Pennant Walters Ltd

Mynydd Glyn Wind Farm

Draft Environmental Statement

Appendix 1A Scoping Report

This report was prepared by WSP Environment & Infrastructure Solutions UK Limited (formerly known as Wood Environment & Infrastructure Solutions UK Limited), company registration number 02190074, which is carrying out these services as a subcontractor and/or agent to Wood Group UK Limited

October 2022

PENNANT WALTERS

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Mynydd y Glyn Wind Farm

Environmental Impact Assessment
Scoping Report

IEMA
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Wood Group UK Limited – September 2021

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1	First Draft	September 2020
2	Revised Draft	July 2021
3	Final	September 2021

Contents

1. Introduction

1.1 Overview of the proposed development

1.1.1 Pennant Walters Ltd. are seeking planning permission for the construction and operation of a wind farm of up to seven turbines on land known as Mynydd y Glyn in the Rhondda Valley ('the Site').

1.1.2 The Mynydd y Glyn Wind Farm ('the Proposed Development') consists of the following elements:

- up to seven wind turbines;
- substation and transformer housing;
- temporary construction compound;
- temporary site offices;
- crane pads and cabling; and
- access track construction.

1.1.3 Pennant Walters Ltd. has accepted a firm grid connection offer from Western Power Distribution (WPD), as the Distribution Network Operator (DNO) for a 33kV connection at Upper Boat. The connection is likely to comprise 1.5km of new line on wooden poles and a further 7.5km underground via ducting in the highway network. The 2019 amendments to the Development of National Significance (DNS) legislation[1] specify that an overhead line would be a DNS where the voltage is 132kV or less and where it would be connected to a Welsh generating station, in this case the proposed wind farm.

1.1.4 The overhead line element of the grid connection could be delivered either as part of the DNS application for the wind farm or by WPD, as a separate DNS application. Alternatively, the applicant and WPD may decide to underground the whole connection such that it would be constructed under different legislation and this would be dependent upon cost, technical and environmental considerations. Whichever route to consent is chosen, the potential environmental effects arising from the connection between the on-site substation and the electricity grid will be considered in the EIA for the proposed wind farm.

1.1.5 The site location is shown on **Figure 1.1** and includes the area required for the 1.5km of overhead line wooden poles.

1.2 The applicant and the project team

1.2.1 This Scoping Report has been prepared on behalf of Pennant Walters Ltd. (hereafter referred to as 'the Applicant') by Wood Group UK Ltd (hereafter referred to as 'Wood').

1.2.2 Pennant Walters is a Walters Group company with a focus on renewable energy having obtained consent for and/or developed a wide variety schemes including onshore wind, solar, small scale hydro and battery storage.

[1] The Developments of National Significance (Procedure) (Wales) (Amendment) Order 2019 [online]. Available at https://www.legislation.gov.uk/wsi/2019/290/contents/made [Accessed 15 September 2021].

1.2.3 Wood is registered with the Institute of Environmental Management and Assessment (IEMA)'s Environmental Impact Assessment (EIA) Quality Mark scheme. The scheme allows organisations that lead the co-ordination of EIAs in the UK to make a commitment to excellence in their EIA activities and have this commitment independently reviewed.

1.3 Purpose of the scoping report

1.3.1 This Scoping Report has been prepared as part of an EIA relating to the Proposed Development. EIA is required because the Applicant considers that the Proposed Development meets the criteria for EIA development under *The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (No. 567 (W.136))*[2] (hereinafter referred to as 'the EIA Regulations').

1.3.2 The Proposed Development requires EIA because the Applicant recognises the potential significant environmental effects of a development of this scale and it exceed the thresholds within Schedule 2 Part 3 (Energy industry) *(i) Installations for the harnessing of wind power for energy production (wind farms)* of the EIA Regulations as the development involves the installation of more than 2 turbines and the hub height of any turbine or height of any other structure exceeds 15 metres (m).

1.3.3 This Scoping Report supports a request for a Scoping Direction to the Planning Inspectorate Wales (PINs) under Regulation 33 of the EIA Regulations in respect of applications for planning permission to Welsh Ministers as a DNS project.

1.3.4 Regulation 33 (2) instructs that a request for a Scoping Direction should include:

(a) a plan sufficient to identify the land;

(b) a brief description of the nature and purpose of the development including its location and technical capacity;

(c) its likely significant effects on the environment;

(d) a statement that the request is made in relation to a development of national significance for the purposes of section 62D of the 1990 Act; and

(e) such other information or representations as the person making the request may wish to provide or make

1.3.5 The purpose of this Scoping Report is to inform PINs and statutory consultees on relevant aspects of the proposal prior to the formulation of a formal Scoping Direction. There is no obligation to request a Scoping Direction, but the Applicant has opted to conduct such an exercise in order to ensure that the public are aware of and engaged on the project, and to provide for the accuracy of the EIA in assessing those effects that have the potential to be significant.

1.3.6 Regard has been made to Appendix 3: Environmental Impact Assessment of The Planning Inspectorate's procedural guidance for DNS projects (*Developments of National Significance, Procedural Guidance version 2.2 October 2019*)[3], which advises in more detail on information to inform a scoping request. It recommends that the Scoping Report should contain all information required by the 2017 EIA Regulations, plus the following additional information:

[2] Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 [online]. Available at: https://www.legislation.gov.uk/wsi/2017/567/contents [Accessed 09 June 2021].
[3] Developments of national significance (DNS): procedural guide [online]. Available at https://gov.wales/developments-national-significance-dns-procedural-guide. [Accessed 09 June 2021].

- an outline of the main alternatives considered and the reasons for selecting a preferred option;
- results of desktop and baseline studies where available;
- a record of consultation undertaken with relevant bodies (including any public engagement) to date;
- referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal;
- guidance and best practice to be relied upon, and whether this has been agreed with the relevant bodies (for example the statutory nature conservation bodies or local authorities) together with copies of correspondence to support these agreements;
- methods used or proposed to be used to assess impacts and the significance criteria framework used;
- any mitigation proposed and the extent to which these are likely to reduce impacts;
- where impacts from consequential or cumulative development have been identified, how applicants intend to assess these impacts in the ES;
- an indication of any European designated nature conservation sites that are likely to be significantly affected by the proposed development and the nature of the likely significant impacts on these sites;
- key topics covered as part of applicants' scoping exercise; and
- an outline of the structure of the proposed ES.

1.3.7 The general description of the Proposed Development presented in this Scoping Report is accurate at the time of writing, although the draft layout at this time is indicative only. Several minor iterative alterations to the design and layout of the Proposed Development are likely to be considered before finalisation for inclusion in the application documentation as a result of the collation of environmental survey information, sensitivity analyses and consultation feedback. In this light, it is requested that PINs acknowledges in issuing its Scoping Direction that the potential development submitted at Scoping is highly likely to change but that the Direction will remain valid unless there are radical alterations (i.e. significant increase in turbine numbers or heights) to the Proposed Development that would warrant a further Scoping exercise.

1.3.8 The Scoping Direction to be provided by PINs will be used to inform the scope and focus of the Environmental Impact Assessment for this proposed DNS.

1.4 Structure of this scoping report

1.4.1 The remainder of this Scoping Report is structured as follows:

- **Chapter 2: The proposed development** – provides a description of the development site and the Proposed Development as it has been considered within this Scoping Report;
- **Chapter 3: Legislation and planning policy overview** – provides an overview of the legislative and planning policy framework in relation to the development site and Proposed Development;
- **Chapter 4: The Environmental Impact Assessment process** – explains the approach that has been taken to identify the scope of the EIA and how the EIA will proceed;

- **Chapters 5 to 12** – set out the proposed scope and methodology for each technical topic where a significant environmental effect is likely to arise as a result of the proposed Development.
- **Chapter 13: Infrastructure and other issues** – sets out the proposed approach to other assessments relevant to the EIA of the Proposed Development;
- **Chapter 14: Summary of scope** – identifies those effects that are scoped out of the EIA and sets out the proposed content of the Environmental Statement.

1.4.2 This Scoping Report also contains a number of appendices which are referenced throughout the document. All figures can be found at the end of the report.

2. The proposed development

2.1 Introduction

2.1.1 This section provides a brief description of the nature and purpose of the Proposed Development, including its location and potential technical capacity. These details form the basis for the assessment of likely significant effects upon the baseline situation.

2.2 The development site

Site location

2.2.1 The Proposed Development site is situated within the Rhondda Valley and consists of upland habitat, the majority of which has been improved for agricultural grazing and is controlled by two landowners.

2.2.2 The Site lies within the Rhondda Cynon Taf County Borough Council administrative area and its boundary is located approximately 600 metres (m) from the southeastern edge of the village of Pant (National Grid Reference ST 03626 89459).

