://legislation.gov.uk) [Accessed on 25-11-2024].
- Horn J.W., Arnett E.B. and Kunz T.H. (2006). Behavioural responses of bats to operating wind turbines. *J. Wildl. Manag.* 2008;72:123–132.
- JNCC. (2016). Handbook for Phase 1 Habitat Survey – a technique for environmental audit. Peterborough.
- Mathews, F., Richardson, S., Lintott, P. and Hosken, D. (2016). Understanding the Risk to European Protected Species (bats) at Onshore Wind Turbine Sites to inform Risk Management. University of Exeter.
- Mathews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C., McDonald, R.A., Shore, R.F (2018). A review of the population and conservation status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage
- NatureScot (2021). Bats and onshore wind turbines: survey, assessment and mitigation. Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation>. Accessed 07/01/2025
- Kean, E. F. and Chadwick, E. A. (2021). Otter Survey of Wales 2015-2018. NRW Report No: 519, NRW.
- NRW, SEPA, NIEA (2023) Guidelines for Pollution Prevention. Working at construction and demolition sites: GPP 6.
- Porter, D. L. and Naleway, S. E (2022) Hyphal systems and their effect on the mechanical properties of fungal sporocarps. *Acta Biomater.* 2022, 145, 272–282
- Reason, P. F. and Wray, S. (2023). UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats. Version 1.1. Chartered Institute of Ecology and Environmental Management, Ampfield.
- Rodwell (2006) National Vegetation Classification: Users' handbook. Joint Nature Conservation Committee. Peterborough.
- Roos, A., Loy, A., de Silva, P., Hajkova, P. and Zemanová, B. (2015). *Lutra lutra*. The IUCN Red List of Threatened Species 2015: e.T12419A21935287.
- Roswag, M., Roswag, A., Roswag, M.S, Fietz, J, Taefi, T. T. (2025) Advancing bat monitoring: Assessing the impact of unmanned aerial systems on bat activity. *PLoS One.* 2025 Jan 22;20(1):e0314679. doi: 10.1371/journal.pone.0314679. PMID: 39841701; PMCID: PMC11753712.
- Scottish Environment Protection Agency (2017) Land Use Planning System. SEPA Guidance Note 31. Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems

-
- The Conservation of Habitats and Species Regulations 2017 (as amended). Available at [The Conservation of Habitats and Species Regulations 2017 \(legislation.gov.uk\)](https://www.legislation.gov.uk). [Accessed 01-12-2024].
 - The Wildlife and Countryside Act 1981. Available at [Wildlife and Countryside Act 1981 \(legislation.gov.uk\)](https://www.legislation.gov.uk) [Accessed 01-12-2024].
 - Welsh Government (2009) Technical Advice Note 5: Nature Conservation and Planning. Available at: <http://wales.gov.uk/topics/planning/policy/tans/tan5/?lang=en> [Accessed on: 27-08-24].
 - Welsh Government (2024) Planning Policy Wales Edition 12. Available at: gov.wales/sites/default/files/publications/2024-07/planning-policy-wales-edition-12.pdf [Accessed on 10-12-24].
 - Wembridge, D., White, I., Freegard, K., Al-Fulaij, N., Langton, S. (2023) The State of Britain's Dormice. People's Trust for Endangered Species 3 Cloisters House 8 Battersea Park Road London SW8 4BG.

7 Ornithology

7.1 Introduction

7.1.1 The following Chapter assesses impacts on ornithological receptors in relation to information presented in the PAC Ornithological Report. This information was both desktop and field data collated bespoke from site following core industry methods.

7.1.2 information about the scheme, client etc. as is already covered in earlier chapters of the ES.

7.2 Legislative and Policy Context

National Planning Policy Context

7.2.1 The key national planning policy documents relevant to the assessment of ornithology 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).

Local Planning Policy Context

7.2.2 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024

7.3 Consultation and Engagement

Scoping

7.3.1 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.

7.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to ornithology are listed in **Table 7.1**.

Table 7.1: Summary of scoping responses relevant to ornithology

Comment	How and where considered in the ES
PEDW	
Survey requirements: NRW noted that two years of surveys were required, and noted to have been carried out; but no further information is provided in the SR.	Full details of surveys, including methods, dates, effort and results are presented in the PAC Ornithological report.
NRW advised Birds of Conservation Concern (BoCC) must be considered a part of the ES.	BoCC have been considered and incorporated into the ES as requested.
The Applicant is advised to liaise directly with the relevant LPA's Ecologists in order to ensure ornithology issues are adequately addressed.	A meeting took place between the LPA's ecologist, Applicant and consultant prior to drafting of the ES.

7.4 Assessment Methodology

Relevant Guidance

7.4.1 The assessment of Ornithology 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:

European Legislation, Policy and Guidance

- Directive 2009/147/EC on the Conservation of Wild Birds (the Birds Directive).
- Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (the Habitats Directive).
- Environmental Impact Assessment Directive 2014/52/EU.
- European Commission (2010) Natura 2000 Guidance Document 'Wind Energy Developments and Natura 2000'. European Commission, Brussels.

National Legislation, Policy and Guidance

- The Conservation of Habitats and Species Regulations 2017.
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019
- The Countryside and Rights of Way Act 2000
- The Wildlife and Countryside Act 1981 (as amended)

- The Environment Act 2021
- The Environment (Wales) Act 2016
- The Wellbeing of Future Generations (Wales) Act 2015
- Planning Policy Wales, Edition 12 (2024)
- Future Wales: the national plan 2040 (2021)
- Technical Advice Note 5 (TAN5): Nature Conservation and Planning 2009

Other Guidance

- Bridgend County Borough Council Biodiversity Action Plan
- Bridgend County Borough Council Local Development Plan (LDP) 2018-2033
- CIEEM. 2018. Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester
- NatureScot. 2022. General Pre-application and Scoping Advice for Onshore Wind Farms.
- SNH 2018. Guidance – Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas. Version 2.
- SNH. 2000. Windfarms and Birds: Calculating a Theoretical Collision Risk Assuming no Avoidance Action. SNH Guidance Note. SNH.
- SNH. 2016. Environmental Statements and Annexes of Environmentally Sensitive Bird Information. Guidance for Developers, Consultants and Consultees. Version 2.
- SNH. 2016. Guidance – Assessing Connectivity with Special Protection Areas (SPAs). Version 3.
- SNH. 2017. Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. Version 2.
- SNH. 2018. Avoidance Rates for the Onshore SNH Wind Farm Collision Risk Model. Version 2.
- SNH. 2018. Environmental Impact Assessment Handbook – Version 5: Guidance for Competent Authorities, Consultation Bodies, and Others Involved in the Environmental Impact Assessment Process in Scotland.
- SNH. 2018. Guidance – Assessing the Cumulative Impacts of Onshore Wind Farms on Birds.
- SNH. 2019. Guidance – Good Practice During Wind Farm Construction. 4th Edition.

- Stanbury, A. J., Eaton, M. A., Aebischer, N. J., Balmer, D., Brown, A. F., Douse, A., Lindley, P., McCulloch, N., Noble, D. G. and Win, I. 2021. Birds of Conservation Concern 5. British Birds Volume 114

Scope of the Assessment

7.4.2 The scoping and other consultation responses have been considered, **Table 7.** summarises the key issues taken forward as part of this assessment.

Table 7.4: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Construction of turbines and other infrastructure	Impacts (direct and indirect) on habitats of importance to target bird species, including heathland, scrub and woodland
Construction of turbines and other infrastructure	Disturbance and/or displacement of breeding bird species within or in adjoining areas
Construction of turbines and other infrastructure	Damage to active nests
Operation and maintenance	
Operation and maintenance of turbines and other infrastructure	Indirect impacts on habitats of importance to target bird species, including heathland, scrub and woodland
Operation and maintenance of turbines and other infrastructure	Collision risk to birds during the breeding and non-breeding season from the operational turbines
Operation and maintenance of turbines and other infrastructure	Disturbance/displacement of breeding bird species within or in adjoining areas
Operation and maintenance of turbines and other infrastructure	Change in habitat context e.g. due to changes in ground/surface water conditions, shading etc, and changes to land management
Decommissioning	
Reinstatement of original land use	Habitat disturbance, damage or loss
	Disturbance and/or displacement of breeding birds within or in adjoining areas
	Damage to active nests

7.4.3 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 7.5**.

Table 7.5: Issues scoped out of the assessment

Issue	Justification
Ornithology overall	No issues relevant to Ornithology were formally scoped out within the Scoping Opinion.

Study area

7.4.4

The Ornithology study area (hereafter referred to as the study area) comprises the following buffers of the Application Boundary. The buffers listed below represent a range of ‘search areas’ designed to capture all ornithology receptors that may be impacted by the Proposed Development.

- 20km for International statutory designated sites, designated for birds. The objective of this wide search area is to identify any impact pathways that may exist between the Proposed Development and international statutory sites which are afforded the highest level of legal protection through the Habitats Regulations Assessment (HRA) process.
- 2km for National statutory designated sites, designated for birds. The objective of this search area is to identify any impact pathways that may exist between the Proposed Development and national statutory sites which are afforded a lesser degree of legal protection.
- 2km for the breeding raptor walkover survey. The purpose of this survey is to identify the raptor species breeding in the vicinity of the Proposed Development, to enable the potential impacts of disturbance or displacement to be assessed. The search area is based on the established guidance set out in Hardey *et al.* (2009) and recommended in NatureScot (2017). This buffer size was designed to account for the ranging behaviour of raptors during the breeding season. Following NatureScot (2017), a 2km buffer of the Application Boundary encompasses the typical foraging range of all raptor species expected to occur at the Proposed Development.
- 1 km for Local non-statutory designated sites designated for birds. The objective of this search area is to identify any impact pathways that may exist between the Proposed Development and non-statutory sites which are afforded a lesser degree of legal protection.
- 500m buffer of the outermost turbines for the vantage point (VP) survey. The objective of this survey is to record flight activity by birds over the Proposed Development from various VPs that cover this buffer. This allows flight activity through the rotor-swept area to be quantified over the breeding and non-breeding seasons. These data enable collision risk modelling (CRM) to be carried out in accordance with guidance (NatureScot 2017), and the potential impact of collision during the operational period to be assessed.

- 500m for the breeding bird survey. The purpose of this survey is to identify the bird species breeding in the vicinity of the Proposed Development, to enable the potential impacts of disturbance or displacement to be assessed. This survey buffer is in accordance with the recommended guidance set out in Brown and Shepherd (1993), adapted in Calladine *et al.* (2009) and recommended in NatureScot (2017).
- Farm buildings and a barn owl box located a Blackmill, Bridgend, within the Application Boundary; to identify any barn owls breeding in the vicinity of the Proposed Development, to enable the potential impacts of disturbance or displacement on this species to be assessed. This survey buffer is in accordance with Shawyer (2012).

7.4.5 The location and geographic extent of the study area is presented in Volume 2 of the ES.

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 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).

7.5.3 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.

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: Approach to Environmental Assessment.

7.5.5 This Ornithology Chapter will determine the ‘importance’ of ornithological features, specifically target species, that are considered to be of conservation interest and could be impacted by the Proposed Development. The evaluation will specifically refer to the following target species:

- Qualifying features of International statutory designated sites within 20km, National statutory designated sites within 2km, and Local non-statutory sites within 1km; including assemblage components.
- Species listed on Annex I of the Birds Directive, Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), or the Red List of Birds of Conservation Concern (BoCC) Wales 4 (Johnstone *et al.* 2022).
- Species of Principal Importance in Wales (Species listed on Section 7 of the Environment (Wales) Act 2016).

- 7.5.6 The importance will be qualified in a geographic context.
- 7.5.7 The approach will identify, qualify, and where possible, quantify, the sensitivity, value and magnitude of all ornithological receptors which cannot be scoped out of this assessment.

Receptor Value and Sensitivity

- 7.5.8 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 7.6** below.

Table 7.6 : Sensitivity criteria

Sensitivity/Value	Definition
Very High (International)	Very high importance and rarity, international scale, very limited potential for substitution. An internationally designated Site or candidate Site, such as an SPA, Ramsar, Biosphere Reserve, or an area which NRW has determined meets the published selection criteria for national designation, whether or not it has yet been notified.
High (National)	High importance and rarity, national scale and limited potential for substitution. A nationally designated Site, e.g. a Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), or an area which Natural Resources Wales (NRW) has determined meets the published selection criteria for national designation (e.g. SSSI selection guidelines) irrespective of whether or not it has yet been notified.
Medium (Regional)	High or medium importance and rarity, regional scale, limited potential for substitution. Viable areas of habitat identified in a County Biodiversity Action Plan (BAP), or designated as a Local Wildlife Site (LWS), a locally significant population of a species identified as important on a county basis, such as the County Biodiversity Action Plan (BAP).
Low (Local)	Low or medium importance and rarity, local scale. Diverse and/or ornithologically valuable habitats not of county importance.
Negligible	Very low importance and rarity, local scale. Commonplace feature of little or no habitat/historical significance. Loss of such a feature would not be seen as detrimental to the ornithology or ecology of the area.

- 7.5.9 In assigning a value to a Site, species (population or assemblage), their distribution and status (informed by survey data and available historical records) will be considered. Rarity will be taken into account because of its relationship with threat and vulnerability, and the need to conserve representative areas of habitats and genetic diversity of populations and species.
- 7.5.10 The valuation of Sites will also take full account of existing value systems such as Site designations.

- 7.5.11 Criteria for the valuation of birds will include Annex I of the Birds Directive, guidelines for the selection of biological SSSIs and criteria used by local planning authorities and the Wildlife Trusts for the selection of local Sites. Legal protection status is also considered.
- 7.5.12 Other criteria considered will include abundance, diversity, rarity, sensitivity to disturbance and impacts from wind farms, importance to the ecological functioning of a Site, ecological value to species of conservation concern, condition and potential importance. Other species related factors that will be considered include the species' distribution and rarity, population trends, the size of the population that would be affected, and the geographic scale of the impact. Species populations will also be valued on the basis of their recognised status (e.g. inclusion in lists of species of conservation concern or BAP status) and legal protection status.
- 7.5.13 Legal protection afforded to species will be taken into account in the development of mitigation measures. For Annex I species, measures will ensure that the species will remain at a favourable conservation status in their natural range.
- 7.5.14 Finally, existing and future predicted baseline conditions will be considered, including predicted changes resulting from climate change.

Magnitude of impact

- 7.5.15 The criteria for defining magnitude in this chapter of the ES are outlined in **Table 7.7** below. The likely impacts of the Proposed Development will be assessed in terms of the:
 - Type – positive or negative impact on an important ecological feature;
 - Magnitude – size or intensity;
 - Extent or spatial scope;
 - Likely duration;
 - Reversibility – naturally or through mitigation action; and
 - Timing and frequency in relation to ecological changes.

Table 7.7: 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.

7.5.16 Where likely adverse impacts are identified, mitigation or compensation measures will be incorporated into the proposal where practicable.

Duration of impacts

7.5.17 The criteria for describing the duration of impacts in this chapter of the ES are outlined in **Table 7.** below.

Table 7.8: 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

7.5.18 The significance of the effect upon Ornithology 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 7.** Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.

7.5.19 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.

7.5.20 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 7.9: 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	Major

7.5.21 Where the magnitude of impact is ‘no change’, no effect would arise. The definitions for significance of effect levels are described as follows:

- Major:** Likely to be significant at a Regional, National, UK, European/International scale. 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:** Likely to be significant at a County or Unitary Authority Area scale. 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:** Likely to be significant at a Local scale. 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.

7.5.22 Considering the assessment methodology summarised in Table 7. above, ornithological receptors of less than district level importance will not be considered to be important ecological features, since even major impacts will result in a minor effect and, therefore, will be not significant in EIA terms.

Assumptions and limitations of the assessment

7.5.23 Data collected during the breeding bird survey of the Application Boundary in 2021 and 2022 have still to undergo territory analysis to estimate the number and distribution of breeding territories. Territory analysis will be complete for final submission of the ES later in 2025. This introduces a small limitation of prediction methodology as the number and distribution of breeding territories for target species are not known at this stage. This limitation has been managed to an acceptable level by using the raw breeding bird survey records instead, which give an overview of which target species are likely to be breeding, and in what numbers and locations. This provides information at a slightly coarser level than usual in an ES but is more transparent and precautionary.

7.6 Baseline Environment Conditions

Desk studies

7.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment for Ornithology. The existing studies and datasets referred to as part of the desk-based review for Ornithology are summarised in **Table 7.2** below.

Table 7.2: Summary of desk study sources

Title	Source	Year published
NRW 'Search for a Protected Area' to identify designated sites with ornithological interest	https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en	N/A
Records of long-eared owl and nightjar	South East Wales Biodiversity Records Centre	Historic records were provided for the Application Boundary plus a 2km buffer for the following years: 1968, 1982, 2005, 2006, 2007, 2009 and 2010.

7.6.2 The desk study identified that no designated sites, either statutory or non-statutory, with any ornithological interest, either species or assemblage interest, overlap with the Application Boundary or occur within 20km (for International sites), 2km (for National sites) or 1km (for Local sites). Also the Proposed Development is not functionally linked with any designated sites.

7.6.3 The desk study further identified 41 records of nightjar, and confirmed no records of long-eared owl, over seven years from 1968 to 2010.

Site-specific surveys

7.6.4 Site-specific surveys were undertaken to inform the baseline assessment for Ornithology. Full details of survey methodologies are presented in Volume 3, Appendix 7.1 Ornithology Surveys. A summary of the site-specific surveys undertaken to inform this chapter of the ES is provided in **Table 7.3**.

Table 7.3: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
VP survey	To quantify the level and distribution of flight activity in the airspace over the Proposed Development during the breeding and non-breeding seasons. Data were collected during timed watches from strategic VPs. The data gathered were used in CRM to predict mortality from collision with operational turbines. The data were also used to inform assessment of potential impacts of disturbance, displacement and barrier effects.	March 2021- March 2023
Raptor walkover survey	To identify the raptor species breeding in the vicinity of the Proposed Development, to enable the potential impacts of disturbance or displacement to be assessed.	April-June 2021 April-June 2022
Breeding bird survey	To identify the bird species breeding in the vicinity of the Proposed Development, to enable the potential impacts of disturbance or displacement to be assessed.	March-July 2021 April-July 2022 April-July 2024
Barn owl survey	To identify any barn owls breeding in the vicinity of the Proposed Development, to enable the potential impacts of disturbance or displacement on this species to be assessed.	August 2022

VP survey

7.6.5 The VP survey followed NatureScot (2017) guidance. Although this is Scottish guidance, it is adopted across the UK by SNCBs and industry and is accepted as the benchmark information to work with. To create the survey area, a line was drawn around the outermost proposed turbines to produce the turbine envelope, a 500m buffer was then applied to this area. VP viewsheds were identified and arranged to provide maximum coverage of the survey area. Three VPs were required: VP A at 293466, 185715, 26°, VP C at 294827, 185775, 65°, VP F at 297054, 185945, 270°.

7.6.6 The scanning arc for all VPs was 180° and the viewable extent was clipped at 2km. Two of the VPs were located outside the survey area to minimise the observer’s effect on bird behaviour, while VP C had to be located inside the survey area due to a lack of suitable alternatives (Volume 2 of the ES).

7.6.7 For target species, the time of detection, flight duration and flight height at 15 second intervals were recorded, and the flight path was plotted directly onto

an Ordnance Survey (OS) 1:25,000 scale map. The following height bands were used: 1=<20m, 2=20-40m, 3=40-100m, 4=100-150m, 5=150-250m, 6=250m+.

7.6.8 Activity summaries were recorded for secondary species: each watch was divided into 5-minute periods, at the end of which the number and activity of all secondary species observed was recorded.

7.6.9 The VP survey was carried out monthly over two years from 22 March 2021 to 31 March 2023. This schedule encompassed two complete breeding seasons, two complete non-breeding seasons, and the month of March 2023 which marked the start of a third breeding season. A minimum of 36 hours of survey effort was carried out per VP per season. A summary of VP survey effort is presented in **Table 7.4**.

Table 7.4: VP survey effort

Month and year	Hours surveyed		
	VP A	VP C	VP F
March 2021	6	6	6
April 2021	3	3	6
May 2021	6	6	6
June 2021	6	6	6
July 2021	6	6	6
August 2021	6	3	9
September 2021	3	6	6
Total hrs surveyed in 2021 breeding season:	36	36	45
October 2021	15	15	15
November 2021	15	12	18
December 2021	3	3	6
January 2022	6	6	3
February 2022	6	6	6
Total hrs surveyed in 2021-22 non-breeding season:	45	42	48
March 2022	9	6	6

Month and year	Hours surveyed		
	VP A	VP C	VP F
April 2022	-	-	6
May 2022	3	3	6
June 2022	6	6	6
July 2022	6	6	6
August 2022	6	6	6
September 2022	15	12	12
Total hrs surveyed in 2022 breeding season:	45	39	48
October 2022	9	3	12
November 2022	15	15	12
December 2022	6	6	9
January 2023	6	6	6
February 2023	6	9	6
Total hrs surveyed in 2022-23 non-breeding season:	42	39	45
March 2023	6	6	6

Raptor walkover survey

7.6.10 The raptor walkover survey followed guidance set out in Hardey *et al.* (2009) and recommended in NatureScot (2017). The survey area encompassed the Application Boundary plus a 2km buffer (Volume 2, ES). The survey was carried out over two breeding seasons: April to June 2021, and April to June 2022. A summary of raptor walkover survey effort is presented in **Table 7.5**.

Table 7.5: Raptor walkover survey effort

Month and year	Hours surveyed
April 2021	27hrs 50 mins
May 2021	3hrs

June 2021	21hrs 5 mins
Total hrs surveyed in 2021 breeding season:	51 hrs 55 mins
April 2022	6hrs
May 2022	-
June 2022	18 hrs
Total hrs surveyed in 2022 breeding season:	24 hrs

Breeding bird survey

7.6.11 The breeding bird survey followed the recommended guidance set out in Brown and Shepherd (1993), adapted in Calladine *et al.* (2009) and recommended in NatureScot (2017). The survey area encompassed the Application Boundary plus a 500m buffer. The survey was carried out over two breeding seasons: March to July 2021 and April to July 2022. Territory analysis to estimate the number and distribution of breeding territories has still to be finalised, therefore raw breeding bird survey records have been used in this PAC assessment instead (territory analysis will be complete for final submission of the ES later in 2025). A summary of breeding bird survey effort is presented in **Table 7.6**.

Table 7.6: Breeding bird survey effort

Month and year	Hours surveyed
March 2021	13 hrs 15 mins
April 2021	14 hrs 10 mins
May 2021	14 hrs 30 mins
June 2021	12 hrs 55 mins
July 2021	13 hrs 40 mins
Total hrs surveyed in 2021 breeding season:	68 hrs 30 mins
April 2022	13 hrs 45 mins
May 2022	2 hrs
June 2022	25 hrs 30 mins
July 2022	12 hrs 20 mins
Total hrs surveyed in 2022 breeding season:	53 hrs 35 mins

7.6.12 An additional breeding bird survey was carried out in 2024 for the Proposed Development haul road only, with a 50m buffer applied to create the survey area. Territory analysis was completed for these data. A summary of breeding bird survey effort for the Proposed Development haul road is presented in **Table 7.7**.

Table 7.7: Breeding bird survey effort for the Proposed Development haul road

Month and year	Hours surveyed
April 2024	2 hrs 4 mins
May 2024	40 mins
July 2024	1 hr 45 mins
Total hrs surveyed in 2024 breeding season:	4hrs 29 mins

Barn owl survey

7.6.13 The barn owl survey followed methods in Shawyer (2012). A series of farm buildings and a barn owl box were checked at Blackmill, Bridgend, within the Application Boundary. The survey was carried out in August 2022.

Collision risk modelling

7.6.14 CRM was carried out for the Proposed Development following NatureScot (2017; 2018) guidance. The CRM was based on data collected during the VP surveys conducted March 2021 to March 2023. The ‘collision risk area’ was the VP survey area (the turbine envelope drawn around the outermost proposed turbines, with a 500m buffer applied). All bird flights recorded were loaded into the ‘R’ coding environment using the ‘sf’ package.

7.6.15 First, only flights, or parts of flights, that were inside the collision risk area, were included in the CRM. If a flight was partially inside the collision risk area, the proportion of that flight that was inside the collision risk area was calculated, and the number of seconds was adjusted assuming the bird was flying a constant speed.

7.6.16 Next, some species were excluded if they had only been recorded as incidental records. Only species with three or more flights, recorded inside the collision risk area, were taken forward for further CRM assessment.

7.6.17 There was substantial variation in the extent of each of the three viewsheds that overlapped with the collision risk area. To be precautionary, only parts of viewsheds that overlapped with the collision risk area were included in the CRM to prevent collision risk from being underestimated.

7.6.18 Two sets of CRM results were calculated: one based on an air gap of 20m, which included flights from 20m to 250m, and another based on an air gap of 40m, which included flights from 40m-250m. The air gap is the distance between the ground and the lowest sweep of the turbine blade tip. As the air

gap of the proposed turbine models is expected to be 45m, the 20m air gap scenario is highly precautionary, and the 40m air gap scenario is realistic. The turbine parameters used in the CRM are provided in **Table 7.8**.

Table 7.8: Turbine parameters used in CRM

Turbine parameter	Turbine model 1	Turbine model 2	Turbine model 3
Blade diameter (m)	162	150	162
Turbine radius (m)	81	75	81
Tower height (m)	119	105	149
Turbine height (m)	200	180	230
Air gap (m)	38	30	68
Number of turbines	7	3	1
Blade depth (m)	4.5	4.5	4.5
Rotation period (s)	5.5	5.5	5.5

7.6.19 Bird parameters used in the CRM are provided in **Table 7.9**.

Table 7.9: Bird parameters used in CRM

Bird species	Length	Wingspan	Flight speed	Avoidance rate
Curlew	0.55	0.9	16.3	98%
Golden plover	0.28	0.72	13.7	98%
Goshawk	0.55	1.5	11.3	98%
Hen harrier	0.48	1.1	9.1	99%
Herring gull	0.6	1.44	12.8	99.5%
Kestrel	0.34	0.76	10.1	95%
Lapwing	0.3	0.84	11.9	98%
Mallard	0.58	0.9	18.5	98%
Merlin	0.28	0.56	12.1	98%
Peregrine	0.42	1.02	12.1	98%
Red kite	0.63	1.85	12	99%

Snipe	0.26	0.46	17.1	98%
-------	------	------	------	-----

7.6.20 Full details of the CRM methodology, including the step-by-step calculation, are presented in Volume 3, Appendix 7.1 Ornithology Surveys.

Baseline results

7.6.21 The findings of the desk study, site-specific surveys and CRM are summarised in this section. Full details are presented in Volume 3, Appendix 7.1 Ornithology Surveys.

7.6.22 The Ornithology desk study and site-specific surveys identified 41 target species in and around the Proposed Development (see Paragraph 7.5.5 for a definition of target species). As no designated sites with ornithological interest were found during the desk study, no target species have this category of conservation interest assigned to them. The target species are presented alongside the desk study and site-specific surveys in which they were identified in **Table 7.**, and alongside their conservation listings in **Table 7.** .

Table 7.18: Target species identified during the desk study and site-specific surveys

Target species	South East Wales Biodiversity Records Centre	VP survey	Raptor walkover survey	Breeding bird survey	Barn owl survey
Gamebirds					
Red grouse				✓	
Nightjar, swift and cuckoo					
Nightjar	✓				
Swift				✓	
Cuckoo				✓	
Waders					
Black-tailed godwit		✓			
Curlew		✓			
Golden plover		✓		✓	
Lapwing		✓			
Ringed plover				✓	

Target species	South East Wales Biodiversity Records Centre	VP survey	Raptor walkover survey	Breeding bird survey	Barn owl survey
Gulls					
Herring gull		✓		✓	
Lesser black-backed gull				✓	
Raptors					
Goshawk		✓	✓	✓	
Marsh harrier		✓			
Hen harrier		✓			
Red kite		✓	✓	✓	
Kestrel		✓		✓	
Merlin		✓			
Hobby			✓		
Peregrine		✓	✓	✓	
Corvids					
Chough				✓	
Passerines					
Skylark				✓	
Wood warbler				✓	
Willow warbler				✓	
Whitethroat				✓	
Grasshopper warbler				✓	
Goldcrest				✓	
Starling				✓	

Target species	South East Wales Biodiversity Records Centre	VP survey	Raptor walkover survey	Breeding bird survey	Barn owl survey
Song thrush				✓	
Spotted flycatcher				✓	
Black redstart				✓	
House sparrow				✓	
Meadow pipit				✓	
Tree pipit				✓	
Bullfinch				✓	
Greenfinch				✓	
Linnet				✓	
Lesser redpoll				✓	
Crossbill				✓	
Yellowhammer				✓	
Reed bunting				✓	

Table 7.19: Conservation interest of target species identified during the desk study and site-specific surveys

Target species	Annex I	Schedule 1	Red List of BoCC Wales 4	Species of Principal Importance in Wales
Gamebirds				
Red grouse			✓	✓
Nightjar, swift and cuckoo				
Nightjar	✓			✓
Swift			✓	
Cuckoo			✓	✓

Target species	Annex I	Schedule 1	Red List of BoCC Wales 4	Species of Principal Importance in Wales
Waders				
Black-tailed godwit		✓		
Curlew			✓	✓
Golden plover	✓		✓	✓
Lapwing			✓	✓
Ringed plover			✓	✓
Gulls				
Herring gull			✓	✓
Lesser black-backed gull			✓	
Raptors				
Goshawk		✓		
Marsh harrier		✓		
Hen harrier	✓	✓	✓	✓
Red kite	✓	✓		
Kestrel			✓	✓
Merlin		✓	✓	
Hobby		✓		
Peregrine	✓	✓		
Corvids				
Chough	✓	✓		✓
Passerines				
Skylark				✓
Wood warbler			✓	✓

Target species	Annex I	Schedule 1	Red List of BoCC Wales 4	Species of Principal Importance in Wales
Willow warbler			✓	
Whitethroat			✓	
Grasshopper warbler			✓	✓
Goldcrest			✓	
Starling			✓	✓
Song thrush				✓
Spotted flycatcher			✓	✓
Black redstart		✓		
House sparrow				✓
Meadow pipit			✓	
Tree pipit			✓	✓
Bullfinch				✓
Greenfinch			✓	
Linnet			✓	✓
Lesser redpoll				✓
Crossbill		✓		
Yellowhammer			✓	✓
Reed bunting				✓

VP survey results

7.6.23 The VP survey recorded 12 target species comprising four waders: black-tailed godwit, curlew, golden plover and lapwing, also herring gull, and seven raptors: goshawk, marsh harrier, hen harrier, red kite, kestrel, merlin and peregrine. Snipe, although a non-target species, met CRM requirements and was brought forward for modelling, therefore it is included in the species summaries below. For ten of the species summarised below, flight activity over the two-year recording period was not substantial, however for herring gull, red kite and

kestrel, flight activity was very high. Figures for all species are presented in Volume 2, Figures, of the ES).

- 7.6.24 Black-tailed godwit: just one flight was recorded in the breeding season (March to July), in the west of the VP survey area.
- 7.6.25 Curlew: just two flights were recorded, both in the breeding season (March to July), one in the west of the VP survey area and one in the east.
- 7.6.26 Golden plover: 32 flights were recorded in the non-breeding season (August to February), dispersed across the VP survey area.
- 7.6.27 Lapwing: 19 flights were recorded in the non-breeding season (August to February), mainly in the west of the VP survey area .
- 7.6.28 Herring gull: numerous flights were recorded throughout the year with loose centres of activity in the west, centre and eastern edge of the Application Boundary. It is in these areas that herring gulls were observed foraging for invertebrate prey over marshy fields.
- 7.6.29 Goshawk: 17 flights were recorded throughout the year and across the VP survey area.
- 7.6.30 Marsh harrier: just one flight was recorded in the non-breeding season (August to February), in the west of the VP survey area.
- 7.6.31 Hen harrier: just three flights were recorded in the non-breeding season (August to February), mainly inside the Application Boundary.
- 7.6.32 Red kite: in the breeding season (March to July), numerous flights were recorded dispersed across the VP survey area. However, in the non-breeding season (August to February), extremely high numbers of flights were recorded, with centres of activity in the west, centre, and eastern edge of the Application Boundary. It is in these areas that red kites were observed foraging, it is believed for invertebrate prey over marshy fields.
- 7.6.33 Kestrel: 35 flights were recorded in the breeding season (March to July), and numerous flights were recorded in the non-breeding season (August to February). In both seasons, centres of activity occurred in the west, centre, and eastern edge of the Application Boundary. It is in these areas that kestrels were observed foraging for invertebrate prey over marshy fields.
- 7.6.34 Merlin: eight flights were recorded, in the non-breeding season (August to February), across the VP survey area.
- 7.6.35 Peregrine: four flights were recorded in the breeding season (March to July), and 26 flights were recorded in the non-breeding season (August to February), dispersed across the VP survey area.
- 7.6.36 Snipe: just four flights were recorded in the non-breeding season (August to February), only two of which were inside the Application Boundary.

Raptor walkover survey results

- 7.6.37 During the raptor walkover survey which took place over the 2021 and 2022 breeding seasons, small numbers of goshawk and red kite records were made,

together with one peregrine and one hobby flight. The raptors were mostly observed foraging, with occasional records of carrying prey, nest material or displaying. No nests were found for any raptor species within the survey area.

Breeding bird survey results

- 7.6.38 During the breeding bird survey of the Proposed Development which took place over the 2021 and 2022 breeding seasons, 33 target species were recorded within the survey area. As territory analysis to estimate the number and distribution of breeding territories has still to be finalised, raw breeding bird survey records are summarised below instead (territory analysis will be complete for final submission of the ES later in 2025).
- 7.6.39 Goshawk were recorded on a few occasions, and red kite on several occasions, and both species were exhibiting breeding behaviours such as alarm and territorial calls.
- 7.6.40 Skylark and meadow pipit were extremely numerous with records for each species numbering in the thousands over both years. Nests and breeding behaviours were observed, and both species were distributed across every part of the survey area (except for the south portion of the survey buffer).
- 7.6.41 Willow warbler and linnet were numerous with records of each species numbering in the hundreds over both years. Abundant breeding behaviours, including a linnet nest, were observed. Linnets were seen across most of the survey area (except for the south portion of the survey buffer). For willow warbler most records occurred in the periphery of the survey area.
- 7.6.42 Whitethroat, song thrush, house sparrow and reed bunting were all recorded in moderate numbers, frequently exhibiting breeding behaviours (singing).
- 7.6.43 Cuckoo, lesser black-backed gull, goldcrest, tree pipit, bullfinch, greenfinch, lesser redpoll, crossbill and yellowhammer were all recorded in low or very low numbers, occasionally exhibiting breeding behaviours (singing).
- 7.6.44 Red grouse, swift, golden plover, ringed plover, herring gull, kestrel, peregrine, chough, wood warbler, grasshopper warbler, starling, spotted flycatcher and black redstart were all recorded in low or very low numbers, with no breeding behaviour observed.
- 7.6.45 The additional breeding bird survey carried out in 2024 for the Proposed Development haul road only, estimated, based on territory analysis, that seven target species were potentially holding breeding territories within the survey area; these are summarised below.
- Cuckoo: one possible territory
 - Willow warbler: five possible territories
 - Whitethroat: one probable territory
 - Goldcrest: three possible territories
 - Song thrush: five possible territories, and two probable territories

- House sparrow: one possible territory
- Meadow pipit: two possible territories

Barn owl survey results

7.6.46 No evidence was found of ongoing barn owl use within any of the buildings surveyed, the barn owl box, or the wider area. However, there is potential for future use, with a barn owl box on site and good foraging habitat adjacent.

CRM results

7.6.47 CRM was carried out for 10 species (comprising nine target species and one non-target species) which were not incidental records and for which three or more flights had been recorded inside the collision risk area. Two iterations of the CRM were run: for 9-turbine and 11-turbine layouts. The operational time parameter was set to 85% (i.e. 15% downtime). As per the PAC Ornithological Report CRM may be revisited with more accurate downtime at EIA stage of ~50%.

7.6.48 The 11-turbine layout is the preferred option. The 9-turbine layout resulted in an output with an average reduction of 28% of the risk level for all species. Results of the CRM are presented in **Table 7.**

Table 7.20: CRM results (non-target species in italics)

Scenario	Species	Breeding season collisions (per annum)	Non-breeding season collisions (per annum)	Total collisions (per annum)	Collisions over 50 years
11-T 15% downtime	Herring gull	13.121 to 9.359	1.278 to 0.990	14.399 to 10.349	719.95
	Red kite	1.186 to 0.888	4.889 to 4.020	6.075 to 4.909	312.50
	Kestrel	1.360 to 1.221	3.017 to 2.559	4.377 to 3.780	217.39
	Golden plover	None	1.652 to 1.014	1.652 to 1.014	81.97
	Goshawk	0.133 to 0.099	0.040 to 0.034	0.173 to 0.133	8.65
	Peregrine	0.052 to 0.030	0.110 to 0.071	0.163 to 0.101	8.13
	Lapwing	None	0.083 to 0.060	0.083 to 0.060	4.13
	<i>Snipe</i>	None	0.027 to 0.015	0.027 to 0.015	1.36
	Merlin	None	0.012 to 0.009	0.012 to 0.009	0.58
	Hen harrier	None	0.003 to 0.003	0.003 to 0.003	0.16

Scenario	Species	Breeding season collisions (per annum)	Non-breeding season collisions (per annum)	Total collisions (per annum)	Collisions over 50 years
9-T 15% downtime	Herring gull	9.233 to 6.560	0.918 to 11.344	10.151 to 7.269	507.55
	Red kite	0.828 to 0.619	3.496 to 2.870	4.324 to 3.489	217.39
	Kestrel	0.991 to 0.889	2.107 to 1.788	3.097 to 2.676	156.25
	Golden plover	None	1.206 to 0.740	1.206 to 0.740	60.24
	Goshawk	0.098 to 0.073	0.023 to 0.018	0.120 to 0.091	6.02
	Peregrine	0.037 to 0.021	0.080 to 0.052	0.117 to 0.073	5.85
	Lapwing	None	0.060 to 0.044	0.060 to 0.044	3.02
	<i>Snipe</i>	None	0.020 to 0.011	0.020 to 0.011	1.00
	Merlin	None	0.008 to 0.007	0.008 to 0.007	0.42
Hen harrier	None	0.002 to 0.002	0.002 to 0.002	0.12	
9-T 40% downtime	Herring gull	6.518 to 4.631	0.648 to 0.501	7.166 to 5.132	358.30

7.6.49 Full details of CRM results, including the step-by-step calculation, are presented in Volume 3, Appendix 7.1 Ornithology Surveys

Future baseline conditions

7.6.50 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.

7.6.51 It is expected that the ornithological baseline of the Application Boundary will remain more or less the same in the absence of the Proposed Development. The grazing regime on Mynydd y Gaer Common is likely to remain the same hence the acid grassland and dwarf shrub heath habitats will also likely remain the same. This means that the observed assemblage of target species comprising mainly waders, raptors and passerines will likely persist in approximately the current balance remaining. However, if bracken is not managed then this habitat can spread at the expense of other habitats, and

this would change the current target bird assemblage in the long term, to the detriment of species such as waders and skylark.

7.6.52 Climate change is likely to alter the composition and distribution of species of some taxon groups in the long term (over the next ~50-100 years). Research suggests that several groups, which are relevant to areas within the Application Boundary, would be subject to change (Pearce-Higgins, 2021). It is likely that range expansion and a northward shift in the distribution of some species and taxon groups would occur. Additionally, weather patterns could lead to soils losing moisture which may cause complete drying of marshy grassland, waterbodies and mire habitats, particularly in the summer months, with unpredictable rain patterns and extreme weather events leading to local flooding. The loss of marshy grassland habitats would potentially lead to some loss of the herring gull, red kite, kestrel and golden plover numbers observed, as these species appear to be using this habitat heavily year-round.