2.2.3 Parts of the Site are within a Site of Importance for Nature Conservation (SINC), designated in the Rhondda Cynon Taf County Borough Local Development Plan[4]. The Site lies within Mynydd y Glyn and Nant Muchudd Basin Special Landscape Area, partially within Rhondda Historic Landscape Area, and approximately 15 kilometres (km) from the Brecon Beacons National Park.

2.3 Description of the proposed development

2.3.1 The Proposed Development is to construct and operate a wind farm of seven turbines and associated infrastructure including access tracks, transformer and a substation.

2.3.2 The turbines proposed for the development would have a maximum power output of up to 6 Megawatts (MW), dependant on the final commercial choice, and therefore a combined maximum rated output of up to 42MW of electrical power. The annual generation expected at the site would be equivalent to the domestic needs of approximately 32,000 average households[5].

2.3.3 The wind farm will be designed with an operational life of 30 years. At the end of this period the Applicant has three options; to decommission the wind farm and dismantle and remove the turbines; to apply for an extension to the operating period using existing equipment or apply to install new equipment on the Site. For the purposes of this assessment, it is assumed that the wind farm would be decommissioned.

[4] Rhondda Cynon Taf Local Development Plan up to 2021 – Adopted 2021 [online]. Available at: https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/LocalDevelopmentPlan20062021.aspx. [Accessed 09 June 2021].

[5] https://www.renewableuk.com/page/UKWEDExplained [Accessed 26 July 2021].

Key components of the proposed development

Turbines

2.3.4 The proposed turbines are yet to be selected but are likely to have heights to blade tip in the range of 170-180m (a mid-range height of 175m has been used for the scoping of initial, potential effects), with rotor diameters between 130m-140m. The Environmental Statement will assess the worst-case in terms of tip height for the turbines.

2.3.5 The indicative grid references for each turbine are provided within **Table 2.1** and indicative turbine locations are shown on **Figure 2.1**.

Table 2.1 Indicative turbine locations

Turbine	X	Y
1	302987	189734
2	303120	189391
3	303673	189405
4	303432	188958
5	303018	189075
6	304184	189354
7	303450	189817

The turbine positions will be refined through the process of environmental impact assessment and as a result of consultation.

Turbine foundations

2.3.6 The turbines would be installed on foundations, comprising both stone and concrete. These would be dressed back with topsoil to allow re-vegetation. Turbine foundations could be larger or smaller, depending on imposed loadings, ground conditions and drainage design.

Crane pads

2.3.7 Each wind turbine requires an area of hardstanding to be built adjacent to the turbine foundation. This provides a stable base on which to lay down turbine components ready for assembly and erection, and to site the two cranes necessary to lift the three tower section, nacelle and rotor into place. The crane hardstanding would be left in place following construction in order to allow for the use of similar plant should major components need replacing during the operation of the wind farm. These could also be utilised during decommissioning at the end of the wind farm's life. The total area of hard standing at each turbine location including the turbine foundations and the crane pad would be approximately 2,640m^2. Approximately a third of this area would be dressed back with topsoil and landscaped into the surrounding area upon completion of turbine erection.

Site access

2.3.8 The principal access to the Site from the local road network would be from the west via an existing gated access point located on Collenna Road, a few metres north of the junction with Llantrisant Road. Traffic would route from the M4 (Welsh Trunk Road Network) in the south, continuing north

on the A4119 for approximately 11km, before taking the A4233 at Tonyrefail for 1km to Collenna Road.

Stone and concrete requirements and sourcing

2.3.9 Stone materials for track building are expected to be imported from local quarries; no borrow pits are proposed on the Site. Concrete for construction of the turbine foundations and substation structures would be imported to site.

Cabling

2.3.10 Underground cables would link the turbines to each other and to the on-site substation. Detailed construction and trenching specifications would depend on the ground conditions encountered at the time, but typically cables would be laid in a trench 750mm deep and 450mm wide. To minimise ground disturbance, cables would be routed along the side of the access tracks wherever practicable.

Construction of the proposed development

2.3.11 The construction period for the wind farm would last approximately 24 months. The construction process would consist of the following principal activities:

- up-grading of existing tracks and construction of new access tracks and passing places inter-linking the turbine locations and substation; this will require import of suitable roadstone;
- potentially remedial works to public highway to facilitate delivery of turbines which will be confirmed following discussion with the Highways Authority;
- formation of site compound including hard standing and temporary site office facilities;
- construction of crane hardstanding areas to facilitate erection of turbines;
- construction of turbine foundations and transformer bases where required by the selected turbine;
- construction of site substation and transformer building;
- excavation of trenches and cable laying adjacent to site roads;
- connection of on-site distribution and signal cables;
- delivery and erection of wind turbines;
- commissioning of site equipment; and
- site restoration.

2.3.12 Many of these operations would be carried out concurrently, although predominantly in the order identified to minimise the overall length of the construction programme. In addition, development would be phased such that at different parts of the site, the civil engineering works would be continuing whilst wind turbines are being erected. Site restoration would be programmed and carried out to allow restoration of disturbed areas as early as possible and in a progressive manner.

Decommissioning of the proposed development

2.3.13 The wind farm would be designed with an operational life of approximately 30 years. When dismantling and removing the turbines the bases would be broken out to below ground levels and

all cables cut at depth below ground level and left in the ground. Roads would either be left for use by the landowner or covered with topsoil. No stone would be removed from the Site. The decommissioning works are estimated to take approximately six months. This approach is considered to be less environmentally damaging than seeking to remove foundations and cables entirely.

2.3.14 The turbine components themselves would be taken to an appropriate recycling facility where applicable. Due to the timescales it is not possible to identify a specific facility at this time.

2.3.15 It should be noted that the developer would set up a decommissioning fund during the life of the project.

Off-site infrastructure

2.3.16 All wind farms need to be connected into the grid distribution system, though such connections are often subject to a different consenting process to the wind farms themselves as outlined in Section 1.1 of this Scoping Report. The site sub-station would connect the wind farm into the national distribution system on site (to be via a 33kv connection in the sub-station compound). It is understood that the intention is for Western Power Distribution to deliver the connection potentially using its permitted development rights, or Section 37 of the Electricity Act if it is subsequently decided that all or part of the connection should be overhead.

3. Legislation and planning policy overview

3.1 Introduction

3.1.1 This section provides an overview of relevant UK legislation and energy policy, devolved Welsh planning policy and the relevant planning policies of the Rhondda Cynon Taf County Borough Council's Local Development Plan. The policy framework will be described in full in a Planning Statement that will accompany the DNS application.

3.2 Legislative context

3.2.1 Relevant Welsh primary legislation on sustainability and climate change includes:

- The Wellbeing of Future Generations (Wales) Act6 - requires all Wales' based public bodies to put long-term sustainability at the forefront of thinking and actions;
- The Environment (Wales) Act 20167 - sets in place an obligation on Welsh Government to reduce greenhouse gas emissions by 80% against 1990 levels by 2050.
- The Planning (Wales) Act 20158 – outlines powers given to Ministers to determine strategic energy projects of 10 - 50MW (subsequently amended to 350MW).

3.3 Planning policy context

3.3.1 The Environmental Statement will consider planning policy which is relevant to the Proposed Development as summarised in the following sub-sections.

National planning policy context

3.3.2 *Future Wales: The National Plan 2040*[9], published in February 2021, is the National Development Framework for Wales, setting out the direction for development to 2040. The intention of the Nation Plan is to provide a clear, long term spatial direction for Government policy, action and investment in Wales. It sets out a framework for addressing key national priorities through the planning system, inclusive of decarbonisation. The National Plan states:

> *"Future Wales together with Planning Policy Wales will ensure the planning system focuses on delivering a decarbonised and resilient Wales through the places we create, the energy we generate, the natural resources and materials we use and how we live and travel."*

3.3.3 The National Plan also states that in respect of renewable energy:

> *"Wales can become a world leader in renewable energy technologies. Our wind and tidal resources, our potential for solar generation, our support for both large and community scaled*

[6] Well-being of Future Generations (Wales) Act 2015 [online]. Available at: https://www.legislation.gov.uk/anaw/2015/2. [Accessed 09 June 2021].
[7] The Environment (Wales) Act 2015 [online]. Available at: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted. [Accessed 09 June 2021].
[8] The Planning (Wales) Act 2015 [online]. Available at: https://www.legislation.gov.uk/anaw/2015/4/contents. [Accessed 09 June 2021].
[9] Future Wales: The National Plan 2040 [online]. Available at: https://gov.wales/future-wales-national-plan-2040-0. [Accessed 09 June 2021].

projects and our commitment to ensuring the planning system provides a strong lead for renewable energy development, mean we are well placed to support the renewable sector, attract new investment and reduce carbon emissions."