Important Ornithological Features

7.6.53 **Table 7.** lists eight Important Ornithological Features (IOFs) brought forward for assessment for Ornithology: one wader, one gull, three raptors and three passerines. Where a receptor has not been included in the table below, this is because, based on professional judgement, the receptor is unlikely to experience significant impacts caused by the Proposed Development (e.g. collision mortality or disturbance/displacement effects), or its presence within the Application Boundary is rare (e.g. one record of a hunting hobby), or transient (e.g. one record of a migrating marsh harrier), or it does not use the habitats there (e.g. one record of a chough which is a coastal species).

Table 7.21: Key receptors taken forward to assessment

Receptor	Description	Value	Sensitivity
Golden plover	An Annex I wader, listed on the Red List of the BoCC Wales 4, and a Species of Principal Importance in Wales. CRM for the 11-T scenario estimated that golden plover would be impacted by collision mortality of up to 1.652 birds per year, or 81.97 birds over 50 years, all in the non-breeding season. This wader was mainly detected by the VP survey in the non-breeding season, with several flights occurring across the Application Boundary.	International	Very high
Herring gull	A large gull species, listed on the Red List of the BoCC Wales 4, and a Species of Principal Importance in Wales. CRM for the 11-T scenario estimated that herring gull would be impacted by collision mortality of up to 14.399 birds per year, or 719.95 birds over 50 years, mainly in the breeding season. This gull was mainly detected by the VP survey year-round, with numerous flights focused on three main foraging sites.	Regional	Medium
Goshawk	A Schedule 1 raptor. Goshawks were seen occasionally during the raptor walkover survey and the breeding bird survey, and breeding behaviours were observed. As goshawks are normally highly elusive, these results suggest that the species may be breeding close to the Proposed Development.	National	High
Red kite	An Annex I and Schedule 1 raptor.	International	Very high

Receptor	Description	Value	Sensitivity
	<p>CRM for the 11-T scenario estimated that red kite would be impacted by collision mortality of up to 6.075 birds per year, or 312.50 birds over 50 years, mainly in the non-breeding season.</p> <p>This raptor was mainly detected by the VP survey year-round, with numbers extremely high in the non-breeding season; flights were focused on three main foraging sites.</p> <p>Red kites were seen occasionally during the raptor walkover survey and the breeding bird survey, and breeding behaviours were observed, so it is possible that the species may be breeding close to the Proposed Development</p>		
Kestrel	<p>A raptor listed on the Red List of the BoCC Wales 4, and a Species of Principal Importance in Wales.</p> <p>CRM for the 11-T scenario estimated that kestrel would be impacted by collision mortality of up to 4.377 birds per year, or 217.39 birds over 50 years, mainly in the non-breeding season.</p> <p>This raptor was mainly detected by the VP survey in the non-breeding season, with numerous flights focused on three main foraging sites.</p>	Regional	Medium
Skylark	<p>A passerine which is a Species of Principal Importance in Wales.</p> <p>Breeding skylark was identified by the breeding bird survey to be extremely numerous and distributed across almost every part of the Application Boundary.</p>	Regional	Medium
Meadow pipit	<p>A passerine listed on the Red List of the BoCC Wales 4.</p> <p>Breeding meadow pipit was identified by the breeding bird survey to be extremely numerous and distributed across almost every part of the Application Boundary.</p>	Regional	Medium
Linnet	<p>A passerine listed on the Red List of the BoCC Wales 4, and a Species of Principal Importance in Wales.</p> <p>Breeding linnet was identified by the breeding bird survey to be numerous and distributed across almost every part of the Application Boundary.</p>	Regional	Medium

7.7 Key Parameters for Assessment

- 7.7.1 The maximum design parameters (MDPs) identified in **Table 7.10** 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.
- 7.7.2 It should be noted that impacts and effects during the decommissioning stage are considered to be similar or no worse than during construction and have therefore not been separately considered during this chapter of the ES. Moreover, it is considered that an accurate assessment of the effects arising from decommissioning cannot be undertaken at this stage given the temporal nature of the works occurring ~2080.

Table 7.10: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase		Maximum Design Parameters	Justification
	C	O		
Collision mortality impact during operation of the Proposed Development	*	✓	<p>Operation and maintenance phase</p> <p>The MDP considers the following estimated mortality rates for four of the IOFs:</p> <ul style="list-style-type: none"> • 1.652 birds per year for golden plover • 14.399 birds per year for herring gull • 6.075 birds per year for red kite • 4.377 birds per year for kestrel 	The MDP considers the largest number of turbines (11) and the greatest operational time (85%). This is a highly precautionary scenario.
Disturbance/displacement impacts during construction of the Proposed Development	✓	*	<p>Construction phase</p> <p>The MDP considers the following breeding IOFs: one breeding pair of goshawk, one breeding pair of red kite, and several locally breeding herring gull and red kite could be disturbed/displaced.</p> <p>The MDP considers the following non-breeding IOFs: several foraging golden plover, herring gull, red kite and kestrel could be disturbed/displaced.</p>	The MDP considers that all breeding/foraging golden plover, herring gull, goshawk, red kite and kestrel would be impacted.
Disturbance/displacement and habitat loss impacts during construction and operation of the Proposed Development	✓	✓	<p>Construction phase</p> <p>The MDP considers that a sizeable proportion of the following breeding IOFs: skylark, meadow pipit and linnets, would be disturbed/displaced by the construction process, and suffer habitat loss impacts.</p> <p>Operation and maintenance phase</p> <p>The MDP considers that a sizeable proportion of the following breeding IOFs: skylark, meadow pipit and linnets, would be disturbed/displaced by turbine noise which interferes with their display song, and would suffer habitat loss impacts.</p>	The MDP considers that a sizeable proportion of breeding skylarks, meadow pipits and linnets would be impacted.

^a C=construction, O=operational and maintenance

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

- 7.8.1 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.
- 7.8.2 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').
- 7.8.3 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.
- 7.8.4 Implementation of embedded mitigation relied upon in the assessment will be secured in the Development of National Significance (DNS). Compliance of detailed design of the Proposed Development with the Outline Design Principles, or through compliance with relevant environmental management plans.
- 7.8.5 During the design process, the following Mitigation Measures have been incorporated into the final infrastructure layout of the Proposed Development, to benefit Ornithology.
- The number of turbines has dropped from 13 to 11 to reduce the potential impacts of collision mortality on the IOFs golden plover, herring gull, red kite and kestrel, and habitat loss on the IOFs breeding skylark, meadow pipit and linnet.
 - Turbine 3 was moved from its original position to avoid the considerable herring gull flight activity recorded near the hilltop at Waun Wen.
 - Turbines 1, 2, 4 and 9 have been sited away from prime unimproved acid grassland habitat on Mynydd y Gaer Common where ground-nesting birds have been recorded breeding in high densities. The aim was to reduce the potential impacts of disturbance/displacement and habitat loss on the IOFs breeding skylark, meadow pipit and linnet. These four turbines have instead been proposed for areas of improved, agricultural grassland where these IOFs have not been recorded.
 - Turbines 5 to 10 will be constructed outside of the goshawk and red kite breeding season (March to July inclusive (Forestry Commission (1996); Scottish Natural Heritage (SNH) (2014)) to reduce the potential impacts of disturbance/displacement, and to avoid an offence to Schedule 1 birds under the Wildlife and Countryside Act 1981 (amended).

- 7.8.6 Further, the following Enhancement Measures have been incorporated into the final infrastructure layout of the Proposed Development, to benefit Ornithology.
- Bracken control would be carried out over Mynydd y Gaer Common to increase the extent of unimproved acid grassland to benefit ground-nesting birds.
 - Woodland restoration would increase opportunities for woodland birds to colonise.
- 7.8.7 Where practicably possible, infrastructure has been sited on areas of lower biodiversity value such as improved grassland and areas of dense bracken, and access tracks have been located on existing bare ground, existing tracks, or designed to avoid areas of higher habitat value. As part of the iterative design process of the Proposed Development, turbines that were originally sited within areas of sensitive habitats (specifically mire habitats) such as Turbine 2 and Turbine 6 have been relocated into habitats of lower biodiversity value (specifically improved pasture and bracken). Several turbines have also been removed from the scheme.
- 7.8.8 Construction related activities would be implemented pursuant to environmental best practice measures as set out within a Construction Environmental Management Plan (CEMP). Precautionary Working Methods to prevent accidental damage to habitats and mortality to protected and or notable species during construction would also be set out in a CEMP.
- 7.8.9 Wind farm maintenance and associated activities will be subject to an Operational Environmental Management Plan (OEMP) during the operational stage. An OEMP would include environmental best practice measures to prevent pollution, though it is anticipated that the operational phase would be very low risk in terms of pollution incidents. The OEMP would also include measures to prevent accidental encroachment into sensitive habitats in proximity to the Proposed Development footprint.
- 7.8.10 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.
- 7.8.11 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.
- 7.8.12 Both embedded and additional mitigation measures relevant to the assessment of Ornithology are summarised in **Table 7.** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 7.23: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	Nature of mitigation	How the measure will be secured
Embedded mitigation		
CEMP	Environmental best practice such as pollution prevention, dust minimisation and precautionary working methods to prevent injury and/mortality to protected and/notable species.	Secured through a condition of the DNS
OEMP	Environmental best practice measures such as pollution prevention during operation.	Secured through a condition of the DNS
Further mitigation		
Habitat enhancement and restoration	Bracken control and woodland restoration	Secured through a condition of the DNS

7.9 Assessment of effects

7.9.1 The impacts of the construction, and the operation and maintenance, phases of the Proposed Development have been assessed. Potential impacts are listed in Table 7.10 , 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 phase

Disturbance/displacement and habitat loss

7.9.2 The construction phase could cause disturbance/displacement impacts on the IOFs listed below through construction-related noise and human and vehicle presence. This phase will also cause habitat loss impacts through temporary habitat loss such as vehicle compounds, borrow pits and crane pads, and permanent habitat loss due to the Proposed Development infrastructure.

7.9.3 There is evidence to suggest that there is one pair of goshawk and one pair of red kite breeding close to the Proposed Development, though not within the site boundary.

7.9.4 Numerous flights of herring gull and red kite foraging for invertebrate prey have been recorded over marshy fields in three key locations in the west, centre and eastern edge of the Application Boundary, in the breeding season.

7.9.5 Numerous flights of golden plover, herring gull, red kite and kestrel foraging for invertebrate prey have also been recorded over marshy fields

in three key locations in the west, centre and eastern edge of the Application Boundary, in the non-breeding season.

7.9.6 Finally, high densities of skylark, meadow pipit and linnet have been recorded breeding across most of the Application Boundary.

Sensitivity of receptors

7.9.7 The sensitivity of the receptors is:

- Golden plover (non-breeding): **very high**
- Herring gull (breeding and non-breeding): **medium**
- Goshawk (breeding): **high**
- Red kite (breeding and non-breeding): **very high**
- Kestrel (non-breeding): **medium**
- Skylark (breeding): **medium**
- Meadow pipit (breeding): **medium**
- Linnet (breeding): **medium**

Magnitude of impact

7.9.8 The magnitude of the impact on the receptors is:

- Golden plover (non-breeding): **low**
- Herring gull (breeding and non-breeding): **low**
- Goshawk (breeding): **negligible**
- Red kite (breeding and non-breeding): **negligible**
- Kestrel (non-breeding): **low**
- Skylark (breeding): **low**
- Meadow pipit (breeding): **low**
- Linnet (breeding): **low**

Significance of effects

7.9.9 Golden plover (non-breeding): on the basis that the sensitivity of the receptor is **very high** and the magnitude of the impact is **low**, it is assessed that there will be a **moderate or major adverse** effect, which is **significant**.

7.9.10 Herring gull (breeding and non-breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.

- 7.9.11 Goshawk (breeding): 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 **minor adverse** effect, which is **not significant**.
- 7.9.12 Red kite (breeding and non-breeding): on the basis that the sensitivity of the receptor is **very high** and the magnitude of the impact is **low**, it is assessed that there will be a **moderate or major adverse** effect, which is **significant**.
- 7.9.13 Kestrel (non-breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.
- 7.9.14 Skylark (breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.
- 7.9.15 Meadow pipit (breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.
- 7.9.16 Linnet (breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.

Operation and maintenance phase

Collision mortality

- 7.9.17 The operation and maintenance phase could cause collision mortality impacts on the IOFs listed below through birds colliding with the rotors of the operational turbines. CRM has been carried out and MDPs consider the following estimated maximum mortality rates for four of the IOFs:
- Golden plover: 1.652 birds per year (all non-breeding)
 - Herring gull: 14.399 birds per year (mainly breeding)
 - Red kite: 6.075 birds per year (mainly non-breeding)
 - Kestrel: 4.377 birds per year (mainly non-breeding)

Sensitivity of receptors

- 7.9.18 The sensitivity of the receptors is:
- Golden plover (non-breeding): **very high**
 - Herring gull (breeding and non-breeding): **medium**
 - Red kite (breeding and non-breeding): **very high**
 - Kestrel (non-breeding): **medium**

Magnitude of impact

- 7.9.19 The magnitude of the impact on the receptors is:

- Golden plover (non-breeding): **negligible**
- Herring gull (breeding and non-breeding): **medium**
- Red kite (breeding and non-breeding): **low**
- Kestrel (non-breeding): **low**

Significance of effects

- 7.9.20 Golden plover (non-breeding): On the basis that the sensitivity of the receptor is **very high** and the magnitude of the impact is **negligible**, it is assessed that there will be a **minor** adverse effect, which is **not significant**.
- 7.9.21 Herring gull (breeding and non-breeding): On the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **medium**, it is assessed that there will be a **moderate** adverse effect, which is **significant**.
- 7.9.22 Red kite (breeding and non-breeding): On the basis that the sensitivity of the receptor is **very high** and the magnitude of the impact is **low**, it is assessed that there will be a **moderate or major** adverse effect, which is **significant**.
- 7.9.23 Kestrel (non-breeding): On the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor** adverse effect, which is **not significant**.

Disturbance/displacement and habitat loss

- 7.9.24 The operation and maintenance phase could cause disturbance/displacement impacts on the IOFs listed below primarily through operation-related turbine noise which interferes with their display song. This phase will also cause habitat loss impacts through the permanent loss of some of the unimproved acid grassland habitat of Mynydd y Gaer Common due to the Proposed Development infrastructure.
- 7.9.25 High densities of skylark, meadow pipit and linnet have been recorded breeding across most of the Application Boundary.

Sensitivity of receptors

- 7.9.26 The sensitivity of the receptors is:
- Skylark (breeding): **medium**
 - Meadow pipit (breeding): **medium**
 - Linnet (breeding): **medium**

Magnitude of impact

- 7.9.27 The magnitude of the impact on the receptors is:

- Skylark (breeding): **low**
- Meadow pipit (breeding): **low**
- Linnet (breeding): **low**

Significance of effects

- 7.9.28 Skylark (breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.
- 7.9.29 Meadow pipit (breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.
- 7.9.30 Linnet (breeding): on the basis that the sensitivity of the receptor is **medium** and the magnitude of the impact is **low**, it is assessed that there will be a **minor adverse** effect, which is **not significant**.

7.10 Cumulative Effects

- 7.10.1 The assessment of cumulative effects for Ornithology 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.
- 7.10.2 The development types allocated to tier 1, tier 2 and tier 3 for the assessment of cumulative effect are summarised in **Table 7.11**.

Table 7.11: 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.
--	--

7.10.3 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 7.12**.

Table 7.12: List of other projects, plans and activities considered within the CEA (both Teir 1)

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Operational period	Temporal overlap with the Proposed Development
Tyn y Waun Solar Farm	Awaiting construction	2km	40MW solar farm and ancillary development, size is 31.4ha		Yes
Mynydd y Glyn Wind Farm	Awaiting construction	6.98km	7-T wind farm with a tip height of 115m, size is 208ha	30 years	Yes

Cumulative effects assessment

7.10.4 The Proposed Developments identified in **Table 7.13** 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 and plans, in order to inform the maximum design parameters.

Table 7.13 Assessment of cumulative effects – Red kite

Potential cumulative effect	Phase		Maximum Design Parameters	Justification
	C	O		
Collision mortality impact during operation of the Proposed Development and the Proposed Mynydd y Glyn Wind Farm	x	✓	<p>Project assessed cumulatively with the following other projects/plans include:</p> <p>Tier 1</p> <p>Mynydd y Glyn Wind Farm</p> <p>Collision rate (breeding season): Based on 85% operational time and 99% avoidance, 0.99-0.135 collisions per year during breeding season (2.97-4.06 birds over anticipated 30-year lifespan of Proposed Development)</p> <p>Collision rate (non-breeding season): Based on 85% operational time and 99% avoidance, 0.113-0.215 collisions per year during non-breeding (3.39-6.46 birds over the anticipated lifespan of the Proposed Development).</p> <p>Collision rate (annual): Based on 85% operational time and 99% avoidance, number of total annual collisions is 0.212-0.35 collisions (8.44 over 30 years)</p>	<p>Conclusion: Whilst the loss of eight birds over 30 years from the local population could have a minor impact at a local level, immigration into the area from neighbouring counties is likely to balance any loss through collision. Based on the current design, observed flight activity levels and the outputs of CRM, the predicted effect of collision is of very low magnitude and therefore not significant.</p>

^a C=construction, O=operational and maintenance

7.11 Cumulative effects assessment

7.11.1 A description of the cumulative effects between the Proposed Development and other developments identified in **Table 7.13** upon **Ornithology** receptors is provided below.

Collision mortality

Operation and maintenance phase

Sensitivity of the receptor

7.11.2 The sensitivity of the receptor red kite is **very high**

Magnitude of impact

7.11.3 The magnitude of the impact is **low**

Significance of the effect

- 7.11.4 Red kite (breeding and non-breeding): On the basis that the sensitivity of the receptor is **very high** and the magnitude of the impact is **low**, it is assessed that there will be a **moderate or major** adverse effect, which is **significant**.

7.12 References

- Calladine, J., Garner, G., Wernham, C. and Thiel, A. (2009) *The influence of survey frequency on population estimates of moorland breeding birds*. *Bird Study*, 56(3), 381-388.
- Hardey, J., Crick, H., Wernham, C., Riley, H. & Thompson, D. (2009) *Raptors: a field guide to survey and monitoring*. 2nd Edition. Edinburgh, The Stationery Office.
- Hannah F. R. Hereward, Callum J. Macgregor, Owain Gabb, Alice Connell, Robert J. Thomas, Anthony V. Cross and Rachel C. Taylor (2024). *Modelling population-level impacts of wind farm collision risk on Welsh Red Kites*. BTO Research Report 766
- Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. and Taylor, R.C. (2022) *Birds of Conservation Concern Wales 4: the population status of birds in Wales*. *Milvus: The Journal of the Welsh Ornithological Society*.
- NatureScot (2018) *Avoidance rates for the Onshore SNH Wind Farm Collision Risk Model*. Version 2. Available at: [Wind farm impacts on birds - Use of Avoidance Rates in the SNH Wind Farm Collision Risk Model.pdf](#) Accessed January 2025.
- NatureScot. (2017) *Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms*. Version 2. Available at: [Recommended bird survey methods to inform impact assessment of onshore windfarms | NatureScot](#) Accessed January 2025.
- Pearce-Higgins, J. W. (2021) *Climate Change and the UK's Birds*. British Trust for Ornithology Report, Thetford, Norfolk.
- Petty, S. J. (1996) *Research Information Note 267: Reducing disturbance to goshawks during the breeding season*. Forestry Commission.
- Shawyer, C. (2012) *Barn owl Tyto Alba Survey Methodology and Techniques for use in Ecological Assessment*. Wildlife Conservation Partnership.
- SNH (2014) *Breeding season dates for key breeding species in Scotland*.

8 Transport

8.1 Introduction

8.1.1 This chapter presents an assessment of the likely significant effects on traffic associated with the construction, operation and decommissioning of Mynydd Y Gaer Windfarm. Consideration is given within the chapter to changes to traffic flows on the local highway network, and the associated implications for highway users in the vicinity of the site.

8.1.2 The assessments and chapter have been prepared by arcitran.

8.1.3 The objectives of the chapter 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.

8.1.4 In addition, this chapter is supported by several figures and appendices. Figures are provided within the text, with the following appendices referred to throughout the chapter:

- **Appendix 8.1:** Abnormal Load Transport Management Plan (ALTMP).
- **Appendix 8.2:** Framework Construction Traffic Management Plan (CTMP).

8.2 Legislative and Policy Context

National Planning Policy Context

8.2.1 The key national planning policy documents relevant to the assessment of transport 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).

8.2.2 **Table 8.1:** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of transport, including how and where these have been considered in the ES.

Table 8.1: 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	
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 8.9 and summarised in Table 8.29.
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 8.9 and summarised in Table 8.29.
TAN 18 Transport	
Paragraph 2.3: Ensure that transport improvements for new developments maintain the functionality of existing transport networks.	Refer to Appendix 8.1 ALTMP, 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 8.1 ALTMP, 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 Chapter 1.3, consultation confirmed that no standalone Transport Assessment is required.
Paragraph 9.3: Early discussions with authorities required to ensure agreement on the Transport Assessment scope.	Detailed in Chapter 1.3, consultation confirmed that no standalone Transport Assessment is required.
Paragraph 9.8: EIA is required where a development is likely to have significant environmental effects.	EIA results detailed within this ES Chapter.
Paragraph 9.9: TAs should be incorporated into an ES where the transport impacts of an application are significant.	Detailed in Chapter 1.3, consultation confirmed that no standalone Transport Assessment is required. The assessment of transport impacts is instead incorporated into this ES Chapter.
Paragraph 9.16: The type of site access should be suitable for the type of road and expected traffic volume.	Refer to Appendix 8.1 ALTMP, which details the specification of vehicles required to route through the site access, and this ES Chapter for the volume of development traffic anticipated.
Paragraph 9.17: Any works to a trunk road to be constructed to Government standards.	Refer to Appendix 8.1 ALTMP, small areas of mitigation are required on the trunk road network to deliver areas of load oversail only.
Paragraph 9.19: Any necessary transport improvements can be conditioned through the planning process, or via the S278 process.	Refer to Appendix 8.1 ALTMP, which details any transport improvements required.

Local Planning Policy Context

8.2.3 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of transport for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024

8.2.4 **Table 8.2** provides a summary of the provisions contained within the local plan relevant to the assessment of transport including how and where these have been considered in the ES.

Table 8.2: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
Policy SP5	Developments must ensure safe access, mitigate impacts, and demonstrate acceptable effects on the road network.	Assessed throughout this chapter, with the resulting environmental effects, mitigation and monitoring detailed at section 8.9 and summarised in Table 8.29.
Policy SP13	Renewable developments will be permitted where there would not be an unacceptable impact on access and highway safety.	Assessed throughout this chapter, with the resulting environmental effects, mitigation and monitoring detailed at section 8.9 and summarised in Table 8.29.

8.3 Consultation and Engagement

Scoping

- 8.3.1 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.
- 8.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to transport are listed in **Table 8.3**, including how and where these have been considered in the ES.

Table 8.3: Summary of scoping responses relevant to transport

Comment	How and where considered in the ES
PEDW	
ID.28: Access tracks to be included within the ES, including information on their location and materials.	Refer to 8.9.102.
ID.29: BCBC recommend investigating a route from the north. Any hedgerow removal should be limited and considered in conjunction with BCBC Officers.	Refer to Appendix 8.1 ALTMP, this route option was discarded as access via Glynogwr faces significant constraint and is a longer route (conflicts with TAN 18, para 8.11). Hedgerow removal minimised wherever possible.
ID.30: Transport Division of WG detail further information required, set out within the 'Pulling Together' document.	Refer to Appendix 8.1 ALTMP.
ID.31: Transport Division of WG advise it would be beneficial to include a CTMP.	Refer to Appendix 8.2 CTMP.
ID.32: Operational traffic is scoped out.	Noted. Refer to 8.9.101.
BCBC	
Recommended that a route from the north via Glynogwr is investigated.	Refer to Appendix 8.1 ALTMP, this route option was discarded as access via Glynogwr faces significant constraint and is a longer route (conflicts with TAN 18, para 8.11).
Removal of hedgerows is likely a necessity but should be limited and considered in conjunction with BCBC Officers.	Refer to Appendix 8.1 ALTMP, hedgerow removal minimised wherever possible.
Operational traffic is scoped out.	Noted. Refer to 8.9.101.
RCTBC	
It is unlikely that there will be any highway impacts within RCT.	Noted. <i>No action required.</i>
WG Transport Division	

Comment	How and where considered in the ES
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 Appendix 8.1 ALTMP, 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 Appendix 8.1 ALTMP, 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 Appendix 8.1 ALTMP.

8.4 Assessment Methodology

Relevant Guidance

8.4.1 The assessment of transport 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:

- 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, Chapter 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

8.4.2 Taking into account the scoping and other consultation, **Table 8.4** summarises the issues considered as part of this assessment.

Table 8.4: 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.
Operation and maintenance	
Maintenance regime	An assessment of the on-site highway space required for operation of the windfarm and ongoing maintenance.

8.4.3 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 8.5**.

Table 8.5: Issues scoped out of the assessment

Issue	Justification
Operational traffic	BCBC in their comments at Appendix 1 agrees that the operational traffic associated with the development does not need to be included within the transport and traffic assessment, but state that an assessment of the operational space requirements (maintenance regime) should be included. (ID.32)

Study area

8.4.4 The Transport study area (hereafter referred to as the study area) comprises A473 Penybont Road, the B4280 Penprysg Road and Bryngarn Road (referred to in the Scoping Request as the Rhiwceiliog Pencoed road), as set out in the Scoping Request. These are local roads in the area immediately surrounding the site which may be impacted by construction traffic.

8.4.5 It also includes Public Rights of Way (PRoWs) in and around the site which may be impacted by construction traffic.

8.4.6 The location and geographic extent of the study area is presented in Volume 2, Figures, Figure 8.1 of the ES.

8.4.7 It is acknowledged that the Scoping Direction recommended investigating an access route from the north, which would result in a different study area (ID.29). Refer to Appendix 8.1 ALTMP, which details an assessment on this route, advising on why this route option was found to be less suitable and not taken forward.

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 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).

8.5.3 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.

8.5.4 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Approach to Environmental Assessment.

Receptor Value and Sensitivity

8.5.5 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.

8.5.6 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.

8.5.7 Informed by this guidance, the criteria for defining sensitivity in this chapter of the ES are outlined in **Table 8.6** below.

Table 8.6 : Sensitivity criteria

Sensitivity/Value	Definition
Very High	<p>Very high importance and rarity, international scale, very limited potential for substitution.</p> <p>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.</p>

High	<p>High importance and rarity, national scale and limited potential for substitution.</p> <p>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.</p> <p>For settlements in more rural areas, this includes larger settlements with many local facilities.</p> <p>For other receptors it includes highly sensitive sites such as schools, playgrounds, retirement homes etc.</p>
Medium	<p>High or medium importance and rarity, regional scale, limited potential for substitution.</p> <p>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.</p> <p>For settlements in more rural areas, it includes settlements with a level of local facilities.</p> <p>For other receptors, it includes traffic sensitive receptors such as hospitals, community facilities, and recreational facilities.</p>
Low	<p>Low or medium importance and rarity, local scale.</p> <p>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.</p> <p>For settlements in more rural areas, this includes small settlements with few local facilities.</p> <p>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.</p>
Negligible	<p>Very low importance and rarity, local scale.</p> <p>This sensitivity is assigned to receptors with low sensitivity to traffic flows, and those distant from impacted parts of the highway network.</p> <p>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.</p> <p>For settlements in more rural areas, it includes locations with isolated dwellings / scattered settlement that lack local facilities.</p> <p>For other receptors, it includes those sufficient distant from impacted highway links and junctions.</p>

Magnitude of impact

8.5.8 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.

8.5.9 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.

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

Severance

8.5.11 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.

8.5.12 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.

8.5.13 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.

8.5.14 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 8.7**.

Table 8.7 : 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

8.5.15 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)

8.5.16 Pedestrian delay assesses how traffic conditions affect the ability of pedestrians and other non-motorised users to cross roads. It is closely linked to severance and influenced by factors such as traffic volume, speed, pedestrian activity levels, and site conditions.

8.5.17 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

8.5.18 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.

8.5.19 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

8.5.20 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.

8.5.21 The guidelines outline a weighting system that can be used in the assessment of pedestrian fear and intimidation, offering scores for different highway conditions.

8.5.22 The scoring system is outlined in **Tables 8.8, 8.9 and 8.10.**

Table 8.8: 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 8.9: 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 8.10: 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

8.5.23 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

- 8.5.24 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 8.11**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 8.5.25 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.
- 8.5.26 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 8.11: 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
Very High	Negligible	Minor	Moderate or Major	Major	Major

- 8.5.27 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

- 8.5.28 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.
- 8.5.29 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.

8.6 Baseline Environment Conditions

Baseline Transport Conditions

- 8.6.1 Access to the site is achieved via the A473 Penybont Road, the B4280 Penprysg Road and Bryngarn Road.
- 8.6.2 The A473 Penybont Road routes north from the Penybont Road roundabout through the northeastern edge of Pencoed to the A473 / B4280 roundabout. In this area, it operates as a single carriageway road with a 30mph speed restriction, street lighting and a varied range of footways, combined footways/cycleways and residential properties. Through this section, areas of traffic calming are present.
- 8.6.3 The B4280 is a derestricted single carriageway road subject to the national speed limit of 60mph. Between the A473 and the north-western edge of Pencoed at Penprysg Road there are verges on both sides and pedestrians are prohibited. Between Penprysg Road and Bryngarn Road there is no formal pedestrian prohibition.
- 8.6.4 Bryngarn Road is a single carriageway road with a 50mph speed restriction and a footway on its eastern side at its southern end and a 30mph speed restriction, street lighting and intermittent footway on its western side at its northern end.
- 8.6.5 The Rockwool manufacturing facility is located on the north-western side of Bryngarn Road, providing two accesses, one at its southern end within the 50mph speed restricted area and one at its northern end within the 30mph speed restricted area.

Observed Traffic Flows

8.6.6 Observed traffic flows have been obtained to inform the assessments, these comprise:

- Automatic Traffic Count (ATC) 1: B4280 west of the A473 roundabout (2025).
- ATC 2: Bryngarn Road between the B4280 and the Rockwool southern entrance (2025).
- ATC 3: Bryngarn north of the Rockwool northern entrance (2025).
- DfT Countpoint 90313: A473 Penybont Road (2023).

8.6.7 The traffic survey locations are illustrated in **Figure 8.1**, with a summary of the traffic flows recorded provided at **Table 8.12**.

Table 8.12: 24-hour Average Daily Observed Traffic Flows (Two-Way)

Location	Light Vehicles	HGVs	Total	Year
B4280	4,329	847	5,176	2025
Bryngarn Road between the B4280 and the Rockwool southern entrance	1,061	302	1,362	2025
Bryngarn north of the Rockwool northern entrance	168	60	228	2025
A473 Penybont Road	12,041	554	12,595	2023

8.6.8 The ATCs completed also collected information on vehicle speeds, with the average daily vehicle speed and 85th percentile vehicle speed summarised in **Table 8.13**.

Table 8.13: Observed Speed Summary

Location	Average Speed	85 th Percentile Speed	Speed Limit
B4280	38.4 mph	46.3 mph	60 mph
Bryngarn Road between the B4280 and the Rockwool southern entrance	29.5 mph	35.6 mph	50 mph
Bryngarn Road north of the Rockwool northern entrance	31.7 mph	39.2 mph	30 mph
A473 Penybont Road	n/a	n/a	30 mph

8.6.9 **Table 8.13** highlights that there are concerns with speeding along Bryngarn Road, north of the Rockwool northern entrance, with an average vehicle speed of 31.7 mph recorded in a 30-mph speed limit.

8.6.10 This highlights that the CTMP will need to include measures for all site vehicles to ensure that the speed limit is adhered to by site staff and deliveries. It is also

important to note that construction traffic, operating within the speed limit, can help to slow down other vehicle traffic along this link.

Highway Safety Audit

- 8.6.11 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. ‘Crashmap’ compiles data reported by police regarding Personal Injury Accidents. The data is approved by the National Statistics Authority and reported on by the DfT each year.
- 8.6.12 The study area comprises of the A473 from the A473 / Penybont Road / Bridgend College Campus roundabout, to the A473 Penybont Road / B4280 / Brynna Road Roundabout. It also comprises the B4280 from the A473 Penybont Road Roundabout to the junction with Bryngarn Road, alongside the length of Bryngarn Road from the B4280 to the site access junction.
- 8.6.13 **Table 8.14** summarises the recorded incidents within the study area, categorising the severity of incidents as ‘slight,’ ‘serious,’ or ‘fatal’. The locations of the PIAs are shown in **Figure 8.3**.

Table 8.14: Personal Injury Accident Data Summary (5-Year)

Severity	2019	2020	2021	2022	2023	Total
Slight	2	3	0	0	0	5
Serious	0	0	0	0	0	0
Fatal	0	0	0	0	0	0
Total	2	3	0	0	0	5

- 8.6.14 **Table 8.14** illustrates that 5 incidents were recorded during the study period with all 5 incidents classified as ‘slight’. No incidents were recorded as ‘serious’ or ‘fatal’.
- 8.6.15 No accident clusters were identified as part of the Highway Safety Audit.
- 8.6.16 Three of the recorded incidents occurred on the B4280. An ATC was placed on the B4280 and recorded a two-way 7-day daily average of 5,176 vehicles. This equates to approximately 1.9 million vehicles per year. Based on this traffic volume the 3 slight incidents which occurred on the B4280 over the five years, equates to one accident per 630,000 vehicle movements.
- 8.6.17 Given the traffic volume on the local highway network, and absence of any accident clusters, the recorded incidents over this period do not suggest any inherent design flaws in the highway that could be worsened by this development. Therefore, the incidents cannot be attributed to the layout or geometry of the road network.
- 8.6.18 On this basis, 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.

Sustainable Travel Audit

- 8.6.19 A review has been completed of the existing sustainable travel network within the vicinity of the study area to identify whether any PRow, National Cycle Route or Active Travel Network users may be sensitive to changes in traffic conditions associated with the construction phase of Mynydd y Gaer.
- 8.6.20 This review has identified that there are several PRowS within the site and the associated study area.
- 8.6.21 It has also confirmed that there are no National Cycle Routes located within the site or associated study area.
- 8.6.22 The review also confirms that there are no existing pedestrian or cyclist Active Travel Routes within the site or the study area, as published by Bridgend County Borough Council.
- 8.6.23 There are future aspirations for several Active Travel Routes, which are detailed further in the future baseline conditions section.
- 8.6.24 The location of the existing public rights of way within the site is shown on **Figure 8.4**.

Future baseline conditions

- 8.6.25 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

- 8.6.26 Cenin Renewables Ltd have advised that they anticipate an operation date of 2030, with a two-year construction programme. Construction traffic is likely to peak circa 12 months into development (during 2029), so to provide a robust worst-case assessment of baseline traffic flows anticipated during the two-year construction period, observed traffic flows have been growthed to 2029.
- 8.6.27 Traffic flows growth factors have been calculated and applied to the surveyed flows using the most recent DfT guidance ‘TAG unit M4 forecasting and uncertainty’ published May 2023.
- 8.6.28 The calculation of traffic growth is undertaken using the DfT TEMPro v8.1 computer software. Growth factors have been calculated based on data for Bridgend, for all roads serving the region, using the Core Scenario dataset.
- 8.6.29 TEMPro includes traffic forecasts that have been provided to the DfT by Local Planning Authorities, which include LPA forecasts on demography change, employment and housing levels, and the impact of allocated/consented applications.

8.6.30 **Table 8.15** provides a summary of the resultant growth rates outputted by TEMPro v8.1.

Table 8.15: TEMPro Growth Rates

Time Period	Average Day
2023-2029	1.074109405
2025-2029	1.061358422

8.6.31 The TEMPro Growth Rates identified in **Table 8.15** have been applied to the observed traffic flows summarised in **Table 8.12** to produce a 2029 future baseline daily traffic flow scenario, which are shown in **Table 8.16**.

Table 8.16: 2029 Future Baseline Average Daily Traffic Flows (Two-Way)

Location	Light Vehicles	HGVs	Total
B4280	4,594	899	5,493
Bryngarn Road between the B4280 and the Rockwool southern entrance	1,126	320	1,446
Bryngarn north of the Rockwool northern entrance	178	64	242
A473 Penybont Road	12,933	595	13,528

Future Sustainable Travel Network

8.6.32 BCBC have identified an aspiration to develop several formal Active Travel Networks within the study area. Should they come forward, the plans include:

- A short-term aspiration for a future walking and cycling route along the A473 Penybont Road between the A473 / Penybont Road roundabout and the B4280 roundabout (INM-PE-2).
- A medium-term aspiration for a future cycling route along the B4280 between the B4280 roundabout and the Penprysg Road junction (INM-PE-18); and,
- A short-term aspiration for a future walking and cycling route along the B4280 between the Penprysg Road junction and the Bryngarn Road junction (INM-BR-10).

8.6.33 The location of these routes is shown in **Figure 8.5**.

Impact of Climate Change

8.6.34 As a result of forecast climate projections for the UK, it is considered that climate change will not have a notable impact on the forecast 2030 baseline traffic flows.

Receptor Sensitivity

8.6.35 A review of receptors within the study area has been completed, with the results outline in **Table 8.17**. **Table 8.17** assigns each receptor a sensitivity level, based upon the criteria detailed in **Table 8.6**.

Table 8.17: Receptor Sensitivity Review

Location	Sensitivity	Comments
Users of A473 Penybont Road	Medium	A more local A road, designed to connect different areas, suitable for HGV use and featuring a level of traffic calming.
Users of the B4280	Medium	A B-road intended to connect different areas, suitable for regular HGV use (as used by Rockwool traffic)
Users of Bryngarn Road between the B4280 and the Rockwool southern entrance	Medium	While an unclassified road, it is designed to accommodate regular HGV use by Rockwool traffic.
Users of Bryngarn Road north of the Rockwool northern entrance	High	An unclassified rural road not intended for regular HGV use.
Residents of Pencoed in vicinity of A473 Penybont Road	High	A larger settlement with many local facilities.
Students at Bridgend College – Pencoed Campus	High	A significant educational facility, located on an A road with a level of traffic calming / management such as signalised crossing points.
Residents of Rhiwceiliog Pencoed	Low	A small settlement with few local facilities.
Public Right of Way Users	Very High	Existing public rights of way not designed for vehicle or HGV use.

8.6.36 Based upon the assessment detailed in **Table 8.16** and in accordance with the IEMA guidelines, users of Bryngarn Road (northern), residents of Pencoed, students of Bridgend College – Pencoed Campus 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.

8.6.37 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 Trip Generation

8.6.38 Through the 24-month construction phase, various traffic elements will access the site, these include:

- Abnormal load traffic – comprising turbine components, escort vehicles and crange.
- Construction staff - in minibuses or private cars.
- Equipment and materials – including general supplies, aggregate, sand, concrete etc.

8.6.39 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. The derivation of the forecast trip generation is detailed in the subsequent sections.

8.6.40 It is assumed that construction is undertaken over a 22 working day month.

Construction Staff

8.6.41 Staff would arrive in non-HGV vehicles, with efforts made to encourage car sharing wherever possible. The number of workers on-site would vary depending on the construction activities, but based on prior wind farm projects, a peak workforce of approximately 33 staff members per day is anticipated.

8.6.42 To ensure a robust assessment of traffic movements, it has been assumed that two-thirds of staff would travel in single-occupancy cars or LGVs, while the remaining third would use a minibus with a capacity of up to 16 passengers.

8.6.43 Under these assumptions, staff transport is expected to generate up to 44 two-way vehicle trips daily (22 arrivals and 22 departures).

Abnormal Load Deliveries

8.6.44 The turbine components, including the hub, nacelle, drive train, blades, and tower sections, are classified as AILs due to their dimensions and weight when transported.

8.6.45 For this report, the worst-case scenario for the number of components requiring transport is presented in **Table 8.17**. However, the turbines ultimately installed on the site may require fewer tower sections, potentially reducing the total number of loads.

Table 8.18: Turbine Component Deliveries

Component	Number per Turbine
Blades	3
Tower Sections	6
Nacelle	1
Hub	1
Drive Train	1
Container	1
Nose Cone	1
Footings	1
Site parts	0.2
Total Movements	15.2
Number of Turbines	11
Total Vehicle Deliveries	168
Total Vehicle Movements	336

8.6.46 In addition to turbine deliveries, two high-capacity cranes, likely mobile cranes with a lifting capacity of up to 1,000 tonnes, would be required to offload

specific components and assemble the turbines. These cranes would be escorted by boom and ballast trucks to ensure full mobilisation on-site. Smaller auxiliary cranes would also be deployed to assemble the main cranes and facilitate the overall turbine erection process.

General Deliveries

8.6.47 During the construction phase, general deliveries to the site will be made via HGVs and are anticipated to include fuel, site office supplies, and staff welfare provisions. For a robust assessment, it is assumed that one HGV delivery will occur daily, with an average of 22 working days per month. This equates to up to 44 two-way HGV journeys per month, comprising 22 arrivals and 22 departures.

Delivery of Materials

8.6.48 Several materials will need to be delivered to site to enable the construction of on-site access tracks, infrastructure and turbine foundations.

8.6.49 At commencement this will comprise the delivery of items to enable the construction of the site compound, alongside construction machinery.

Access Tracks, Hardstanding and Construction Areas

8.6.50 To enable the construction of access tracks, hardstanding and construction areas, aggregate material will be required. While on-site borrow pits are proposed, to provide a robust assessment, it has been assumed that 50% of the aggregate required will be sourced from on-site borrow pits, with the remaining 50% imported.

8.6.51 The access tracks are proposed to be 5m wide and designed to accommodate the axle loading required for turbine components. The forecast aggregate requirements are summarised in **Table 8.18**.

Table 8.19: Aggregate Vehicle Movements

Item	Volume (m ³)	Weight (t)	HGV Capacity (m ³)	Deliveries	Total Two-Way Trips
Access Tracks	17,742	35,485	20	1,775	3,550
Construction Areas	7,591	15,183	20	760	1,520
Hardstanding	19,234	38,469	20	1,924	3,848
Removal of temporary facilities	12,761	25,522	20	1,276	2,552

Access Tracks: Geotextile Membrane

8.6.52 An allowance has been made for laying geotextile membrane in the foundations of the access tracks, construction areas and hardstanding. Geotextile membrane will be delivered to the site by HGV in rolls, with 293 rolls

likely required. This will result in a total of 30 two-way trips, with 15 arriving and 15 departing.

Access Tracks: Cable and Cable Sand

8.6.53 Electrical cables will connect each turbine to the substation and will be laid in trenches along the access track. The cables will be buried in sand which will be imported to the site. The total estimated number of trips required to deliver cabling and sand is summarised in **Tables 8.19** and **8.20**.

Table 8.20: Cable Vehicle Movements

Item	Total Length Required (m)	Length per Drum (m)	No. of Drums	Deliveries	Total Two-Way Trips
Cables	30,727	500	62	7	14

Table 8.21: Cabling Sand and Backfill Vehicle Movements

Item	Volume Required (m ³)	Weight Required (t)	HGV Capacity (t)	Deliveries	Total Two-Way Trips
Cabling Sand	3,457	5,531	20	277	554
Cabling Backfill (where not under tracks)	777	1554	20	39	78

Turbine Construction

8.6.54 An estimate of concrete and steel reinforcement requirements for the turbine foundations has been calculated, based upon previous experience and published documentation.

8.6.55 Given the size of the site, it has been assumed that ready-mix concrete will be utilised, with deliveries arriving from the south via the A473 (75%) and the east via the A473 (25%)

8.6.56 The total trips estimate for the delivery of concrete and steel reinforcement is summarised in **Tables 8.21** and **8.22**.

Table 8.22: Concrete Deliveries

Item	Volume Required (m ³)	Vehicle Capacity (m ³)	Deliveries	Total Two-Way Trips
Concrete	11,000	6	1,834	3,668

Table 8.23: Steel Reinforcement Deliveries

Item	Total Weight Required (t)	HGV Capacity (t)	Deliveries	Total Two-Way Trips
Reinforcement	1,375	30	46	92

Total Construction Traffic

- 8.6.57 The total estimated construction traffic movements are detailed in **Table 8.23**. This illustrates that construction will peak in month 13, with 112 two-way trips forecast per day, comprising 48 light vehicles and 64 heavy vehicles.

Table 8.24: Forecast Trip Generation

Activity	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	44
Staff	253	506	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	1,012	506	506
Turbine Component Delivery	0	0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48	0	0	0	0	0	0
AIL Escorts	0	0	0	0	0	0	0	0	0	0	0	0	43	43	43	43	43	43	43	0	0	0	0	0	0
Access Tracks, Hardstanding and Construction Areas	372	372	744	744	744	744	744	744	744	744	744	744	744	0	0	0	0	0	0	0	639	639	639	639	639
Geotextile Membrane	8	0	0	8	0	0	8	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cabling deliveries and sand	0	0	0	0	0	0	0	72	72	72	72	72	72	72	72	72	0	0	0	0	0	0	0	0	0
Concrete and Reinforcement	0	0	0	0	0	0	0	418	418	418	418	418	418	418	418	418	0	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	0
Cranage and related vehicles	0	0	0	0	0	0	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	30	0	0	0
Total Estimated Movements	777	1,022	1,800	1,808	1,800	1,800	1,808	2,298	2,298	2,306	2,298	2,298	2,419	1,645	1,645	1,645	1,147	1,147	1,147	1,056	1,725	1,695	1,289	1,289	
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	22
Daily Average*	37	47	82	83	82	82	83	106	106	106	106	106	112	77	77	77	53	53	53	48	80	78	60	60	
Daily Average Light Vehicles	12	23	46	46	46	46	46	46	46	46	46	46	48	48	48	48	48	48	48	46	46	46	23	23	
Daily Average Heavy Vehicles	25	24	36	37	36	36	37	60	60	60	60	60	64	29	29	29	5	5	5	2	34	32	37	37	

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

Construction Development Traffic Distribution and Assignment

8.6.58 The distribution of development traffic on the highway network will vary depending on the types of movement. To assign the development traffic, various assumptions have been made, which are detailed below:

- All construction development traffic will access the site at the purpose-built site access, from the A473 Penybont Road / B4280 / Brynna Road / New Road roundabout, via the B4280 and Bryngarn Road.
- For staff trips, 25% will access from the A473 New Road, 25% from Penybont Road and 50% from the A473.
- For HGV traffic, 25% will access from the A473 New Road, with the remaining 75% accessing from the A473.
- For aggregate and concrete deliveries, 25% will access from the A473 New Road, with the remaining 75% accessing from the A473.
- For turbine deliveries, all loads will access the site from the Port of Swansea via the M4 and A473 Penybont Road. Refer to Appendix 8.1 ALTMP for full details on AIL access arrangements.

8.6.59 The resultant peak construction development traffic assignment within the study area is summarised in **Table 8.24**.

Table 8.25: Peak Construction Development Traffic

Location	Light Vehicles	HGVs	Total Two-Way Trips
B4280	48	64	112
Bryngarn Road between the B4280 and the Rockwool southern entrance	48	64	112
Bryngarn north of the Rockwool northern entrance	48	64	112
A473 Penybont Road	47	49	85

Net Impact Assessment

8.6.60 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 8.25**.

Table 8.26: 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
B4280	4,541	889	5,429	4,595	954	5,548	1.1%	7.2%	2.1%
Bryngarn Road (southern)	1,113	316	1,429	1,167	381	1,548	4.3%	20.2%	7.8%
Bryngarn Road (northern)	176	63	239	230	128	358	27.3%	101.2%	46.8%
A473 Penybont Road	12,782	588	13,370	12,825	638	13,463	0.3%	8.3%	0.6%

8.6.61 **Table 8.25** highlights that the only highway link forecast to experience a net impact of 30% or more is Bryngarn Road (north of the Rockwool northern entrance), which is forecast to experience a 46.8% growth in total vehicles during peak construction, comprising 27.3% growth in light vehicles and 101.2% growth in heavy vehicles. This is largely due to the very low existing traffic volumes along this link.

8.6.62 The only highway link forecast to experience a net impact of 10% or more is Bryngarn Road (south of the Rockwool southern entrance), which is forecast to experience a 20.2% growth in heavy vehicles, alongside 7.8% growth in total vehicles and 4.3% growth in light vehicles.

8.6.63 The B4280 and A473 Penybont Road are forecast to experience a net impact of 2.1% and 0.6% respectively.

Key receptors

8.6.64 **Table 8.27** identifies the receptors taken forward into the assessment for transport.

Table 8.27: Key receptors taken forward to assessment

Receptor	Description
Users of Bryngarn Road (north of Rockwool) and	This sensitive receptor is forecast to experience a net impact of greater than 10%, meeting Rule 2 of the IEMA guidance for inclusion with the EIA study area.
Residents of Rhiwceiliog Pencoed	This receptor is forecast to experience a net impact of greater than 30%, meeting Rule 1 of the IEMA guidance for inclusion with the EIA study area.
Public Right of Way Users	A sensitive receptor as not designed for use by traffic.

- 8.6.65 The B4280, A473 Penybont Road, residents of Pencoed in vicinity of the A473 Penybont Road and Students at Bridgend College – Pencoed Campus do not meet the IEMA Rule 1 or Rule 2 magnitude of change thresholds for inclusion within the EIA study area.
- 8.6.66 Bryngarn Road (south of Rockwool) is detailed as a medium sensitivity receptor in **Table 8.16**, it does not meet the IEMA Rule 1 magnitude of change threshold for inclusion and has not been included within the EIA study area.
- 8.6.67 In accordance with the IEMA Guidelines, full assessments have been completed for:
- Users of Bryngarn Road (north of Rockwool) and adjacent residents of Rhiwceiliog Pencoed.
 - Public Right of Way Users.

8.7 Key Parameters for Assessment

- 8.7.1 The maximum design parameters identified for the Vestas V162 turbine have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. This is the largest candidate turbine and will have the greatest impact on construction traffic levels. These parameters have been selected from the information provided in Volume 1, Chapter 2: Project Description of the ES.

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

- 8.8.1 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.
- 8.8.2 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').
- 8.8.3 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.
- 8.8.4 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.
- 8.8.5 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.

8.8.6 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.

8.8.7 Both embedded and additional mitigation measures relevant to the assessment of Transport are summarised in

8.8.8 **Table 8.28.** Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 8.28: Mitigation measures intended 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	
Construction Traffic Management Plan (CTMP)	A framework CTMP 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 developed into a Full Construction Traffic Management Plan and agreed with the required Highway Authorities prior to commencement on site.
Abnormal Load Transport Management Plan (ALTMP)	A framework ALTMP 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 developed into a Full ALTMP and agreed with the required Highway Authorities prior to commencement on site.
Onsite Traffic Management Plan	An Onsite Traffic Management Plan could be prepared and secured through any consent. This will set out a series of measures to manage the interaction between on-site vehicle movements and existing PRow users, to help to minimise the impact any PRow users might experience during the short-term construction period.

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 ALMTP.

8.9 Assessment of effects

8.9.1 The impacts of the construction of the Proposed Development have been assessed. The potential impacts arising from the construction of the Proposed Development are stated in **Paragraph 8.7.1**, 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 Traffic – Users of Bryngarn Road (northern)

8.9.2 An assessment has been completed regarding the impact of construction traffic on users of Bryngarn Road (northern), as a net impact increase in traffic levels of 49.7% is forecast, as detailed in **Table 8.25**.

Sensitivity of the receptor

8.9.3 As detailed in **Table 8.16**, Bryngarn Road (northern) is classified as a high sensitivity receptor.

Magnitude of impact

8.9.4 The magnitude of the impact along Bryngarn Road (northern) meets Rule 2 of the IEMA guidance for the users of Bryngarn Road (northern) and has therefore been included in assessment.

Severance

8.9.5 Traffic volumes are forecast to increase during peak construction by 46.8% (all vehicles) and 101.2% (HGVs). With no simple alternative route to avoid this section of Bryngarn Road, the increase in journey length for any walkers, cyclists or horse riders wishing to use this link would be greater than 500m.

8.9.6 The magnitude of the effect is therefore considered to be high.

Driver Delay

- 8.9.7 Bryngarn Road (northern) in the 2029 Future Baseline is forecast to experiences an average daily traffic volume of 239 vehicles per day (circa 10 vehicles per hour, or 1 vehicle every 6 minutes). This is significantly within accepted thresholds for theoretical highway capacity. Therefore, this link is not operating at, or close to, capacity.
- 8.9.8 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

- 8.9.9 As detailed under Driver Delay, Bryngarn Road (northern) is not operating at, or close to capacity.
- 8.9.10 The magnitude of the effect is therefore considered to be negligible.

Non-motorised user amenity

- 8.9.11 The HGV traffic flows on Bryngarn Road (northern) are expected to double during peak construction.
- 8.9.12 The magnitude of the effect is therefore considered to be high.

Fear and Intimidation

- 8.9.13 The average traffic flow per hour over an 18-hour day along Bryngarn Road (northern) during both the 2029 Future Baseline and 2029 with development is less than 600, the degree of hazard score is 0.
- 8.9.14 The total 18-hour heavy vehicle flow along Bryngarn Road (northern) during both the 2029 Future Baseline and 2029 with development is less than 1,000, the degree of hazards score is 0.
- 8.9.15 The average recorded vehicle speed along Bryngarn Road (southern) is 31.7 mph, the degree of hazards score is 20. It is anticipated that the average speed may lower with construction traffic which is committed to adhering to the speed limit. The future average vehicle speed is therefore anticipated to be no higher than observed speed.
- 8.9.16 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).
- 8.9.17 There is no step change in the level of fear and intimidation.
- 8.9.18 The magnitude of the effect is therefore considered to be negligible.

Road Safety

- 8.9.19 No personal injury accidents have been recorded along Bryngarn Road (northern) in the last five years.
- 8.9.20 The magnitude of the effect is therefore considered to be negligible.

Significance of the effect

Severance

- 8.9.21 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

- 8.9.22 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)

- 8.9.23 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

- 8.9.24 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 short term major adverse effect, which is significant.

Fear and Intimidation

- 8.9.25 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.

Road Safety

- 8.9.26 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.

Construction Traffic – Residents of Rhiwceiliog Pencoed

- 8.9.27 An assessment has been completed regarding the impact of construction traffic on residents of Rhiwceiliog Pencoed, as a net impact increase in traffic levels of 49.7% is forecast, in the vicinity of the village as detailed in **Table 8.25**.

Sensitivity of the receptor

- 8.9.28 As detailed in **Table 8.16**, residents of Rhiwceiliog Pencoed are classified as a low sensitivity receptor.

Magnitude of impact

- 8.9.29 The magnitude of the impact along Bryngarn Road (northern) meets Rule 1 of the IEMA guidance for the adjacent residents of Rhiwceiliog Pencoed and has therefore been included in assessment.

Severance

- 8.9.30 Traffic volumes are forecast to increase during peak construction by 46.8% (all vehicles) and 101.2% (HGVs). With no simple alternative route to avoid this section of Bryngarn Road, the increase in journey length for any walkers, cyclists or horse riders wishing to use this link would be greater than 500m.
- 8.9.31 The magnitude of the effect is therefore considered to be high.

Driver Delay

- 8.9.32 Bryngarn Road (northern) in the 2029 Future Baseline is forecast to experiences an average daily traffic volume of 239 vehicles per day (circa 10 vehicles per hour, or 1 vehicle every 6 minutes). This is significantly within accepted thresholds for theoretical highway capacity, and thus this link is not operating at, or close to, capacity.
- 8.9.33 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

- 8.9.34 As detailed under Driver Delay, Bryngarn Road (northern) is not operating at, or close to capacity.
- 8.9.35 The magnitude of the effect is therefore considered to be negligible.

Non-motorised user amenity

- 8.9.36 The HGV traffic flows on Bryngarn Road (northern) are expected to double during peak construction.
- 8.9.37 The magnitude of the effect is therefore considered to be major.

Fear and Intimidation

- 8.9.38 The average traffic flow per hour over an 18-hour day along Bryngarn Road (northern) during both the 2029 Future Baseline and 2029 with development is less than 600, the degree of hazard score is 0.
- 8.9.39 The total 18-hour heavy vehicle flow along Bryngarn Road (northern) during both the 2029 Future Baseline and 2029 with development is less than 1,000, the degree of hazards score is 0.
- 8.9.40 The average recorded vehicle speed along Bryngarn Road (southern) is 31.7 mph, the degree of hazards score is 20. It is anticipated that the average speed may lower with construction traffic which is committed to adhering to the speed

limit. The future average vehicle speed is therefore anticipated to be no higher than observed speed.

8.9.41 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).

8.9.42 There is no step change in the level of fear and intimidation.

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

Road Safety

8.9.44 No personal injury accidents have been recorded along Bryngarn Road (northern) in the last five years.

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

Significance of the effect

Severance

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

Driver Delay

8.9.47 On the basis that the sensitivity of the receptor is low, and the magnitude of the impact is negligible, it is assessed that there will be a negligible effect, which is not significant.

Pedestrian Delay (including all non-motorised users)

8.9.48 On the basis that the sensitivity of the receptor is low, and the magnitude of the impact is negligible, it is assessed that there will be a negligible effect, which is not significant.

Non-motorised user amenity

8.9.49 On the basis that the sensitivity of the receptor is low, and the magnitude of the impact is negligible, it is assessed that there will be a negligible effect, which is not significant.

Fear and Intimidation

8.9.50 On the basis that the sensitivity of the receptor is low, and the magnitude of the impact is negligible, it is assessed that there will be a minor effect, which is not significant.

Road Safety

- 8.9.51 On the basis that the sensitivity of the receptor is low, and the magnitude of the impact is negligible, it is assessed that there will be a negligible effect, which is not significant.

Construction Traffic – Users of On-site Public Rights of Way

- 8.9.52 An assessment has been completed regarding the impact of construction traffic on users of the on-site Public Rights of Way, as these would not typically be trafficked by vehicles.

Sensitivity of the receptor

- 8.9.53 As detailed in **Table 8.16**, users of Public Rights of Way are classified as a very high sensitivity receptor.

Magnitude of impact

- 8.9.54 The magnitude of the impact to Public Rights of Way users meets Rule 1 of the IEMA guidance and has therefore been included in assessment.

Severance

- 8.9.55 PRowS within the site, including footpaths, a bridleway, and a Byway Open to All Traffic (BOAT), are not currently used by vehicle traffic. The introduction of construction traffic may create a perception of severance, potentially disrupting connectivity and access for PRow users. To ensure the safety of all potential users, appropriate management measures may be required.
- 8.9.56 The magnitude of the effect is therefore considered to be high.

Driver Delay

- 8.9.57 This is not applicable.
- 8.9.58 The magnitude of the effect is therefore considered to be negligible.

Pedestrian Delay (including all non-motorised users)

- 8.9.59 Pedestrian users of the PRowS may experience delays if their movements coincide with construction traffic. For example, users may need to wait for an Abnormal Indivisible Load (AIL) to pass. As the site was previously untrafficked, this may lead to the perception of delays.
- 8.9.60 However, on site traffic volumes are anticipated to be low, leaving significant portions of the day where pedestrians are unlikely to experience any delay. Further, construction is likely to be limited on weekends, leaving significant portions of typical recreational periods where no delays are anticipated.
- 8.9.61 The magnitude of this effect is assessed as low.

Non-motorised user amenity

- 8.9.62 Construction traffic at previously untrafficked locations may impact upon non-motorised user amenity.
- 8.9.63 The magnitude of the effect is therefore considered to be high.

Fear and Intimidation

- 8.9.64 Construction traffic at previously untrafficked locations may result in fear and intimidation of PRow users.
- 8.9.65 The average traffic flow per hour over an 18-hour day within the site during the 2029 with development scenario is less than 600, the degree of hazard score is 0.
- 8.9.66 The total 18-hour heavy vehicle flow within the site during the 2029 with development scenario is less than 1,000, the degree of hazards score is 0.
- 8.9.67 The average vehicle speed within the site is likely to be under 20 mph, the degree of hazards score is 0.
- 8.9.68 The level of fear and intimidation is therefore small (0-20) in the 2029 with Development scenario.
- 8.9.69 In accordance with IEMA guidelines, this will result in no step change in the level of fear and intimidation.
- 8.9.70 The magnitude of the effect is therefore considered to be negligible.

Road Safety

- 8.9.71 With the introduction of vehicular traffic during construction, there is a risk that interactions with construction traffic impacts the safety of PRow users.
- 8.9.72 The magnitude of the effect is therefore considered to be moderate.

Significance of the effect

Severance

- 8.9.73 On the basis that the sensitivity of the receptor is very 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

- 8.9.74 This is not applicable.
- 8.9.75 It is assessed that there will be a negligible effect, which is not significant.

Pedestrian Delay (including all non-motorised users)

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

Non-motorised user amenity

- 8.9.77 On the basis that the sensitivity of the receptor is very 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

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

Road Safety

- 8.9.79 On the basis that the sensitivity of the receptor is very 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.

Summary of Assessment

- 8.9.80 The assessments have highlighted the following significant effects:

Users of Bryngarn Road (northern)

- Severance: significant short term major adverse effect.
- Non-motorised user amenity: significance short term major adverse effect.

Users of Public Rights of Way

- Severance: significant short term major adverse effect.
- Pedestrian Delay (including all non-motorised users): significant short term moderate adverse effect.
- Non-motorised user amenity: significant short term major adverse effect.
- Road Safety: significant short term major adverse effect.

Users of Bryngarn Road: Additional mitigation and residual effect

- 8.9.81 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.

- 8.9.82 Bryngarn Road (northern) is a rural road, routing north from Pencoed towards Mynydd y Gaer, the existing Mynydd y Gaer car park and other leisure facilities such as the South Wales Equestrian Centre.
- 8.9.83 As a result, it is considered that it is largely used for leisure purposes.
- 8.9.84 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.
- 8.9.85 A CTMP, 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.
- 8.9.86 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.
- 8.9.87 Together, these mitigation measures will limit the volume of construction traffic, thereby minimising severance and any impact on non-motorised user amenity.
- 8.9.88 They will also seek to limit the impact of construction traffic during leisure hours where Bryngarn Road (northern) is often used to access recreational facilities, thereby minimising severance and any impact on non-motorised user amenity.
- 8.9.89 It is also important to note that the impact of construction traffic is in part driven by the very low baseline traffic flows along Bryngarn Road (northern). The addition of temporary peak construction traffic is forecast to increase the daily traffic flow along Bryngarn Road (northern) from 239 vehicles per day to 351 vehicles per day.
- 8.9.90 This increase translates to an average rise in vehicle frequency from one vehicle every six minutes to one every four minutes.
- 8.9.91 This means that along the short section of Bryngarn Road (northern), 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 of loss of non-motorised user amenity.

8.9.92 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.

8.9.93 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.

Public Right of Way Users: Additional mitigation and residual effect

8.9.94 The significant short term adverse effects of severance, pedestrian delay (including all non-motorised users), non-motorised user amenity and road safety all relate to the temporary introduction of vehicular traffic to an otherwise untrafficked area during the temporary construction period.

8.9.95 As detailed in Paragraphs 8.9.85 to 8.9.87, a CTMP and Staff Travel Plan can be implemented which will help limit the volume of construction traffic. They will also seek to limit the effect of construction traffic during leisure hours, when the PRoW network is most used. It will also provide leisure users with advanced warning of any abnormal load movements so that any leisure activities can be planned accordingly.

8.9.96 Additional mitigation can be provided for PRoW users in the form of an Onsite Traffic Management Plan, secured as part of any consent. This will set out a series of measures for the contractor to implement, such as:

- Public information noticeboards / updates to project website offering details on where and when works are taking place during the current month so that recreational users have the option to avoid these areas.
- Site specific training could be provided to on-site drivers, regarding specific concerns in routing large vehicles past pedestrians, cyclists and horse riders. Examples include ensuring minimum passing distances, giving way or stopping on site of horse riders.
- In areas of potential conflict, proximity to PRoW, or PRoW crossings, provide barriers or formally signed crossing points to offer separation and the safe passage of PRoW users.
- Offer regular reminders to site staff in team meetings that PRoW users may be present.
- Provide warning signage for site traffic on approach to the PRoW network that PRoW users may be present.
- Ensure that site traffic adheres to on-site speed limits, particularly in the vicinity of the PRoW network.

- 8.9.97 Taking the additional mitigation into account, it is assessed that the residual effect of severance will be a short-term minor adverse effect, which is not significant.
- 8.9.98 Taking the additional mitigation into account, it is assessed that the residual effect of pedestrian delay (including all non-motorised users) will be a short-term minor adverse effect, which is not significant.
- 8.9.99 Taking the additional mitigation into account, it is assessed that the residual effect of non-motorised user amenity will be a short-term minor adverse effect, which is not significant.
- 8.9.100 Taking the additional mitigation into account, it is assessed that the residual effect of road safety will be a short-term minor adverse effect, which is not significant.

Operation and maintenance

- 8.9.101 Operational traffic is not scoped into the Transport EIA. The only operational assessment required is an assessment of the on-site highway space required for operation of the windfarm and ongoing maintenance.
- 8.9.102 Each turbine is provided with a circa 850 m² permanent area of hardstanding, which is considered appropriate for the routine ongoing operation and maintenance of the site.

Decommissioning

- 8.9.103 Decommissioning is not scoped into the Transport EIA.

8.10 Cumulative Effects

- 8.10.1 The assessment of cumulative effects for Transport 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.
- 8.10.2 Volume 1, Chapter 4: Approach to Environmental Assessment lists the cumulative projects considered as part of this ES.
- 8.10.3 Regarding the impact of cumulative construction traffic, no significant traffic volumes associated with the cumulative projects are expected to use highway links considered within this ES.
- 8.10.4 Regarding the impact of cumulative development resulting in greater baseline traffic volumes, this will have the effect of reducing the net impact of development traffic associated with Mynydd y Gaer, reducing the minor impacts associated with short-term construction traffic from this application.
- 8.10.5 Therefore, no residual cumulative Transport effects are anticipated during construction of the Proposed Development.

8.11 Inter-related effects

8.11.1 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 Transport 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.

8.11.2 IEMA guidelines note the link between development traffic and air quality, acoustics (noise), landscape and visual, terrestrial ecology and historic environment assessments. These are addressed within their own standalone ES Chapters.

8.12 Summary of environmental effects, mitigation measures and monitoring

8.12.1 **Table 8.29** presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 8.29: Summary of potential environmental effects, mitigation and monitoring (All construction phase only)

Receptor	Description of impact	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Users of Bryngarn Road (northern)	Severance	High	High	Short-term major adverse, significant	CTMP 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	CTMP 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 Rhiwceiliog Pencoed	Severance	High	Low	Short-term minor, not significant	n/a	n/a	n/a
	Driver Delay	Negligible	Low	Negligible, not significant	n/a	n/a	n/a

	Pedestrian Delay (including all non-motorised users)	Negligible	Low	Negligible, not significant	n/a	n/a	n/a
	Non-motorised user amenity	Negligible	Low	Negligible, not significant	n/a	n/a	n/a
	Fear and Intimidation	Negligible	Low	Negligible, not significant	n/a	n/a	n/a
	Road Safety	Negligible	Low	Negligible, not significant	n/a	n/a	n/a
						CTMP	
	Severance	High	Very High	Short-term major adverse, significant	Staff Travel Plan On-site Traffic Management Plan Public Information	Short-term minor, not significant	n/a
Users of On-site Public Rights of Way	Driver Delay	Not applicable	Very High	Negligible, not significant	n/a	n/a	n/a
						CTMP	
	Pedestrian Delay (including all non-motorised users)	Low	Very High	Short-term moderate adverse, significant	Staff Travel Plan On-site Traffic Management Plan	Short-term minor, not significant	n/a

Public Information						
Non-motorised user amenity	High	Very High	Short-term major adverse, significant	CTMP	Short-term minor, not significant	n/a
				Staff Travel Plan		
				On-site Traffic Management Plan		
Public Information						
Fear and Intimidation	Negligible	Very High	Short-term minor, not significant	n/a	n/a	n/a
Road Safety	High	Very High	Short-term major adverse, significant	CTMP	Short-term minor, not significant	n/a
				Staff Travel Plan		
				On-site Traffic Management Plan		
Public Information						

^a C=construction, O=operational and maintenance, D=decommissioning

8.13 References

Bridgend County Borough Council Local Development Plan up to 2033. Available at: <https://www.bridgend.gov.uk/residents/planning-and-building-control/replacement-local-development-plan/adopted-bridgend-replacement-local-development-plan-2018-2033/>, accessed January 2025.

Design Manual for Roads and Bridges (2020) LA 104 Environmental assessment and monitoring. Available at: <https://www.standardsforhighways.co.uk/dmrb>, accessed January 2025.

Design Manual for Roads and Bridges (2020) LA 112 Population and Human Health. Available at: <https://www.standardsforhighways.co.uk/dmrb>, accessed January 2025.

Department for Transport (2023) TAG unit M4 forecasting and uncertainty. Available at: <https://www.gov.uk/government/publications/tag-unit-m4-forecasting-and-uncertainty>, accessed January 2025.

Institute of Environmental Management and Assessment (2023) Guidelines: Environmental Assessment of Traffic and Movement. Available at: <https://www.iema.net/media/5mrmquib/iema-report-environmental-assessment-of-traffic-and-movement-rev07-july-2023.pdf>, accessed January 2025.

Welsh Government (2021) Future Wales: The National Plan 2040. Available at: <https://www.gov.wales/future-wales-national-plan-2040-0>, accessed January 2025.

Welsh Government (2024) Planning Policy Wales Edition 12. Available at: <https://www.gov.wales/planning-policy-wales>, accessed January 2025.

Welsh Government (2007) TAN 18 Transport. Available at: <https://www.gov.wales/technical-advice-note-tan-18-transport>, accessed January 2025.

9 Historic Environment

9.1 Introduction

9.1.1 This chapter of the Environmental Statement assesses the likely significance of the effect of the Proposed Development upon the archaeological and heritage resource (the Historic Environment) within the Site and surrounding area.

9.1.2 A desk-based assessment (DBA) of archaeology and heritage impacts attributable to the Proposed Development has been undertaken by Heneb-Dyfed Archaeology (Poucher 2024). This work was carried out in order to identify the archaeological and heritage constraints surrounding the development of the site and assess any potential impacts on those features within the study area. This will be combined with subsequent geophysical survey and archaeological evaluation to provide a current assessment of impacts in due course.

9.1.3 Both potential ‘direct’ and ‘indirect’ impacts on the historic environment are considered. Where likely significant adverse effects are identified, mitigation measures to prevent, reduce, or offset them are proposed, and likely residual effects remaining after mitigation are determined

9.2 Legislative and Policy Context

Legislation

- **The Historic Environment (Wales) Act 2023** (Welsh Government 2024)

9.2.1 The Historic Environment (Wales) Act consolidates multiple previous acts relating to the historic environment of Wales. The control of works affecting historic assets are included in Part 2 scheduled monuments, Part 3 listed buildings, Part 4 conservation areas, Part 6 registered parks and gardens, historic place names and historic environment records

National Planning Policy Context

9.2.2 The key national planning policy documents relevant to the assessment of the Historic Environment 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).

9.2.3 **Table 9.1** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of the

Historic Environment, 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
Future Wales: The National Plan 2040	
<p>The Proposed Development area lies within one of ten pre-assessed areas for wind energy development (Area 9). There is a presumption in favour of large scale wind energy development in these areas, subject to various criteria to avoid unacceptable impacts to the environment.</p> <p>Policy 18 – Renewable and Low Carbon Energy Developments of National Significance, outlines these criteria, which includes:</p> <p><i>6. there are no unacceptable adverse impacts on statutorily protected built heritage assets</i></p>	<p>The Historic Environment chapter of the ES assesses the likely significance of the effect of the Proposed Development upon all heritage assets (including ‘built heritage assets’) within the Site and surrounding area. Where likely significant adverse effects are identified, mitigation measures to prevent, reduce, or offset them are proposed.</p> <p>Scoping advice has been sought from Cadw and included within the ES chapter. Further advice is being sought from Heneb-The Trust for Welsh Archaeology, in their role as archaeological advisors to the local planning authority.</p> <p>The Historic Environment chapter of the ES assesses the likely significance of the effect of the Proposed Development upon all heritage assets, which includes scheduled monuments, listed buildings, conservation areas, registered parks and gardens, registered battlefields, historic landscapes of Wales, and assets included within the historic environment records.</p>
Planning Policy Wales Edition 12	
<p>Chapter 6, ‘Distinctive and Natural Places’, explains how planning systems must take into account the Welsh Government’s objectives to protect, conserve, promote and enhance the historic environment as a resource for the general well-being of present and future generations. It also sets out the planning policies for the sustainable management of specific categories of historic environment assets.</p>	<p>The Historic Environment chapter of the ES is informed by a desk-based assessment which identifies the known and potential elements of the historic environment, taking into the account the sources of information and guidance outlined within Chapter 6 of PPW (Ed.12). The Historic Environment chapter of the ES assesses the likely significance of the effect of the Proposed Development upon these identified assets.</p>
TAN [24] The Historic Environment	

<p>This technical advice note provides guidance on how the planning system considers the historic environment during development, plan, preparation and decision making on planning and Listed Building Consent applications. It also provides specific guidance on designated historic environment assets should be considered.</p>	<p>Scoping advice has been provided by Cadw, who provide advice and decisions on planning applications affecting nationally significant historic environment features. These assets have been included within the assessment up to 5km from the development boundary, and within the Zone of Theoretical Visibility beyond this point, where designed views have been identified.</p>
--	---

Local Planning Policy Context

9.2.4 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of the Historic Environment for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024

9.2.5 **Table 9.1** provides a summary of the provisions contained within the local plan relevant to the assessment of the Historic Environment, including how and where these have been considered in the ES.

Table 9.1: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
Strategic Policy SP18 Conservation of the Historic Environment	<p>Development proposals must protect, conserve, and, where appropriate, preserve and enhance the significance of historic assets, including their settings. In particular, there is a general presumption in favour of the preservation or enhancement of the significance of historic assets and their settings including:</p> <ul style="list-style-type: none"> (1) World Heritage Sites; (2) Scheduled Monuments; (3) Archaeologically Sensitive Areas and Archaeological Remains; (4) Listed Buildings; (5) Conservation Areas; (6) Historic Parks and Gardens; (7) Historic Landscapes 	<p>The Historic Environment chapter of the ES assesses the likely significance of the effect of the Proposed Development upon all heritage assets listed within SP18 within the Site and surrounding area. Where likely significant adverse effects are identified, mitigation measures to prevent, reduce, or offset them are proposed.</p>
SP13: Renewable and Low Carbon Energy Development	<p>Renewable and low carbon development proposals which contribute to meeting national and local renewable and low carbon energy and energy efficiency targets will be permitted where:</p>	<p>As above.</p>

a) It can be demonstrated that there will be no unacceptable impacts on the natural and historic environment or local communities (such as noise and air pollution) and that no other unacceptable cumulative impacts will arise.

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 the 25 August 2023. Key issues raised by statutory bodies specific to the Historic Environment are listed in **Table 9.2**, including how and where these have been considered in the ES.

Table 9.2: Summary of scoping responses relevant to the Historic Environment

Comment	How and where considered in the ES
PEDW	
<p>PEDW issued its scoping direction on 25th August 2023</p>	<p>Although Table 1 id 47-49 referenced the need for a Heritage Impact Assessment, the PEDW scoping did not include the Historic Environment or Cultural Heritage as a specific topic to be scoped in, under Chapter 7.1. However, advice from Cadw dated 19th May 2023 and from BCBC dated 11th July 2023 (see both responses below) was included within the appendices.</p>
Cadw	
<p>In general Cadw concurred with the approach and methodology outlined in Chapter 7: Historic Environment of the scoping report produced by RPS.</p>	<p>The assessment will consider the likely effects of the project on the significance of historic assets, including buried archaeological remains. It will consider:</p> <ul style="list-style-type: none"> • the effects of construction upon the physical fabric of assets within the Site; • the effects of the operational phase of the project upon the setting of designated assets and non-designated assets within 5 km of the Site and within the Zone of Theoretical Visibility ZTV, or beyond 5 km of the Site and within the ZTV in the case of historic assets with designed views towards the Site; • the effects of the operational phase of the project on the character of the historic landscape; and • the cumulative operational effects of the project and other developments within the vicinity of the Site.
<p>Cadw highlighted that Section 9.11 of the scoping report noted the potential requirement for geophysical surveys and archaeological evaluations to be undertaken to determine the significance and extent of the archaeological resource. Cadw suggested that this should be carried out prior to the completion of the EIA.</p>	<p>Discussions are currently ongoing to agree the extent and methodology for selective geophysical survey and archaeological evaluation of the Proposed Development area. These works will be undertaken in 2025 and the results will be included in the final ES.</p>

Comment	How and where considered in the ES
Cadw identified designated historic assets within the 5km study area and request a stage 1 assessment (Identify Historic Assets) as per the guidance in “The Setting of Historic Assets in Wales”.	Slight changes in the layout of the design proposals have resulted in a re-identification of those designated historic assets included within the given study area. This Stage 1 assessment was undertaken within the desk-based assessment (Poucher 2024), the results of which are included within the Historic Environment ES chapter, with the desk-based assessment included as an appendix.
Cadw identified that the boundary of scheduled monument GM084 Mynydd y Gaer extends into the submitted application area, therefore any proposed works in this area will need to be included within the EIA.	A preliminary assessment of the potential impact of proposed works on the site and setting of GM084 is included within the attached desk-based assessment, with the results included within the Historic Environment chapter of the ES. These impacts will be further refined during a subsequent stage of geophysical survey and archaeological evaluation, to be included as part of an updated EIA.
BCBC	
Bridgend County Borough Council responded on 11 th July 2023	No comments. The DNS application should be supported by a Heritage Impact Assessment.

Other consultation

9.3.3 Following scoping, consultation and engagement with interested parties specific to the Historic Environment has continued. These included discussions with the Development Management (Stewardship) section of Heneb – The Trust for Welsh Archaeology (Glamorgan-Gwent Region) in their role as advisors to the local planning authority regarding archaeology and the historic environment. Further detail regarding key items discussed and how these have been addressed is provided in Table 9.3 of this ES chapter below.

Table 9.3: Summary of other consultation relevant to the Historic Environment

Comment	How and where considered in the ES
Heneb – The Trust for Welsh Archaeology (Glamorgan-Gwent Region)	
A written scheme of investigation for an Historic Environment Desk-Based Assessment was produced, detailing the methodology by which the assessment would be undertaken. This was approved without further comment by Rob Dunning, Stewardship Officer at Heneb (Glamorgan-Gwent Region).	The subsequent Historic Environment Desk-Based Assessment has formed the basis of the assessment within the Historic Environment chapter of the ES. The desk-based assessment itself is included as an appendix.