3.3.4 The National Plan is therefore a principal planning policy statement for renewable energy against which the planning application will be assessed.

3.3.5 Planning Policy Wales (PPW), republished in February 2021 (Edition 11)[10], outlines land use planning policies and is supported by topic based Technical Advice Notes, including TAN8: Renewable Energy (2005). The PPW is designed to ensure the planning system supports the delivery of sustainable development and improves social, economic, environmental and cultural well-being. Alongside the National Development Framework, the PPW outlines the way in which the planning system can support this delivery through Strategic and Local Development Plans. The PPW states in relation to renewable and low carbon energy that:

"Local authorities should facilitate all forms of renewable and low carbon energy development and should seek cross-department co-operation to achieve this. In doing so, planning authorities should seek to ensure their area's full potential for renewable and low carbon energy generation is maximised and renewable energy targets are achieved. Planning authorities should seek to maximise the potential of renewable energy by linking the development plan with other local authority strategies, including Local Well-being plans and Economic/Regeneration strategies."

Local planning policy context

3.3.6 The Proposed Development is located within the administrative area of Rhondda Cynon Taf. The authority adopted its Local Development Plan (LDP) in March 2011. The relevant policies within the Plan which have informed the proposed assessment scope include:

- CS10 – Minerals.
- AW4 – Community Infrastructure & Planning Obligations.
- AW5 – New Development.
- AW7 – Protection and Enhancement of the Built Environment.
- AW8 – Protection and Enhancement of the Natural Environment.
- AW10 – Environmental Protection & Public Health
- AW13 – Large Wind Farm Development.
- AW14 – Safeguarding of Minerals.
- SSA 23 – Special Landscape Areas.

3.3.7 The Council has also adopted the following Supplementary Planning Guidance which will inform the assessment process:

- Supplementary Planning Guidance: The Historic Built Environment.
- Supplementary Planning Guidance: Nature Conservation.

[10] Planning Policy Wales, Edition 11. February 2021 [online]. Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf. [Accessed 09 June 2021].

- Supplementary Planning Guidance: Planning Obligations.

4. The Environmental Impact Assessment process

4.1 Overview of the process

4.1.1 EIA is a systematic process that must be followed for certain categories of project before they can receive development consent. It aims to identify a project's likely significant effects through the Scoping process, and then assess those effects, which will be reported in an Environmental Statement. This helps to ensure that the predicted effects, and the scope for mitigation measures to reduce them where necessary, are properly understood by the public and PINS before it makes its decision.

4.1.2 The EIA process should be systematic, analytical, impartial, consultative and iterative allowing opportunities for environmental concerns to be addressed in the design of a project. Typically, a number of design iterations take place in response to environmental constraints identified during the EIA process prior to the final design being reached.

4.1.3 The EIA process should be based upon on recognised good practice and guidelines specific to each technical area and identify the likely significant environmental effects arising from a proposed development. Consultees are also encouraged to provide confirmation of agreement to the proposed scope in terms of what is included and excluded, the methodology and the receptors identified.

4.2 EIA Terminology

Impacts and effects

4.2.1 EIA is concerned with the identification of likely significant effects on the environment. However, the terms *impact* and *effect* are often used synonymously, and this can lead to confusion. For clarity, the convention used in this assessment is to use 'impacts' within the context of the term EIA, which describes the process from Scoping through to Environmental Statement preparation to subsequent monitoring and other work. Otherwise, this document uses the word 'effects' when describing the environmental consequences of the proposed development. For example, such effects may come about as a result of the following:

- Physical activities that would take place if the development were to proceed (e.g. vehicle movements during construction operations);
- Environmental changes that are predicted to occur as a result of these activities (e.g. loss of vegetation prior to the start of construction work or an increase in noise levels). In some cases one change causes another change, which in turn results in an environmental effect.

4.2.2 The predicted environmental effects are the consequences of the environmental changes for specific environmental receptors. For example, with respect to bats, the loss of roosting sites or foraging areas could affect the bats' population size; with regard to people, an increase in noise levels could affect amenity.

4.2.3 This assessment is concerned with assessing the significance of the environmental effects of the Proposed Development, rather than the activities or changes that cause them. However, this requires these activities to be understood and the resultant changes identified; often based on predictive assessment work.

Type of effect

4.2.4 The 2017 EIA Regulations (Schedule 4, Part 5) require consideration of a variety of types of effect, namely direct / indirect, secondary, cumulative, positive / negative, short / medium / long-term, and permanent / temporary. In the Environmental Statement that will follow this Scoping Report, effects are considered in terms of how they arise, their nature (i.e. whether they are positive or negative) and duration. Each will have a source originating from the proposed development, a pathway and a receptor and may fall into one of several categories:

- Direct effects are readily identified because of the physical connection between some element of the development and an affected receptor;
- Indirect effects require some additional pathway for the effect to arise. For example, a listed building may not be directly affected by any elements of a development, but its setting may be if the development is visible in views from it or when looking towards it; in which case there would be an indirect effect;
- Secondary effects would typically require further pathway connections, for example, an effect on a receptor population A could have a secondary effect on receptor population B, if B was itself dependent on A in some way, as, for example, a food source; and
- Cumulative effects arise when the receptors affected by one development are also affected by other developments resulting in the aggregation of environmental effects or the interaction of impacts.

4.2.5 Most predicted effects will be obviously positive or negative, and will be described as such. However, in some cases it is appropriate to identify that the interpretation of a change is a matter of personal opinion, and such effects will be described as 'subjective'.

Temporal and spatial scope

4.2.6 In its broadest sense, the spatial scope is the area over which changes to the environment would occur as a consequence of the development. In practice, an EIA should focus on those areas where these effects are likely to be significant.

4.2.7 The spatial scope varies between environmental topic areas. For example, the effect of a proposed development on the landscape resource and visual amenity is generally assessed within a zone of up to 35 km from the wind turbines (and potentially up to 70 km for cumulative effects), whilst noise effects are assessed within a much smaller area encompassing those representative properties close to a development site.

4.2.8 The temporal scope is stated where known and effects are typically described as:

- Temporary – likely to be related to a particular activity and will cease when the activity finishes. The terms 'short-term' and 'long-term' may also be used to provide a further indication of how long the effect will be experienced; and
- Permanent – this typically means an unrecoverable change.

4.2.9 Effects are generally considered in relation to the following key stages of a proposed development:

- Construction – the effects may arise from the construction activities themselves, or from the temporary occupation of land. Effects are often of limited duration although there is potential for permanent effects. Where construction activities create permanent change, the effects will continue into the operational period;

- Operation – effects may be permanent, or they may be temporary, intermittent, or limited to the life of a proposed development until decommissioning (as in the case of wind power developments which gain planning permission for a defined and finite number of years); and
- Decommissioning – effects may arise from the decommissioning activities themselves, or from the temporary occupation of land. The effects would generally be temporary and of limited duration. Additional permanent change would normally be unlikely unless associated with restoration.

4.3 EIA Scoping

4.3.1 The results of the EIA process are reported in an Environmental Statement and Schedule 4(4) of the EIA Regulations specifies that it should describe those *"…factors…likely to be significantly affected by the development: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape"*.

4.3.2 Regulation 4(2) of the EIA Regulations requires the interaction between these factors to be considered. In addition, Regulation 4(4) requires Environmental Statements to consider *"…the expected effects deriving from the vulnerability of the development to risks, so far as relevant to the development, of major accidents and disasters"*.

4.3.3 Establishing which aspects of the environment are likely to be significantly affected by a particular project is captured in the EIA Scoping process which aims to identify those aspects of the environment and associated issues that need to be considered when assessing the potential effects resulting from a proposed development. This recognises that there may be some environmental elements for which the project is unlikely to have a significant effect and hence where there is no need for further investigation to be undertaken as part of the EIA.

4.3.4 The proposed scope of the EIA for the Proposed Development is set out in **Chapters 5** to **13** of this report. The scope and assessment methodologies proposed in this Scoping Report are based on recognised good practice and guidelines specific to each topic area. Baseline conditions have been determined through desk-based studies and survey work undertaken to date. The environmental topic chapters identify where significant effects are anticipated as a result of the Proposed Development and take into account:

- baseline data from surveys undertaken from March 2020 to April 2021;
- the description of the Proposed Development in Chapter 2;
- relevant guidance on assessment methodologies; and
- any cumulative effects, which may arise.