Comment	How and where considered in the ES
Discussions have been ongoing with the Stewardship Officer to formulate an appropriate methodology for further assessment and evaluation within the development area. This will be detailed within a further written scheme of investigation which will be sent to the Stewardship Officer for comment and approval.	Subsequent geophysical survey and archaeological evaluation within the Proposed Development boundary will be carried out in 2025 and the results incorporated into the final EIA.

9.4 Assessment Methodology

Relevant Guidance

9.4.1 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, LA106: Cultural Heritage Assessment (Highways England et al., 2020).
- Standard and guidance for historic environment desk-based assessment (ClfA 2014, rev.2020).
- Heritage Impact Assessment in Wales (Cadw 2017)
- Setting of Historic Assets in Wales (Cadw 2017)
- The Conservation Principles for the Sustainable Management of the Historic Environment in Wales (Conservation Principles) (Cadw 2011)

Scope of the Assessment

9.4.2 Taking into account the scoping and other consultation, **Table 9.4** summarises the issues considered as part of this assessment.

Table 9.4: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Groundworks	Direct (physical) impact, noise and visual impact
Operation and maintenance	
Tall structures	Indirect (mainly visual) impact through development within the setting of designated historic assets

Decommissioning	
Groundworks	Direct (physical) impact, noise and visual impact

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 9.5**.

Table 9.5: Issues scoped out of the assessment

Issue	Justification
Designated historic assets located beyond 5km from the boundary of the Proposed Development area.	Effects on designated historic assets located more than 5 km from the boundary of the project Site will not be assessed due to the low likelihood of significant effects being received, except where the asset includes a designed view towards the project Site.

Study area

- 9.4.4 The Historic Environment study area comprises a ridge of high ground known as Mynydd y Gaer and Waun Wen in Bridgend County Borough. Much of the ridge comprises unenclosed grazed upland moorland and grasses, crossed by a series of unenclosed, and often ill-defined tracks. One single-track road crosses the common from north to south towards the eastern end of the site. The open common is surrounded by enclosed farmland on valley slopes and lower ground, largely small to medium irregular fields of pasture, bounded by dry stone walls and post-and-wire fencing. A block of coniferous plantation lies centrally on the northern side of the ridge.
- 9.4.5 Considering the size and nature of the Proposed Development, a study area that includes the Proposed Development area and a 1km buffer around it has been used to assess potential impacts on non-designated historic assets and establish the archaeological potential of the Proposed Development area.
- 9.4.6 The assessment also considered the effect of the Proposed Development on the setting of high status historic assets within 5 km of the Site and within the Zone of Theoretical Visibility (ZTV), or beyond 5 km of the Site and within the ZTV in the case of historic assets with designed views towards the Site.
- 9.4.7 These study areas were initially agreed with Cadw at the scoping stage, following the Welsh Government guidance given in the document “The Setting of Historic Assets in Wales”.
- 9.4.8 These study areas were also subsequently agreed with the Stewardship Officer at Heneb-The Trust for Welsh Archaeology (Glamorgan-Gwent Region), in their role as archaeological advisors to the local planning authority.

9.5 Assessment Criteria and Assignment of Significance

- 9.5.1 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.
- 9.5.2 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).
- 9.5.3 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.

Receptor Value and Sensitivity

- 9.5.4 The criteria for defining sensitivity (sometimes described as heritage value) in this chapter of the ES are outlined in **Table 9.7** below.

Table 9.6 : Sensitivity criteria

Sensitivity/Value	Definition
Very High	Very high importance and rarity, international scale, very limited potential for substitution. This includes World Heritage Sites (including nominated sites), assets of acknowledged international importance and assets that can contribute significantly to acknowledged international research objectives.
High	High importance and rarity, national scale and limited potential for substitution. This includes designated assets (scheduled monuments, listed buildings, registered parks and gardens, conservation areas, registered historic landscapes) including proposed sites, non-designated assets of schedulable or listing quality and importance, assets that can contribute significantly to acknowledged national research objectives.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution. Designated or non-designated assets that contribute to regional research objectives.
Low	Low or medium importance and rarity, local scale. Non-designated assets of local importance, assets compromised by poor preservation and/or poor survival of contextual associations, assets of limited value, but with potential to contribute to local research objectives.
Negligible	Very low importance and rarity, local scale. Assets with very little or no surviving archaeological interest.

Magnitude of impact

9.5.5 The criteria for defining magnitude in this chapter of the ES are outlined in **Table 9.8** below.

Table 9.7: 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 Change to most or all key archaeological materials, such that the resource is totally altered. Comprehensive changes to setting.
	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 Changes to many key archaeological materials, such that the resource is clearly modified. Considerable changes to setting that affect the character of the asset
	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 Changes to key archaeological materials, such that the asset is slightly altered. Slight changes to setting
	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 Very minor changes to archaeological materials, or setting
	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 9.8** below.

Table 9.8: Duration of impacts

Definition	Duration of impact	Definition
Temporary	Short term	Period of months, up to one year. e.g. construction phase impacts

Definition	Duration of impact	Definition
	Medium term	Period of more than one year, up to five years.
	Long term	Period of greater than five years. arising from the long-term presence of the development affecting the setting of a receptor
Permanent	Operational lifetime	An impact that occurs throughout the operational lifetime of the Proposed Development and those that persist beyond the predicted operational lifetime of the development. All direct impacts are considered to be permanent

Significance of effect

- 9.5.6 The significance of the effect upon the Historic Environment 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 9.9**. Where a range of significance levels is presented, the final assessment for each effect is based upon professional judgement.
- 9.5.7 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.
- 9.5.8 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, whilst those that are scored as moderate might be significant, subject to professional judgement. A score that is not significant does not negate the requirement for further mitigation.

Table 9.9: Assessment matrix for significance of effect

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
-----------	------------	-------	-------------------	-------	-------

9.5.9 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.
- **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 the iterative design process of the Proposed Development, and in determining a mitigation strategy.
- **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

9.5.10 It is assumed that the information held within the consulted datasets is sufficiently accurate for the purpose of assessing impacts on the historic environment resource. The Historic Environment Record and National Monuments Record Wales (the primary datasets used in the assessment) are records of known archaeological and historical assets. They are not exhaustive and do not preclude the existence of further assets which are unknown at present.

9.5.11 Areas of archaeological potential can be identified, but the precise nature of this resource is not fully understood at this stage. More detailed archaeological investigations, including geophysical survey and intrusive archaeological evaluation, are planned and the results will be included within the final ES, but as these data are not yet available the current assessment is reliant on the desk-based research and site walkover surveys.

9.5.12 Similarly work to date has not included a detailed assessment of the impact on the settings of all designated assets within 5km of the development area,

although a Stage 1 assessment has been undertaken (see Table 1.3). A full detailed assessment of setting impacts will be carried out as part of the subsequent suite of archaeological investigations outlined above.

9.6 Baseline Environment Conditions

Desk studies

9.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment for the Historic Environment. The existing studies and datasets referred to as part of the desk-based review for the Historic Environment are summarised in Table 9.10 below.

Table 9.10: Summary of desk study sources

Title	Source	Year published	Author
Mynydd y Gaer Wind Farm, Bridgend: Historic Environment Desk-Based Assessment	Dyfed Archaeological Services	2024	P. Poucher
Mynydd y Gaer Wind Farm, Bridgend: Cultural Heritage Desk-Based Assessment	RPS	2022	N.Cooke
Historic Environment Record	Heneb – The Trust for Welsh Archaeology (Glamorgan-Gwent region)	2024	Heneb
National Monument Record	Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW)	2024	RCAHMW
Scheduled monument, listed building, registered parks and gardens, conservation areas, registered historic landscape descriptions	Cof Cymru online database	2024	Cadw
Historic mapping	Various	1729, 1813, 1842, 1843, 1884, 1899, 1900, 1921, 1953, 1965	Anon (1842-3), E.Bowen (1729), Ordnance Survey (1813, 1884, 1899, 1900, 1921, 1953, 1965)
Aerial Photography	Various	1946-2023	Royal Air Force, Ordnance Survey, RCAHMW, Google.
Lidar data	DataMap Wales	2023	Welsh Government
Prehistoric funerary and ritual sites	Glamorgan-Gwent Archaeological Trust, unpublished report	2006	E.Evans and F.Olding

Military Aircraft Crash sites in Southeast Wales	Glamorgan-Gwent Archaeological Trust, unpublished report	2013	P.W.Huckfield and J.Burton
Archaeological watching brief VHP 14, Phase II, Nantgarw – Margam	Glamorgan-Gwent Archaeological Trust, unpublished report	1994	N.Page
Prehistoric defended enclosures in Glamorgan with recommendations for fieldwork	Glamorgan-Gwent Archaeological Trust, unpublished report	2005	H.Wiggins and E.Evans

- 9.6.2 The latest historic environment desk-based assessment (Poucher 2024) draws together information from all the listed and readily available sources. This assessment is included in Volume 3, Annex of the ES.
- 9.6.3 Areas of both general archaeological potential and specific sites of archaeological interest have been identified within the Proposed Development area.
- 9.6.4 The presence of cairn sites (PRN 00353m, PRN 00354m and PRN 05185m) in the locality suggests a low to medium potential for Bronze Age archaeological remains within the Proposed Development area. No specific areas of interest have been highlighted, although areas both close to the cairn sites and close to local watercourses may have a slightly heightened archaeological potential.
- 9.6.5 The presence of defended enclosures suggests a low to medium potential for Iron Age archaeological remains within the Proposed Development area. It is suggested that the ridge approach to Mynydd-y-Gaer hillfort (PRN 00383m / GM084) may be an area of heightened archaeological potential.
- 9.6.6 Medieval activity is recorded in the locality which would suggest a low to medium potential for medieval archaeological remains within the Proposed Development area. Some of the trackways across the common may have medieval origins, as may some of the local farms. The site of a cross and a beacon on the common is also suggested, but not closely located.
- 9.6.7 There is also a potential for post-medieval archaeological remains within the Proposed Development area, but these have largely been identified as specific archaeological sites and are outlined below.
- 9.6.8 Sixteen specific sites of archaeological interest have been identified. These sites include terraced platforms and banks (PRN 06279m to 06284m, NPRN 408433, 408434, 91966 and 91968, and MG06) that may represent deserted rural settlements, a series of historic trackways (PRN 00882.0m, MG02, MG03 and MG04), a pillow mound (NPRN 408432), coal pits (MG05) and a farmstead (PRN 09131m). A Second World War aircraft crash site (PRN 07907m) has also been recorded, and several extant historic field boundaries are also noted. The development site also lies within a Landmap Historic Landscape area.

9.6.9 In addition to these assets within the Proposed Development area, a potential impact to the setting of assets outside the development area have been identified. These include four scheduled monuments, ten listed buildings and one conservation area.

Site-specific surveys

9.6.10 Site specific surveys were undertaken to inform the baseline assessment for the Historic Environment. A summary of the site specific surveys undertaken to inform this chapter of the ES are provided in Table 9.11.

Table 9.11: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
Site walkover survey	To identify sites of potential archaeological interest and inform the findings from the desk-based assessment.	15/08/2024

9.6.11 The results of the site walkover survey have been incorporated into the historic environment desk-based assessment (Poucher 2024), which is included in Volume 3, Annexes.

Future baseline conditions

9.6.12 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.

9.6.13 For the foreseeable future, the baseline conditions are unlikely to change from the type of farming that is currently the main land-use of the area, both as common land grazing, and private agricultural practices.

Key receptors

9.6.14 **Table 9.12** identifies the receptors taken forward into the assessment for the Historic Environment.

Table 9.12: Key receptors taken forward to assessment

Receptor	Description

<p>Scheduled monument – High value GM084 Mynydd y Gaer hillfort</p>	<p>A probable Iron Age hillfort, located at the end of the ridge, surrounded by a single but prominent bank and ditch. Breaks in the defences may indicate the defences are unfinished or damaged. Part of the scheduled area extends into the boundary of the Proposed Development area. The hillfort is located at the end of a relatively level, accessible and traversable ridge to the northwest. The topography would suggest this ridge provides an area of increased archaeological potential associated with this site.</p>
<p>Scheduled monument – High value GM294 Mynydd Mandy Round Cairn</p>	<p>A relatively well-preserved Bronze Age round cairn lying on high ground, currently amongst the Mynydd Maendy wind turbines. The cairn is sited on the southern side of the ridge top, therefore both prominently visible from lower lying ground to the south, and with extensive views southward. The location of the monument appears to have been deliberately chosen for these views. The site shares an inter-visibility with the Bronze Age cairn sites (PRNs 00353m and 00354m) on Mynydd-y-gaer to the west.</p>
<p>Scheduled monument – High value GM338 St Peter’s Church</p>	<p>A ruinous medieval parish church. The history of the church has not been examined in detail but the masonry is assumed to be largely medieval with a piscina present. The church is shown on 18th century mapping, and 18th century graves are recorded in the graveyard but is marked as ruined on the tithe map of the 1840s. There is a suggestion that the church may lie within an earlier curvilinear enclosure, although this is very uncertain. The site has been linked to mythical stories of King Arthur and was the subject of a privately funded excavation in 1990 purportedly finding evidence of this link, but the results have not been professionally verified. There is no clear evidence of associated settlement, although early references to ‘Peterston’ suggest there may have been one, but the church appears to have served a largely rural community.</p>
<p>Scheduled monument – High value GM356 Camp at Cwm Llwyd</p>	<p>A hillfort of likely Iron Age date built on a small promontory on the western side of a steep-sided stream valley on the southern slopes of Mynydd-y-gaer. The site is defended by a prominent bank and ditch to the north, which peters out on the remaining sides, largely defended by the steep natural slopes.</p>
<p>Conservation Area – Medium value Llangeinor</p>	<p>A small conservation area including three principal dwellings and a village green on elevated land to the northwest of Mynydd y Gaer with noted viewpoints.</p>
<p>Listed building grade II – Medium value 18602 Capel Newydd</p>	<p>Early 19th century Calvinistic Methodist chapel in Glynogwr to the north. Remodelled and altered in 1849 and 1904-5.</p>
<p>Listed building grade II* - High value 18604 Church of St Tyfodwg</p>	<p>Parish church with some medieval masonry, extensively altered and rebuilt in the later 19th century. Potentially on the site of an early medieval predecessor. Lies in Glynogwr to the north.</p>
<p>Listed building grade II – Medium value 18606 Blackmill War Memorial</p>	<p>War memorial in Blackmill to the northwest, erected following the First World War.</p>
<p>Listed building grade II – Medium value 19049 Wern Tarw</p>	<p>Farmhouse on the southern slopes of Mynydd y Gaer with 17th, 18th and 19th century elements, listed as an example of the organic development of a Glamorgan farmhouse.</p>
<p>Listed building grade II – Medium value 19050 Barn at Wern Tawr</p>	<p>18th to early 19th century threshing barn associated with Wern Tarw farmhouse.</p>

Listed building grade II – Medium value 18605 Fox and Hounds	A late 18 th or early 19 th century public house built in a Georgian style, in Blackmill to the northwest.
Listed building grade II – Medium value 18603 Paran Capel y Bedyddwr.	An early 19 th century Baptist chapel, important in the religious history of the Ogmore Valley and also known for its attached school which ran until the 1940s.
Listed building grade II – Medium value Jenkins Monument (18607)	Jenkins family grave monument, erected in c.1830 in the graveyard of Paran Chapel, Blackmill. The Jenkins family were important in the establishment of the local chapel.
Listed building grade II – Medium value 18608 Evans Chest Tomb	A chest tomb for Mary and Henry Evans, c.1868. Part of a group of monuments in the graveyard of Paran Chapel, Blackmill.
Listed building grade II – Medium value 18609 Edwards Monument	A tomb and granite obelisk for Sarah and Colwyn Edwards, c.1909. Part of a group of monuments in the graveyard of Paran Chapel, Blackmill.
Landmap Historic Landscape Aspect Area – Medium value CYNONHL645 Mynydd y Gaer and Allt y Rhiw	An non-designated historic landscape area drawn largely around the boundaries of the common land of Mynydd y gaer. The presence of building platforms and longhuts are a noted part of the archaeological element to this landscape.
Non-designated asset (HER) – Low value PRN 00882.0m Mynydd y Gaer trackway	A series of extant trackways across the common, with potential medieval origins but used during the post-medieval period.
Non-designated asset (HER) – Medium value PRN 06279m Mynydd y Gaer building platform	Part of an area of terraced platforms, banks, enclosures and trackways representing a likely post-medieval deserted rural settlement.
Non-designated asset (HER) – Medium value PRN 06280m Mynydd y Gaer building platform	Part of an area of terraced platforms, banks, enclosures and trackways representing a likely post-medieval deserted rural settlement
Non-designated asset (HER) – Medium value PRN 06281m Mynydd y Gaer platform enclosure	Part of an area of terraced platforms, banks, enclosures and trackways representing a likely post-medieval deserted rural settlement
Non-designated asset (HER) – Medium value PRN 06282m Mynydd y Gaer building platform	Part of an area of terraced platforms, banks, enclosures and trackways representing a likely post-medieval deserted rural settlement
Non-designated asset (HER) – Medium value PRN 06283m Mynydd y Gaer building platform	Part of an area of terraced platforms, banks, enclosures and trackways representing a likely post-medieval deserted rural settlement
Non-designated asset (HER) – Medium value PRN 06284m Mynydd y Gaer building platform	Part of an area of terraced platforms, banks, enclosures and trackways representing a likely post-medieval deserted rural settlement
Non-designated asset (HER) – High value PRN 07907m Lockheed Hudson T9442 KZS crash site	Crash site of a Lockheed Hudson in 1941, resulting in the death of four crewmen. No precise location given.
Non-designated asset (HER) – Medium value PRN 09131m Caner Mawr Farnstead	An extant later post-medieval farmstead.
Non-designated asset (NMR) – Medium value NPRN 91966 Gelli-Feddgaer, Platform Settlement	An area of terraced platforms and banks representing a likely post-medieval deserted rural settlement.
Non-designated asset (NMR) – Medium value NPRN 91968 Mynydd-y-Gaer, Platforms	Terraced platforms, possible post-medieval building platforms
Non-designated asset (NMR) – Low value NPRN 408432 Caner Mawr, Rabbit Warren	Post-medieval pillow mound
Non-designated asset (NMR) – Medium value NPRN 408433 Caner Mawr House Platforms (South)	A series of three terraced platforms, possible post-medieval deserted rural settlement.

Non-designated asset (NMR) – Medium value NPRN 408434 Caner Mawr House Platforms (North)	A pair of terraced platforms, possibly part of a post-medieval deserted rural settlement
Non-designated asset (from assessment) – Low value MG02 Trackway	Part of an area of terraced platforms, banks, enclosures and trackways representing a likely post-medieval deserted rural settlement
Non-designated asset (from assessment) – Low value MG03 Trackway/Boundary	A sunken linear feature, possibly a trackway or boundary feature of uncertain date
Non-designated asset (from assessment) – Low value MG04 Trackway/holloway	A sunken linear feature, possibly a holloway of uncertain date.
Non-designated asset (from assessment) – Medium value MG05 Coal Pits	A series of pits on the edge of the common, potentially a mix of post-medieval quarry sites and coal pits
Non-designated asset (from assessment) – Medium value MG06 Blaencrymlyn earthworks	A pair of earthworks of uncertain date and function.
Non-designated asset (from assessment) – Medium value General archaeological potential	Background archaeological potential, with a heightened potential for Bronze Age, Iron Age and Medieval archaeological remains.
Non-designated asset (from assessment) – Low value Historic field boundaries	Extant field boundaries enclosing the common land and sub-dividing surrounding farmland, largely of drystone wall construction. These field enclosures may range from late medieval to early 19 th century in date.

9.7 Key Parameters for Assessment

9.7.1 The maximum design parameters identified in **Table 9.13** 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 9.13: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Ground-breaking activities associated with construction and decommission.	✓	✗	✓	<p>Construction phase</p> <p>Damage to or destruction of identified and potential receptors through ground-breaking activity due to:</p> <ul style="list-style-type: none"> • topsoil stripping • excavations for access tracks, compounds, hard standings, borrow pits, turbine bases, cable runs • Landscaping works <p>Operation and maintenance phase</p> <ul style="list-style-type: none"> • None <p>Decommissioning phase</p> <p>Damage to or destruction of identified and potential receptors through ground breaking activity due to:</p> <ul style="list-style-type: none"> • excavations for access tracks, compounds, hard standings, • excavations to remove installed foundations 	The damage or destruction of receptors through ground-breaking activity would be considered a permanent impact.

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Other construction or decommissioning activities causing ground disturbance and impacts.	✓	✗	✓	<p>Construction phase</p> <p>Damage to identified and potential receptors through unintentional ground-breaking activity due to:</p> <ul style="list-style-type: none"> • vehicle movement across soft ground • storage of overburden • landscaping works <p>Operation and maintenance phase</p> <ul style="list-style-type: none"> • off-road vehicle movements around the site <p>Decommissioning phase</p> <ul style="list-style-type: none"> • vehicle movement across soft ground • landscaping works 	The damage or destruction of receptors through unintentional ground-breaking activity would be considered a permanent impact.

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Alterations to the setting of designated receptors	x	✓	x	<p>Construction phase</p> <p>Construction activity has the potential to impact upon the setting of designated receptors, through</p> <ul style="list-style-type: none"> removing or affecting the condition of elements that contribute to the setting of these receptors, affecting access to and from these receptors affecting visibility and noise to and from these receptors: <p>Operation and maintenance phase</p> <p>The operation of the wind farm has the potential to alter the setting of designated receptors, by</p> <ul style="list-style-type: none"> affecting significant views to and from the receptors, altering the understanding of the receptors, impacting the tranquillity of the receptors altering the traditional layout and use of the landscape associated with the receptors <p>Decommissioning phase</p> <p>None</p>	<p>Impacts to setting during the construction phase would be considered a temporary, short term impact.</p> <p>Impacts to setting during the operational life of the development would be considered a temporary, long term impact, or permanent (if the duration of operational life extends a generation or more).</p>

^a C=construction, O=operational and maintenance, D=decommissioning

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

- 9.8.1 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.
- 9.8.2 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').
- 9.8.3 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.
- 9.8.4 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.
- 9.8.5 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.
- 9.8.6 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.
- 9.8.7 Both embedded and additional mitigation measures relevant to the assessment of the Historic Environment are summarised in **Table 9.14** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 9.14: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
Consultation during development of initial design freezes to avoid known areas of significant archaeological remains	The layout of the Proposed Development has been adjusted to avoid identified archaeological remains as far as reasonably possible.
Further mitigation	
Geophysical survey of areas on the approach to scheduled monument GM084 and around the location of Turbine 9 to identify potential archaeological remains.	The survey has been commissioned and the work will be carried out in 2025 with the results incorporated into the final EIA.
Metal detector survey around the location of Turbine 6 to identify any potential remains of a World War II aircraft crash site	The survey has been commissioned and the work will be carried out in 2025 with the results incorporated into the final EIA.
Trenched archaeological evaluation throughout the Proposed Development area to identify the character and extent of potential archaeological remains.	The survey has been commissioned and the work will be carried out in 2025 with the results incorporated into the final EIA.
Ongoing consultation with archaeological consultants and the stewardship office at Heneb-The Trust for Welsh Archaeology (Glamorgan-Gwent region) to agree any ongoing mitigation measures for design and construction, such as marking out historic assets to avoid accidental damage, or archaeological investigation prior to or during groundworks, and subsequent reporting and archiving.	The Stewardship Officer provides advice to the local planning authority, therefore any further mitigation options can be dealt with through the planning process.

9.9 Assessment of effects

9.9.1 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 9.13, 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 phase

Sensitivity of the receptor

- 9.9.2 There are multiple receptors identified within the Proposed Development that could be affected by the impacts outlined above. The associated desk-based assessment (Poucher 2024, see Volume 3 (Annexes)) describes all receptors identified in the area, including those where no impact could be identified. Only the impacted receptors are presented below, with a brief discussion of their sensitivity. As also outlined in Table 1.14 the loss of some or all of the receptors through ground-breaking activities associated with the construction would be a permanent impact. Impacts to the settings of designated monuments are likely to be temporary impacts during the construction and operational phases. Within the initial assessment (Poucher 2024) sensitivity is largely a combination of the ‘potential’ and ‘value’ of the heritage assets, however, to remain consistent with the methodology criteria applied to the EIA “sensitivity” in the following paragraphs should be equated with the value of the receptor.
- 9.9.3 **GM084 Mynydd y Gaer hillfort.** The monument extends partly within the development boundaries, but no specific development works are planned within the scheduled area. The vulnerability of the receptor is therefore low, although as a site of national significance the value of the receptor is high.
- 9.9.4 Three further scheduled monuments are included, namely **GM294 Mynydd Mandy Round Cairn**, **GM338 St Peter’s Church** and **GM356 Camp at Cwm Llwyd**. All three sites lie outside the Proposed Development area, therefore there will be no direct (physical) impact upon them during the construction phase, although as sites of national significance the value of these receptors remains high.
- 9.9.5 **Llangeinor** (Conservation Area). The site lies outside the Proposed Development area, therefore there will be no direct (physical) impact upon it during the construction phase, although as a conservation area the value of the receptor remains medium.
- 9.9.6 There are seven listed buildings (grade II and grade II*) included, namely **18602 Capel Newydd**, **18604 Church of St Tyfodwg**, **18606 Blackmill War Memorial**, **19049 Wern Tarw**, **19050 Barn at Wern Tawr**, **18605 Fox and Hounds** and **18603 Paran Capel y Bedyddwr**. These sites lie outside the Proposed Development area, therefore there will be no direct (physical) impact upon them during the construction phase, although as listed buildings the value of these receptors remains medium - high.
- 9.9.7 Three listed buildings (grade II) lie within the churchyard of Paran Chapel, namely **18607 Jenkins Monument**, **18608 Evans Chest Tomb** and **18609 Edwards Monument**. The sites also lie outside the Proposed Development area, therefore there will be no direct (physical) impact upon them during the construction phase. As listed buildings they have heightened value, but as part of a group of monuments largely associated with 18603 Paran Chapel the value of these receptors is medium.

- 9.9.8 **CYNONHL645 Mynydd y Gaer and Allt y Rhiw** (Landmap Historic Landscape). This area largely corresponds to the common land upon which the development is focussed, and therefore there will be a large focus of development within this receptor making it vulnerable to construction works. This is not a designated historic landscape, but it is a well-defined and distinct historic landscape, therefore the value of the receptor is medium.
- 9.9.9 **PRN 07907m Lockheed Hudson T9442 KZS crash site**. This receptor will be the subject of further assessment to better understand its sensitivity to construction works, given that its precise location, extent and condition are not currently known. Presently, the lack of known remains and the relative accessibility of the site suggests a low potential for remains to exist. Although a non-designated asset, as a wartime crash site resulting in several fatalities it retains a high value.
- 9.9.10 **PRN 06279m Mynydd y Gaer building platform, PRN 06280m Mynydd y Gaer building platform, PRN 06281m Mynydd y Gaer platform enclosure, PRN 06282m Mynydd y Gaer building platform, PRN 06283m Mynydd y Gaer building platform, and PRN 06284m Mynydd y Gaer building platform**. These receptors represent a cluster of sites located in an area of constrained topography close to the location of Turbine 7. There is therefore a good potential for remains to exist that could be particularly sensitive to direct impacts during the construction phase. As a potential deserted rural settlement they are considered to be of medium value.
- 9.9.11 **NPRN 91966 Gelli-Feddgaer, Platform Settlement**. This receptor is spread across an area of enclosed farmland around Turbine 9. The extent and layout of this receptor will be further defined through subsequent survey work but it remains very sensitive to direct impacts during the construction phase. As a potential deserted rural settlement they are considered to be of medium value.
- 9.9.12 **NPRN 408433 Caner Mawr House Platforms (South) and NPRN 408434 Caner Mawr House Platforms (North)** may be part of a contemporary deserted rural settlement. They lie in close proximity to Turbine 4 and its access tracks and are therefore sensitive to direct impact through construction work. As a potential deserted rural settlement they are considered to be of medium value.
- 9.9.13 **PRN 09131m Caner Mawr Farmstead, MG05 Coal Pits and MG06 Blaencrymlyn earthworks** lie within the development boundary, and close to areas of proposed works, but appear to be discrete sites that lie outside the boundaries of specific works and therefore should have a lesser sensitivity to direct impacts during the construction phase. These receptors are considered to be of medium value.
- 9.9.14 **NPRN 91968 Mynydd-y-Gaer, Platforms**. This site lies within the development boundary, but outside the boundaries of specific works, with the two areas divided by a public footpath. The sensitivity to impacts is therefore minimal during construction works. This receptor is considered to be of medium value.
- 9.9.15 **PRN 00882.0m Mynydd y Gaer trackway, MG02 Trackway, MG03 Trackway/Boundary, MG04 Trackway/Holloway, NPRN 408432 Caner Mawr, Rabbit Warren and Historic field boundaries**. Many of these receptors are

linear features whose routes are crossed by elements of the Proposed Development and are likely to be directly affected by construction activities, therefore with a high sensitivity to impacts. These features are relatively common in the local landscape however, and are therefore of low value.

- 9.9.16 A **general archaeological potential** has been identified as a receptor within the development boundary. This potential will be further assessed through a series of subsequent archaeological investigations, therefore the sensitivity of this receptor to impacts during the construction phase are uncertain. Generally, however, there is considered to be a medium potential for archaeological remains to be present, which are given a medium value.

Magnitude of impact

- 9.9.17 The magnitude of the impact is dependent on the extent to which construction activities will impact upon the receptors and the condition and extent of those receptors. Archaeology deals with many unknowns and this area will be subject to further archaeological investigations that could improve or alter the current understanding of the condition and extent of the receptors.
- 9.9.18 The impacts from construction activities will be direct, adverse, permanent impacts upon the identified receptors through the loss of elements of these receptors that cannot be replaced.
- 9.9.19 Construction activity is currently considered to result in Negligible impact on **PRN 07907m Lockheed Hudson T9442 KZS crash site, PRN 09131m Caner Mawr Farnstead, NPRN 91968 Mynydd-y-Gaer, Platforms**, as development plans suggest groundworks are likely to avoid the core area of these receptors.
- 9.9.20 A Low impact has been identified on **CYNONHL645 Mynydd y Gaer and Allt y Rhiw, MG03 Trackway/Boundary, MG04 Trackway/Holloway and MG05 Coal Pits and MG06 Blaencrymlyn earthworks** during construction activity. These receptors lie close to areas of likely groundworks which could result in the loss of elements of these receptors.
- 9.9.21 A Medium impact has been identified on **PRN 00882.0m Mynydd y Gaer trackway, PRN 06279m Mynydd y Gaer building platform, PRN 06280m Mynydd y Gaer building platform, PRN 06281m Mynydd y Gaer platform enclosure, PRN 06282m Mynydd y Gaer building platform, PRN 06283m Mynydd y Gaer building platform, PRN 06284m Mynydd y Gaer building platform, NPRN 91966 Gelli-Feddgaer, Platform Settlement, MG02 Trackway, historic field boundaries and the general archaeological potential**. Development plans suggest construction works may impact on parts of these receptors, potentially resulting in the loss or change of many of the elements of these receptors.
- 9.9.22 A High impact has been identified on **NPRN 408433 Caner Mawr House Platforms (South), NPRN 408434 Caner Mawr House Platforms (North) and NPRN 408432 Caner Mawr, Rabbit Warren** as significant elements of these receptors appear to lie within areas of likely construction work.

Significance of the effect

- 9.9.23 As outlined in the assessment matrix (Table 1.10) those receptors with a low value and low magnitude of impact (**MG03 Trackway/Boundary, MG04 Trackway/Holloway**), a low value and medium magnitude of impact (**historic field boundaries**), a medium value but negligible magnitude of impact (**PRN 09131m Caner Mawr Farnstead, NPRN 91968 Mynydd-y-Gaer, Platforms**) have a **Negligible to Minor adverse effect**, which is not significant.
- 9.9.24 Receptors with a low value and medium magnitude of impact (**PRN 09131m Caner Mawr Farmstead, MG02 Trackway**), a medium value and low magnitude of impact (**CYNONHL645 Mynydd y Gaer and Allt y Rhiw, MG05 Coal Pits, MG06 Blaencrymlyn earthworks**), a high value and a negligible magnitude of impact (**PRN 07907m Lockheed Hudson T9442 KZS crash site**) have **Minor adverse effect**, which is not significant.
- 9.9.25 Receptors with a low value but high magnitude of impact (**NPRN 408432 Caner Mawr, Rabbit Warren**) have a **Minor or Moderate adverse effect**, and receptors with a medium value and medium magnitude of impact (**PRN 06279m Mynydd y Gaer building platform, PRN 06280m Mynydd y Gaer building platform, PRN 06281m Mynydd y Gaer platform enclosure, PRN 06282m Mynydd y Gaer building platform, PRN 06283m Mynydd y Gaer building platform, PRN 06284m Mynydd y Gaer building platform, NPRN 91966 Gelli-Feddgaer, Platform Settlement and the general archaeological potential**) have a **Moderate adverse effect**, which is significant.
- 9.9.26 Receptors with a medium value and a high magnitude of effect (**NPRN 408433 Caner Mawr House Platforms (South), NPRN 408434 Caner Mawr House Platforms (North)**) have a **Moderate or Major adverse effect**, which is significant.

Additional mitigation and residual effect

- 9.9.27 Additional mitigation, as outlined in table 1.15, will take the form of further archaeological investigations, comprising a geophysical survey and metal detecting survey of sensitive areas and a trenched archaeological evaluation of areas that may be disturbed through construction activities.
- 9.9.28 The geophysical survey and archaeological evaluation is intended to further define the understanding of the extent and condition of all receptors for which there is a moderate or major adverse impact, along with all other remaining receptors. This greater understanding therefore has the potential to alter the current definition of the sensitivity/value of the receptor, and allow for the agreement of further mitigation before or during the construction process to reduce the adverse impact on these receptors.
- 9.9.29 Taking this additional mitigation into account, it is assessed that there will be a **minor to moderate adverse residual affect** on those receptors with a previously held moderate to major adverse effect. A minor effect is considered not significant.

Operation and maintenance

Sensitivity of the receptor

- 9.9.30 The operational phase of the development has the potential to impact upon the setting of a limited number of receptors. A full assessment of this impact has not yet been undertaken which may result in a different understanding of these impacts, but suggested impacts from the currently preliminary assessment are outlined below. There will be no significant impact on the remaining receptors during the operational phase.
- 9.9.31 **GM084 Mynydd y Gaer hillfort, GM294 Mynydd Maendy Round Cairn, GM338 St Peter's Church and GM356 Camp at Cwm Llwyd** are all scheduled sites of national significance, therefore the value of these receptors is high.
- 9.9.32 **Llangeinor** is a conservation area, as such the value of the receptor is medium.
- 9.9.33 There are seven listed buildings (grade II and grade II*) included, namely **18602 Capel Newydd, 18604 Church of St Tyfodwg, 18606 Blackmill War Memorial, 19049 Wern Tarw, 19050 Barn at Wern Tawr, 18605 Fox and Hounds and 18603 Paran Capel y Bedyddwr**. The value of these receptors is medium - high.
- 9.9.34 Three listed buildings (grade II) lie within the churchyard of Paran Chapel, namely **18607 Jenkins Monument, 18608 Evans Chest Tomb and 18609 Edwards Monument**. The value of these receptors is medium.

Magnitude of impact

- 9.9.35 A low magnitude of impact is suggested for **GM084 Mynydd y Gaer hillfort**. The development will form a visible backdrop to the receptor, altering its current visual setting, temporarily limiting access and potentially affecting associated archaeology. The receptor itself and significant viewpoint should remain unaffected.
- 9.9.36 A low magnitude of impact is identified for **GM294 Mynydd Maendy Round Cairn**. Proposed Development will intrude on potential significant viewpoints altering the setting of this receptor.
- 9.9.37 A low magnitude of impact is identified for **GM356 Camp at Cwm Llwyd**. The development will change the visual backdrop to this receptor and thereby alter its setting, but an understanding of the receptor itself will not be affected.
- 9.9.38 A negligible magnitude of impact is identified for **GM338 St Peter's Church**, largely due to a build up of turbines in views from this receptor.
- 9.9.39 A low magnitude of impact is identified for **Llangeinor** conservation area. The conservation area itself will remain unaffected, but viewpoints towards the Proposed Development area are a noted element of this area.
- 9.9.40 A low magnitude of impact is identified for **18602 Capel Newydd, 18604 Church of St Tyfodwg**. Both receptors share similar views of the Proposed Development area.

- 9.9.41 A negligible magnitude of impact is identified for **18606 Blackmill War Memorial**, **19049 Wern Tarw**, **19050 Barn at Wern Tawr**, **18605 Fox and Hounds** and **18603 Paran Capel y Bedyddwr**. The development will be visible in shared viewpoints of these receptors.
- 9.9.42 A negligible magnitude of impact is identified for **18607 Jenkins Monument**, **18608 Evans Chest Tomb** and **18609 Edwards Monument**. The development will be visible in shared viewpoints of these receptors.

Significance of the effect

- 9.9.43 On the basis that the value of **GM084 Mynydd y Gaer hillfort** is high and the magnitude of the impact is low, it is assessed that there will be a **minor to moderate adverse effect**. A moderate effect would be considered significant.
- 9.9.44 Both **GM294 Mynydd Maendy Round Cairn** and **GM356 Camp at Cwm Llwyd** have a high value and a low magnitude of impact. This indicates there will a minor to moderate adverse effect. Given that the impact will be less than that of GM084, it is assessed that this will be **minor adverse effect**, which is not considered significant.
- 9.9.45 **GM338 St Peter's Church** has a high value with a negligible magnitude of effect. This is assessed as a **minor adverse effect**, which is not considered significant.
- 9.9.46 **Llangeinor** conservation area has a high value and a low magnitude of impact. This indicates there will a minor to moderate adverse effect. Given the lack of other impacts on this area it is assessed that this will be **minor adverse effect**, which is not considered significant.
- 9.9.47 **18602 Capel Newydd**, **18604 Church of St Tyfodwg** both have a high value and low magnitude of impact. This indicates there will a minor to moderate adverse effect. Given the lack of other impacts on these receptors it is assessed that this will be **minor adverse effect**, which is not considered significant.
- 9.9.48 **18606 Blackmill War Memorial**, **19049 Wern Tarw**, **19050 Barn at Wern Tawr**, **18605 Fox and Hounds** and **18603 Paran Capel y Bedyddwr** have high values but a negligible magnitude of impact, which is assessed as a **minor adverse effect**, which is not considered significant.
- 9.9.49 **18607 Jenkins Monument**, **18608 Evans Chest Tomb** and **18609 Edwards Monument** have a medium value and a negligible magnitude of effect, assessed as a **negligible to minor adverse effect**, which is not considered significant.

Additional mitigation and residual effect

- 9.9.50 Additional mitigation, as outlined in table 1.15, will take the form of further archaeological investigations, comprising a geophysical survey and metal detecting survey of sensitive areas and a trenched archaeological evaluation of areas that may be disturbed through construction activities.

9.9.51 It is anticipated that these archaeological investigations will further define the setting of **GM084 Mynydd y Gaer hillfort** through the identification of any associated activity on the ridgeway approach to GM084. An enhanced understanding of this setting will allow for further mitigation measures to be incorporated before or during construction activities to reduce adverse effects on the setting.

9.9.52 Taking the additional mitigation into account, and based on a current preliminary understanding of the impact upon the setting, it is assessed that there will be a **minor adverse residual effect** on GM084, which is not significant.

Decommissioning

Sensitivity of the receptor

9.9.53 Activity during the decommissioning stage of the development has the potential to affect those receptors outlined in the construction phase above. As a result of the construction phase the sensitivity of those receptors may have altered, either through their removal as part of the construction activity, or through a greater understanding of their nature, condition and extent. The sensitivity of these receptors is therefore likely to be either consistent with those outlined in the construction phase, or may have reduced for receptors within the development area.

Magnitude of impact

9.9.54 As outlined above, the impacts of the decommissioning phase will apply broadly to the same receptors impacted directly during the construction phase. The magnitude of the impact is likely to be reduced for all receptors however.

Significance of the effect

9.9.55 On the basis that the sensitivity of the receptors is likely to either be consistent or reduced from the construction phase and the magnitude of the impact is also likely to be reduced from the construction phase, it is assessed that there will be a range of **negligible to minor adverse effects**, which are not significant.

Additional mitigation and residual effect

9.9.56 No additional mitigation is proposed for the decommissioning stage.

Future monitoring

9.9.57 No future monitoring is required as a consequence of the assessment of historic environment, except where mitigation is required as determined by the planning authority.

9.10 Cumulative Effects

- 9.10.1 An assessment of cumulative effects for the Historic Environment will be carried out once a comprehensive assessment of the impact on the setting of receptors outlined above (section 1.9.30 to 1.9.52) has been undertaken. At present there is insufficient information to complete an assessment of cumulative effects.
- 9.10.2 The assessment of cumulative effects for the Historic Environment will follow 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.
- 9.10.3 The development types allocated to tier 1, tier 2 and tier 3 for the assessment of cumulative effect are summarised in **Table 9.15**.

Table 9.15: 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.

- 9.10.4 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 9.16**.

Table 9.16: List of other projects, plans and activities considered within the CEA.

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Construction period	Operational period	Temporal overlap with the Proposed Development
Tier 1						
Fforch Nest	Operational		Wind Farm (11 turbines in total)			
Pant y Wal and extensions	Operational/consented		Wind Farm (18 turbines in total)			
Taff Ely and repowering	Operational		Wind Farm (20 operational turbines, 7 proposed)			
Mynydd Portreth & extension	Operational		Wind Farm (17 turbines in total)			
Mynydd y Glyn	Consented		Wind Farm (7 turbines planned)			
Y Bryn	In planning		Wind Farm (21 turbines proposed)			
Tier 2						
N/A						
Tier 3						
N/A						

Cumulative effects assessment

- 9.10.5 Once further information and feedback, as well as visual modelling from the landscape architects has been obtained and a full assessment of the impacts upon the setting of surrounding designated receptors has been carried out, then a cumulative effects assessment can be undertaken. This assessment will be included together with the results from the geophysical surveys and archaeological evaluation, as part of a revised and updated ES chapter in six months time.
- 9.10.6 Once these results have been obtained the impacts with the greatest potential effects from the projects outlined above can be identified. The cumulative effects that will be presented and assessed will be 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.
- 9.10.7 As with direct impacts on receptors within the Proposed Development site the cumulative effects assessment will identify the sensitivity of the receptor, the magnitude of impact and the significance of effect for the construction, operational and decommissioning stages of the Proposed Development.
- 9.10.8 The inter-relationships will be considered between the Historic Environment with other topics as part of the ES. The assessment will consider 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.
- 9.10.9 A summary of potential cumulative environmental effects, additional mitigation measures and further monitoring will be provided in the updated ES chapter.

9.11 References

Cadw (1998) *Register of Landscapes of Outstanding Historic Interest in Wales*. Cardiff: Cadw

Ogwr Borough Council (1991) *Conservation Areas in the Borough of Ogwr Planning Dept.*

Rhondda Cynon Taf County Borough Council (2011) *Supplementary Planning Guidance: The Historic Built Environment*

Cooke, N. (2022) *Mynydd y Gaer Wind Farm, Bridgend: Cultural Heritage Desk-Based Assessment*. RPS Report

Evans, E & Olding, F (2006) *Prehistoric funerary and ritual sites*. Glamorgan-Gwent Archaeological Trust Report

Huckfield, P.W. & Burton, J. (2013) *GGAT 126: Military Aircraft Crash sites in Southeast Wales*. Glamorgan-Gwent Archaeological Trust Report

Page N. (1994) *Archaeological Watching brief VHP 14, Phase II, Nantgarw-Margam*. Glamorgan-Gwent Archaeological Trust Report 94/052

Poucher, P (2024) *Mynydd y Gaer Wind Farm, Bridgend: Historic Environment Desk-Based Assessment*. Dyfed Archaeological Services (Heneb) Report No.2024-43

Wiggins, H and Evans, E (2005) *Prehistoric defended enclosures in Glamorgan with recommendations for fieldwork*. Glamorgan-Gwent Archaeological Trust Report

Chartered Institute for Archaeologists.(2014) *Standard and guidance for historic environment desk-based assessment*. Available : http://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_3.pdf Accessed 14.02.2023

Welsh Government. (2017) *Planning Policy Wales: Technical Advice Note 24: The Historic Environment*. Cardiff: Cadw. Available: <https://www.gov.wales/technical-advice-note-tan-24-historic-environment> Accessed: 19.04.2024

Welsh Government. (2017) *Setting of Historic Assets in Wales*. Cardiff: Cadw. Available: <http://cadw.gov.wales/docs/cadw/publications/historicenvironment/20170531Setting%20of%20Historic%20Assets%20in%20Wales%2026918%20EN.pdf> Accessed 19.04.2024

Welsh Government. (2024) *Planning Policy Wales. Edition 12*. Cardiff. CADW. Available: https://www.gov.wales/sites/default/files/publications/2024-02/planning-policy-wales-edition-12_1.pdf Accessed 19.04.2024

10 Noise

10.1 Introduction

- 10.1.1 This chapter presents the assessment of noise effects from the construction and operation of the proposed Mynydd Y Gaer Windfarm on nearby noise-sensitive receptors.
- 10.1.2 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).
- 10.1.3 The assessment of operational noise has been undertaken through consultation with the appointed noise specialist for Bridgend 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”.
- 10.1.4 The assessment includes the cumulative impact from other wind energy developments both operating and within the planning system.
- 10.1.5 This chapter presents a summary of the assessment with the full details in the Rappor Consultants Limited technical report included in **Appendix 10.1**.

10.2 Legislative and Policy Context

National Planning Policy Context

- 10.2.1 The key national planning policy documents relevant to the assessment of noise 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).
- 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 noise, 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
Future Wales: The National Plan 2040	

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	
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 develops 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

Local Planning Policy Context

10.2.3 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of noise for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024

10.2.4 **Table 10.2** provides a summary of the provisions contained within the local plan relevant to the assessment of noise, 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
Policy SP13	Renewable and Low Carbon Energy Development should demonstrate that there will be no unacceptable impacts from noise	Noise assessment undertaken in accordance with current guidance and best practice

10.3 Consultation and Engagement

Scoping

- 10.3.1 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.
- 10.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to noise 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 noise

Comment	How and where considered in the ES
PEDW	
PEDW welcomes that consultation will be undertaken with BCBC Planning and Environmental Health departments regarding this chapter.	Consultation undertaken with appointed noise specialist at BCBC
<p>PEDW welcomes that a cumulative impact of all known proposed schemes (including those still awaiting a Planning Decision) will be undertaken.</p> <p>The Applicant's attention is drawn to comments by BCBC contained at Appendix 1 stating that cumulative noise measurements should be based on the maximum levels that surrounding wind farms could generate under their consents, referencing the Pant Y Wal wind farm and Pant Y Wal extension to the west of the site and the Mynydd Portref wind farm to the east of the site.</p>	Cumulative assessment of identified wind farms undertaken
BCBC	
Cumulative noise assessment should be based on maximum noise levels from surrounding consented schemes	Considered within the cumulative assessment.

Other consultation

- 10.3.3 Following scoping, consultation and engagement with interested parties specific to noise has continued. These included discussions with Acoustic 24,

the appointed noise specialist for BCBC regarding the baseline noise survey. Further detail regarding key items discussed and how these have been addressed is provided in **Table 10.4** of this ES chapter below.

Table 10.4: Summary of other consultation relevant to noise

Comment	How and where considered in the ES
Acoustic 24 – Appointed Noise Specialist for BCBC	
Pre-agreement on monitoring positions and also attended during initial equipment deployment	Baseline noise survey completed with their approval

10.4 Assessment Methodology

Relevant Guidance

10.4.1 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
- International Standard ISO 9613-2, Acoustics – Attenuation of Sound During Propagation outdoors – Part 2: General Method of Calculation, 1996

Scope of the Assessment

10.4.2 Taking into account the scoping and other consultation, **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	
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 and the IoA GPG.

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.

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
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

10.4.4 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 1 km from the boundary.

10.4.5 The location and geographic extent of the study area is presented in Volume 2, Figures, **Figure 10.1** of the ES.

10.5 Assessment Criteria and Assignment of Significance

Construction Noise Criteria

10.5.1 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.

10.5.2 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".

- 10.5.3 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

- 10.5.4 The assessment of operational noise from windfarms 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 LA90,10min for daytime and 43dB LA90,10min for night-time.
- 10.5.5 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.
- 10.5.6 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.
- 10.5.7 Full details of the above guidance documents are provided in **Appendix 10.1**.

Duration of impacts

- 10.5.8 The criteria for describing the duration of impacts in this chapter of the ES are outlined in **Table 10.7** below.

Table 10.7: 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

- 10.5.9 The significance of the effect upon noise has been determined by taking into account the thresholds for construction and operational noise as set out above. Where the predicted impacts are below these thresholds at a noise-sensitive receptor, it is considered that no significant effect occurs.

Assumptions and limitations of the assessment

- 10.5.10 No significant information gaps were identified, and the assessment was undertaken in line with relevant standards and policy documents.

10.6 Baseline Environment Conditions

Site-specific surveys

- 10.6.1 Site specific surveys were undertaken to inform the baseline assessment for noise. A summary of the surveys undertaken to inform this chapter of the ES are provided in **Table 10.8**.

Table 10.8: 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	18 th December 2024 – 31 st January 2025

- 10.6.2 A background survey was undertaken between Wednesday 18th December 2024 and Friday 31st January 2025. A total of eleven Noise Monitoring Locations (NML) were used as detailed in **Table 10.9**. These are considered to be representative of the nearest noise-sensitive receptors to the Proposed Development i.e. NML 1 is representative of NSR1.

Table 10.9: Noise Monitoring Locations

Noise Monitoring Location	Address	Easting	Northing
NML 1	Llwyn Helyg	295892	186785
NML 2	Gellifeddgaer Farm	296369	186612
NML 3	Cae Gwyn	296921	186535
NML 4	Pen Yr Heol	296942	186449
NML 5	Coedcae Farm	296899	185000
NML 7	Garddau Hen	295879	185414

NML 8	Garddau Hen	295505	185311
NML 9	Ty Gwilym	295300	185347
NML 10	Pentre Farm	293811	185716
NML 11	Blaencrymlyn	293823	186145
NML 12	Lan Farm	294321	186262

- 10.6.3 The survey duration exceeded the minimum recommended period as detailed in ETSU-R-97 and the IOA GPG to capture representative data through the range of wind speeds.
- 10.6.4 Through the site visits and baseline survey, the soundscape in the area can be defined as generally natural sounds such as wind induced noise and birdsong. Whilst road traffic noise was noted at some of the monitoring locations this was not considered the dominant source.
- 10.6.5 Further details of the existing conditions can be found in **Appendix 10.1** including charts of the measurement results. In general, background sound levels varied between ?? and ??dB as wind speed increased for the daytime period and between ?? and ??dB during the night-time period.
- 10.6.6 Details of the derivation of noise limits in accordance with ETSU-R-97 is presented in **Appendix 10.1** with the resultant limits presented in **Table 10.10** and **Table 10.11** below for the daytime and night-time period respectively.

Table 10.10: ETSU-R-97 Daytime Amenity Noise Limit

Noise Monitoring Location	Noise, dB L _{A90} , 10 min at standardised 10 m wind speed, ms ⁻¹								
	4	5	6	7	8	9	10	11	12
NML 1									
NML 2									
NML 3									
NML 4									
NML 5									
NML 7									
NML 8									
NML 9									
NML 10									

NML 11									
NML 12									

Table 10.11: ETSU-R-97 Night-time Noise Limit

Noise Monitoring Location	Noise, dB L _{A90} , 10 min at standardised 10 m wind speed, ms ⁻¹								
	4	5	6	7	8	9	10	11	12
NML 1									
NML 2									
NML 3									
NML 4									
NML 5									
NML 7									
NML 8									
NML 9									
NML 10									
NML 11									
NML 12									

Future baseline conditions

- 10.6.7 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.
- 10.6.8 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.

10.7 Key Parameters for Assessment

- 10.7.1 The maximum design parameters identified in **Table 10.12** 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 10.12: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Loss of amenity during construction and decommissioning of the Proposed Development	✓	✗	✓	<p>Construction phase</p> <ul style="list-style-type: none"> creation of construction compound, groundworks and turbine erection <p>Operation and maintenance phase</p> <ul style="list-style-type: none"> turbines operating following commissioning <p>Decommissioning phase</p> <ul style="list-style-type: none"> likely to results in similar activities to the construction phase 	The MDP considers the construction activities at the closest approach to each NSR and activities occurring simultaneously.
Loss of amenity during operation and maintenance of the Proposed Development	✗	✓	✗		The MDP considers all wind turbines operating unrestricted utilising the noise data of the candidate turbine provided by the manufacturer.

^a C=construction, O=operational and maintenance, D=decommissioning

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

- 10.8.1 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.
- 10.8.2 The key aspects where the design has evolved are described in Volume 1, Chapter 3: Needs 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').
- 10.8.3 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.
- 10.8.4 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.
- 10.8.5 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.
- 10.8.6 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.
- 10.8.7 Both embedded and additional mitigation measures relevant to the assessment of noise are summarised in **Chapter 2: Site and Project Description**. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

10.9 Assessment of effects

10.9.1 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 10.12**, 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.

Loss of Amenity

Construction phase

10.9.2 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.

10.9.3 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.

10.9.4 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 10.14**. 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 10.14: Noise Levels for Construction Activities (SPL at 10m), dB

BS5228 Reference	Activity	Octave Band Frequency, Hz							
		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

10.9.5 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.

10.9.6 **Table 10.15** 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 10.15: Predicted Construction Noise Levels

Noise-Sensitive Receptor	Predicted Noise Level, LAeq dB
NSR 1	55
NSR 2	54
NSR 3	55
NSR 4	55
NSR 5	59
NSR 7	61
NSR 8	55
NSR 9	56
NSR 10	61
NSR 11	56
NSR 12	60

Significance of the effect

10.9.7 The predicted construction noise levels have been assessed against an external daytime criterion of 70dB LAeq. 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**.

10.9.8 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

- 10.9.9 There are several safeguards which 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.
- 10.9.10 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.
- 10.9.11 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.

10.9.12 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.

10.9.13 Taking the additional mitigation into account, it is assessed that there will be a **temporary, not significant** residual effect.

Operation and maintenance

10.9.14 Operational noise levels from the proposed wind farm have been predicted at the nearest noise-sensitive receptors with the results detailed in Section 5 of **Appendix 10.1**. A combination of Vestas V150 and V162 wind turbines have been selected as the candidate turbines for the noise assessment with predictions undertaken in accordance with the IOA GPG.

10.9.15 The predicted noise levels at the assessment locations vary with wind speed by approximately 9dB from cut in to 12ms⁻¹ resulting in noise levels at the closest receptor of up to ??dB LA90.

Decommissioning

10.9.16 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**.

10.10 Cumulative Effects

10.10.1 The assessment of cumulative effects for noise 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.

10.10.2 The development types allocated to Tier 1, Tier 2 and Tier 3 for the assessment of cumulative effect are summarised in

10.10.3

10.10.4 **Table 10..**

Table 10.16: Development tiers used for assessment of cumulative effects

Tier	Development types
<p>Tier 1</p>	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
<p>Tier 2</p>	Developments for which a scoping report has been submitted.
<p>Tier 3</p>	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.

10.10.5 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 10..**

Table 10.17: List of other projects, plans and activities considered within the CEA.

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Construction period	Operational period	Temporal overlap with the Proposed Development
Tier 1						
Pant Y Wal wind farm	Operational		10 turbine operational windfarm	N/A		
Pant Y Wal extension	Operational		12 turbine operational windfarm	N/A		
Mynydd Portref	Operational		17 turbine operational windfarm	N/A		
Taff Ely	Operational		20 turbine operational windfarm	N/A		
Taff Ely Repowering	Permitted		7 turbine consented repowering of Taff Ely windfarm	Undetermined		

Cumulative effects assessment

- 10.10.6 The Proposed Developments identified in **Table 10.** 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 and plans, in order to inform the maximum design parameters.

Table 10.18 Assessment of cumulative effects

Potential cumulative effect	Phase			Maximum Design Parameters	Justification
	C	O	D		
Impact on amenity through consideration of ETSU-R-97 Limits	x	✓	x	Project assessed cumulatively with the following other projects/plans include: Tier 1 Pant Y Wal wind farm Pant Y Wal extension Mynydd Portref Taff Ely Taff Ely Repowering	Noise from cumulative sites assessed as operating at their conditioned limits

^a C=construction, O=operational and maintenance, D=decommissioning

10.11 Cumulative effects assessment

10.11.1 A description of the cumulative effects between the Proposed Development and other developments identified in **Table 10.18** upon noise at nearby noise-sensitive receptors is provided below.

Loss of Amenity

Operation and maintenance phase

10.11.2 Cumulative operational noise levels from consented schemes and the proposed wind farm have been predicted at the nearest noise-sensitive receptors with the results detailed in Section 6 of **Appendix 10.1**.

10.12 Inter-related effects

10.12.1 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 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.

10.13 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)

11 Air Quality

11.1 Introduction

11.1.1 This chapter of the Environmental Statement presents the assessment of the potential impact of the Mynydd Y Gaer windfarm on air quality. Specifically, this chapter considers the potential impact of the scheme during the construction, operations and maintenance, and decommissioning phases.

11.2 Legislative and Policy Context

Air Quality Standards Regulations

11.2.1 The Air Quality Standards Regulations (Wales) amended by The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, sets limit values for ambient air concentrations for the main air pollutants: particulate matter (PM₁₀ and PM_{2.5}), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), ozone (O₃), carbon monoxide (CO), lead (Pb) and benzene, certain toxic heavy metals (arsenic, cadmium, and nickel) and polycyclic aromatic hydrocarbons (PAHs).

11.2.2 These limit values are legally binding on the Secretary of State. The UK Government and devolved administrations operate various national ambient air quality monitoring networks to measure compliance and develop plans to meet the set limit values for the main air pollutants.

UK Air Quality Strategy

11.2.3 The Environment Act 1995, as amended by the Environment Act 2021, established the requirement for the Government and the devolved administrations to produce a National Air Quality Strategy (AQS) for improving ambient air quality, the first being published in 1997 and having been revised several times since, with the latest published in 2020 (Welsh Government, 2020).

11.2.4 The AQS sets UK air quality standards¹ and objectives² for the pollutants in the Air Quality Standards Regulations, and recognises that action at national, regional and local level may be needed, depending on the scale and nature of the air quality problem. In addition to this, Natural Resources Wales is required to consider the AQS when discharging its pollution control functions. There is no legal requirement to meet objectives set within the UK AQS except where equivalent limit values are set within the Air Quality Standards Regulations.

¹ Standards are concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. Standards, as the benchmarks for setting objectives, are set purely with regard to scientific evidence and medical evidence on the effects of the particular pollutant on health, or on the wider environment, as minimum or zero risk levels.

² Objectives are policy targets expressed as a concentration that should be achieved, all the time or for a percentage of time, by a certain date.

11.2.5 The Environment Act 1995 also established the UK system of Local Air Quality Management (LAQM), that requires local authorities to go through a process of review and assessment of air quality in their areas, identifying places where objectives are not likely to be met, then declaring Air Quality Management Areas (AQMAs) and putting in place Air Quality Action Plans to improve air quality. These plans also contribute, at local level, to the achievement of the limit values in the Air Quality Standards Regulations.

11.2.6 The limit values and objectives relevant to this assessment are summarised in Table 11.1 of this chapter below. Where the limit values and the AQS objectives differ, the more stringent objective/limit value has been used.

Table 11.1: Summary of relevant air quality limit values and objectives.

Pollutant	Averaging period	Objectives/Limit Values (micrograms per cubic metre, $\mu\text{g.m}^{-3}$)	Not to be exceeded more than
<i>Nitrogen Dioxide (NO₂)</i>	1 hour	200 $\mu\text{g.m}^{-3}$	18 times per calendar year
	Annual	40 $\mu\text{g.m}^{-3}$	-
<i>Particulate Matter (PM₁₀)</i>	24 Hour	50 $\mu\text{g.m}^{-3}$	35 times per calendar year
	Annual	40 $\mu\text{g.m}^{-3}$	-
<i>Particulate Matter (PM_{2.5})</i>	Annual	20 $\mu\text{g.m}^{-3}$	-

National Planning Policy Context

11.2.7 The key national planning policy documents relevant to the assessment of air quality 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).

11.2.8 Table 11.2 provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of air quality, including how and where these have been considered in the ES.

Table 11.2: 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	
Proposals for renewable projects must not cause unacceptable adverse impacts to air quality. Policy 18, bullet 7. Future Wales: The National Plan 2040	The environmental impacts are assessed in 11.9.
Planning Policy Wales Edition 12	
<i>Section 6.7.26 of PPW states that 'planning authorities must consider the potential for temporary environmental risks, including airborne pollution and surface and subsurface risks, arising during the construction phases of development. Where appropriate planning authorities should require a construction management plan, covering pollution prevention, noisy plant, hours of operation, dust mitigation and details for keeping residents informed about temporary risks.'</i>	The temporary environmental effects will be assessed in a construction dust assessment in section 11.9.

Local Planning Policy Context

- 11.2.9 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of air quality for the Proposed Development is:
- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024
- 11.2.10 Table 11.3 provides a summary of the provisions contained within the local plan relevant to the assessment of air quality, including how and where these have been considered in the ES.

Table 11.3: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
Policy SP14	The development would not cause demonstrable harm to the amenities of local communities, in particular with regard to air quality.	A construction dust assessment has been undertaken in Section 11.9 to assess impacts to air quality during construction and decommissioning.

11.3 Consultation and Engagement

Scoping

- 11.3.1 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.
- 11.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to air quality are listed in Table 11.4, including how and where these have been considered in the ES.

Table 11.4: Summary of scoping responses relevant to air quality

Comment	How and where considered in the ES
PEDW	
Air quality cannot be scoped out due to possible impact of infrastructure being moved via the M4 AQMA of Taibach / Margam. [paragraph ID 9 of the EIA Scoping Direction]	Possible impacts of construction traffic are discussed in section 11.9.

Other consultation

- 11.3.3 Following scoping, consultation and engagement with interested parties specific to air quality has continued. These included discussions with Bridgend County Borough Council regarding the assessment methodology. Further detail regarding key items discussed and how these have been addressed is provided in Table 11.5 of this ES chapter below.

Table 11.5: Summary of other consultation relevant to air quality

Comment	How and where considered in the ES
Bridgend County Borough Council	
Methodology confirmed by Bridgend County Borough Council	

11.4 Assessment Methodology

Relevant Guidance

- 11.4.1 The assessment of air quality 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:

- Defra’s Local Air Quality Management Technical Guidance: LAQM.TG22 (2022);
- EPUK & IAQM – Land-Use Planning & Development Control: Planning for Air Quality (2017);
- IAQM – Guidance on the assessment of dust from demolition and construction (2024); and
- Highways England, Transport Scotland, Welsh Government and Department for Infrastructure Northern Ireland’s - DMRB LA 105 (applies to all of the UK) – Air Quality (2024).

Scope of the Assessment

11.4.2 Taking into account the scoping and other consultation, Table 11.6 summarises the issues considered as part of this assessment.

Table 11.6: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Construction of Windfarm assets.	The impact on human and ecological receptors (dust soling and human health) arising from fugitive dust emissions generated during construction.
Operation and maintenance	
N/A	Air quality impacts during operation and maintenance has been scoped out of assessment.
Decommissioning	
Decommissioning of Windfarm assets.	The impact on human and ecological receptors (dust soling and human health) arising from fugitive dust emissions generated during decommissioning.

11.4.3 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 11.7.

Table 11.7: Issues scoped out of the assessment

Issue	Justification
<p>The impact on human and ecological receptors arising from air emissions generated by vehicle traffic during construction and decommission</p>	<p>The EPUK & IAQM Land-Use Planning & Development Control: Planning for Air Quality document (EPUK & IAQM, 2017) indicates that air quality assessments should include developments that increase annual average daily Light Duty Vehicle (LDV) traffic flows by more than 100 within or adjacent to an AQMA and more than 500 elsewhere. The results of the traffic and transport assessment (detailed in detailed in Chapter 8: Traffic and Transport, of the ES) undertaken for this Proposed Development indicates that the aforementioned EPUK & IAQM thresholds are not expected to be exceeded for any individual road during the construction, operational or decommissioning phase of this Proposed Development; therefore, vehicle exhaust emissions have not been assessed specifically. The EPUK & IAQM states that:</p> <p><i>'If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the Proposed Development on the local area, and the impacts can be considered to have insignificant effects.'</i></p>
<p>The impact on human and ecological receptors arising from air emissions generated by vehicle traffic during operations and maintenance.</p>	<p>Operation of the development will generate a small number of additional two-way vehicle movements as a result occasional maintenance activities.</p> <p>However, the additional two-way vehicle movements associated with maintenance will not exceed the EPUK and IAQM indicative criteria (see paragraph 11.4.6) for an air quality assessment, irrespective of whether the air quality study area was located within or adjacent to an AQMA.</p> <p>Therefore, the potential impact on human or ecological receptors arising from air emissions generated by vehicle traffic during operations and maintenance is unlikely to be significant and an air quality assessment is proposed to be scoped out.</p>
<p>The impact on human and ecological receptors (dust soling and human health) arising from fugitive dust emissions generated during operation and maintenance of the Proposed Development.</p>	<p>Activities associated with the operation and maintenance of the Proposed Development are unlikely to generate dust. Therefore, the potential impact on human or ecological receptors arising from fugitive dust emissions generated during operation and maintenance is unlikely to result in significant effects and thus, has been scoped out of the assessment for air quality.</p>
<p>The impact on human and ecological receptors arising from air emissions generated by plants or stacks during operation and maintenance of the Proposed Development</p>	<p>The Proposed Development does not include proposals for any plant or emissions stacks which could give rise to air emissions during construction, operation or decommissioning of the Proposed Development. Therefore, the potential impact on human or ecological receptors arising from plant or stack emissions would not occur and would not result in significant effects and thus, has been scoped out of the assessment for air quality.</p>

Study area

- 11.4.4 Guidance on the assessment of dust from demolition and construction (Institute of Air Quality Management (IAQM), 2024) indicates that there could potentially be annoyance dust and particulate matter (PM) with diameters of 10 micrometres or smaller (PM₁₀) effects on human health receptors located

within 250 m of onsite construction activities and ecological receptors located within 50 m of onsite construction activities.

11.4.5 As such, the air quality study area has been defined with respect to construction dust and covers an area up to 250 m around the Mynydd Y Gaer Wind Farm site boundary, and 250 m from construction site entrances. In accordance with IAQM guidance (IAQM, 2024), receptors are also considered within 20 m, 50 m, 100 m, and 250 m.

11.4.6 The Environmental Protection UK (EPUK) and IAQM Land-Use Planning & Development Control: Planning for Air Quality guidance document (EPUK and IAQM, 2017) provides the following threshold criteria for determining when an air quality assessment should be undertaken:

- Roads within an AQMA:
 - an increase in annual average daily Light Duty Vehicle (LDV) flows by more than 100
 - an increase in annual average daily Heavy Duty Vehicle (HDV) flows by more than 25.
- Roads outside of an AQMA:
 - an increase in annual average daily LDV flows by more than 500
 - an increase in annual average daily HDV flows by more than 100.

11.4.7 The EPUK and IAQM guidance document continues by stating that '*If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the Proposed Development on the local area, and the impacts can be considered to have insignificant effects.*'

11.4.8 The projects transport consultants have advised that there will be no exceedances of the above thresholds during the construction, operational or decommissioning phases. This is outlined in Chapter 8 of the ES.

11.4.9 The location and geographic extent of the study area is presented in Figure 11.1 of the ES.

11.5 Assessment Criteria and Assignment of Significance

11.5.1 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.

11.5.2 The terms used to define magnitude and sensitivity are based on and have been adapted from those outlined in the EPUK & IAQM Land-Use Planning & Development Control: Planning For Air Quality and the IAQM Guidance on the assessment of dust from demolition and construction.

Receptor Value and Sensitivity

- 11.5.3 Guidance on the assessment of dust from demolition and construction (IAQM, 2024) states that several attempts have been made to categorise receptors into high, medium, and low sensitivity categories. However, there is no unified sensitivity classification scheme that covers the different types of potential effects on property, human health, and ecological receptors and so separate sensitivity categories are used for each of these effects.
- 11.5.4 Table 11.8, Table 11.9 and Table 11.10 below set out the sensitivity of people, property, and ecological receptors to dust and PM₁₀, in accordance with IAQM guidance (IAQM, 2024).

Table 11.8: Sensitivities of people and property receptors to dust.

Receptor	Sensitivity
<p>Principles:</p> <ul style="list-style-type: none"> • Users can reasonably expect enjoyment of a high level of amenity • The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land • Indicative examples: <ul style="list-style-type: none"> – Residential properties – Museums and other culturally important collections – Medium and long-term car parks and car showrooms. 	High
<p>Principles:</p> <ul style="list-style-type: none"> • Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home • The appearance, aesthetics or value of their property could be diminished by soiling • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Indicative examples: <ul style="list-style-type: none"> – Parks – Places of work. 	Medium

<p>Principles:</p> <ul style="list-style-type: none"> • The enjoyment of amenity would not reasonably be expected • There is property that would not reasonably be expected to be diminished in appearance, aesthetics, or value by soiling • There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land • Indicative examples: <ul style="list-style-type: none"> – Playing fields – Farmland (unless commercially sensitive horticultural) – Footpaths – Roads – Short-term car parks. 	<p>Low</p>
---	------------

Table 11.9: Sensitivities of people and property receptors to PM₁₀.

Receptor	Sensitivity
<p>Principles:</p> <ul style="list-style-type: none"> • Locations where members of the public are exposed over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM₁₀, a relevant location would be one where individuals may be exposed for eight hours or more in a day) • Indicative examples: <ul style="list-style-type: none"> – Residential properties – Schools, hospitals and residential care homes. 	<p>High</p>
<p>Principles:</p> <ul style="list-style-type: none"> • Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective (in the case of the 24-hour objective for PM₁₀, a relevant location would be one where individuals may be exposed for eight hours or more in a day) • Indicative examples include: <ul style="list-style-type: none"> – Office workers – Shop workers • Generally excludes workers occupationally exposed to PM₁₀ as protection is covered by Health and Safety at Work legislation. 	<p>Medium</p>
<p>Principles:</p> <ul style="list-style-type: none"> • Locations where human exposure is transient. • Indicative examples: <ul style="list-style-type: none"> – Public footpaths – Playing fields – Parks – Shopping streets. 	<p>Low</p>

Table 11.10: Sensitivities of ecological receptors to dust.

Receptor	Sensitivity
<p>Principles:</p> <ul style="list-style-type: none"> • Locations with an international or national designation and the designated features may be affected by dust soiling; or • Locations where there is a community of a particular dust sensitive species such as vascular plants included in the Red Data List for Great Britain. • Indicative Examples:- <ul style="list-style-type: none"> – Special Area of Conservation designated for acid heathlands adjacent to the demolition of a large site containing concrete (alkali) buildings or for the presence of lichen. 	High
<p>Principles:</p> <ul style="list-style-type: none"> • Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition. • Indicative Examples:- <ul style="list-style-type: none"> – Site of Special Scientific Interest (SSSI) with dust sensitive features. 	Medium
<p>Principles:</p> <ul style="list-style-type: none"> • Locations with a local designation where the features may be affected by dust deposition • Indicative Examples: <ul style="list-style-type: none"> – A Local Nature Reserve with dust sensitive features. 	Low

Magnitude of impact

11.5.5 Guidance on the assessment of dust from demolition and construction (IAQM, 2024) gives examples of the dust emission magnitudes for demolition, earthworks, construction activities and trackout. These example dust emission magnitudes are based on the site area, building volume, number of Heavy Duty Vehicle (HDV) movements generated by the activities and the materials used.

11.5.6 These magnitudes have been combined with the anticipated duration of construction activities to determine the ranking of source magnitude. The features of the source of dust emissions and associated dust emission magnitude are set out in Table 11.11 below.

Table 11.11: Impact magnitude criteria

Features of the source of dust emissions	Dust emission magnitude
<p>Demolition - building over 75,000 m³, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 12 m above ground level.</p> <p>Earthworks – total site area over 110,000 m², potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds > 6 m in height.</p> <p>Construction - total building volume over 75,000 m³, activities include piling, on-site concrete batching, sand blasting.</p> <p>Trackout – 50 HDV outwards movements in any one day, potentially dusty surface material (e.g. High clay content), unpaved road length > 100 m.</p>	Large
<p>Demolition - building between 12,000 to 75,000 m³, potentially dusty construction material and demolition activities 6 - 12 m above ground level.</p> <p>Earthworks – total site area between 18,000 to 110,000 m², moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 3 - 6 m in height.</p> <p>Construction - total building volume between 12,000 and 75,000 m³, use of construction materials with high potential for dust release (e.g. concrete), activities include piling, on-site concrete batching.</p> <p>Trackout – 20 - 50 HDV outwards movements in any one day, moderately dusty surface material (e.g. High clay content), unpaved road length 50 – 100 m.</p>	Medium
<p>Demolition - building less than 12,000 m³, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 10 m above ground, demolition during winter months.</p> <p>Earthworks – total site area less than 18,000 m². Soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height.</p> <p>Construction - total building volume below 12,000 m³, use of construction materials with low potential for dust release (e.g. metal cladding or timber).</p> <p>Trackout – < 20 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.</p>	Small

11.5.7 The sensitivity of the surrounding area and the magnitude of risk have been combined in the matrices provided in Table 11.12 below to assign the level of risk for each activity type required during the construction of the Project.

Table 11.12: Risk of dust impacts for each activity type

Sensitivity of area	Magnitude of dust impacts		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 11.13: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors ^a	Distance from the Source (m) ^b			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.

^a The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.

^b For trackout, the distances have been measured from the side of the roads used by construction traffic. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table 11.14: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration ^a	Number of Receptors ^{b, c}	Distance from the Source (m) ^b			
			<20	<50	<100	<250
High	> 32 µg.m ⁻³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28 - 32 µg.m ⁻³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24 - 28 µg.m ⁻³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	< 24 µg.m ⁻³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	> 32 µg.m ⁻³	>10	High	Medium	Low	Low
		1 – 10	Medium	Low	Low	Low
	28 – 32 µg.m ⁻³	> 10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	< 28 µg.m ⁻³	>1	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout.

^a This refers to the background concentration derived from the assessment of baseline conditions later in this report. The concentration categories listed in this column apply to England, Wales and Northern Ireland but not to Scotland.

^b The total number of receptors within the stated distance has been estimated. Only the highest level of area sensitivity from the table has been recorded.

^c For high sensitivity receptors with high occupancy (such as schools or hospitals), the approximate number of occupants has been used to derive an equivalent number of receptors.

^d For trackout, the distances should be measured from the side of the roads used by construction traffic. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table 11.15: Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m) ^a	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

The sensitivity of the area has been derived for demolition, construction, earthworks and trackout and for each designated site.

^a Only the highest level of area sensitivity has been recorded.

Table 11.16 Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	High	High Risk
Medium	High Risk	Medium	High Risk
Low	Medium Risk	Low	Medium Risk

Table 11.17 Risk of Dust Impacts – Earthworks

Receptor Sensitivity	Distance from the Source (m) ^a		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 11.18: Risk of Dust Impacts – Construction

Receptor Sensitivity	Distance from the Source (m) ^a		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 11.19: Risk of Dust Impacts – Trackout

Receptor Sensitivity	Distance from the Source (m) ^a		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Significance of effect

11.5.8 The dust risk categories that have been determined for each of the activities (earthworks, construction and trackout) have been used to define the appropriate site-specific mitigation measures outlined in Table 11.12 based on those described in the IAQM dust guidance. The guidance states that provided the mitigation measures are successfully implemented, the resultant effects of the dust exposure will normally be ‘not significant’. For those cases where the risk category is “negligible”, no mitigation measures are required.

Assumptions and limitations of the assessment

11.5.9 The background PM₁₀ concentration has been drawn from the highest Defra mapped concentration estimate across the study area. Whilst this does not provide a site-specific concentration, it provides a sufficient level of detail to enable the assessment of the impact risk arising from dust generated during construction of the Proposed Development to be predicted robustly. This is because PM₁₀ concentrations are relatively evenly distributed across the UK due to the wide range of sources and the contribution of secondary particulate matter.

11.6 Baseline Environment Conditions

Desk studies

11.6.1 A comprehensive desk-based review was undertaken to inform the baseline assessment for air quality. The existing studies and datasets referred to as part of the desk-based review for air quality are summarised in Table 11.20 below.

11.6.2 A large proportion of the total pollutant concentration is usually made up of the background concentration. It is therefore important that the background concentration selected for the assessment is realistic to avoid inaccurate results.

11.6.3 Such background data may come from local monitoring studies or from national or government data sources, including the Department for

Environment, Food & Rural Affairs (Defra) UK AIR Air Information Source national pollution map.

- 11.6.4 Local Air Quality Management (LAQM) Technical Guidance (TG22) (Defra, 2022) recommends that Defra mapped concentration estimates are used in the first instance to inform background concentrations in air quality modelling.

Table 11.20: Summary of desk study sources

Title	Source	Year published	Author
Bridgend County Borough Council Air Quality Progress Report (BCBC, 2024)	Bridgend County Borough Council	2024	Bridgend County Borough Council
Defra projections of pollutant concentrations for years from 2021 to 2030 for each 1km grid square in the UK (Defra, 2021)	<i>UK Air Information Source - Background Mapping data for local authorities - 2021</i>	2024	Defra

- 11.6.5 This section reviews the existing air quality conditions within the air quality study area using the baseline data sources identified in Table 11.20 above.

- 11.6.6 There are no designated Air Quality Management Areas (AQMAs) within the air quality study area as concentrations of all pollutants (including PM₁₀) are below the relevant objectives and limit values within the local authority areas of Bridgend County Borough Council.

- 11.6.7 For this air quality assessment, the background air quality has been characterised by drawing upon information provided in the Bridgend 2024 Air Quality Progress Report (Bridgend County Borough Council, 2024), and Defra projections of pollutant concentrations for years from 2021 to 2030 for each km grid square in the UK (Defra, 2021).

Appropriate Background Concentrations for the Development Site

- 11.6.8 In the absence of any monitoring at this site, the background annual-mean concentration at the Site has been derived from the maximum Defra mapped background concentration estimate for the grid squares covering study area.

- 11.6.9 Table 11.21 summarises the annual-mean background concentration for PM₁₀ used in this assessment.

Table 11.21 Summary of Background Annual-Mean (Long-term) Concentrations used in the Assessment

Pollutant	Data Source	Concentration (µg.m ⁻³)
PM ₁₀	Defra Mapped (2021)	9.93

Future baseline conditions

- 11.6.10 With UK-wide initiatives such as those set out in the Clean Air Strategy (Defra, 2019), air quality is likely to improve over time. However, to ensure that the assessment presents conservative (worst case) results, no reduction in the background concentration has been assumed in future years.