4.4 Cumulative Effects

4.4.1 Cumulative effects can arise from the interaction between a proposed development and other developments proposed or under construction. In line with standard practice, for the purpose of the EIA, other wind farm developments which are operational, subject to planning approval or subject to a full and validated planning application will be included in the consideration of potential cumulative effects (subject to a cut-off point to allow assessments to be undertaken). It should be

noted that not all of the cumulative developments would necessarily have a cumulative effect in respect of any particular environmental topic.

4.5 Mitigation

4.5.1 Some mitigation measures to avoid, reduce or offset the consequences of the Proposed Development would be embedded within its design whilst others may require adherence to particular constraints on construction methodology or mode of operation. The final assessment of significance will take into account the mitigation measures and constraints that have been incorporated into the proposed development (i.e. it will be the assessment of residual effects).

4.5.2 It is likely that the following management plans will be submitted as part of the EIA or as a post-consent condition:

- Construction Environmental Management Plan (CEMP);
- Habitat Management Plan (HMP); and
- Construction Traffic Management Plan (CTMP).

4.6 EIA Methodology

4.6.1 The Environmental Statement will identify the assessment methodologies based on recognised good practice and guidelines specific to each of the relevant environmental topic areas where the Proposed Development could result in significant effects. In general terms, the technical studies undertaken for each topic area and chapter included in the Environmental Statement to accompany the planning application would include:

- collection and collation of existing baseline information about the receiving environment and surveys to fill any gaps in knowledge or to update any historic information, together with identification or any relevant trends in, or evolution of, the baseline;
- consultation with experts and relevant consultees as necessary;
- consideration of the potential effects of the Proposed Development on the baseline, followed by identification of any additional mitigation measures to seek to avoid or reduce any predicted adverse effects;
- assessment and evaluation of any residual significant effects after mitigation measures have been implemented; and
- compilation of the Environmental Statement chapter.

Significance evaluation methodology

4.6.2 The receptors that could be significantly affected, and therefore be taken forward for consideration in further detailed assessment in the ES, are identified within each topic chapter. A combination of professional judgement and a topic-specific significance evaluation methodology has been adopted to determine whether the effects on these receptors are significant.

4.6.3 In applying this approach to significance evaluation, it is necessary to ensure that there is consistency between each environmental topic in the level at which effects are considered to be significant. Thus, it is inappropriate for the assessment of one topic to conclude that minor effects are significant, when, for another topic, only comparatively major effects are significant.

4.6.4 In order to achieve the desired level of consistency, each topic chapter has considered the 'significance test' to inform their decision on whether effects are likely to be significant or not. Alongside this, consideration has also been given to the relevant topic-specific significance evaluation methodologies. This approach will also be adopted for the technical assessments to be included in the ES.

4.6.5 For some of the topics to be assessed in the ES, there is published guidance available about significance evaluation. Where such guidance exists, even if in draft, it will be used to inform the development of the significance evaluation methodologies to be used in the ES. For other topics, it will be necessary to develop methodologies without the benefit of guidance. This will involve technical specialists drawing on their previous experience of significance evaluation in EIA.

Evaluation matrices

4.6.6 Significance evaluation involves combining information about the sensitivity or value of a receptor, and the magnitude and other characteristics of the changes that affect the receptor. The approach to using this information for significance evaluation is outlined below.

Receptor sensitivity of value

4.6.7 The sensitivity or value of a receptor is largely a product of the importance of an asset, as informed by legislation and policy, and as qualified by professional judgement. For example, receptors for landscape, biodiversity or the historic environment may be defined as being of international or national importance; lower value resources may be designated as being sensitive or important at a county or district level.

4.6.8 The use of a receptor would also play a part in its classification. For example, when considering effects on the amenity of a human population, a receptor used for recreational purposes may be valued more than a place of work as the environmental quality of the recreational receptor is more likely to be an important part of that receptor's use.

Magnitude of change

4.6.9 The magnitude of change affecting a receptor that would result from the Proposed Development would be identified on a scale from minor alterations of change, up to major changes or the total or substantial loss of the receptor. For certain topics, the magnitude of change would be related to guidance on levels of acceptability (e.g. for noise), and be based on numerical parameters, whilst for others it will be a matter of professional judgement to determine the magnitude of change, using descriptive terminology.

Determination of significance

4.6.10 The determination of significance is derived with reference to information about the nature of the Proposed Development, the sensitivity or value of receptors that could be affected, together with the magnitudes of change that are likely to occur. For many environmental aspects, significance can be determined by using a matrix (see **Table 4.1**).

4.6.11 Variations to this matrix approach, which may be applicable to specific environmental topics (e.g. ecology and ornithology), will be detailed in the relevant 'assessment methodology' sub-section contained in each environmental topic chapter where relevant. Definitions of how the categories that are used in the matrix are derived for each topic are also set out in each environmental topic chapter, along with the relevant explanation and descriptions of receptor sensitivity, magnitude of change and levels of effect that are considered significant in terms of the EIA Regulations.

4.6.12 In addition, professional judgement is applied in the assessment, as the lines between the sensitivities or magnitudes of change may not be clearly defined and the resulting assessment conclusions may need clarifying.

4.6.13 The overall significance matrix that will be used for the EIA is shown in **Table 4.1**. Reference is made to:

- major effects, which will always be determined as being significant in EIA terms;
- moderate effects that may be significant, although there may also be circumstances where such effects are considered 'not significant' based on specific scenarios and professional judgement; and
- minor or negligible effects, which will always be determined as 'not significant'.

4.6.14 Effects can be beneficial or adverse.

Table 4.1 Example significance evaluation matrix

		Magnitude of change				
		Very high	**High**	**Medium**	**Low**	**Very low**
Sensitivity/importance/value	**Very high**	**Major (Significant)**	**Major (Significant)**	**Major (Significant)**	**Major (Significant)**	Moderate (Potentially significant)
	High	**Major (Significant)**	**Major (Significant)**	**Major (Significant)**	Moderate (Potentially significant)	Minor (Not significant)
	Medium	**Major (Significant)**	**Major (Significant)**	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
	Low	**Major** (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
	Very Low	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Note: Significant effects are those identified as 'Major'. 'Moderate' effects have the potential to be significant, however there may be some exceptions, depending on the environmental topic and the application of professional judgment.

4.7 Consultation

4.7.1 Consultation is an essential element of the EIA and DNS application processes and will be reported within the Environmental Statement and application supporting documentation such as a Pre-Application Consultation Report as necessary.

4.7.2 The Applicant is committed to promoting dialogue with statutory and non-statutory consultees and the local community, seeking to engage with all those with an interest in the Proposed Development to provide transparency during the process.

5. Landscape and Visual Impact Assessment

5.1 Introduction

5.1.1 This chapter sets out the proposed scope of the Landscape and Visual Impact Assessment (LVIA) which will assess the likely significant effects, including cumulative effects of the Proposed Development on landscape and visual amenity receptors. The following related technical assessments would also be included:

- Night-time Lighting Assessment; and
- Residential Visual Amenity Assessment (RVAA).

5.1.2 Consultees are requested to confirm the scope of this assessment and in particular comment on other known wind farm developments which should be included in the assessment (**Table 5.1**), the proposed viewpoint locations (**Table 5.2**), matters that are proposed to be scoped in and scoped out of the LVIA (Section 5.3) and the assessment methodology (Section 5.4).

5.1.3 The chapter is supported by **Figures 5.1-5.6** and should be read in conjunction with **Chapter 2: The proposed development**.

5.2 Baseline conditions

Data sources

5.2.1 A range of desk-based and site-based data will be sourced to undertake the LVIA and cumulative landscape and visual impact assessment (CLVIA), covering landscape and visual receptors and other cumulative wind farm development. The desk-based data will be drawn from Ordnance survey maps (master map, 1:50,000 and 1:25,000 as required) and a range of document sources in addition to the relevant planning policy documents outlined in **Chapter 3: Legislation and Planning policy overview.**

Preliminary LVIA Study Area

5.2.2 The LVIA Search and Study Areas for the Proposed Development are illustrated in **Figure 5.1**. They have been defined in accordance with NRW guidance contained in a review of LANDMAP Guidance Note 46[11] - Using LANDMAP in Landscape and Visual Impact Assessments. They are appropriate for the proposed turbine height and numbers (seven turbines 175m to blade tip).

5.2.3 The LVIA search area is 23km radius from the Mynydd y Glyn Wind Farm site boundary and the LVIA study area is also 23km radius from the site boundary. This accords with the separation distance ration of 1:133 for 175m blade tip height turbines to potentially have "*an average low magnitude of effect on a high sensitivity receptor*" as specified in the section on extent of search and study areas for tall structures in Guidance Note 46.