Key receptors

- 11.6.11 Table 11.22 identifies the receptors taken forward into the assessment for air quality.

Table 11.22: Key receptors taken forward to assessment

Receptor	Description
All receptors within 250 m of the site boundary	High, medium and low sensitivity human and ecological receptors within 250m of the site boundary

11.7 Key Parameters for Assessment

- 11.7.1 The maximum design parameters identified in Table 11.23 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 11.23: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
The impact of dust soiling (annoyance) on property and an increase in suspended particulate matter arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	<p>Construction phase</p> <ul style="list-style-type: none"> Maximum 2 years of construction Site area of approximately 300 hectares <p>Decommissioning phase</p> <ul style="list-style-type: none"> Decommissioning is likely to operate within the parameters identified for construction (i.e., any activities are likely to occur within the construction working areas and to requires no greater amount or duration of activity than assessed for construction). 	The maximum design scenario presents the greatest area required for the construction of the Proposed Development; the greatest size of the temporary working areas; the movement of construction vehicles; and the longest duration of construction which represents the greatest potential for dust soiling generated by construction and decommissioning activities.

^a C=construction, O=operational and maintenance, D=decommissioning

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

- 11.8.1 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.
- 11.8.2 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').
- 11.8.3 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.
- 11.8.4 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.
- 11.8.5 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.
- 11.8.6 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.
- 11.8.7 Both embedded and additional mitigation measures relevant to the assessment of air quality are summarised in Table 11.24 below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 11.24: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Embedded mitigation	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site	Included in the DMP as a condition
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	
Display the head or regional office contact information.	
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	
Make the complaints log available to the local authority when asked.	
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary.	
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	
Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	

Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extended period.	
Avoid site runoff of water or mud.	
Keep site fencing, barriers and scaffolding clean using wet methods.	
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	
Cover, seed or fence stockpiles to prevent wind whipping.	
Ensure all vehicles switch off engines when stationary – no idling vehicles.	
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	
Use enclosed chutes and conveyors and covered skips.	
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	
Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	
Bag and remove any biological debris or damp down such material before demolition	
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	

Further mitigation

No further mitigation required.

11.9 Assessment of effects

11.9.1 The impacts of the construction, and decommissioning phases of the Proposed Development have been assessed. The potential impacts arising from the construction, and decommissioning phases of the Proposed Development are listed in Table 11.25, 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.

Impact of Dust on Surrounding Area

Construction and decommissioning phases

11.9.2 The type of activities that could cause fugitive dust emissions are: from stockpiles; handling of loose construction materials; and movement of vehicles, both on and off site.

11.9.3 The level and distribution of construction dust emissions will vary according to factors such as the type of dust, duration and location of dust-generating activity, weather conditions and the effectiveness of suppression methods.

11.9.4 The main effect of any dust emissions, if not mitigated, could be annoyance due to soiling of surfaces, particularly windows, cars and laundry. However, it is normally possible, by implementation of proper control, to ensure that dust deposition does not give rise to significant adverse effects, although short-term events may occur (for example, due to technical failure or exceptional weather conditions). The following assessment, using the IAQM methodology, predicts the risk of dust impacts without mitigation and the level of mitigation that is required to control the residual effects to a level that is “not significant”.

Sensitivity of the receptor

All demolition, earthworks and construction activities are assumed to occur within the site boundary. As such, receptors at distances within 20 m, 50 m, 100 m and 250 m of the site boundary have been identified and are illustrated in Figure 11.2. The sensitivity of the area has been classified and the results are provided in Table 11.25.

Table 11.25: Mitigation measures intended to be adopted as part of the Proposed Development

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Medium	Approx. 3 residential properties to the south of the site boundary and 2 to the west. 1 – 10 high sensitivity receptors located within 20 m of the site boundary (Table 11.13)
Human Health	Low	Approx. 3 residential properties to the south of the site boundary and 2 to the west. Background PM ₁₀ concentrations for the assessment = 9.93 µg.m ⁻³ 1 – 10 high sensitivity receptors located within 20 m of the site boundary and PM ₁₀ concentrations below 24 µg.m ⁻³ (Table 11.14)
Ecological	Low	Ancient Woodland within 20 m of the site boundary. Brynna A Wern Tarw SSSI within 50 m of site boundary.

11.9.5 Trackout may occur on roads up to 250 m from the site. The major route within 250 m of the site is Chapel Road. The sensitivity of the area has been classified and the results are provided in Table 11.26.

Table 11.26 Sensitivity of the Surrounding Area for Trackout

Potential Impact	Sensitivity of the Surrounding Area	Reason for Sensitivity Classification
Dust Soiling	Low	No residential properties aligning Chapel Road within 250m of the site. 1 – 10 high sensitivity receptors located within 20 m of the roads (Table 11.13)
Human Health	Low	No residential properties aligning Chapel Road within 250m of the site. Background PM ₁₀ concentrations for the assessment = 9.93 µg.m ⁻³ 1 – 10 high sensitivity receptors located within 20 m of the roads and PM ₁₀ concentrations below 24 µg.m ⁻³ (Table 11.14)

Ecological	Low	Ancient Woodland within 20 m of Chapel Road. Brynna A Wern Tarw SSSI within 50 m of Chapel Road.
------------	-----	---

Magnitude of impact

- 11.9.6 Following the IAQM guidance, the dust emission magnitude for demolition, earthworks, construction and trackout have been derived.
- 11.9.7 There will be no demolition, so it has not been considered further.
- 11.9.8 The site area is approximately 3,000,000 m². As this is over 110,000 m², the dust emission magnitude for the earthworks phase is classified, using the IAQM guidance, as large.
- 11.9.9 The total volume of the structures to be constructed would be between 12,000 and 75,000 m³ and the dust emission magnitude for the construction phase is classified as medium.
- 11.9.10 The maximum number of outwards movements in any one day is between 20 and 50 HDVs, and the dust emission magnitude for trackout is classified as medium.

Table 11.27 Dust Emission Magnitude for Earthworks, Construction and Trackout

Earthworks	Construction	Trackout
Large	Medium	Medium

Significance of the effect

- 11.9.11 The Dust Emission Magnitude has been considered in the context of the Sensitivity of the Area (Table 11.13 and Table 11.14) to give the Dust Impact Risk. Table 11.28 summarises the Dust Impact Risk for the four activities.

Table 11.28 Dust Impact Risk for Earthworks, Construction and Trackout

Source	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Low
Human Health	Low	Low	Low
Ecology	Low	Low	Low
Risk	Medium	Medium	Low

11.9.12 Taking the site as a whole, the overall risk is deemed to be medium. The mitigation measures appropriate to a level of risk for the site as a whole and for each of the phases are set out in Table 11.24

11.9.13 Provided this package of mitigation measures is implemented, the residual construction dust effects will not be significant. The IAQM dust guidance states that *“For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be ‘not significant’.”* The IAQM dust guidance recommends that significance is only assigned to the effect after the activities are considered with mitigation in place.

Additional mitigation and residual effect

11.9.14 Following the implementation of dust control measures recommended for medium risk sites (see Table 11.24), the dust impact risk for construction, earthworks and trackout associated with construction of the Proposed Development is categorised as negligible, which is not significant in EIA terms.

Future monitoring

11.9.15 The future monitoring proposed as part as a consequence of the assessment of air quality are set out in Table 11.29.

Table 11.29: Future monitoring commitments

Measure adopted	How the measure will be secured
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	Included in the DMP as a condition.
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	

11.9.16 No future monitoring is required as a consequence of the assessment of air quality.

11.10 Cumulative Effects

11.10.1 The assessment of cumulative effects for air quality 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.

11.10.2 The development types allocated to tier 1, tier 2 and tier 3 for the assessment of cumulative effect are summarised in Table 11.30.

Table 11.30: 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.

11.10.3 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 11.31.

Table 11.31: List of other projects, plans and activities considered within the CEA.

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Construction period	Operational period	Temporal overlap with the Proposed Development
Tier 1						
Llwyncelyn Wind Farm	Construction	8.8	Construction of two turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Former Nant-y-Gwyddon Landfill Site	Awaiting Construction	8.3	Construction of one turbine	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Foel Trawsnant	Awaiting Construction	13	Construction of 11 turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Abergorki Wind Farm	Awaiting Construction	13	Construction of three turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Headwind Taff Ely Wind Farm (Repowering)	Awaiting Construction	2	Construction of seven turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Upper Ogmore Wind Farm	Awaiting Construction	8	Construction of seven turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Pant y Wal (Second extension)	Under construction	3	Construction of two turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	

Llwynceilyn Wind Farm - Resubmission	Application Submitted	8	Construction of two turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Y Bryn	In Consultation	20	Construction of 21 turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Melin Court	Awaiting Construction	20	Construction of five turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Mynydd Fforch Dwm	Application Submitted	20	Construction of six turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Mynydd y Glyn	Awaiting Construction	10	Construction of seven turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Mynydd Carn y Cefn	Awaiting Construction	30	Construction of eight turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Mynydd Maen	Application submitted	9	Construction of 13 turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Manmoel	Application submitted	30	Construction of five turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes
Tier 3						
Mynydd Bedwellte	Pre-Application	30	Construction of nine turbines	Not provided but assumed to overlap with Mynydd Y Gaer	Not provided but assumed to overlap with Mynydd Y Gaer	Yes

Cumulative effects assessment

- 11.10.4 The Proposed Developments identified in Table 11.32 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 and plans, in order to inform the maximum design parameters.

Table 11.32: Assessment of cumulative effects

Potential cumulative effect	Phase			Maximum Design Parameters	Justification
	C	O	D		
The impact of dust soiling (annoyance) on property and an increase in suspended particulate matter arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	Project assessed cumulatively with the following other projects/plans include: Tier 1 Llwynceilyn Wind Farm Former Nant-y-Gwyddon Landfill Site Foel Trawsnant Abergorki Wind Farm Headwind Taff Ely Wind Farm (Repowering) Upper Ogmore Wind Farm Pant y Wal (Second extension)	Outcome of the CEA will be greatest when the greatest number of other schemes are considered.
The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	Llwynceilyn Wind Farm – Resubmission Y Bryn Melin Court ynydd Fforch Dwm Mynydd y Glyn ynydd Carn y Cefn Mynydd Maen Manmoel	
The impact of an increase in suspended particulate matter on ecology arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	Tier 3 Mynydd Bedwellte	

^a C=construction, O=operational and maintenance, D=decommissioning

11.11 Cumulative effects assessment

11.11.1 A description of the cumulative effects between the Proposed Development and other developments identified in Table 11.31 upon air quality receptors is provided below.

11.11.2 There is potential for cumulative effects to occur with other Proposed Developments within 500 m of the Mynydd Y Gaer Study Area during construction. This distance is two times the relevant study area of the Proposed Development (250 m) and allows for any overlap between the Proposed Development and another cumulative scheme.

Construction phase

11.11.3 No specific projects have been identified within 500 m of the Proposed Development Envelope and therefore the cumulative effects would be not significant.

Operation and maintenance phase

11.11.4 The potential impacts with respect to air quality arising from operations and maintenance of the Mynydd Y Gaer Wind Farm have been scoped out of the assessment.

Decommissioning

11.11.5 The potential impacts during decommissioning of the Mynydd Y Gaer Wind Farm are expected to be similar to the impacts during demolition, earthworks and construction. Therefore, it is considered that cumulative effects arising during decommissioning of the Mynydd Y Gaer Wind Farm are **not significant**.

11.12 Inter-related effects

11.12.1 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 air quality 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.

- 11.12.2 Table 11.33 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 11.33: Summary of likely significant inter-related effects

Description of impact	Phase			Likely significant inter-related effects	Significance
	C	O	D		
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	The potential impacts of dust soiling during the operation and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development, project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	Not significant
The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	The potential impacts of suspended particulate matter on people during the operation and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on humans will be negligible, which is not significant in EIA terms	Not significant
The impact of an increase in suspended particulate matter on ecology arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	The potential impacts of suspended particulate matter on ecology during the operation and maintenance phase of the Proposed Development were scoped out of the assessment on the basis that they were unlikely to be significant. Following the implementation of measures adopted as part of the Proposed Development, project lifetime effects would be no greater than those experienced during the construction phase (i.e. negligible). Therefore, it is considered that project lifetime effects of the Proposed Development on ecology will be negligible, which is not significant in EIA terms	Not significant
Receptor-led effects					
Dust generated during the construction phase will also affect human receptors that are also likely to experience increased noise and traffic levels. Noise and traffic will also be managed through the On-CEMP so the inter-related effects are considered to remain not significant. For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than 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.					

Ecological receptors will also be affected by dust and there is the potential for inter-related effects with ecology. Ecological receptors will also be affected by dust and there is the potential for inter-related effects with ecology (Volume 1, Chapter 6: Terrestrial Ecology) and the attached Flood Consequence Assessment and Conceptual Drainage Strategy.

For the receptor led effects, overall, it is unlikely that receptors would experience increased significance of inter-related effects than 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

11.13 Summary of environmental effects, mitigation measures and monitoring

- 11.13.1 Table 11.34 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.
- 11.13.2 Table 11.35 presents a summary of the potential cumulative environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 11.34: 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						
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	C: Medium O: N/A D: Medium	C: High O: N/A D: High	Negligible	No further mitigation required beyond measures based on highly recommended measures for sites with medium dust risk (IAQM, 2024)	C: Negligible O: N/A D: Negligible	None
The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	C: Medium O: N/A D: Medium	C: High O: N/A D: High	Negligible	No further mitigation required beyond measures based on highly recommended measures for sites with medium dust risk (IAQM, 2024)	C: Negligible O: N/A D: Negligible	None
The impact of an increase in suspended particulate matter on ecology arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	C: Medium O: N/A D: Medium	C: Low O: N/A D: Low	Negligible	No further mitigation required beyond measures based on highly recommended measures for sites with medium dust risk (IAQM, 2024)	C: Negligible O: N/A D: Negligible	None
The impact of an increase NO ₂ , PM ₁₀	✓	✗	✓	C: Negligible	C: High	Negligible	None	C: Negligible	None

and PM _{2.5} on people arising from dust emissions generated by onsite construction and decommissioning activities	O: N/A	O: N/A	O: N/A
	D: Negligible	D: High	D: Negligible

^a C=construction, O=operational and maintenance, D=decommissioning

Table 11.35: Summary of potential cumulative environmental effects, mitigation and monitoring.

Description of effect	Phase			Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D						
Tiers 1 and 3									
The impact of dust soiling (annoyance) on property arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	C: Medium	C: High	Negligible	No further mitigation required beyond measures based on highly recommended measures for sites with medium dust risk (IAQM, 2024)	C: Negligible	None
				O: N/A	O: N/A			O: N/A	
				D: Medium	D: High			D: Negligible	
The impact of an increase in suspended particulate matter on people arising from dust emissions generated by onsite construction and decommissioning activities.	✓	✗	✓	C: Medium	C: High	Negligible	No further mitigation required beyond measures based on highly recommended measures for sites with medium dust risk (IAQM, 2024)	C: Negligible	None
				O: N/A	O: N/A			O: N/A	
				D: Medium	D: High			D: Negligible	
The impact of an increase in suspended	✓	✗	✓	C: Medium	C: Low	Negligible	No further mitigation required	C: Negligible	None

Description of effect	Phase			Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D						
particulate matter on ecology arising from dust emissions generated by onsite construction and decommissioning activities.				O: N/A	O: N/A		beyond measures based on highly recommended measures for sites with medium dust risk (IAQM, 2024)	O: N/A	
				D: Medium	D: Low			D: Negligible	
The impact of an increase NO ₂ , PM ₁₀ and PM _{2.5} on people arising from dust emissions generated by onsite construction and decommissioning activities	✓	✗	✓	C: Negligible	C: High	Negligible	None	C: Negligible	None
				O: N/A	O: N/A			O: N/A	
				D: Negligible	D: High			D: Negligible	

^a C=construction, O=operational and maintenance, D=decommissioning

11.14 References

Bridgend County Borough Council Local Development Plan 2018 – 2033 Adopted March 2024. Available at <https://www.bridgend.gov.uk/residents/planning-and-building-control/replacement-local-development-plan/replacement-bridgend-local-development-plan-2018-to-2033>. Accessed: January 2025

Bridgend County Borough Council Air Quality Progress Report (BCBC, 2024). Available at <https://democratic.bridgend.gov.uk/documents/s33686/App1.%20Bridgend%202024%20A PR%20draft.pdf> Accessed: January 2025.

Defra (2022) Background Mapping data for local authorities – 2021. Available at: <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021>. Accessed: January 2025.

Defra, 2022, Local Air Quality Management Technical Guidance, 2022 (LAQM.TG22), Available at <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf> Accessed: January 2025

EPUK and IAQM (January 2017) Land-Use Planning & Development Control: Planning For Air Quality. Available at: <https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf> Accessed: January 2025.

Highways England, Transport Scotland, Welsh Government, Department for Infrastructure (2024) Design Manual for Roads and Bridges (DMRB) LA 104, Environmental assessment and monitoring, Revision 1, Available at: <https://www.standardsforhighways.co.uk/prod/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true> Accessed: January 2025.

IAQM (2024) Guidance on the assessment of dust from demolition and construction. Available at: <https://iaqm.co.uk/guidance/> Accessed: January 2025.

Planning Policy Wales Edition 12 Available at: <https://www.gov.wales/planning-policy-wales> Accessed: January 2025

The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. Available at: <https://www.legislation.gov.uk/ukxi/2020/1313/contents/made> Accessed: January 2025

Welsh Government (2020). Clean Air Plan for Wales: Health Air, Healthy Wales. Available at: <https://www.gov.wales/clean-air-plan-wales-healthy-air-healthy-wales> Accessed: January 2025

12 Shadow Flicker

12.1 Introduction

12.1.1 This chapter describes the potential shadow flicker impacts and effects of the Proposed Development on surrounding dwellings during the construction, operation, and decommissioning phases. The proposed mitigation measures to reduce the impacts of the Development are also provided.

12.1.2 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.

12.1.3 This chapter should be read in conjunction with the Technical Appendix: Shadow Flicker Impact Assessment.

12.2 Legislative and Policy Context

National Planning Policy Context

12.2.1 The key national planning policy documents relevant to the assessment of shadow flicker 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).

12.2.2 **Table** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of shadow flicker, including how and where these have been considered in the ES.

Table 12.1: 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	
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	A Shadow Flicker assessment was carried out based on the outlined methodology and considering the worst-case scenario.
Planning Policy Wales Edition 12	
Planning Policy Wales Edition 12	Shadow flicker is not considered within the planning policy but has been considered in accordance with best practice.

Local Planning Policy Context

- 12.2.3 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of shadow flicker for the Proposed Development is:
- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024
- 12.2.4 No provisions are contained within the local plan relevant to the assessment of shadow flicker. Consultation and Engagement

Scoping

- 12.2.5 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.
- 12.2.6 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to shadow flicker are listed in **Table 12.1**, including how and where these have been considered in the ES.

Table 12.1: Summary of 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.

12.3 Assessment Methodology

Relevant Guidance

- 12.3.1 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

12.3.2 Taking into account the scoping and other consultation, **Table 12.2** summarises the issues considered as part of this assessment.

Table 12.2: 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

12.3.3 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.

12.3.4 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.

12.4 Assessment Criteria and Assignment of Significance

12.4.1 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.

12.4.2 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).

12.4.3 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.

12.4.4 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.

Receptor Value and Sensitivity

12.4.5 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 12.7** below.

Table 12.3 : 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

12.4.6 The criteria for defining magnitude in this chapter of the ES are outlined in **Table 12.8** below.

Table 12.4: Impact magnitude criteria

Magnitude of impact	Definition
High Adverse	Shadow flicker effects above the reference threshold limits of 30 minutes on any given day or 30 hours per year are experienced.

Medium	Adverse	Shadow flicker effects above the reference threshold limits of 30 minutes on any given day or 30 hours per year are experienced.
Low	Adverse	Shadow flicker effects below the reference threshold limits of 30 minutes on any given day and 30 hours per year are experienced.
Negligible	Adverse	No shadow flicker effects are theoretically possible or when they will not be experienced.
No change		No shadow flicker effects are theoretically possible or when they will not be experienced.

Duration of impacts

The criteria for describing the duration of impacts in this chapter of the ES are outlined in **Table 12.5** below.

Table 12.5: 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

- 12.4.7 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.
- 12.4.8 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.
- 12.4.9 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 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

12.4.10 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 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 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

12.4.11 The assessment is limited to desk-based modelling.

- 12.4.12 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.
- 12.4.13 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.
- 12.4.14 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.
- 12.4.15 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.
- 12.4.16 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.

12.5 Baseline Environment Conditions

Site-specific surveys

- 12.5.1 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

- 12.5.2 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.
- 12.5.3 The future baseline conditions, in the context of shadow flicker will be as per the existing baseline conditions.

Key receptors

- 12.5.4 **Table 12.7** identifies the receptors taken forward into the assessment for shadow flicker.

Table 12.7: Key receptors taken forward to assessment

Receptor	Description
117 dwelling receptors	A total of 117 dwelling receptors have been modelled.

12.6 Key Parameters for Assessment

12.6.1 The maximum design parameters identified in **Table 12.8** 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 12.8: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Shadow flicker impacts	x	✓	x	<p>Construction phase</p> <ul style="list-style-type: none"> No impacts during the construction phase have been considered, as shadow flicker impacts would not be possible. <p>Operation and maintenance phase</p> <ul style="list-style-type: none"> A shadow flicker impact assessment has been carried out to identify sensitive receptors and possible significant impacts. <p>Decommissioning phase</p> <ul style="list-style-type: none"> No impacts during the construction phase have been considered, as shadow flicker impacts would not be possible. 	The technical shadow flicker assessment has evaluated effects up to 10 rotor diameters, considering the worst-case scenario as outlined in the assumptions and limitations.

^aC=construction, O=operational and maintenance, D=decommissioning

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

- 12.7.1 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.
- 12.7.2 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').
- 12.7.3 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.
- 12.7.4 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.
- 12.7.5 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.
- 12.7.6 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.
- 12.7.7 Both embedded and additional mitigation measures relevant to the assessment of shadow flicker are summarised in **Table 12.9** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 12.9: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	How the measure will be secured
Further mitigation	
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 12.8, 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.

Shadow flicker impacts upon dwelling receptors

Operation and maintenance

Sensitivity of the receptor

12.8.2 In total, 117 dwelling receptors have been identified within the study area. The sensitivity of the receptors is **high**.

Magnitude of impact

12.8.3 82 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 35 dwelling receptors are not expected to experience shadow flicker impacts or experience effects less than 30 minutes on any given day or 30 hours per year. The magnitude of impact is **negligible or minor adverse**.

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 82 dwellings, which is significant.

Additional mitigation and residual effect

12.8.6 A shutdown scheme will remove shadow flicker impacts for 82 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

12.9.1 The assessment of cumulative effects for shadow flicker 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.

12.9.2 The development types allocated to tier 1, tier 2 and tier 3 for the assessment of cumulative effect are summarised in **Table 12.10**.

Table 12.10: 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.

12.9.3 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 12.11**.

Table 12.11: List of other projects, plans and activities considered within the CEA.

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Construction period	Operational period	Temporal overlap with the Proposed Development
Tier 1						
Mynydd Portref	Operational	1.715	11 turbines of 52m diameter	-	-	Yes

Cumulative effects assessment

- 12.9.4 The Proposed Developments identified in **Table 12.12** 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 and plans, in order to inform the maximum design parameters.

Table 12.12 Assessment of cumulative effects

Potential cumulative effect	Phase			Maximum Design Parameters	Justification
	C	O	D		
Cumulative shadow flicker impacts	x	✓	x	Projects assessed cumulatively with the following other projects/plans include: Mynydd Portref	Considering the rotor diameter of the turbines pertaining to this development (52m), cumulative impacts would not be considered due to the distance to the nearest assessed dwelling receptor exceeding 10 rotor diameters.

^a C=construction, O=operational and maintenance, D=decommissioning

12.10 Cumulative effects assessment

12.10.1 A description of the cumulative effects between the Proposed Development and other developments identified in **Table 12.12** upon shadow flicker receptors is provided below.

Operation and maintenance phase

Sensitivity of the receptor

12.10.2 The sensitivity of the receptor is **high**.

Magnitude of impact

12.10.3 The magnitude of the impact is **negligible**.

Significance of the effect

12.10.4 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 **negligible** cumulative effect, which is **not significant**.

12.11 Inter-related effects

12.11.1 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 shadow flicker 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.

12.11.2 No inter-related effects pertaining to shadow flicker are predicted.

12.12 Summary of environmental effects, mitigation measures and monitoring

12.12.1 **Table 12.13** presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

12.12.2 **Table 12.14** presents a summary of the potential cumulative environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 12.13: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a C O D	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
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

Table 12.14: 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							
Shadow flicker		C: Negligible O: Negligible D: Negligible	C: Negligible O: Negligible D: Negligible	Negligible	Negligible	C: None O: None D: None	None

^a C=construction, O=operational and maintenance, D=decommissioning

13 Aviation and Telecommunications

13.1 Introduction

13.1.1 A wind farm 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.

13.2 Legislative and Policy Context

National Planning Policy Context

13.2.1 The key national planning policy documents relevant to the assessment of Aviation and Telecommunications 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).

13.2.2

13.2.3 **Table 13.1** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of Aviation and Telecommunications including how and where these have been considered in the ES.

Table 13.1: 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	
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.

Local Planning Policy Context

13.2.4 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of Aviation and Telecommunications for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024

13.2.5 **Table 13.2** provides a summary of the provisions contained within the local plan relevant to the assessment of Aviation and Telecommunications, including how and where these have been considered in the ES.

Table 13.2: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
Policy [5.3.72]	PPW advises that adequate and efficient infrastructure, including telecommunications, is crucial for the economic, social and environmental sustainability of all parts of Wales. SP10 therefore outlines that infrastructure must be provided as part of development proposals.	A telecommunications impact assessment, and aviation risk assessment have been conducted, with the findings used to inform the design to reduce the impact upon infrastructure.

13.3 Consultation and Engagement

Scoping

- 13.3.1 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. Where required the associated impact significance is provided and the appropriate mitigation options are presented.
- 13.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to Aviation and Telecommunications are listed in **Table 13.3**, including how and where these have been considered in the ES.

Table 13.3: Summary of 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.
Arqiva	
Link operator regarding Telecommunications Infrastructure	Arqiva have provided details of their link infrastructure, which has been used to model exclusion zones to inform the design of the Proposed Development
Atkins / Dwr Crymu	
Link operator regarding Telecommunications Infrastructure	Atkins / Dwr Crymu have confirmed they have no link infrastructure within vicinity of the Proposed Development, and therefore have raised no objection
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	
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	

Comment	How and where considered in the ES
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

Other consultation

13.3.3 Following scoping, consultation and engagement with interested parties specific to Aviation has continued. These included discussions with Bristol Airport and Cardiff Airport regarding the impact upon their Primary Surveillance Radar. Further details regarding key items discussed and how these have been addressed is provided in Table 13.4 of this ES chapter below.

Table 13.4: Summary of other consultation relevant to Aviation

Comment	How and where considered in the ES
Bristol Airport	
Impact upon Primary Surveillance Radar	The Aviation impact Assessment has determined a technical impact is predicted but not predicted to cause an operational impact. Consultation to confirm their position on the Proposed Development will continue
Cardiff Airport	
Impact upon Primary Surveillance Radar	The Aviation impact Assessment has determined a technical impact is predicted but not predicted to cause an operational impact. Consultation to confirm their position on the Proposed Development will continue
CAA	
Civil Aviation Authority lighting requirement	Consultation with the CAA will be undertaken to confirm the aviation lighting requirement for the Proposed Development
MOD	
Ministry of Defence lighting requirement	Consultation with the MOD will be undertaken to confirm the aviation lighting requirement for the Proposed Development

13.4 Assessment Methodology

Relevant Guidance

Telecommunications

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 Taking into account the scoping and other consultation, **Table 13.5** summarises the issues considered as part of this assessment.

Table 13.5: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Crane Usage (Aviation and Telecommunications)	<p>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</p> <p>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</p>

Operation and maintenance	
Aviation Infrastructure	<p>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</p> <p>The Proposed Development is within line-of-sight to the Primary Surveillance Radar (PSR) at Bristol Airport and Cardiff Airport, at distances 57km and 22km away, respectively. The Cardiff Airport PSR is understood to provide Approach Radar services for St Athan Airport, at a distance of 17km away.</p>
Telecommunications Infrastructure	Five telecommunication links were 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 areas

13.4.3 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.

13.4.4 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: Approach to Environmental Assessment.

Receptor Value and Sensitivity

- 13.5.5 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 13.7** below.

Table 13.6 : 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 **Table 13.8** below.

Table 13.7: 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
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 13.8**. 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 13.8: 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 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.

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 into the assessment for Aviation and Telecommunications

Table 13.9: Key receptors taken forward to assessment

Receptor	Description
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 Key Parameters for Assessment

13.7.1 The maximum design parameters identified in **Table 13.10** 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: Site and Project Description of the ES.

Table 13.10: Maximum design parameters considered for the assessment of potential impacts

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Impact upon Bristol Airport Primary Surveillance Radar		✓		<p>Construction phase No impact upon the PSR is predicted during the construction phase.</p> <p>Operation and maintenance phase A technical impact is predicted upon the PSR during operation of the Proposed Development. An operational impact is to be confirmed by the airport.</p> <p>Decommissioning phase No impact upon the PSR is predicted during the construction phase</p>	The predicted impact may not impact operations at the aerodrome and therefore will result in a negligible impact
Impact upon Cardiff Airport Primary Surveillance Radar		✓	Impact upon Cardiff Airport Primary Surveillance Radar	<p>Construction phase No impact upon the PSR is predicted during the construction phase.</p> <p>Operation and maintenance phase A technical impact is predicted upon the PSR during operation of the Proposed Development. An operational impact is to be confirmed by the airport.</p> <p>Decommissioning phase No impact upon the PSR is predicted during the construction phase</p>	

Potential Impact	Phase			Maximum Design Parameters	Justification
	C	O	D		
Impact upon Arqiva telecommunication infrastructure		✓		<p>Construction phase No impact upon the PSR is predicted during the construction phase.</p> <p>Operation and maintenance phase A technical impact is predicted upon the PSR during operation of the Proposed Development. An operational impact is to be confirmed by the airport.</p> <p>Decommissioning phase No impact upon the PSR is predicted during the construction phase</p>	The site layout has considered the exclusion zones to avoid impact upon the telecommunications infrastructure

^a C=construction, O=operational and maintenance, D=decommissioning

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

- 13.8.1 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.
- 13.8.2 The key aspects where the design has evolved are described in Volume 1, Chapter 3: Needs 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').
- 13.8.3 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.
- 13.8.4 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.
- 13.8.5 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.
- 13.8.6 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.
- 13.8.7 Both embedded and additional mitigation measures relevant to the assessment of Aviation and Telecommunications are summarised in **Table 13.11** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 13.11: Mitigation measures intended 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.

13.9 Assessment of effects

13.9.1 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 13.10, 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.

Impact Upon Bristol Airport PSR

Construction phase

Sensitivity of the receptor

13.9.2 The sensitivity of the receptor is **High**.

Magnitude of impact

13.9.3 The magnitude of the impact is **High**.

Significance of the effect

13.9.4 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

- 13.9.5 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.
- 13.9.6 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

- 13.9.7 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.9.8 The magnitude of the impact is **High**.

Significance of the effect

- 13.9.9 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

- 13.9.10 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.
- 13.9.11 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

- 13.9.12 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.9.13 The magnitude of the impact is **High**.

Significance of the effect

- 13.9.14 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

- 13.9.15 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
- 13.9.16 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

- 13.9.17 The sensitivity of the receptor is **High**.

Magnitude of impact

- 13.9.18 The magnitude of the impact is **High**.

Significance of the effect

- 13.9.19 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

- 13.9.20 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.
- 13.9.21 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

13.9.22 The sensitivity of the receptor is **High**.

Magnitude of impact

13.9.23 The magnitude of the impact is **High**.

Significance of the effect

13.9.24 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

13.9.25 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.

13.9.26 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

13.9.27 The sensitivity of the receptor is **High**.

Magnitude of impact

13.9.28 The magnitude of the impact is **High**.

Significance of the effect

13.9.29 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

13.9.30 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

- 13.9.31 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

- 13.9.32 The sensitivity of the receptor is **Medium**.

Magnitude of impact

- 13.9.33 The magnitude of the impact is **Moderate**.

Significance of the effect

- 13.9.34 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

- 13.9.35 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.

- 13.9.36 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

- 13.9.37 The sensitivity of the receptor is **Medium**.

Magnitude of impact

- 13.9.38 The magnitude of the impact is **Moderate**.

Significance of the effect

- 13.9.39 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

- 13.9.40 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.
- 13.9.41 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

- 13.9.42 The sensitivity of the receptor is **medium**.

Magnitude of impact

- 13.9.43 The magnitude of the impact is **moderate**.

Significance of the effect

- 13.9.44 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

- 13.9.45 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

Future monitoring

- 13.9.46 No future monitoring is required as a consequence of the assessment of Aviation and Telecommunications.

13.10 Cumulative Effects

13.10.1 The assessment of cumulative effects for Aviation and Telecommunications 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.

Cumulative effects assessment

13.10.2 No potential for cumulative effects pertaining to Aviation and Telecommunications has been identified.

13.11 Inter-related effects

13.11.1 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 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.

13.11.2 No inter-related effects pertaining to Aviation and Telecommunication are predicted.

13.12 Summary of environmental effects, mitigation measures and monitoring

13.12.1 **Table 13.16** presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 13.16: 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 upon Bristol Airport Primary Surveillance Radar	✓	✓	✓	C: High	C: High	Moderate adverse	Consultation to confirm impact Radar blanking	C: None	N/A
				O: High	O: High			O: None	
				D: High	D: High			D: None	
Impact upon Cardiff Airport Primary Surveillance Radar	✓	✓	✓	C: High	C: High	Moderate adverse	Consultation to confirm impact Radar blanking	C: None	N/A
				O: High	O: High			O: None	
				D: High	D: High			D: None	
Impact upon Arqiva Telecommunications Infrastructure	✓	✓	✓	C: Moderate	C: Medium	Moderate adverse	Micrositing turbines	C: None	N/A
				O: Moderate	O: Medium			O: None	
				D: Moderate	D: Medium			D: None	

^a C=construction, O=operational and maintenance, D=decommissioning

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 8: Transport
 - Chapter 10: Noise; and
 - Chapter 16: Land and Soils;
- 14.1.3 This chapter is supported by the following Technical Appendices:
- Technical Appendix A14.1: Socioeconomic Baseline Report
 - Technical Appendix A14.2: Recreational Resource Plan
 - Technical Appendix A14.2: Recreational Survey Results

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 **Table 14.1** 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	
<p>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.</p>	<p>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.</p>
<p>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.</p>	<p>Chapter 5: Traffic will assess the direct impact upon the road network and users. Within the socioeconomic assessment, the conclusions of Chapter 5 will be utilised to inform the assessment on commuting patterns and the tourism economy.</p>
Planning Policy Wales Edition 12	
<p>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.</p>	<p>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</p>
<p>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.</p>	<p>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.</p>
TAN 6 - Planning for Sustainable Rural Communities	
<p>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)</p>	<p>The diversification of the agricultural land, and subsequently rural employment is discussed within the ‘Assessment of Effects’ section of this chapter.</p>
The Equality Act	
<p>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.</p>	<p>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.</p>

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

14.1.6 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of Socioeconomics for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024

14.1.7 **Table 14.2** 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 14.2: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
PLA9	As part of adopting a sustainable placemaking 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 the visitor economy and access to recreation has been considered in detail within the 'Assessment of Effects' section of this chapter. Recreation has also been discussed in greater detail within Appendix 14.2: Recreation Resource Plan.
PLA12	Development must maximise walking and cycling access by prioritising the provision within the site.	The impact on access to recreation has been considered in detail within the 'Assessment of Effects' section of this chapter. Recreation has also been discussed in greater detail within Appendix 14.2: Recreation Resource Plan.

Consultation and Engagement

Scoping

14.1.8 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.

14.1.9 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. There were no key issues raised by statutory bodies specific to Socioeconomics.

Assessment Methodology

Relevant Guidance

14.1.10 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

14.1.11 Taking into account the scoping and other consultation, **Table 14.3** summarises the issues considered as part of this assessment.

Table 14.3: 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.

14.1.12 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 14.4**

Table 14.4: Issues scoped out of the assessment

Issue	Justification
Visitor Economy – Operational phase	There is little evidence of wind 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

- 14.1.13 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)
- 14.1.14 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 Bridgend TTWA.
- 14.1.15 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 Bridgend. As can be seen there is a higher net migration of workers out of the area (18,040) compared to those who commute to the area to work (17,256). The majority of residents who commute out of the area for work travel to Cardiff (4,932) and the largest inflow of workers comes from Rhondda Cynon Taf (4,004). Overall, however the spread of workers is quite even indicating any employment impacts outside of Bridgend are likely to be reduced.

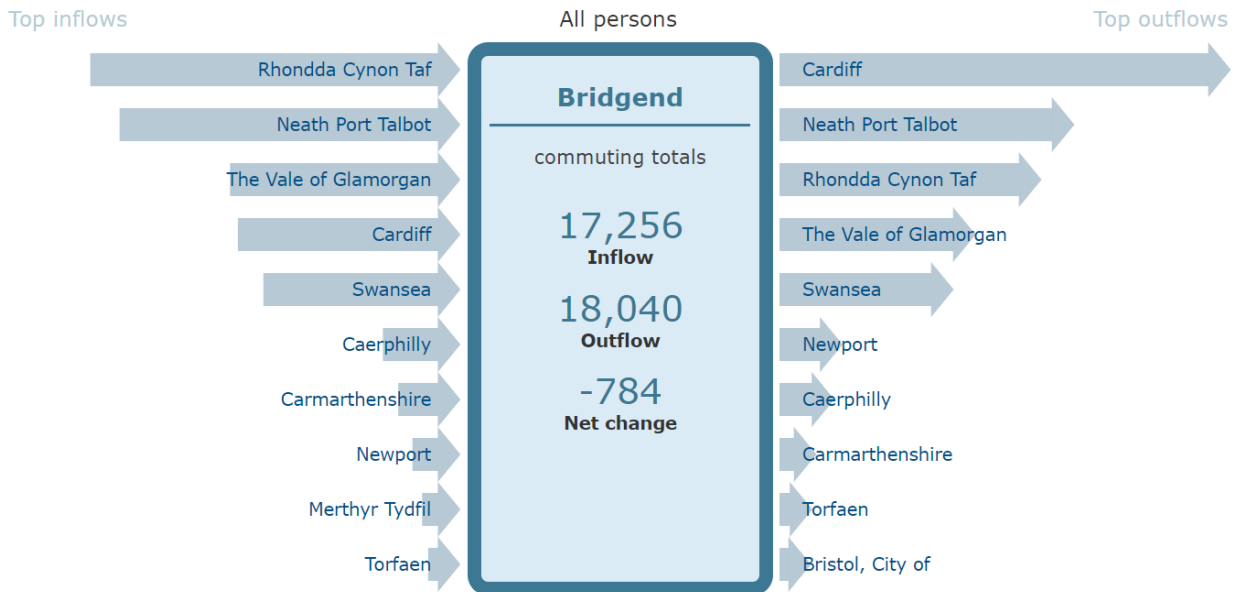


Figure 14.1 - Commuting Totals Bridgend - Source: ONS, Census WU01UK - Location of usual residence and place of work

14.1.16 The table below 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 Bridgend also live in the area (34,247). There is, however, a large number of workers who come from outside of the identified TTWA from the neighbouring authorities of Rhondda Cynon Taf, The Vale of Glamorgan and Cardiff (Cardiff TTWA) as well as from Neath Port Talbot and Swansea (Swansea TTWA). Overall, however the spread of workers is quite even indicating any employment impacts outside of Bridgend are likely to be reduced.