5.2.4 Based upon a review of the preliminary ZTVs in **Figures 5.2** and **5.3**, knowledge of the site and surrounding area and experience of undertaking several wind farm LVIAs and public inquiries in

[11] Natural Resources Wales. LANDMAP Guidance Note 46: *Using LANDMAP in Landscape And Visual Impact Assessments GN46.* June 2021

south Wales applying LANDMAP guidance, it is considered that significant landscape effects upon LANDMAP aspect areas and local landscape designations would be highly unlikely at separation distances in excess of 10 km.

5.2.5 For visual receptors it is considered highly unlikely that significant effects could be sustained by visual receptors at separation distances in excess of 10 km, although as set out in the scope of the assessment (Section 5.3), a limited number of visual receptors with particularly high sensitivity in locations in the LVIA study area at separation distances of 10-23 km from the wind farm site boundary would be included in the visual assessment.

5.2.6 The LVIA will be prepared in relation to the following data sources:

- LANDMAP Geological Landscape (GLAA), Landscape Habitats (LHAA), Visual and Sensory (VSAA), Historic Landscape (HLAA) and Cultural Landscape (CLAA) assessments for the local authorities within the LVIA study area as defined below;
- The relevant planning policy documents listed in Chapter 3;
- The Brecon Beacons National Park Management Plan (2015 - 2020) and draft SPG on landscape character (2012);
- Heads of the Valleys Smaller Scale Wind Turbine Development Landscape and Sensitivity Study Final Report (April 2015) prepared by Gillespies. This study covers five local authorities including the host local authority: Rhondda Cynon Taff Borough Council plus Blaenau Gwent County Borough Council, Torfaen County Borough Council, Caerphilly County Borough Council and Merthyr Tydfil County Borough Council. As set out in its methodology the Study is confined to wind turbine developments that do not exceed a planned capacity of 5MW i.e. for a maximum of two turbines over 109 m blade tip height. Nevertheless, aspects of the Study are likely to remain relevant to the Proposed Development.
- Landscape Character Assessment for Bridgend County Borough. Prepared by LUC, (2013).
- Development of Criteria for Special Landscape Area Designations for South East Wales Local Authorities. (2007) TACP supplemented by identification, reviews and background papers concerning Special Landscape Areas prepared for local authorities located within the detailed landscape study area including Bridgend CBC (2010, TACP), Caerphilly CBC (2008, TACP), Vale of Glamorgan CBC (2008, TACP) and Cardiff CC (2008, TACP).
- Assessment of onshore wind and solar energy potential in Wales Stage 1 and Stage 2. (March 2019 and June 2019), Welsh Government;
- Ordnance Survey (OS) map data - Scale 1:50, 000 and 1:25,000 as appropriate; and
- Site visits and photographic records.

Current baseline

The site of proposed development and immediate surrounding area

5.2.7 The Site of Proposed Development is located on the summit and upper slopes (above approximately 300 m AOD) of the steep-sided hill of Mynydd-y-Glyn to the south of a west-east orientated section of the Rhondda River. This section of the Rhondda River is west of its confluence with the River Taff at Pontypridd and east of the confluence of the Rhondda Fawr and Fach Rivers at Porth. The Site therefore is located at the southern edge of the extensive area of south Wales

termed the Valleys. To the south the topography generally becomes less elevated towards the lower-lying Vale of Glamorgan.

5.2.8 The Site possesses relatively simple but distinct topography. In the central part of the site are two summits approximately 400 m apart. The north-western summit at 377 m AOD and the south-eastern summit at 375 m AOD. The latter is marked by a triangulation (trig) point. The summit is relatively flat descending gently for approximately 500 m in all directions to the 350 m contour line. To the north, south, and especially the west of this contour line, the slopes steepen as far as and beyond the boundary of the Site which is generally close to the 300 m contour line. To the east the topography descends more gently and has greater complexity due to the shallow incisions made by the upper streams that flow into the Nant Gelliwion water course to the south-east.

5.2.9 The topography and elevation of the Site is replicated in the surrounding area except to the south. There are hills and short ridgelines with similar elevations to the west (Mynydd Gilfach and Mynydd Pen-y-graig); to the north-west (Mynydd Dinas and Mynydd y Cymmer); to the north on the northern side of the Rhondda Valley (trig point summit at 356 m AOD east of Ynyshir); and, at a greater separation distance, to the east (Mynydd Meio and Cefn Eglwysilan). To the south towards Llantrisant, the topography becomes less elevated and more rolling with less distinctive hill summits generally less than 200 m AOD.

5.2.10 The Site's land-use almost entirely consists of a mosaic of improved and semi-improved grazing. There is a single small plantation of deciduous woodland located towards the southern boundary. There is no other tree cover within the site except a few stream-side trees in the south-east and scattered patches of scrub in the north-east. An extensive commercial coniferous plantation woodland is located adjacent to the north-eastern boundary. This plantation extends down to the bottom of the Rhondda Valley at Hopkinstown. Beyond the Site's southern boundary, the areas of lower elevation correspond with a gradual increase in tree cover. This comprises a limited number of small deciduous plantations and copses but more extensively tree cover in field boundaries.

5.2.11 Field boundaries within the Site are generally indistinct. There are periodic isolated lengths of stone wall routed alongside some of the main tracks. The absence of a distinctive field boundary pattern and tree cover results in the Site being open and exposed. There is no built development within the Site, but it is traversed by an overhead electricity transmission line supported by double pole pylons.

5.2.12 There is a limited public rights of way (PRoW) network within and close to the Site, principally a PRoW linking Porth in the Rhondda Valley to Langton Court Farm, one of the closest properties to the south-east. A large proportion of the Site on its western and eastern parts is within an extensive tract of Access Land that extends north across all the closest section of the southern side of Rhondda Valley to the edge of the valley bottom settlements.

Landscape baseline

5.2.13 National landscape designations within the LVIA study area with the blade tip and hub height comparative Zones of Theoretical Visibility (ZTV) for the Proposed Development are shown in **Figure 5.2**. A total of 78 km^2 (5.9 %) of the 1,320 km^2 Brecon Beacons National Park (BBNP) falls within the northern part of the LVIA study area, extending to within approximately 17 km of the proposed wind farm site at its closest point (around Hirwaun).

5.2.14 The second national landscape designation that is almost entirely sited within the LVIA study area is the Glamorgan Heritage Coast. A total of 42.7 km^2 (89.1%) of the 47.5 km^2 Heritage Coast extends across the south-western part of the LVIA study area extending to within approximately 20 km of the Site at its closest points (around Llantwit Major and St. Brides Major).

5.2.15 Local landscape designations within the closest parts of the LVIA study area within the blade tip and hub height comparative Zones of Theoretical Visibility (ZTV) for the Proposed Development are shown in **Figure 5.3.** This figure shows that there are numerous local landscape designations in the relevant local authorities' Local Development Plans. These are all termed Special Landscape Areas (SLAs). In general SLAs extend across upland areas and the upper valley slopes. The Site is located within Rhondda Cynon Taff CBC's Mynydd y Glyn SLA which is one of the more extensive SLAs. Caerphilly CBC also defines a second local landscape designation: Visually Important Local Landscapes (VILLs), but as these are all located in excess of 15 km from the proposed wind farm site, it is considered that there is no potential for the Proposed Development to cause these receptors to sustain significant landscape effects and that they should therefore be excluded from the scope of the LVIA.

5.2.16 Landscape character in Wales is described by the LANDMAP Information System. LANDMAP is comprehensive and identifies and describes the landscape in relation to five overarching categories termed Aspects. These are:

- Geological Landscape Aspect Areas (GLAA);
- Landscape Habitats Aspect Areas (LHAA);
- The Visual and Sensory Landscape Aspect Areas (VSAA);
- Historic Landscape Aspect Areas (HLAA); and
- Cultural Landscape Aspect Areas (CLAA).

5.2.17 Areas of shared characteristics, termed Aspect Areas, are identified in relation to each of the five Aspects. The site is located within the following host aspect areas:

- Geological Landscape Aspect Areas – Lower Rhondda Valley (CYNONGL029) & Upper Ely (CYNONGL032);
- Landscape Habitats Aspect Areas – Dry (Relatively) Terrestrial Habitats (CYNONLH089) & Dry (Relatively) Terrestrial Habitats (CYNONLH094);
- The Visual and Sensory Landscape Aspect Area – Mynydd y Glyn (CYNONVS142);
- Historic Landscape Aspect Areas – Mynyddau Cymmer a Glyn (CYNONHL648); and Nant Castellau and Nant Machudd (CYNONHL649); and
- Cultural Landscape Aspect Areas – Designated Landscape Areas (CYNONCL056).

5.2.18 LANDMAP Guidance Note 46 specifically cross references LVIA using LANDMAP data to the concept of landscape value as identified and defined in the third edition of Guidelines for Landscape and Visual Impact Assessment. In accordance with LANDMAP Guidance Note 46 aspect areas for all five aspect layers will be included within the landscape assessment. The selection of which individual aspect areas to included will again be guided by LANDMAP Guidance Note 46, which advocates two varying processes for 'filtering' the five different types of aspect area.

5.2.19 For Geological Landscape; Landscape Habitats; and Cultural Landscape Services Aspect Areas the proscribed four stage filter process recommends that the landscape assessment is confined to aspect areas that "*overlap fully, partially or are adjacent to the development site boundary*". Subsequent filters include whether aspect areas are within the ZTV and, for Geological Landscapes or Landscape Habitats, have high or outstanding evaluations for specific survey response questions.

5.2.20 For Visual and Sensory and Historic Landscape Aspect Areas the proscribed four stage filter process initially requires identification of all these aspect areas across the LVIA study area (23km radius for

the proposed Carn y Cefn Wind Farm). The second filter relates to their inclusion within the ZTV (whether blade tip or hub height ZTV is not specified). Subsequent filters focus upon the retained Visual and Sensory Aspect Areas possessing high or outstanding evaluations for specific survey response questions relating to overall evaluation; scenic quality; or character; and for the retained Historic Landscape Aspect Areas possession of moderate, high, or outstanding overall evaluation.

5.2.21 The detailed scoping approach to be applied to each of the five aspect layers is set out in Section 5.3.

Visual baseline

5.2.22 Visual receptors can be broadly sub-divided into two categories: those visual receptors who live or travel through the LVIA study area i.e. people within their communities, or transport visual receptors; and those visual receptors who undertake outdoor recreational activities at locations or along routes through the LVIA study area i.e. recreational visual receptors. The baseline distribution of these categories of visual receptors is summarised below.

5.2.23 For people in their communities, the central and northern parts of the LVIA study area exhibit the broad settlement pattern that is present across much of 'the Valleys' area of south Wales. This pattern is of periodic dense settlements on some sections of valley bottom or lower valley sides but limited settlement especially in more elevated areas. As occurs in the upper sections of the Rhondda Fawr and Rhondda Fach Valleys, individual valley bottom settlements can amalgamate with one another to result in a continuous tract of settlement extending along several kilometres of a valley and /or into side valleys such as at Clydach. A similar settlement pattern prevails in the more easterly Cynon and Taff Valleys with built development in the latter extending almost continuously to the north-western edge of Cardiff. There are a limited number of residential properties located outside these valley bottom settlements, a good proportion of which are, or at least were, originally farmsteads. There are a few examples of separate settlements and housing estates at higher elevations outside of the valleys, with Penrhys on the ridgeline between the Rhondda Fawr and Rhondda Fach valleys being a prime example.

5.2.24 In the southern part of the LVIA study areas, where the topography is not as varied, and elevations are lower, less distinctive settlement patterns prevail. Within approximately 4 km of the southern site boundary there is a dispersed, low density, rural settlement pattern with only a few village communities. Further south there is belt of substantial communities including Church Village, Beddau and Llantrisant that extend from the lower Taff Valley to the M4 corridor. South of the M4 corridor in the Vale of Glamorgan, a more dispersed settlement pattern again prevails with larger settlements restricted to periodic market towns such a Cowbridge. East of the Vale of Glamorgan, the south-eastern part of the LVIA study area is largely occupied by the major city of Cardiff.

5.2.25 In the central and north-western parts of the LVIA study area, the transportation network of 'A' and 'B' roads is mainly routed along valley bottoms and lower sides. Consequently, vehicular receptors' journeys often pass through extensive areas of built development with limited availability of outward views. Key 'A' roads have been identified as being A4233 routed along Rhondda Fach Valley and south to Tonyrefail; A4046 routed along the Rhondda Fawr Valley and then east along Rhondda Valley to Porth; and the A470 trunk road which is routed parallel with A4054 along the Taff Valley to Cardiff further to the east. A key route in the LVIA study area is the M4, the closest section of which is routed east-west approximately 7 km south of the proposal site.

5.2.26 The LVIA study area includes a wide range of visual receptors undertaking outdoor recreational activities where the availability of views and their composition are likely to contribute to receptors' enjoyment of their activity. Recreational receptors within the blade tip ZTV will be identified under the following categories:

- **Designated long distance footpaths (national and regional trails).** The only national trail within the LVIA study area is the Wales Coast Path. **Figure 5.2** demonstrates that whilst the Coast Path's route winds in and out of much of the southern edge of the LVIA study area i.e. at least 23 km distant, it is mostly outside the blade tip ZTV. There are sections of several regional trails within the LVIA study area. These include the Glamorgan Ridgeway Walk; the Taff Trail; Taff Ely Ridgeway; and the Rhymney Valley Ridgeway Walk.
- **Sustrans National Cycle Routes**. South Wales contains a dense network of national cycle routes (NCRs) and regional cycle routes (RCRs). Sections of NCRs within the LVIA study area are NCR 4 (routed close to the south of the proposal site); NCR 8, and NCR 47. Sections of RCRs within the LVIA study area are RCR 881 (routed close to the north of the site); RCR 883; RCR 475; RCR 477 and RCR 478. These NCRs and RCRs are mostly routed along the valley bottoms.
- **Prominent publicly accessible elevated locations and summits**. There are locations within the closest parts of the LVIA study area such as Mynydd-y-Glyn itself, Garth Hill and Mynydd Dinas.
- **Locally promoted walking, cycling and mountain biking routes** around the Taff, upper Ely and Rhondda Fach and Fawr Valleys and the intervening ridgelines and elevated areas.
- **Public Rights of Way (PRoWs) and Access Land** - the distribution of PRoWs is varied in the closest parts of the LVIA study area but overall is moderately dense upon the more open middle and upper valley sides and most elevated areas are crossed by at least one PRoW (although these do not always go to the summits). The highest concentration of PRoWs is within the less elevated, highly rural area to the south of the site. Access Land is scattered across the LVIA study area. The largest is the Access Area that includes a proportion of the site of the Proposed Development. There are several small and medium-sized Access Land concentrated on the valley sides (but rarely the ridgeline tops other than Mynydd Dinas) in the lower Rhondda Fawr and Fach Valleys with some also extending across areas of commercial forestry. To the south of the site there is no Access Land until Llantrisant Forest and Llantrisant Common.
- **Outdoor Recreational Facilities, Public Amenity Areas, Registered Parks and Gardens and Country Parks.** Local examples include Barry Sidings Countryside Park in Hopkinstown; Cwm Clydach Countryside Park in Tonypandy; Bronwydd Park in Porth; Ynysangharad War Memorial Park (including the Wales National Lido) in Pontypridd; Pontypridd Common; Rhondda Heritage Park at Trehafod; and Pontypridd Golf Club. The Shrine of Our Lady at Penrhys is a noted attraction for pilgrims/worshippers.

Future baseline

5.2.27 It is unlikely that the future baseline will alter markedly in the short to medium term as many of the potential forces for change within and around the site are in relative stasis, particularly with the reduction in renewable energy applications that has taken place in the past five years. Wind energy developments that are relevant to the cumulative assessment i.e. located within the LVIA study area, including those that are consented but not built or at planning stage i.e. part of the future baseline, are listed in **Table 5.1** and their location shown in **Figures 5.4** and **5.5.**