Place of work	Bridgend	Cardiff	Neath Port Talbot	Rhondda	Swansea	The Vale of Glamorgan
Bridgend	34,247	2,331	3,672	4,004	2,042	2,420

Figure 14.2 – Commuter Inflows, Bridgend

14.1.17 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 Bridgend as a whole, the local authority where the majority of its workforce is expected to originate.

14.1.18 A wider area incorporating Cardiff, Rhondda Cynon Taff, Neath Port Talbot, Swansea and The Vale of Glamorgan will also experience some benefit. Caerphilly may experience some slight benefits due to the inflow of workers to the area, however, it is unlikely to be substantial.

14.1.19 Overall, therefore, our suggested study area consists of Bridgend. However, data will also be collected for Cardiff, Rhondda Cynon Taff, Neath Port Talbot,

Swansea and The Vale of Glamorgan to ensure local and national comparisons are analysed.

14.1.20 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

14.1.21 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.

14.1.22 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).

14.1.23 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.

14.1.24 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

14.1.25 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
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

14.1.26 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%.
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 14.7** 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

- 14.1.27 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 **Table 14.8**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 14.1.28 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.
- 14.1.29 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

- 14.1.30 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.
- 14.1.31 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

- 14.1.32 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.
- 14.1.33 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

14.1.34 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 14.9 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
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

14.1.35 The Baseline Assessment can be found in full at Appendix 14.1.

Future baseline conditions

- 14.1.36 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.
- 14.1.37 Welsh Government data estimates future population growth based on the ONS 2018-based interim projections. It suggests that the study area’s population will increase to around 1,366,469 in 2043, from 1,270,792 in 2018, approximately a 7.5% increase.
- 14.1.38 The age group of 16-64 is only expected to see a smaller rise in population, equivalent to a 3.2% rise. On the other hand, significant growth equivalent to 30.1% is expected within the 65+ age band.
- 14.1.39 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.
- 14.1.40 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

- 14.1.41 **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

14.1.42 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: The Site and 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	✓	✓	✓	<p>Construction phase</p> <p>The minimum capacity of onshore wind generation that consent is being sought for – 75 MW</p> <p>Minimum construction period of 2 years</p> <p>Operation and maintenance phase</p> <p>The minimum capacity of onshore wind generation that consent is being sought for – 75 MW</p> <p>Minimum 50 year operational period</p> <p>Decommissioning phase</p> <ul style="list-style-type: none"> The minimum capacity of onshore wind generation that consent is being sought for – 75 MW <p>Minimum decommissioning period of 2 years</p>	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	✓	✓	✓	<p>Construction phase</p> <p>The minimum capacity of onshore wind generation that consent is being sought for – 75 MW</p> <p>Minimum construction period of 2 years</p> <p>Operation and maintenance phase</p> <p>The minimum capacity of onshore wind generation that consent is being sought for – 75 MW</p> <p>Minimum 50 year operational period</p> <p>Decommissioning phase</p> <ul style="list-style-type: none"> The minimum capacity of onshore wind generation that consent is being sought for – 75 MW <p>Minimum decommissioning period of 2 years</p>	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.

Tourism Economy	✓	✓	✓	<p>Construction phase Maximum 11 no. of wind turbines Maximum construction period of 2 years</p> <p>Operation and maintenance phase Maximum 11 no. of wind turbines Maximum turbine heights:</p> <ul style="list-style-type: none"> • V150 Turbine - 180m • V162 Turbine – 198m <p>Maximum operational period of 50 years</p> <p>Decommissioning phase Maximum 11 no. of wind turbines Maximum decommissioning period of 2 years</p>	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.
Education & Skills	✓	✓	✓	<p>Construction, Operation and Maintenance and Decommissioning phase Minimum capacity of wind turbines equivalent to 75MW</p>	The lower the capacity of onshore wind 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	✓	✓	✓	<p>Construction and Decommissioning phases The maximum key routes to be used by the construction traffic: B4280, Heol-Y-Felin</p>	The greater the number of key routes used by construction traffic, the greater the potential impact on commuting patterns.
Recreation				<p>Construction, Operation and Maintenance and Decommissioning phase Maximum area of development land</p>	The larger 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

- 14.1.43 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.
- 14.1.44 The key aspects where the design has evolved are described in Volume 1, Chapter 3: Needs 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').
- 14.1.45 Embedded mitigation measures for the Proposed Development are set out in the Volume 1, Chapter 2: Site and Project Description and the various management plans outlined in this chapter of the ES.
- 14.1.46 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.
- 14.1.47 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.
- 14.1.48 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.
- 14.1.49 Embedded mitigation measures for the Proposed Development are set out in the *Volume 1, Chapter 2: Site and Project Description*.
- 14.1.50 No additional mitigations are proposed as part of the socioeconomic, tourism and recreation assessment.

Assessment of effects

14.1.51 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

14.1.52 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 person-years of direct and indirect employment connected to the construction phase.

14.1.53 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.

14.1.54 The research also included a series of consultations with developers/operators to gain information on spending patterns and employment.

14.1.55 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 395 person-years of direct employment and 565 years of indirect and induced employment.

14.1.56 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 332 person years of direct construction and manufacturing employment.

14.1.57 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).
- 14.1.58 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).
- 14.1.59 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.
- 14.1.60 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 £76.7m. 10.0% of the total installed cost equates to £7.7m, this is the identified cost associated with the direct construction.
- 14.1.61 In order to assess the number of jobs the direct construction could support, this cost (£7.7m), is divided by the average construction worker wage in Wales (£41,319) to arrive at an estimate of the person years required. This equates to 186 direct construction person years or 55.9% of the total direct construction and manufacturing jobs identified above. Subsequently, it is assumed, there will be 146 direct manufacturing jobs.
- 14.1.62 The impacts of displacement and leakage on the construction and manufacturing workforce also need to be considered.
- 14.1.63 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.
- 14.1.64 Leakage measures the extent to which jobs will be taken from people living outside of the study area.
- 14.1.65 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.
- 14.1.66 Applying this level of displacement to the total direct construction jobs created, it is estimated that the Project will result in a net direct construction employment equivalent to 140 direct person years of construction employment.
- 14.1.67 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%

- 14.1.68 Applying this 50% leakage to the 140 direct person years of construction employment results in an overall net direct local construction employment figure of 70 person years.
- 14.1.69 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.
- 14.1.70 Applying this level of displacement to the total direct manufacturing jobs created as a result of this Project results in a net direct manufacturing employment equivalent to 73 person years.
- 14.1.71 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.
- 14.1.72 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 7 local net direct construction FTE jobs.

Sensitivity of the receptor

- 14.1.73 In terms of the vulnerability of the receptor; unemployment levels in the study area has historically fallen below the national average over the last five-year period. However, the latest Annual Population Survey data indicates that the unemployment rate in the study area in Q2 2024 was approximately 0.7% higher than the national average. Employment generation is a policy priority across all local authorities in the study area.
- 14.1.74 The sensitivity of the receptor is **Medium**.

Magnitude of impact

- 14.1.75 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.
- 14.1.76 The impact is predicted to be of regional spatial extent and medium-term continuous duration.
- 14.1.77 Therefore, the magnitude of impact is assessed to be **Low Beneficial**.

Significance of the effect

- 14.1.78 Given the above, it is assessed that there will be a **Minor Beneficial** effect, which is significant.

Operation and maintenance

- 14.1.79 The operational stage is expected to last for 40 years. During the operational stage, a project of 75 MW of installed onshore wind capacity is estimated to support 45 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.
- 14.1.80 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 19 person-years of direct employment and 26 person years of indirect and induced employment.
- 14.1.81 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.

14.1.82 On this basis the operational and maintenance stage would result in the creation of approximately two direct local FTE jobs in the local economy over the full operational phase of 50 years.

14.1.83 The jobs created will be in the renewable energy sector, assisting in the UK's transition to net zero.

Sensitivity of the receptor

14.1.84 As per 1.9.24, the sensitivity of the receptor is **Medium**.

Magnitude of impact

14.1.85 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.

14.1.86 The impact is predicted to be of regional spatial extent and medium-term continuous duration.

14.1.87 Employment at the operational phase will be lower intensity than during construction and decommissioning, resulting in an overall increase in employment equivalent to two direct local FTE jobs.

14.1.88 Given all of the above, the magnitude is Low **Beneficial**.

Significance of the effect

14.1.89 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

14.1.90 The number of construction jobs created by the decommissioning stage is considered to be commensurate with the construction stage, 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

14.1.91 As per 1.9.24, the sensitivity of the receptor is **Medium**.

Magnitude of impact

14.1.92 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

- 14.1.93 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

- 14.1.94 The Proposed Development comprises 11 onshore wind turbines, with an anticipated maximum export capacity of 75 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 £76.7m.
- 14.1.95 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 £29.9m is likely to be generated as a result of this Development. Overall, that equates to a direct and indirect investment of around £106.6m.
- 14.1.96 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.
- 14.1.97 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 seven direct local FTE construction jobs in the study area over the 2-year construction programme.
- 14.1.98 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.
- 14.1.99 According to the ONS, the current price Gross Value Added (GVA) in Bridgend generated by the construction industry equated to £281,000,000 in 2022.
- 14.1.100 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 (3,000). This results in an estimate of GVA per construction worker of £93,667.
- 14.1.101 Over the two-year construction programme, construction employment would, therefore, result in a total contribution to GVA in Bridgend of approximately £0.6m.

14.1.102 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.

14.1.103 Overall, therefore, the total GVA associated with the direct and indirect jobs would equate to approximately £0.6m. This is in addition to the direct and indirect capital investment into the local economy of around £106.6 million.

Sensitivity of receptor

14.1.104 According to the most recent data (Annual Population Survey, 2024) for economic activity, the study area had a lower level (68%) of economic activity compared to Wales as a whole (75.6%). Potential increases in economic activity will, therefore, have a disproportionately positive effect in the study area. In conclusion, the sensitivity is **High**.

Magnitude of impact

14.1.105 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.

14.1.106 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

14.1.107 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.

Operational phase

14.1.108 The contribution of the operational phase of the development to economic output has been calculated by taking the direct job creation associated with the Development, two (rounded) FTE direct local jobs, and multiplying this by the average GVA per employee in the study area (£60,998 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 £7.1m. It is good practice, however, to apply a discount rate to future benefits and costs to present a current present value. The HM Treasury Green Book recommends applying a discount rate of 3.5% per annum and on that basis the revised GVA figure would be circa £3.0m.

14.1.109 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 £42.77/MWh. At maximum efficiency, the development could produce 87,600MWh per annum, or 4,380,000MWh over the operational period. Subsequently, the economic output as a result of the sale of electricity would equate to £3.75m per annum, or £187.3m over the operational period. After accounting for a discount rate of 3.5%, as discussed above, this equates to an economic output of £80.0m during the operational period. **Sensitivity of Receptor**

14.1.110 As per para 14.1.104, the sensitivity of the receptor is **High**.

Magnitude of Impact

14.1.111 The impact on economic output is both direct through electricity generation and also indirect through the GVA of jobs created by the operational requirements.

14.1.112 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

14.1.113 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

14.1.114 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

14.1.115 As per para 14.1.104, the sensitivity of the receptor is **High**.

Magnitude of Impact

14.1.116 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.

14.1.117 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

- 14.1.118 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

- 14.1.119 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

- 14.1.120 At construction stage the visual impact of construction equipment and the associated noise and traffic impacts has the potential to impact nearby tourism receptors.
- 14.1.121 The Travel and Transport chapter states that there is predicted to be a short term major adverse (significant) effect on Users of On-Site Public Rights of Way as a result of severance. There is also likely to be a short term major adverse (significant) impact on non-motorised user amenity and road safety. Lastly, there is predicted to be a short term moderate adverse (significant effects) on pedestrian delay.
- 14.1.122 The Landscape and Visual Impact chapter states that there will be a significant impact on all viewpoints within 5km of the development during the construction phase.
- 14.1.123 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.
- 14.1.124 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 Bridgend County is situated in Bridgend and Porthcawl. There is very little holiday accommodation adjacent / in close proximity to the Proposed Development.
- 14.1.125 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 more than offset by the need for construction workers to stay overnight.

14.1.126 The User Footpaths Surveys undertaken as part of the assessment of recreational impact found there to be 61 users of the proposed development land over the course of three days during the summer holidays. As users were not specifically identified as local residents or tourists visitoing the area, within the assessment of tourism impact, to ensure a worst-case scenario is assessed, we have had to assume all users were also tourists.

Sensitivity of receptor

14.1.127 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

14.1.128 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.

14.1.129 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.

14.1.130 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

14.1.131 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.

14.1.132 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.

14.1.133 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

- 14.1.134 No restrictions are envisaged to public rights of ways at operational stage. Therefore, any impacts on the visitor economy at operational stage will relate to the effect of the visual change in landscape from fields to fields with wind turbines.
- 14.1.135 The Landscape and Visual impact chapter states that during the operational phase of the development, of the 13 viewpoints analysed, there is anticipated to be 11 significant adverse effects.
- 14.1.136 The Landscape and Visual Impact chapter also assesses the impact on recreational users during the operational period, for which there is anticipated to be significant adverse effects on 9 of the 13 receptors. It is estimated that there will be a significant adverse impact on open access users in Mynydd Y Gaer. Users of Public Rights of Way within 1.5km of the development are anticipated to significant adverse effects, along with users of Cefn Hirgoed Common. The impacts of various other recreational receptors, including cycle paths, can be found in the 'Summary of Effects' section of the Landscape and Visual Impact chapter, with effects ranging from Major Adverse to Negligible.
- 14.1.137 There are seven Landscape Character Areas for which significant negative effects are anticipated as a result of the development during operational phase.

Sensitivity of receptor

- 14.1.138 As per 14.1.127, the sensitivity of the receptor is assessed to be **Low**.

Magnitude of impact

- 14.1.139 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.
- 14.1.140 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 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. Onshore wind energy was the fourth most supported form of renewable energy in the survey. Opposition to onshore wind energy represented 5% of those surveyed, compared to 77% who were supportive.

14.1.141 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 is supported by the latest DESNZ PAT.

14.1.142 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

14.1.143 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

14.1.144 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

14.1.145 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

14.1.146 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

14.1.147 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.

14.1.148 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

14.1.149 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.

14.1.150 Should there be a significant proportion of non-resident workers 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 Bridgend, employing 3,000 individuals, or 5.2% of the workforce. Furthermore, the rate of unemployment within Bridgend was estimated to be 3.9% in Q2 2024.

- 14.1.151 Given the estimated local employment generation as a result of the development (7 local FTE jobs during construction), it is anticipated that the pool of labour within the study area is more than sufficient to support this.
- 14.1.152 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 picture (5%). The report also states that *"A quarter (25%) of construction workers in Wales have worked no more than 20 miles away, fewer than in 2018/19 (29%), and compared with the 2022 UK average of 33%. A further two in five (38%) have worked between 21 and 50 miles away, much in line with 2018/19 (35%) and the UK average of 34%"*. This reiterates the low number of expected construction/decommissioning workers likely to require temporary accommodation to work on the Development.
- 14.1.153 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 the study area, there is a modest number of short-term rental providers, with a greater density of options within the towns/villages surrounding the order limits, e.g. Bridgend and Porthcawl.
- 14.1.154 Regional room occupancy rates are measured monthly as part of the Wales Accommodation Occupancy Survey (EOS). It shows that, in the 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

- 14.1.155 During the full two-year construction phase, it is anticipated that there will be a gain in non-local direct employment equivalent to 7 FTE jobs.
- 14.1.156 Based on the assessment of short-term rental accommodation in the study area 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.
- 14.1.157 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

- 14.1.158 The vulnerability of the receptor is considered to be low given the modest 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.
- 14.1.159 Therefore, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.160 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

- 14.1.161 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

- 14.1.162 The effects of the decommissioning stage on temporary worker accommodation are considered commensurate with the construction stage.

Sensitivity of receptor

- 14.1.163 The sensitivity of the receptor is assessed to be commensurate with the construction phase.
- 14.1.164 Therefore, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.165 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

- 14.1.166 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

- 14.1.167 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

- 14.1.168 During the construction phase, the Transport chapter anticipates that there will be a short term major adverse (significant) effect on severance for users of Bryngarn Road (northern). No other significant effects are predicted.

Sensitivity of receptor

- 14.1.169 The vulnerability of the receptor is considered moderate given the modest percentage 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.
- 14.1.170 Therefore, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.171 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

- 14.1.172 Based on the sensitivity of the receptor and the magnitude of the impact, the significance of the effect is considered to be Low Adverse.
- 14.1.173 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

The effects of the decommissioning stage on commuting patterns are considered commensurate with the construction stage.

Sensitivity of receptor

- 14.1.174 As per 14.1.169, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.175 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

- 14.1.176 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

- 14.1.177 In order to access the impact upon recreation, surveys were undertaken to understand the type and quantity of use. The recreational surveys were undertaken on the following dates:

- Wednesday 16th August 2023 9am – 5pm
- Thursday 24th August 2023 11am – 7pm
- Saturday 2nd September 2023 9am – 5pm

- 14.1.178 The surveys were conducted within school summer holidays and the variation of days were chosen to cover weekdays and a weekend. Additionally, times varied in order to cover evening activity as well as morning and afternoon. This ensured that the likely maximum use of the site for recreational use was captured. The Recreational survey findings are presented in detail in Appendix 14.3.

- 14.1.179 Results found that, across the three days, there were 44 separate uses of the common by 61 people. Recreational usage of the common was higher during the weekend than during the week. Walking was the most frequently observed use of the common. Other users of the common included cyclists, horse riders and motorcyclists (illegal use).

- 14.1.180 Given that over the course of three summer days, 20 people used the common on average per day, use of the common appears to be modest in summer and is likely to be less well used during winter months.

- 14.1.181 Furthermore, the Travel and Transport chapter states that there is predicted to be a short term major adverse (significant) effect on Users of On-Site Public Rights of Way as a result of severance. There is also likely to be a short term major adverse (significant) impact on non-motorised user amenity and road safety. Lastly, there is predicted to be a short term moderate adverse (significant effects) on pedestrian delay.

Construction phase

- 14.1.182 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 Farm.

Sensitivity of Receptor

- 14.1.183 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

- 14.1.184 The Mynydd y Gaer Wind Farm will remain open and accessible to all including the commoners' graziers. 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

- 14.1.185 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.
- 14.1.186 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 the Public Rights of Way and, subsequently, reduce the significance of the effect, resulting in a **Negligible** residual effect.

14.1.187

Operational phase

- 14.1.188 It is not anticipated that there will be any additional restrictions to recreational use of the development land once the wind farm is operational. We would therefore not expect access to recreation to be any different to before the construction of the development.

Sensitivity of receptor

- 14.1.189 As per 14.1.183, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.190 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. Onshore wind energy was the fourth most supported form of renewable energy in the survey. Opposition to onshore wind energy represented 5% of those surveyed, compared to 77% who were supportive.
- 14.1.191 Given the predominant support for onshore wind farm development in the UK, it is not expected that the visibility of wind turbines from PRow routes will deter recreational users from continuing to use the routes through the site or for user enjoyment to significantly decline.
- 14.1.192 Subsequently, the magnitude of impact is assessed as **Low Adverse**.

Significance of effect

- 14.1.193 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

- 14.1.194 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

- 14.1.195 As per 14.1.183, the sensitivity of the receptor is **Low**.

Magnitude of impact

- 14.1.196 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

- 14.1.197 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

- 14.1.198 No future monitoring is required as a consequence of the assessment of Socioeconomics, tourism and recreation.

Cumulative Effects

- 14.1.199 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.
- 14.1.200 The development types allocated to tier 1, tier 2 and tier 3 for the assessment of cumulative effect are summarised in **Table 14.12**.

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.

14.1.201 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			
Llwynceilyn Wind Farm	Cenin Renewables	Construction	15/1635/10
Former Nant-y-Gwyddon Landfill Site	Sirius Group	Awaiting Construction	17/0321/10
Foel Trawsnant	Pennant Walters Ltd	Awaiting Construction	P2014/0825
Abergorki Wind Farm	REG Windpower	Awaiting Construction	13/0663/10
Headwind Taff Ely Wind Farm (Repowering)	RWE Npower Renewables	Awaiting Construction	11/1468/FUL
Upper Ogmores Wind Farm	RES UK & Ireland Limited	Awaiting Construction	P2020/1002
Pant y Wal (Second extension)	Pennant Walters	Under construction	P/20/42/FUL
Y Bryn	Coriolis Energy and ESB	Application submitted	DNS/3264571
Melin Court	Infinis	Awaiting Construction	P2022/0216
Mynydd y Glyn	Pennant Walters	Awaiting Construction	DNS/3280378
Mynydd Carn y Cefn	Pennant Walters	Awaiting Construction	DNS/3270299
Mynydd Maen	RES	Application submitted	DNS/3276725
Tier 1 - Non-Wind Energy Developments			
Ty'n y Waun Solar Farm	Cenin Renewables	Awaiting construction	DNS/3279521

Coed Ely Solar Farm		Awaiting construction	23/0994/GREG
Rhiwfelin Fach Farm	Infinite Renewables	Awaiting construction	21/1613/10
Talbot Green Solar Farm	Windel Energy	Awaiting construction	22/1413/10
Great Western Avenue, Coity Road Battery energy storage	Power Initiatives	Awaiting construction	P/22/225/FUL
HyBont Green Hydrogen	Marubeni Europower	Under consideration	P/23/218/FUL
Treoes Solar Farm	Francesca Wray	Decided - EIA not required	2022/00137/SC1
Land East of Treoes	Windel Solar	Decided - EIA not required	2023/01050/SC1

Cumulative effects assessment

- 14.1.202 The Proposed Developments identified in **Table 14** 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 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

- 14.1.203 A description of the cumulative effects between the Proposed Development and other developments identified in **Table 14.21** upon Socioeconomics, tourism and recreation receptors is provided below.

Temporary Worker Accommodation

Wind Farm Cumulative Developments

Construction phase

- 14.1.204 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).
- 14.1.205 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.
- 14.1.206 A displacement of 25% was then applied to these numbers to arrive at a net construction employment number.
- 14.1.207 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.
- 14.1.208 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.
- 14.1.209 The total net annual construction employment figure for the cumulative solar developments is estimated to be 3,500 as seen in **Table 14.15**, which also outlines the location and type of development alongside the estimated construction job creation.

Table 14.14 - Wind Cumulative Developments

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
Llwynceilyn Wind Farm	2	5	64	48	0.5	96
Former Nant-y-Gwyddon Landfill Site	1	2	19	14	0.5	29
Foel Trawsnant	11	35	445	334	1.0	334
Abergorki Wind Farm	3	14	173	130	0.5	259
Headwind Taff Ely Wind Farm (Repowering)	7	18	224	168	0.5	336
Upper Ogmere Wind Farm	7	25	320	240	1.0	240
Pant y Wal (Second extension)	2	5	64	48	0.5	96
Y Bryn	21	130	1659	1244	2.0	622
Melin Court	5	18	230	173	0.5	346
Mynydd y Glyn	7	30	384	288	1.0	288
Mynydd Carn y Cefn	8	34	435	326	1.0	326
Mynydd Maen	13	55	704	528	1.0	528
		369	4722	3541		3500

Other Energy Cumulative Developments

Solar

- 14.1.210 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).
- 14.1.211 Table 14.16 below summarises the estimated jobs required for each of the cumulative solar developments.

Table 14.15 Wind Cumulative Developments

Energy Development Description	Development Type	Capacity (MW)	Gross Estimated Construction Years of Employment	After 25% Displacement	Estimated Construction Period of Schemes	Estimated Jobs Created Per Annum
Tyn y Waun Solar Farm	Solar	65	1352	1014	1.0	1014
Coed Ely Solar Farm	Solar	6	125	94	0.5	47
Rhiwfelin Fach Farm	Solar	1	21	16	0.5	8
Talbot Green Solar Farm	Solar	10	206	154	0.5	77
Great Western Avenue, Coity Road Battery energy storage	BESS	27	568	426		0
HyBont Green Hydrogen	Green Hydrogen		130	98	1.0	98
Treoes Solar Farm	Solar	10	206	154	0.5	77
Land East of Treoes	Solar	10	206	154	0.5	77
		129	2813	2110		1398

Battery Energy Storage Systems (BESS)

- 14.1.212 Construction employment generated as a result of BESS developments has been estimated based upon IRENA installed cost estimates per Kw (\$273/Kw, or £194/Kw – based on £ to \$ average exchange rate in 2023).
- 14.1.213 The estimated construction cost is divided by the average construction worker salary in Wales in order to estimate the total number of construction workers required. 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.
- 14.1.214 Coity Road BESS in Bridgend is the only BESS facility identified within the cumulative developments list. Whilst the capacity of the scheme is not readily available, within the proposed site layout, seven Tesla Megapacks are shown. Tesla Megapacks have a capacity of up to 3.9MWh. Subsequently, a site capacity of 27.3MWh has been assumed.
- 14.1.215 Subsequently, the total installed cost of the Coity Road BESS is estimated to be £5.3m. Dividing this figure by the average construction worker wage in Wales (£41,319) provides an estimate of the total number of person years of employment required during construction. This equates to 128 person years.
- 14.1.216 After accounting for displacement (25%), this results in a total of 96 person years.

Green Hydrogen

- 14.1.217 HyBont, Marubeni Europower's green hydrogen project is also identified as a cumulative development. By Marubeni Europowers own estimations, the project will generate 130 construction jobs. With no detail on the construction programme readily available, we have assumed that construction will take a year.
- 14.1.218 After accounting for displacement (25%), this results in 98 construction jobs.
- 14.1.219 The total net annual construction employment figure for the cumulative energy (non-wind) developments is estimated to be 2,353 as seen in **Table 14.17**, which also outlines the location and type of development alongside the estimated construction job creation.

Table 14.16 - Energy Cumulative Developments

Energy Development Description	Development Type	Gross Estimated Construction Years of Employment	After 25% Displacement	Estimated Construction Period of Schemes	Estimated Jobs Created Per Annum
Tyn y Waun Solar Farm	Solar	1352	1014	1.0	1014
Coed Ely Solar Farm	Solar	125	94	0.5	187
Rhiwfelein Fach Farm	Solar	21	16	0.5	31
Talbot Green Solar Farm	Solar	206	154	0.5	309
Great Western Avenue, Coity Road Battery energy storage	BESS	128	96	1.0	96
HyBont Green Hydrogen	Green Hydrogen	130	98	1.0	98
Treoes Solar Farm	Solar	206	154	0.5	309
Land East of Treoes	Solar	206	154	0.5	309
		2813	2110		2353

Overall Cumulative Construction Workers Summary

15.1.1 Summarising the information above, a total net additional 5,853 construction workers have been identified (3,500 from onshore wind developments; 2,353 from other energy developments) across all 20 cumulative schemes relevant to the socioeconomic, tourism and recreation assessment. The split of workers is shown in **Figure 14.3** below.

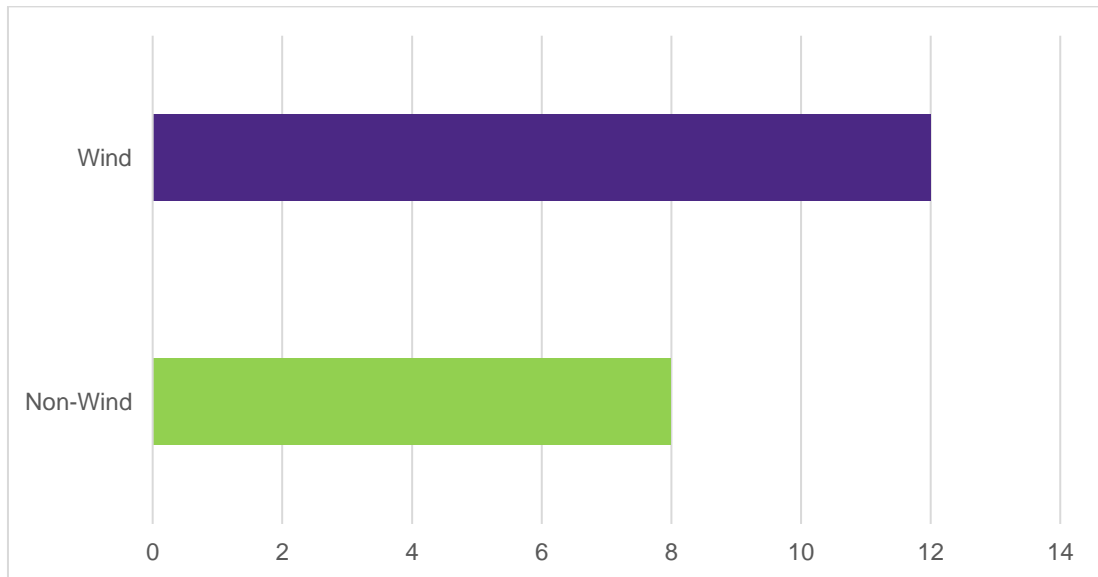


Figure 14.3: Total Number of Construction Workers across Cumulative Developments

Construction Employment Landscape

14.1.220 According to the Annual Population Survey (June 2024), Bridgend has a lower proportion of total employment working in the construction industry, compared to Wales. However, when taking into consideration the total number of construction jobs expected to be required as a result of the 20 cumulative developments (5,853), it is clear that Bridgend combined with other local

authorities providing worker inflows into the county borough (27,500) has approximately 21,647 additional required construction worker, as seen in Figure 14.3. This would appear an adequate supply of construction workers for the needs of the cumulative developments.

- 14.1.221 The Mynydd Y Gaer Wind Farm will require a net direct FTE employment of 14 construction workers within the Study Area, which, when combined with the total expected cumulative development workers needed (5,853) this equates to 5,867. There is, therefore, a surplus of 21,633 construction workers when compared to the total number of construction workers available in Bridgend and authorities with worker inflows.

Table 14.17 - Construction Employment

Industry	Bridgend		Cardiff		Neath Port Talbot		Rhondda Cynon Taf		Swansea		Vale of Glamorgan		Wales	
	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%	no.	%
Construction	3,000	6.1%	8,000	3.7%	2,500	6.4%	6,000	8.7%	6,000	5.9%	2,000	5.2%	66,000	5.8%

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 2022 was estimated to be 3.1 in Wales, down on 3.7 observed in 2021.
- 15.1.4 Serviced accommodation was the predominant accommodation used for overnight trips in 2022 in Wales (38%), followed by both Caravan / Camping / Glamping and staying at someone's private home (21%). 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.

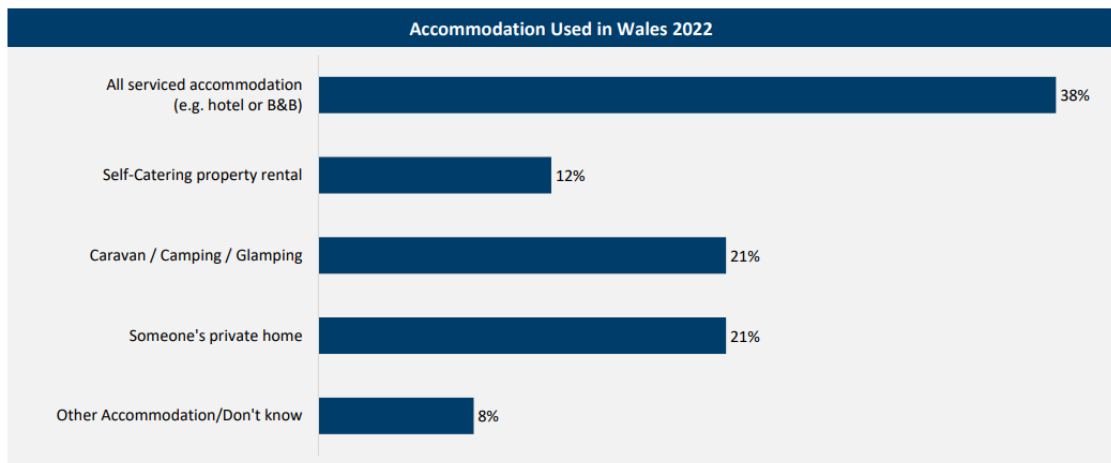


Figure 14.4 – Accommodation Used in Wales (2022)

Temporary Accommodation Demand

- 14.1.222 Although a total of 5,867 annual net direct construction workers has been identified as a result of the cumulative developments (5,853) and Mynydd Y Gaer Wind Farm (14), Bridgend and surrounding local authorities providing worker inflows have a minimum up to 21,633 more construction workers, suggesting it is possible that all workers could come from Bridgend or neighbouring local authorities and thus wouldn't require any temporary accommodation.
- 14.1.223 The CITB Workforce Mobility and Skills in the UK Construction Sector (2022) 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.
- 14.1.224 Applying 6% to the 5,867 workers who may be commuting to site, this would equate to 352 workers who may need to stay in temporary accommodation.

Accommodation Supply

- 14.1.225 Table 14.19 below presents the supply and occupancy rate of Bridgend and neighbouring local authorities, according to Property Market website, Property Market Intel. Applying the average occupancy rate to the total supply across Bridgend and neighbouring local authorities, there is an average of 1,471 unoccupied serviced accommodation bedspaces throughout the year.

Table 14.18 - Serviced Accommodation Supply & Occupancy

Serviced Accommodation	Bridgend	Cardiff	Neath Port Talbot	Rhondda Cynon Taf	Swansea	Vale of Glamorgan	Total / Average
Supply	282	1,337	317	232	487	474	3,129
Occupancy Rate	54%	53%	49%	53%	59%	51%	53%

Temporary Workers Accommodation Conclusion

14.1.226 Based on the above there will be 4.2 times the amount of available temporary accommodation bed spaces (1,471) for the 352 construction workers who may need them. Therefore, there is a **Negligible** impact, which is not significant.

Sensitivity of the receptor

14.1.227 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

14.1.228 Approximately 352 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

14.1.229 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

14.1.230 Table 10 presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

14.1.231 **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

References

- The National Archives (2021). *Equality Act 2010*. Available at: <https://www.legislation.gov.uk/ukpga/2010/15/part/1>. Accessed January 2025.
- Department for Levelling Up, Housing & Communities (2023). *Infrastructure Planning (Environmental Impact Assessment) Regulations 2017*. Available at: <https://www.gov.uk/government/consultations/environmental-outcomes-reports-a-new-approach-to-environmental-assessment/post-implementation-review-infrastructure-planning-environmental-impact-assessment-regulations-2017>. Accessed January 2025.
- Department for Energy Security & Net Zero (2023). *Overarching National Policy Statement for Energy (EN-1)*. Available at: <https://assets.publishing.service.gov.uk/media/65bbfbd709fe1000f637052/overarching-nps-for-energy-en1.pdf>. Accessed January 2025.
- Department for Energy Security & Net Zero (2023). *Overarching National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Accessed January 2025.
- Ministry of Housing, Communities & Local Government (2024). *National Planning Policy Framework*. Available at <https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf>. Accessed January 2025.
- Ministry of Housing, Communities and Local Government, Ministry of Housing, Communities & Local Government (2018 to 2021) and Department for Levelling Up, Housing and Communities (2024). *Planning Practice Guidance - Natural Environment*. Available at: <https://www.gov.uk/guidance/natural-environment>. Accessed January 2025.
- Bridgend County Borough Council (2024). *Bridgend County Borough Council Local Development Plan up to 2033*. Available at: <https://www.bridgend.gov.uk/residents/planning-and-building-control/replacement-local-development-plan/adopted-bridgend-replacement-local-development-plan-2018-2033/>. Accessed January 2025.
- Census (2011). *Location of usual residence and place of work by sex*. [Nomisweb.co.uk](http://www.nomisweb.co.uk). Available at: <https://www.nomisweb.co.uk/census/2011/wu01uk#:~:text=Location%20of%20usual%20residence%20and%20place%20of>. Accessed January 2025.
- Institute of Environmental Management and Assessment (IEMA) (2015). *IEMA Environmental Impact Assessment Guide to Shaping Quality Development*. Available at: <https://iaia.org/pdf/wab/IEMA%20Guidance%20Documents%20EIA%20Guide%20to%20Shaping%20Quality%20Development%20V6.pdf>. Accessed January 2025.
- 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%202023rd%20%202015%20Main%20Orca.pdf>. Accessed January 2025.
- Office of National Statistics (2022). *Low carbon and renewable energy economy indirect estimates*. Available at:

<https://www.ons.gov.uk/economy/environmentalaccounts/datasets/lowcarbonandrenewableenergyeconomyindirectestimatesdataset>. Accessed January 2025.

Homes & Communities Agency (2014). *Additionality Guide*. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/378177/additionality_guide_2014_full.pdf. Accessed January 2025.

Office of National Statistics (2024). *Regional gross value added (balanced) by industry: local authorities by ITL1 region*. Available at: <https://www.ons.gov.uk/economy/grossdomesticproductgdp/datasets/regionalgrossvalueddedbalancedbyindustrylocalauthoritiesbyitl1region>. Accessed January 2025.

Office of National Statistics (2024). *Subregional productivity: labour productivity indices by local authority district*. Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/subregionalproductivitylabourproductivityindicesbylocalauthoritydistrict>. Accessed January 2025.

HM Treasury (2022). *The Green Book, para 5.35*. Available at: https://assets.publishing.service.gov.uk/media/6645c709bd01f5ed32793cbc/Green_Book_2022_updated_links.pdf. Accessed January 2025.

Department for Energy Security & Net Zero (2024). *Renewable electricity by local authority 2014 – 2022*. Available at <https://www.gov.uk/government/statistics/regional-renewable-statistics>. Accessed January 2025.

The Department for Energy Security and Net Zero (2023). *Contracts for Difference Allocation Round 5 results*. Available at: <https://assets.publishing.service.gov.uk/media/64fa0473fdc5d10014fce820/cfd-ar5-results.pdf>. Accessed January 2025.

Office of National Statistics (2023). *Business Register and Employment Survey*. Available at: <https://www.nomisweb.co.uk/query/construct/summary.asp?mode=construct&version=0&dataset=189>. Accessed January 2025.

Department for Energy Security & Net Zero (2024). *Public Attitudes Tracker – 2024*. Available at: <https://assets.publishing.service.gov.uk/media/6683d0774e8630de32854694/DESNZ-PAT-spring-2024-technical-overview.pdf>. Accessed January 2025.

Jacob Ladenburg (2014). *Dynamic properties of the preferences for renewable energy sources – A wind power experience-based approach*. Accessed January 2025.

CITB (2023). *Workforce Mobility and Skills in the UK Construction Sector 2022 – Wales*. Available at: <https://www.citb.co.uk/about-citb/construction-industry-research-reports/search-our-construction-industry-research-reports/workforce-mobility-and-skills-in-the-uk-construction-sector-2022/>. Accessed January 2025.

Welsh Government (2024). *Domestic GB Tourism Statistics: Wales Overnight Tourism Survey Annual Report 2022*. Available at: <https://www.visitbritain.org/research-insights#latest-releases>. Accessed January 2025.

Building Cost Information Service (2024). *Project Cost – Average Prices*. Available at: <https://online.bcis.co.uk/AveragePrices/Rebase>. Accessed January 2025.

Lichfields (2024). Start to Finish: how quickly do large-scale housing sites deliver?. Available at: <https://lichfields.uk/content/insights/start-to-finish-3>. Accessed January 2025.

JMS Energy (2024). A Comprehensive Guide to Wind Farm Construction. Available at: <https://www.jmsenergy.net/a-comprehensive-guide-to-wind-farm-construction/>. Accessed January 2025.

Property Market Intel (2024). Serviced Accommodation – STR Location Dashboard. Available at: <https://app.propertymarketintel.com/data/short-term-rental?default-view==location-analysis>. Accessed January 2025.

15 Geology/Hydrogeology

15.1 Introduction

15.1.1 Spectrum Geo Services (SGS) were requested by Cenin to undertake an Environmental Impact Assessment (EIA), relating to the Geo-Environment of a proposed wind turbine site Mynydd y Gaer, Heol y Cyw, CF35 6NL.

15.1.2 This report should be read in conjunction with reports 24029/R1 and R2.

15.1.3 As part of the ongoing process, an EIA is required, part of which requires an assessment relating to geology, hydrology and hydrogeology.

15.1.4 The site location is labelled on Figure 15.1

15.2 The Environmental Impact Assessment Process

Scoping

15.2.1 The purpose of scoping is to focus the EIA on the likely significant environmental effects of relevance to the proposed development. Therefore, on the basis of the work undertaken to date, the professional judgement of the assessment team, experience from other similar projects, as well as policy, guidance and standards of relevance, each topic-based section within this report outlines both:

- Potentially significant effects associated with the construction and/or operation of the proposed development, identified for detailed consideration within the EIA Report.
- Effects considered unlikely to be significant and requiring no further assessment. These topics will fall outside of the scope of assessment but will be referred to in turn within the EIA Report.

15.2.2 Additional objectives of the Scoping Report are:

- To establish the availability of baseline environmental data and its source;
- To define a survey and assessment framework from which a comprehensive overall assessment can be produced;
- To invite consultees to identify any concerns that they might have in relation to the proposed development;
- To comment on the proposed methodology;
- To provide and receive information relevant to the proposed development; and
- To consider the way in which the findings are presented in the EIA Report.
- To undertake Phase 1, Walkovers, Ground Investigations, hydrology assessments.

Baseline Conditions

- 15.2.3 The EIA Regulations require that the aspects of the environment, which are likely to be significantly affected by the proposed development, be defined within the EIA Report. To achieve this, it is necessary to gather environmental information on each of the topics proposed for consideration as part of the EIA, i.e. 'baseline conditions'.
- 15.2.4 For the purposes of the assessment, the baseline will be considered to be the existing site which is currently undeveloped. Information will also be provided which will compare the consented developments with the proposed development, but this will not form part of the EIA and it is proposed that this is included with the Planning Statement that will accompany the EIA Report.

Assessment of Effects

- 15.2.5 The assessment of potential effects, using a range of appropriate methodologies, will take into account the construction and operation of the proposed development in relation to the site and its environs.

Construction Details

- Construction of the temporary construction compound;
 - Extraction of stone from the borrow pits for track and turbine base construction;
 - Construction of site access tracks, passing places and any watercourse crossings;
 - Construction of culverts under tracks to facilitate drainage and maintain existing hydrology;
 - Construction of turbine foundations and transformer plinths;
 - Excavation of trenches and cable laying adjacent to site tracks;
 - Movement onto site and erection of wind turbines;
 - Commissioning of the site; and
 - Restoration of borrow pits and temporary construction compounds.
- 15.2.6 Many of these operations will be carried out concurrently, although predominantly in the order identified. This will reduce the overall length of the construction programme. In addition, development will be phased such that, at different parts of the site, the civil engineering works will be continuing whilst wind turbines are being erected. Site restoration will be programmed and carried out to allow restoration of disturbed areas progressively and as early as possible.

15.3 Hydrogeology and Geology

Introduction

- 15.3.1 This chapter sets out the proposed approach to the assessment of potential effects of the proposed development on geology, hydrology and hydrogeology during construction and operation of the proposed development.

Existing Conditions

- 15.3.2 The topography of the site is generally hilly, rock and wooded, centred at SS 94978 857760 and is at a maximum elevation of approximately 295m. A.O.D.
- Coal Authority Consultants Report ref 51003441837001.
 - The C.A. interactive viewer.
 - The 1 to 10k Geological Survey sheet
 - The Memoirs of the Geological Survey of The South Wales Coalfield.
 - Historical O.S. mapping.
- 15.3.3 The Consultants Report states that there are recorded underground mine workings of various coal seams beneath the area, the shallowest being within the No2 Rhondda Seam, at a depth of 55m, dipping at 17degrees to the north, and last mined in 1967 being 200mm thick.
- 15.3.4 The Coal Authority have no record of mine entries within the search area. However, the BGS maps indicate entries to the immediate south of the site.
- 15.3.5 In Section 2 the report states there have been no site investigations and there are no recorded surface hazards that have required remedial action within 50m.
- 15.3.6 The C.A. have not received any damage notices or subsidence claims for any property within 50m since October 1994 (i.e. since the formation of the C.A. to take liability for legacy mining issues). There are no records of gas emissions requiring action within 500m.
- 15.3.7 Section 3 states there are no present underground workings or plans for any. There are no Section 46 notices or withdrawal of support notices.
- 15.3.8 All these facts will feed into the later quantitative risk assessment. In Section 4 the report states potential risks have been identified and should be investigated further as part of any risk assessment. The Consultants Report is attached in Appendix 15.2.
- 15.3.9 The C.A. interactive viewer contains a vast amount of information from various sources, particularly on the mining data window. Much of this is not contained within a Consultants Report for reasons unknown. An extract from the planning window can be seen in Figure 15.3. The Site lies within an area of Development High Risk, possibly indicating known shallow mining or unlicensed opencast.
- 15.3.10 In order to fully understand why sites have a high risk status it is informative to study the Coal Mining Data window. This window is far superior to the planning

window as it is at a larger scale. There are multiple datasets which can be turned on and off. An extract from the Mining Data Window is reproduced as Figures 15.3, 15.4 and 15.5. For clarity only one set of data is turned on in Figure 15.4 - seam levels. The green lines are seam levels to Ordnance Datum.

- 15.3.11 The Consultants report shows a large area of unlicensed opencast at the site.
- 15.3.12 Not shown in the Consultants Report, but within the 1:10000 Geological Maps, are several drift entries to the south of the site, with roadways heading north, into the site. This will require the purchase of abandonment plans prior to the design of ground investigation works. The roadways are shown in the vicinity of T3,5,6 and 7.

Turbine Specific Comments

- 15.3.13 T1: This lies in a location at which the presumed outcrop of the No1 Rhondda Rider seam is noted.
- 15.3.14 T2: This lies in a location at which the presumed outcrop of the Horizon of the No1 Rhondda Rider seam is noted.
- 15.3.15 T3: This lies in a location at which the presumed outcrop of the No1 Rhondda Rider seam is noted.
- 15.3.16 T4: This lies to the north of the presumed horizon of the Brithdir Rider seam. The location is close to and on the downthrown side of a north/south fault.
- 15.3.17 T5: This lies to the north of the presumed horizon of the Brithdir Rider seam.
- 15.3.18 T6: This lies to the north of the presumed outcrop of the No1 Rhondda Rider seam is noted. It is between two roadways in the No3 Rhondda.
- 15.3.19 T7: This lies to the south of the presumed horizon of the Brithdir seam.
- 15.3.20 T8: This lies in a location at which the presumed outcrop of the No1 Rhondda Rider seam is noted.
- 15.3.21 T9: This lies to the south of the presumed horizon of the Brithdir seam.
- 15.3.22 T10: This lies in a location at which the presumed outcrop of the No1 Rhondda seam is noted.
- 15.3.23 T11: This lies in a location at which the presumed outcrop of the No1 Rhondda seam is noted.
- 15.3.24 An extract of the 1 to 10k geological map of the western area has been reproduced as Figure 15.6, the west in Figure 15.7.
- 15.3.25 The data contained within the Consultants Coal Mining Report, is confirmed within the BGS data, in that economic Coals are at depths which may impact selected Turbine locations and access routes.

15.4 Design Considerations

- 15.4.1 Where possible, the proposed development will be designed to avoid sensitive water features and sensitive habitats. Watercourse crossings will be kept to a minimum. The primary design considerations with respect to superficial deposits will be to minimise the overlap between infrastructure and the deepest

areas of superficial deposits on site and minimise disruption to natural drainage pathways.

15.5 Walkover

15.5.1 Walkovers were undertaken on 16 and 17 January 2025. Weather conditions were dry, overcast and cold.

15.6 General Ground Conditions

15.6.1 Black peat varies from 50mm to 300mm deep across the site. Below this is glacial till, consisting of clayey sandy gravel with many cobbles.

15.6.2 Where exposed, fines have washed away, leaving gravel and cobbles behind. Site access is easily obtained from Minffrwd Rd between T10 and T11.

15.6.3 Appendix 15.1 presents photographic plates from each of the turbine locations.

15.7 Proposed Surveys and Assessment Methodologies

15.7.1 The scope of works relating to the assessment of effects on geology, hydrology and hydrogeology, informed by work undertaken as part of the EIAs for the consented developments, will include:

- The existing data obtained for the consented developments will be verified through reviewing information on geology, water features, designated sites, flooding, climate and issue of private water supply questionnaires to nearby properties.
- Geological survey data from intended rotary probing will be undertaken. A sub-sample of probe locations will be cored and logged on site to provide information on the composition of the soil/rock column. Other pertinent information will be collected at each probe location to inform general understanding of the site and related assessments.
- Following design iteration a hydrological survey will be completed to examine the exact locations of all proposed infrastructure and the access tracks routes with respect to water features and water crossings. Further probing will be undertaken to ensure that all infrastructure locations and routes have sufficient soil depth information to support related studies on excavation and re-use.

Assessment Method

15.7.2 Based on the information obtained from the review of existing data and the site surveys an assessment of the potential effects of the proposed development will be undertaken. Where potential significant effects are identified mitigation measures will be proposed.

Potential Effects on Geology, Hydrology and Hydrogeology

15.7.3 Potential effects associated with the construction and/or operation of the proposed development, prior to implementation of any avoidance or mitigation measures, include:

- Pollution of public/private drinking water supplies and high levels of suspended solids and turbidity in watercourses caused by sedimentation from excavated/stockpiled material during wind farm construction;
- Pollution of surface water and groundwater, including drinking water supplies, through operation of machinery (e.g. spillage of fuels, oils etc.) during construction and as a result of maintenance activities associated with the operation of the site;
- Modifications to natural drainage patterns, changes to runoff rates and volumes and a consequent increase in flood risk during construction and operation of the proposed development due to increased areas of temporary and permanent hardstanding;
- Loss of/disturbance to carbon rich soils; reductions in natural flows arising should any temporary abstractions be required; and
- Localised flooding and bank erosion caused by impediments to flow, particularly in conditions of high discharge.

15.7.4 On the basis of the professional judgement of the assessment team and experience from other similar projects, it is considered likely that the following effects can be scoped out:

- Increased flood risk caused by impediments to flow in watercourses during operation and maintenance of the proposed development;
- Effects on solid geology during construction and operation of the proposed development; and
- Cumulative impacts due to the absence of proposed development on adjoining hillsides or within the same hydrological catchments to the proposed development.

Approach to Mitigation

15.7.5 Given the teams commitment to, and prior experience of, implementing accepted good practice during construction and operation of wind farm developments, and the current regulatory context, it is anticipated that many potential effects on the water environment can be avoided or reduced.

15.7.6 With respect to the current regulatory context, authorisation will be required in relation to a number of activities, e.g. engineering works in inland waters and wetlands. Consultation with NRW will be undertaken throughout the EIA process in relation to those activities for which a licence or registration is required.

15.7.7 As a consequence, a number of measures are not considered to be mitigation as such, but rather an integral part of the design/construction process and it is proposed that these will be taken into account prior to assessing the likely effects of the proposed development. However, where appropriate, more tailored mitigation measures will be identified prior to determining the likely significance of residual effects.

15.7.8 Both infrastructure specific mitigation and site-wide good practice measures will be specified and carried forward into the Construction Environmental

Management Plan (CEMP) and Geotechnical Risk Register (GRR). In addition to mitigation through design of the layout, implementation of good practice construction measures and controls included within a CEMP, as noted above, it is envisaged that localised mitigation measures may be required and these will be identified through the EIA process.

16 Land Use and Soils

16.1 Introduction

16.1.1 This chapter of the Environmental Statement (ES) assesses the likely effects of the Proposed Development on agricultural land use and soils. The chapter focuses on the potential effects on the:

- quality of agricultural land, including the potential effects on the best and most versatile Grades 1,2 and 3a land.
- soil types affected, including any potential impact on peat soils; and
- operation of farm holdings, including the potential effects on the use land within common land area(s).

16.2 Legislative and Policy Context

National Planning Policy Context

16.2.1 The key national planning policy documents relevant to the assessment of Land Use and Soils 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).

16.2.2 **Table 16.1** provides a summary of the policies contained within the national planning policy documents listed above relevant to the assessment of Land Use and Soils, including how and where these have been considered in the ES.

Table 16.1: 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	
Policy 9: Resilient Ecological Networks and Green Infrastructure, of Future Wales: The National Plan 2040. This policy identifies the importance of the maintenance of ecosystem services where peatlands contribute to the carbon sequestration function.	The identification of peat resources is provided in Appendix 16.1 Soils, Peat and Agricultural Land Classification. Measures adopted as part of the Project to limit damage to peat resources, wherever possible, are considered in section 16.7 of this chapter. The likely significant effects on soils, including peat are considered in section 16.8 of this chapter.
Planning Policy Wales Edition 12	
Section 3: Strategic Placemaking. Paragraphs 3.58 and 3.59 which consider the conservation of the best and most	The quality of the agricultural land on the Site is considered in Appendix 16.1 and section 16.6 of this chapter.

Summary of policy	How and where considered in the ES
versatile Grades 1,2 and 3a land according to the ALC system and the sequential consideration of previously developed land and land of lower quality, alongside other environmental and planning factors in the allocating sites for development.	
Section 6: Distinctive and Natural Places-Biodiversity and Ecological Networks. Paragraph 6.4.3 identifies that policies and development proposals must consider the need to safeguard biodiversity assets and the components that underpin them, including peat.	The identification of peat resources is provided in Appendix 16.1 Soils, Peat and Agricultural Land Classification. Measures adopted as part of the Project to limit damage to peat resources, wherever possible are considered in section 16.7 of this chapter. The likely significant effects on soils, including peat are considered in section 16.8 of this chapter.
TAN 6 Planning for Sustainable Rural Communities	
Section 6 Sustainable Agriculture 6.2 Development Involving agricultural land. Paragraph 6.2.1 identifies that local authorities should consider the quality of agricultural and other agricultural factors and seek to minimise any adverse effects on the environment.	The quality of the agricultural land on the Site is considered in Appendix 16.1 and section 16.6 of this chapter.
Section 6 Sustainable Agriculture 6.2 Development Involving agricultural land. Paragraphs 6.2.5 and 6.2.6 identify the need to consider the potential impacts of development in relation to the size, type and layout of farming businesses.	The nature of farming on the Site, including within the Common is considered in section 16.6 of this chapter. The likely significant effects on farming businesses are considered in section 16.8 of this chapter.

Local Planning Policy Context

16.2.3 The Proposed Development site is located within Bridgend County Borough Council. The local planning policy document relevant to the assessment of Land Use and Soils for the Proposed Development is:

- **Bridgend County Borough Council Local Development Plan up to 2033** - adopted in March 2024

16.2.4 **Table 16.2** provides a summary of the provisions contained within the local plan relevant to the assessment of Land Use and Soils, including how and where these have been considered in the ES.

Table 16.2: Summary of local planning policy

Policy	Summary of policy	How and where considered in the ES
Policy SP17 Conservation and Enhancement of the Natural Environment	This policy states that development proposals will not be permitted where they will have an adverse impact on the quality of its natural resources including soil.	The identification of peat resources is provided in Appendix 16.1 Soils, Peat and Agricultural Land Classification. Measures adopted as part of the Project to limit damage to soil resources including peat,

Policy	Summary of policy	How and where considered in the ES
		<p>wherever possible, are considered in section 16.7 of this chapter.</p> <p>The likely significant effects on soils, including peat are considered in section 16.8 of this chapter</p>

16.3 Consultation and Engagement

Scoping

- 16.3.1 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.
- 16.3.2 Following consultation with the appropriate statutory bodies, PEDW provided an EIA Scoping Direction on the 25 August 2023. Key issues raised by statutory bodies specific to Land Use and Soils are listed in **Table 16.3**, including how and where these have been considered in the ES.

Table 16.3: Summary of scoping responses relevant to Land Use and Soils

Comment	How and where considered in the ES
PEDW	
ID 4: Soils and Land Agricultural Land Classification Survey. Although ALC survey is not required, information on the natures of soils on the Site should be included.	Desk top information on the nature of the soils across the Site are including in Section 16.6. Surveys have been undertaken to assess the potential impact on peat and peaty soils, as described in Appendix 16.1.
ID 5: Soils and Land - Peat. PEDW does not agree that Peat can be scoped out of the ES at this stage.	Surveys have been undertaken to identify the nature of soils across the Site and to identify peat resources likely to be affected by the Proposed Development, as described in Appendix 16.1
ID 6: Soil Management Strategy. A soil management should be prepared with sufficient detail for the consultees to form a judgement on its feasibility.	An Outline Soil Management Strategy will be included as part of the Environmental Statement and will identify measures to conserve soil resources within areas affected within the Site.

16.4 Assessment Methodology

Relevant Guidance

- 16.4.1 The assessment of Land Use and Soils 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, LA109: Geology and Soils (Highways England et al., 2019)
- DMRB Volume 11, LA112: Population and Human Health (Highways England et al., Revision 1 2020b).
- Institute of Environmental Management and Assessment (IEMA) IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment (IEMA, 2022).
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (2009).
- Welsh Government Predictive Agricultural Land Classification Map (Wales) Guidance Note 2.1 (2021)

Scope of the Assessment

16.4.2 Taking into account the scoping and other consultation, **Table 16.4** summarises the issues considered as part of this assessment.

Table 16.4: Issues considered within this assessment

Activity	Impacts scoped into the assessment
Construction	
Construction of temporary infrastructure associated with the Proposed Development, including temporary construction compounds, underground cabling, borrow pits and temporary laydown areas.	<p>Temporary impact on soil resources, including peat.</p> <p>Temporary impact on the operation of farm holdings, including disruption to the agricultural use of common land.</p>
Construction of permanent infrastructure associated with the Proposed Development, including wind turbines, wind turbine foundations, crane platforms, onsite substation compound, access tracks, highway access, landscaping and ecological enhancement areas and common land replacement area.	<p>Permanent impact on soil resources, including peat.</p> <p>Permanent impact on the operation of farm holdings, including disruption to the agricultural use of common land.</p>
Decommissioning	
Decommissioning of permanent infrastructure associated with the Proposed Development, including wind turbines, wind turbine foundations, crane platforms, onsite substation compound, access tracks, highway access, landscaping and ecological enhancement areas and common land replacement area.	<p>Temporary impact on soil resources including peat.</p> <p>Temporary impact on the operation of farm holdings, including disruption to the agricultural use of common land.</p>

- 16.4.3 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 16.5**.

Table 16.5: Issues scoped out of the assessment

Issue	Justification
Impacts on the best and most versatile Grades 1, 2 and 3a land	Welsh Government Soil, Peatland and Agricultural Land Use Planning Unit in their Scoping Direction consultation response stated that <i>“According to the Predictive ALC map, the site is considered at best Subgrade 3b with most of the site Grade 4. As per the published guidance, the Department does not consider bmv to be present at this site”</i> . Based on this consultation response, potential impacts on bmv are not included in this assessment.
Impacts on soils including peat during the operation of the Project	It is proposed to scope out the impact of disruption to soil resources during operation on the basis that permanent and temporary impacts would be likely to occur during the construction and decommissioning phases and impacts during the operational phase would be limited to maintenance and repair activities which would be small in magnitude and infrequent.
Impacts on the operation of farm holdings, including the agricultural use of the common during the operation of the Project	It is proposed to scope out the impact of disruption to agricultural land during operation on the basis that any temporary and permanent effects on agricultural land would occur during the construction and decommissioning phases and impacts during the operational phase would be limited to maintenance and repair activities which would be small in magnitude and infrequent.

Study area

- 16.4.4 The Land Use and Soils study area (hereafter referred to as the study area) comprises the area within the application area, where impacts on receptors are likely to occur.
- 16.4.5 The location and geographic extent of the study area is presented in Volume 2, Figures, Figure MyG4-11b of the ES.

16.5 Assessment Criteria and Assignment of Significance

- 16.5.1 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.
- 16.5.2 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).
- 16.5.3 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.

16.5.4 The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: Approach to Environmental Assessment.

Receptor Value and Sensitivity

16.5.5 The criteria for defining sensitivity in this chapter of the ES are outlined in **Table 16.6** below.

Table 16.6: Sensitivity criteria

Sensitivity/Value	Definition
Very High	<p>Agricultural land:</p> <ul style="list-style-type: none"> Grade 1 and 2 agricultural land. Peat soils (>40cm thickness of peat, or >30cm where peat where soils overlay bedrock) <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Areas of land in which the enterprise is wholly reliant on the spatial relationship of land to key agricultural infrastructure Access between land and key agricultural infrastructure is required on a frequent basis (daily).
High	<p>Agricultural land:</p> <ul style="list-style-type: none"> Grade 3a agricultural land. Peaty Soils (i.e < 40cm thickness of peat, or <30cm peat where soils overlay bedrock) <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Areas of land in which the enterprise is dependent on the spatial relationship of land to key agricultural infrastructure Access between land and key agricultural infrastructure is required on a frequent basis (weekly).
Medium	<p>Agricultural land:</p> <ul style="list-style-type: none"> Grade 3b agricultural land. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Areas of land in which the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure Access between land and key agricultural infrastructure is required on a reasonably frequent basis (monthly).

Sensitivity/Value	Definition
Low	<p>Agricultural land:</p> <ul style="list-style-type: none"> Grades 4 or 5 agricultural land. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Areas of land which the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure Access between land and key agricultural infrastructure is required on an infrequent basis (monthly or less frequent).
Negligible	<p>Agricultural land:</p> <ul style="list-style-type: none"> Previously developed land with little potential to return to agriculture. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Areas of land which are infrequently used on a non-commercial basis.

Magnitude of impact

16.5.6 The criteria for defining magnitude in this chapter of the ES are outlined in **Table 16.7** below.

Table 16.7: Impact magnitude criteria

Magnitude of impact	Definition
High	<p>Soils:</p> <ul style="list-style-type: none"> Physical removal or permanent sealing of more than 20 hectares of agricultural land. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (e.g. direct acquisition and demolition of buildings and direct development of land to accommodate highway assets) Introduction (adverse) or removal (beneficial) of complete severance with no/full accessibility provision.
Medium	<p>Soils:</p> <ul style="list-style-type: none"> Physical removal or permanent sealing on 1 to 20 hectares of agricultural land Permanent loss/reduction of one or more soil function(s) and restriction to current or approved future use. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Partial loss of/damage to key characteristics, features or elements (e.g. partial removal or substantial amendment to access or acquisition of land compromising the viability of agricultural holdings) Introduction (adverse) or removal (beneficial) of severe severance with limited/moderate accessibility provision.
Low	<p>Soils:</p>

Magnitude of impact	Definition
	<ul style="list-style-type: none"> Temporary loss/reduction of one or more soil function(s) and restriction to current or approved future use. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> A discernible change in attributes, quality or vulnerability, or alteration to one (maybe more) key characteristics, features or elements (e.g. amendment to access or acquisition of land resulting in changes to the operating conditions that do not compromise overall viability of agricultural holdings) Introduction (adverse) or removal (beneficial) of severance with adequate accessibility provision.
Negligible	<p>Soils:</p> <ul style="list-style-type: none"> No discernible loss/reduction in soil function(s) that restrict current or approved future use. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> Very minor loss or detrimental alteration to one or more characteristics, features or elements (e.g. acquisition of non-operational land or buildings not directly affecting the viability of agricultural holdings) Very minor introduction (adverse) or removal (beneficial) of severance with ample accessibility provision.
No change	<p>Soils:</p> <ul style="list-style-type: none"> No loss/reduction of soil function(s) that restrict current or approved future use. <p>Agricultural land holdings:</p> <ul style="list-style-type: none"> No loss or alteration of characteristics, features, or elements or accessibility; 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 16.8** below.

Table 16.8: 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

- 16.5.7 The significance of the effect upon Land Use and Soils 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 16.9**. Where a range of significance levels is presented, the final assessment for each effect is based upon expert judgement.
- 16.5.8 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.
- 16.5.9 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 16.9: 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	Major

- 16.5.10 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

16.5.11 There are no limitations in the assessment of Land Use and Soils receptors.

16.6 Baseline Environment Conditions

Desk top study studies – Land Use and Soils

16.6.1 Information on land use and soils within the study area was collected through a desk top review of existing studies and datasets. There are summarised in **Table 16.10** below.

Table 16.10: Summary of desk study sources

Title	Source	Year published	Author
<i>Meteorological Office Climatological Data for ALC</i>	<i>Meteorological Office</i>	1990	Meteorological Office
Soil Survey of England and Wales, National Soil Map Sheet 2 (Wales) 1:250,000 and accompanying Regional Bulletin	Soil Survey of England and Wales	1984	Soil Survey of England and Wales
Welsh Government Predictive ALC viewer (version 2 with soil series information where available)	Welsh Government website	2023	Welsh Government
Welsh Government Agricultural Statistics	Welsh Government website	2022	Welsh Government
National Resources Wales Peatland of Wales Map	NRW website	2022	National Resources Wales

British Geological Survey	British Geological Survey website	Current	British Geological Survey
---------------------------	-----------------------------------	---------	---------------------------

Site-specific surveys

16.6.2 Site specific surveys were undertaken to inform the baseline assessment for Land Use and Soils. A summary of the site specific surveys undertaken to inform this chapter of the ES are provided in **Table 16.11**.

Table 16.11: Summary of site specific surveys undertaken

Survey type	Purpose of survey	Date undertaken
Peat Probing surveys	To identify the presence and thicknesses of sensitive peat and peaty soil resources within the study area.	October 2022 and November 2024.

16.6.3 The results of the surveys undertaken are contained in Appendix 16.1. The first peat probing survey (2022) was undertaken, alongside other environmental studies, to inform the potential siting of infrastructure, as part of the Project. This survey included peat probing undertaken at 100m spacings along potential access routes and at 50m intervals within areas of siting for turbines and crane pad areas.

16.6.4 The second survey, undertaken in December 2024, was carried out in order to assess any likely potential effects of the Project on peat and peaty soils. This survey included peat probes taken at 25m centres across the areas of turbine bases and crane pads and 50m centres along proposed tracks.

Baseline – Soils, Peat and Agricultural Land Classification

16.6.5 Appendix 16.1 contains the results of the desk studies undertaken and the peat probing survey work as described above.

16.6.6 The published soils mapping indicates that within the Site the higher, flatter areas would comprise soils from the Association 654c Gelligaer, the surrounding steeper slopes Association 611d WITHNELL 1 and the lower ground in the south-east soils from Association 721c WILCOCKS 1.

16.6.7 Association 654c Gelligaer consists of extremely acid soils with an overall loamy texture but with a thin peaty topsoil usually only about 20cm thick. The soils are wet for most of the year (Wetness Class V) due to a combination of high rainfall, low evapotranspiration, relatively gentle relief and the sponge-like properties of their peaty tops although many of the subsoils are relatively permeable. These conditions tend to promote a soil forming process called podzolisation resulting in a bleached horizon immediately below the peaty topsoil and an orange-brown, iron-enriched subsoil (Gelligaer series) sometimes with a thin iron-pan (Belmont series).

- 16.6.8 The main soil of Association 611d WITHNELL 1 is the Withnell series per se which has a thin, non-peaty topsoil over a brightly coloured, orange-brown subsoil with sandstone or sandstone rubble at about 50-80cm from the surface. The profile is permeable and free draining (Wetness Class I), in contrast to the much wetter soils of the Gelligaer Association.
- 16.6.9 The soils of Association 721c WILCOCKS 1 are much less permeable and thus poorly drained with peaty topsoils, probably in Wetness Class V but perhaps capable of improvement to IV.
- 16.6.10 In terms of Agricultural Land Classification, the Welsh Government Predictive ALC viewer indicates that the Site would comprise no land which would be of higher quality than Subgrade 3b, with the majority classified as Grade 4 land.
- 16.6.11 The peat probing survey work has identified, as expected from the desk top information, that thickness of peat within the areas affected by the Project are limited. The second survey undertaken, based on the proposed layout of infrastructure as part of the Project, has identified small areas where thicknesses of peat are between 0-200mm depth. In only 4 probing locations were thicknesses of between 500-600mm depth identified on the fringe of the area of construction for Turbine 3.

Agricultural Land Use

- 16.6.12 Much of the application site is designated common land as part of Common Land Unit CL20, which comprises a tract of approximately 1065.5 acres called Allt-Rhiw, Waun Wen and Mynydd-y-Gaer. The Coity Wallia Act 1976 established both the Coity Wallia Board of Conservators to manage the common. A total of approximately 21.2 ha of the common would be affected by 7 of the 11 proposed turbines, together with access tracks and infrastructure are proposed on the common land, which within the Application site is primarily sloping and constitutes a large open area on the plateau with the norther side a steep sided valley side.
- 16.6.13 The majority of the Common and especially the proposed Application Site, is currently grazed by a mix of livestock to a stocking density suitable for maintaining the current mixed habitat albeit the bracken seems to be increasing over recent years looking at historical ariel imagery. It is understood that currently there are 4 active graziers.
- 16.6.14 The remaining turbines are located within the ownership of three local farms and there are a further two landowners who have land affected by the access routes to the windfarm infrastructure. The land within these holdings is used for grassland based livestock farming enterprises.

Future baseline conditions

- 16.6.15 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.

16.6.16 No significant changes to the baseline within the study area are anticipated in relation to land use and soils.

Key receptors

16.6.17 **Table 16.12** identifies the receptors taken forward into the assessment for Land Use and Soils.

Table 16.12: Key receptors taken forward to assessment

Receptor	Description
Soil resources including peat	The potential impacts of the Proposed Development on soil materials including highly sensitive peat resources
Farm holdings	The potential impacts of the Proposed Development on the operation of farm holdings.

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

16.7.1 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.

16.7.2 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').

16.7.3 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.

16.7.4 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.

16.7.5 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.

- 16.7.6 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.
- 16.7.7 Both embedded and additional mitigation measures relevant to the assessment of Land Use and Soils are summarised in **Table 16.13** below. Where relevant, measures have been identified that may result in enhancement of existing environmental conditions.

Table 16.13: Mitigation measures intended to be adopted as part of the Proposed Development

Mitigation measure	Justification
Embedded mitigation	
Preparation of an Outline Soil Management Plan (OSMP) as part of the ES to include:	An OSMP will be prepared as part of the ES to seek to prevent damage to or losses of soil and peat resources.
Preparation of an Outline Construction Environment Management Plan (OCEMP) to include to reduce, as far as possible, potential effects on land and soils.	The inclusion of measures as part of the OCEMP to ensure that the rights of common can continue to be exercised during the construction, operational and decommissioning phases of the Project.
Provision of replacement common land.	To ensure that the requirements of the Commons Act 2006 are met, including the maintenance of the rights of common for the commoners through the construction, operational and decommissioning phases of the Project.

16.8 Assessment of effects

- 16.8.1 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 set out below.
- 16.8.2 As described in Table 16.5, impacts during the operational phase would be limited to maintenance and repair activities which would be small in magnitude and infrequent. These are therefore scoped out of the assessment.
- 16.8.3 It should also be noted that impacts and effects during the decommissioning stage are considered to be similar or no worse than during construction and have therefore not been separately considered during this chapter of the ES.
- 16.8.4 A description of the potential effects on receptors caused by each identified impact is given below.

Soils, including peat.

Construction phase

Sensitivity of the receptor

- 16.8.5 The sensitivity of soils on the site is based on the presence of shallow thicknesses of peat resources, as identified by the peat probing survey work undertaken within the Site. The sensitivity of soils, including peat is therefore assessed to be **high** based on the presence of limited areas of predominantly shallow peaty soils.

Magnitude of impact

- 16.8.6 Embedded measures within the Outline Soil Management Plan, as included in Table 16.15 would enable potential impacts on soil resources, including sensitive shallow peat resources to be reduced, as far as possible, during the construction period. It is therefore assessed that based on the implementation of appropriate soil management measures that the impact of the Proposed Development on soils, including peat resources, would be **negligible**.

Significance of the effect

- 16.8.7 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 **minor** adverse effect, which is not significant.

Farm Holdings

Sensitivity of the receptor

- 16.8.8 The sensitivity of the receptor is land within the farm holdings, including the areas of land within the common, is assessed to be **high**, where the land is key to supporting local agricultural enterprises and access to the land is needed on a regular basis.

Magnitude of impact

- 16.8.9 As part of the proposal, suitable land would be provided as replacement common land for that affected by the application. This would include approximately 21.54ha of land in a single block, which would remain part of CL Unit 20.
- 16.8.10 In addition, for those farms affected by turbines and infrastructure outside of the common, measures would be implemented as part of the CEMP to ensure that disruption to these holdings during the construction phase are reduced, as far as possible.
- 16.8.11 Based on the provision of replacement common and suitable measures within the CEMP to reduce, as far as possible, effects on farm holdings during the

construction period, it is assessed that the impact of the proposal on farm holdings would be **negligible**.

Significance of the effect

- 16.8.12 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 **minor** adverse effect, which not significant.

Future monitoring

- 16.8.13 No future monitoring is required as a consequence of the assessment of Land Use and Soils.

16.9 Cumulative Effects

- 16.9.1 The assessment of cumulative effects for Land Use and Soils has followed the methodology set out in Volume 1, Chapter 4: Approach to Environmental Assessment. As part of the assessment, all moderate-large scale operational, recently consented and recently submitted energy developments were considered. This includes wind energy schemes over three turbines and solar developments ranging from 10 MW upwards. Where a plan or project has not been subject to EIA, or impact assessment information is not available it has not been considered as part of the cumulative effects assessment.
- 16.9.2 The specific projects, plans and activities scoped into the assessment of cumulative effects are therefore set out in **Table 16.14**.

Table 16.14 List of other large scale energy projects considered within 10 km

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Headline Summary and Assessment of Effects
Headwind Taf Ely	Operational	1.07	A seven turbine wind farm with a tip height of 110	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Taf Ely	Operational	1.16	A 20 turbine wind farm with a tip height of 54	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Mynydd Portref	Operational	1.70	An 11 turbine wind farm with tip heights of 75m and 86m	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Tyn y Waun Solar	Awaiting Construction	2 km	40MW solar park and ancillary development	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Pant y Wal	Operational	3.80	A 10 turbine wind farm with a tip height of 115m	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Pant y Wal Extension		3.80	A 12 turbine wind farm with a tip height of 125	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Fforch Nest Wind Farm		4.49	A four turbine wind farm with a tip height of 115m	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.

Project/Plan	Status	Distance from the Proposed Development (nearest point, km)	Description of project/plan	Headline Summary and Assessment of Effects
Pant y Wal Second Extension		4.43	A two turbine wind farm with a tip height of 125 m	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Mynydd y Glyn	Awaiting Construction	6.98	A seven turbine wind farm with a tip height of 115m	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Court Colman Solar Park	Operational	8 km	20 MW solar park Inc. Switchroom, Fencing & Cameras, Landscaping & Assoc. Works	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Upper Ogmores Wind Farm	Operational	8.33	A seven turbine wind farm with a tip height of 150m	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.
Llynfi Afan Renewable Energy	Operational	9.25	A 12 turbine wind farm with a tip height of 118 m	Potential disturbance to soil, including peat resources. Disruption to the operation of farm holdings.

16.10 Cumulative effects assessment

16.10.1 A description of the cumulative effects between the Proposed Development and other developments identified in **Table 16.14** upon Land Use and Soils receptors is provided below.

Soils including Peat

16.10.2 It is assessed that any potential cumulative effects on soils and peat resources would be mitigated through the incorporation of appropriate soil management measures during the construction and decommissioning phases, in a similar way to those proposed as part of this project.

16.10.3 Based on this assumption, it is assessed that there would be no significant cumulative effects on soils and peat arising from the cumulative schemes identified.

Farm Holdings

16.10.4 It is assessed that any potential cumulative effects on farm holdings would be mitigated through the provision of suitable replacement common land, where commons are affected, and/or the implementation of suitable measures during construction and decommissioning phases to address potential disruption to the operation of individual farm holdings, in a similar way to those proposed as part of this project.

16.10.5 Based on this assumption, it is assessed that there would be no significant cumulative effects on farm holdings arising from the cumulative schemes identified.

16.11 Summary of environmental effects, mitigation measures and monitoring

16.11.1 **Table 16.15** presents a summary of the potential environmental effects, additional mitigation, residual effects and further monitoring identified in this chapter of the ES.

Table 16.15: Summary of potential environmental effects, mitigation and monitoring.

Description of impact	Phase ^a C O D	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
Soil and peat resources	✓ x ✓	C: Negligible	C: High	C: Minor Adverse	N/A	C: Minor Adverse	No further monitoring proposed
		O: N/A	O: N/A	O: N/A		O: N/A	
		D: Negligible	D: High	D: Minor Adverse	N/A	D: Minor Adverse	
Farm Holdings	✓ x ✓	C: Negligible	C: High	C: Minor Adverse	N/A	C: Minor Adverse	No further monitoring proposed
		O: N/A	O: N/A	O: N/A		O: N/A	
		D: Negligible	D: High	D: Minor Adverse	N/A	D: Minor Adverse	

^a C=construction, O=operational and maintenance, D=decommissioning

16.12 References

Bridgend Replacement Local Development Plan 2018-2033 Available at: [Adopted Bridgend Replacement Local Development Plan 2018-2033 - Bridgend CBC](#)

British Geological Survey Internet Portal at www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

British Geological Survey Sheet 248 (Pontypridd), 1:50,000. (1975)

Department for Environment, Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf

Highways England, Transport Scotland, Welsh Government and the Department for Infrastructure Northern Ireland (2020) Design Manual for Roads and Bridges, Volume 11. LA 104: Environmental Assessment and Monitoring

Highways England, Transport Scotland, Welsh Government and the Department for Infrastructure Northern Ireland (2020) Design Manual for Roads and Bridges, Volume 11. LA112 Population and Human Health.

IEMA (2022) IEMA Guide: A New Perspective on Land and Soil in Environmental Impact Assessment. Institute of Quarrying (IQ) (2021) Good Practice Guide for Handling Soils in Mineral Workings (IQ, 2021).

Met Office (1989) Climatological Data for Agricultural Land Classification.

Ministry of Agriculture, Fisheries and Food (MAFF) (1988) Agricultural Land Classification of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land. October 1988. Available: <http://publications.naturalengland.org.uk/publication/6257050620264448>.

Soil Survey of England and Wales, National Soil Map of England and Wales, Sheet 2 (Wales), 1:250,000 and accompanying Regional Bulletin. (1984)

Welsh Government (2024) Planning Policy Wales Edition 12. Available: [Planning policy Wales | GOV.WALES](#)

Welsh Government (2010) Technical Advice Note (TAN) 6: planning or sustainable rural communities. Available: <https://www.gov.wales/sites/default/files/publications/2018-09/tan6-sustainable-rural-communities.pdf> Accessed: December 2023.

Welsh Government (2019) Predictive Agricultural Land Classification Map. Available: <http://lle.gov.wales/map/alc2>.