Table 5.1 Wind Farms relevant to the cumulative assessment

Name of wind farm	Local Authority	Number of wind turbines	Height to blade tip (m)	Approximate distance from boundary of Proposed Mynydd y-Glyn Wind Farm (km)	Status
Detailed LVIA Study Area (within 10km)					
Llwyncelyn Farm	Rhondda Cynon Taff	2	138.5	2.6	Consented
West of Rhiwfelin Farm	Rhondda Cynon Taff	1	100	3.2	Operational
Graig Fatha Farm	Rhondda Cynon Taff	1	126	3.9	Operational
Mynydd Portref Extension	Rhondda Cynon Taff	7	110	4.6	Operational
Mynydd Portref	Rhondda Cynon Taff	11	86	5.0	Operational
Bryntail Farm	Rhondda Cynon Taff	2	71	5.3	In Planning
Headwind Taff Ely	Rhondda Cynon Taff	7	110	5.3	Operational
Mynachdy Farm	Rhondda Cynon Taff	2	67	5.4	Operational
Taf Ely	Rhondda Cynon Taff	20	53.5	5.5	Operational
Pant-y-Wal	Rhondda Cynon Taff /Bridgend	10	115	5.8	Operational
Nant-y-Gwyddon	Rhondda Cynon Taff	1	121.5	6.3	Operational
Fforch Nest	Rhondda Cynon Taff/ Bridgend	11	115	6.6	Operational
Bwllfa Farm, Gelli	Rhondda Cynon Taff	1	76	7.5	Operational
Ferndale	Rhondda Cynon Taff	8	74	7.6	Operational
Castell Llwyd Farm	Caerphilly	1	77	9.4	Operational
Cefn Fforest Farm	Merthyr Tydfil	1	102	9.6	Operational
Defined LVIA study area (within 23km)					
Tir Cook Farm	Merthyr Tydfil	1	77	10.1	Operational
Maerdy	Rhondda Cynon Taff	8	145	11.2	Operational
Abergorki	Rhondda Cynon Taff	3	149.9	11.9	Operational
Bryn Ysgawen Farm	Caerphilly	1	77	12.3	Operational
Tyle Crwth	Caerphilly	1	76	13.2	Operational
Groesfaen Farm	Caerphilly	1	77	14.6	Operational
Llynfi Afan	Bridgend	12	118	14.8	Operational
Cefn Bach Farm	Caerphilly	1	78	15.2	Operational
Mynydd Bwllfa	Rhondda Cynon Taff	9	115/125	15.2	Operational
Pen-y-Cymoedd	Rhondda Cynon Taff	76	145	15.5	Operational

Name of wind farm	Local Authority	Number of wind turbines	Height to blade tip (m)	Approximate distance from boundary of Proposed Mynydd y-Glyn Wind Farm (km)	Status
Gelli-wen Farm	Caerphilly	1	77	17.1	Operational
Oakdale Business Park	Caerphilly	2	130	17.7	Operational
Pen-yr-heol Farm	Caerphilly	1	77	17.8	Operational
Penrhiwgwaith Farm	Blaenau Gwent	1	86.5	17.9	Operational
Bedlwyn Farm	Caerphilly	1	86.5	18.4	Operational
Pen.y Fan Ganol Farm	Caerphilly	1	73.5	18.4	Operational
Pen-y-Fan Industrial Estate	Caerphilly	1	124	18.6	Operational
Pengarnddu Industrial Estate (plot 3)	Merthyr Tydfil	1	77	18.8	Operational
Pengarnddu Industrial Estate (St Merryn Meat Factory)	Merthyr Tydfil	1	77	18.9	Operational
Pengarnddu Industrial Estate (plot 5)	Merthyr Tydfil	1	77	18.9	Operational
Foel Trawsnant	Neath Port Talbot	11	145	19.1	Consented
Cruglwyn	Caerphilly	1	86.5	20.0	Operational
Ffynnon Oer	Neath Port Talbot	16	91	20.0	Operational
Melin Court	Neath Port Talbot	5	145	20.7	Consented
Pen Bryn Oer	Caerphilly	3	110	20.7	Operational
Parc Stormy, Stormy Down	Bridgend	1	100	20.8	Operational
Newton Down	Bridgend	2	125	21.1	Operational
G24i	Cardiff	1	120	21.4	Operational
Tafamaubach Industrial Estate	Blaenau Gwent	1	74	21.6	Operational
Newlands Farm	Neath Port Talbot	1	77	21.8	Operational

5.2.28 In the long term there is potential for large-scale changes in agricultural practices in response to national or international agricultural and environmental policy. The long-term continuation of the decline of 'family' farms and the amalgamation of farm units into fewer, more intensively managed farm business could gradually lead to changes such as amalgamation of fields and the introduction of larger scale, less vernacular agricultural buildings. Should livestock farming continue to decline it is likely there would be a commensurate long-term decline in the management field boundaries

and a subsequent decline in the strength of field patterns, especially on more marginal elevated areas.

5.2.29 Many of the large blocks of forestry that are a conspicuous landscape feature across parts of the LVIA study area are coniferous. They are therefore likely to be felled as commercial crops at some point with localised landscape consequences including changes to the nature of available views available to some visual receptors within the LVIA study area.

5.2.30 The UK climate is changing and climate models indicate that this rate of change could accelerate. The predicted future baseline will alter in response to future climate change, such as, higher temperatures and changes to rainfall patterns and intensity. Many of these changes will, at least initially, be subtle, for example, extended growing seasons for certain crops. The following changes with a high likelihood of occurrence could directly or indirectly affect landscape character or levels of visibility:

- Warmer summers and an associated longer growing season potentially affecting the range of crops that can be grown;
- Wetter winters with consequent local flooding as was demonstrated in many parts of the LVIA study area in early 2020;
- Decreases in soil moisture in summer and autumn and associated increased potential for drought stress on vegetation, such as, hedgerows and hedgerow trees; and
- Increased levels of tree loss, especially of more mature trees, due to the anticipated increase in the incidences and severity of winter storms and the increased incidence of diseases affecting specific tree species such as chalara for ash trees and phytophthora for a variety of species including oak, beech, larch and alder.

5.3 Scope of the assessment

Potential receptors

Zone of Theoretical Visibility and Viewpoint Analysis

5.3.1 The Zones of Theoretical Visibility (ZTV) analysis is used to assist the design and further define the LVIA's scope and are used to indicate the areas from where it may be theoretically possible to view all or some of the proposed blade tips and nacelles (hub heights) of one or more of the seven proposed turbines. The ZTVs have been calculated using ReSoft WindFarm computer software. The ZTVs do not however take account of built development and vegetation, which can significantly reduce the area and extent of actual visibility in the field and as such provides the limits of the visual assessment. As a result there may be an over-estimate of the theoretical visibility available to visual receptors within communities, using recreational routes and facilities, and travelling on roads in the LVIA study area who, although shown as falling within the ZTVs, will have restricted viewing opportunities due to screening or filtering of their views by banks, walls and vegetation. The ZTVs therefore provide a starting point in the assessment process and accordingly tend towards giving an over-estimated or maximum theoretical visibility of the proposed turbines.

5.3.2 **Figures 5.2** and **5.3** show the preliminary ZTVs that have been calculated to show the area of theoretical visibility of the proposed turbines based on an indicative seven turbine layout of 175 m turbine height (blade tips).

5.3.3 **Figure 5.6** is provided to assist the scoping process, in particular selection of viewpoint locations and landscape and visual receptors. For the avoidance of doubt, visual and landscape receptors located outside the coloured areas of the ZTV would have no view of any of the proposed turbines (or any other component of the proposed development) and landscape and visual receptors within these areas are consequently scoped out of the LVIA.

Confirmation of Cumulative LVIA Study Area

5.3.4 Reviews have been undertaken of SNH guidance on cumulative assessment, LANDMAP Guidance Note 46; the LVIA assessors' experience in undertaking LVIAs and public inquiries/hearings for six wind farms in south Wales (most recent LVIA for Foel Trawsnant Wind Farm revised design in 2018 and most recent public inquiry Pen Bryn Oer Wind Farm in 2015) and information on existing, consented and proposed wind farms within a 'cumulative search area' of 23 km as set out in **Table 5.1** and **Figures 5.4** and **5.5** in order to inform the CLVIA. This review concludes that a CLVIA study area of 23 km radius i.e. coterminous with the LVIA study area will be fit for purpose being sufficient to assess all potential significant cumulative landscape and visual effects. This approach accords with the advice on CLVIA in Guidance Note 46.

5.3.5 SNH Guidance recommends that micro-generation turbines (25-50 m) within 5 km only need to be included if they consist of three of more turbines. In line with SNH guidance all single turbines beyond 10 km are excluded i.e. all single turbines listed in **Table 5.2** within the LVIA study area table section and shown on **Figure 5.5**. All wind farms at scoping stage wind farms have not been included due to the uncertainty of their attaining operational status.

Viewpoint Selection and Visualisations

5.3.6 A range of viewpoints have been proposed (as illustrated on **Figure 5.6**) and consultees are requested to confirm the viewpoint selection set out in **Table 5.2**, including requests to scope out viewpoints or recommend additional / alternative locations.

5.3.7 Visualisations would be prepared for each viewpoint to accord with SNH guidance and include 90° baseline photographs and wirelines, and 53.5° photomontages and wirelines.

Table 5.2 Proposed LVIA Viewpoints

Viewpoint No. Title & Grid Ref	Minimum Separation Distance	Viewpoint Typology (GLVIA3) / Principal Receptor(s)	Visualisation Method	Comment
1 -Hafod Wen, Tonyrefail 301830, 188599	1.2 km	Illustrative – residential receptors	Photomontage	View from end of cul-de-sac illustrates views available to some of closest residents on eastern edge of this community.
2 - NCR4 at Rhiwinder 302663, 187754	1.2 km	Representative – residential & recreational receptors	Photomontage	Next to National Cycle Route/PRoW at 'Oaklands' and representative of views available within and close to this small community as well as close distance views from south-west.
3 - Hafod Lane, Llwyncelyn 304192, 191527	1.3 km	Illustrative – residential & recreational receptors	Photomontage	Views from short section of minor elevated road illustrate some available to residents and recreational receptors with close distance views in this area above Trehafod and on northern side of closest section of Rhondda Valley.

Viewpoint No. Title & Grid Ref	Minimum Separation Distance	Viewpoint Typology (GLVIA3) / Principal Receptor(s)	Visualisation Method	Comment
4 - PRoW from Trebanog ascending Mynydd Dinas 301469, 190654	1.4 km	Illustrative – recreational receptors	Photomontage	Edge of Access Area on closest part of Mynydd Dinas which is likely to be popular with surrounding communities. Within RCT SLA N1: Mynydd y Cymmer
5 - A4233 south end of bridge over River Rhondda, Porth 302413, 191514	1.5 km	Representative – Residential and vehicular receptors	Photomontage	Representative of the most open views available to some residents in one of the closest communities and users of one of main 'A' roads
6 - North-eastern edge of Pen-y-Coedcae 306101, 187826	2.0 km	Illustrative – Residential receptors	Photomontage	Field entrance on Llantrisant Road provides good example of views available to members of this community and close-distance views from south-east. Close to Roman Fort SM. Within RCT SLA S6: Mynydd y Glyn.
7 - Tynybryn Road/NCR4, Tonyrefail 300559. 188064	2.5 km	Representative – residential & recreational receptors	Photomontage	Provides open view over playing field representative views available to members of this large community and alongside section of National Cycle Route.
8 - Entrance to Pontypridd Common, Pontypridd 308203, 190101	3.9 km	Illustrative – Residential receptors in east Pontypridd. Specific recreational receptors at viewpoint	Photomontage	Viewpoint/information board/seating at one of main entrances to valued recreational asset including heritage trail. One of more elevated locations in this community and illustrative of periodic open views available to many members of community. Access Land. Within RCT SLA S10: Taff Vale Eastern Slopes
9 - Northern edge of Llantrisant 304678, 183746	5.1 km	Illustrative – residential receptors	Photomontage	Views from northern side of cemetery are illustrative of open northern views available to some members of this large community. Edge of Access Land (Llantrisant Common) and RCT SLA 5; Llantrisant Surrounds.
10 - Bryn Terrace, Cwm Clydach, Tonypandy. 298398, 193037	5.3 km	Representative - residential receptors	Photomontage	Representative of open, elevated views available to proportion of people in this and adjacent communities as well as middle-distance views from north-west.
11 - Carpark at Shrine of Our Lady, Penrhys 300226, 194633	5.4 km	Specific – recreational receptor Representative – residential receptors	Photomontage	Southern side of visitors' carpark to popular religious shrine that is representative of periodic open views available to residents in one of most elevated communities in central part of the LVIA study area between Rhondda Fawr and Fach Valleys.
12 - OS marked viewpoint on Ferndale- Llanwonno road 301193, 196410	6.5 km	Specific – vehicular & recreational receptors	Photomontage	Minor road ascending eastern side of Rhondda Fach Valley with layby providing panoramic views.

Viewpoint No. Title & Grid Ref	Minimum Separation Distance	Viewpoint Typology (GLVIA3) / Principal Receptor(s)	Visualisation Method	Comment
13 - 274 m summit on Taff Ely Ridgeway Walk, near Mynydd Meandy 297238, 185970	6.5 km	Representative – recreational receptors	Photomontage	Most elevated point on this section of regional trail with nearby carpark marked on OS map. Access Land. Within Bridgend SLA 4: Mynydd y Gaer. Illustrative of middle-distance views from west.
14 - 321 m trig point summit on Rhymney Valley Ridgeway Walk, Mynydd Mieo 311428, 188305	7.0 km	Representative – recreational receptors	Photomontage	Most elevated point on this section of regional trail. Access Land. Close to Senhenydd Dyke. Within Caerphilly CBC SLA 2: Mynydd Eglwysilan. Illustrative of middle-distance views from east.
15 - 307 m trig point summit of Garth Hill 310340, 183501	8.0 km	Specific / Illustrative – recreational receptors	Photomontage	Trig point is most elevated location in Garth hill adjacent to Taff Ely Ridgeway Walk. Access Land. Within Cardiff CC SLA Garth Hill and Pentyrch Ridges
16 – Valeways Heritage Millenium Trail north of Pendolyn 305781, 177055	11.8 km	Representative – residential & recreational receptors	Photomontage	Illustrative of long-distance views available from some elevated locations in Vale of Glamorgan. Viewpoint east of minor road due to hedgerow. Within Vale of Glamorgan SLA Ely Valley and Ridge Slopes.
17 – A4059 north of Penderyn, Brecon Beacons National Park 294467, 210325	22.7 km	Illustrative-Recreational & vehicular receptors	Photograph & Wireline	Illustrative of only potential blade tip visibility on the most travelled route in closest part of National Park.

Potential receptors

5.3.8 Landscape and visual receptors within the LVIA Study Area most likely to be significantly affected tend to be those which are of higher sensitivity, located closest to the Proposed Development, incurring a direct and / or higher magnitude or level of effect. Viewpoint analysis and site survey, which includes an assessment of sensitivity and magnitude, will be used as part of the assessment to identify those receptors which are most likely to be significantly affected.

Likely significant effects

5.3.9 The likely significant LVIA effects that will be taken forward for assessment in the Environmental Statement are summarised in **Table 5.3**.

Table 5.3 Likely significant LVIA effects

Activity	Effect	Receptor
Landscape and Cumulative Landscape Effects		
Construction: Site preparation and construction of associated infrastructure (tracks, borrow pits, control buildings / sub-stations, contractors' facilities, site access and electrical cabling).	Direct localised effects on some parts of the proposal site's landscape character, characteristics and landscape elements may be significant. Indirect effects upon adjacent local landscape designation.	Host LANDMAP Aspect Areas (Visual and Sensory; Geological. Landscape Habitats and Historic) Mynydd -y-Glyn SLA
Construction and Operation: Turbine erection and operation.	Direct effects on the host landscape character, characteristics and potentially the landscape elements are likely to be significant within ~3-5km. Night-time effects resulting from aviation warning lights are also likely to be significant. Indirect effects related to the visibility of the turbines and their effect on landscape character and perceptual characteristics have the potential to be significant. Night-time effects resulting from aviation warning lights are also likely to be significant. Based on the preliminary ZTVs 16 of the local landscape designations entirely or partly located within 10 km of the boundary of the site could sustain significant indirect landscape effects., plus Mynydd -y-Glyn SLA potential direct and indirect landscape effects.	LANDMAP Aspect Areas VSAAs • All host and adjacent VSAAs; • VSAAs within 23 km radius LVIA study area that have more than 20% of their area within blade tip ZTV and have LANDMAP assessment of outstanding/high/moderate for at least one of Descriptor Responses on Overall Evaluation (50); Scenic Quality (46), or Character (48). HLAAs & CLAAs • Host and adjacent HLAAs; • Host CLAA; • HLAAs and CLAAs within 23 km radius LVIA study area that have more than 20% of their area within blade tip ZTV and have LANDMAP assessment of outstanding/high for overall evaluation (40) GLAAs and LHAAs • Host GLAAs and LHAAs • Adjacent GLAAs with outstanding/high responses for survey questions 31 or 33; • Adjacent LHAAs with outstanding/high responses for survey question 42 or 45; • Adjacent CLAAs with more than 20% of their area within blade tip ZTV; and • Any GLAAs that have are within hub height ZTV and have a special relationship with the Proposal Site. Local Landscape Designations Rhondda Cynon Taff CBC SLAs • N1-Mynydd y Cymmer; • N2-Mynydd Troed y Rhiw Slopes; • N3-Llwyncelyn Slopes; • N4-Cwm Clydach; • S4-Coed-y-Hendy & Mwyndy; • S5-Llantrisant Surrounds; • S6-Mynydd y Glyn; • S7-Mynydd Hugh; • S8-Efail Isaf; • S9-Craig yr Alt; • S10-Taff Vale Eastern Slopes;

Activity	Effect	Receptor
		• S11-Treforest Western Slopes. Bridgend CBC SLAs • Northern Uplands; • Mynydd y Gaer. Caerphilly CBC SLAs • Mynydd Eglwysilsan. Vale of Glamorgan Council • Ely Valley and Ridge Slopes Cardiff County Council • Garth Hill and Pentyrch Ridges
Decommissioning: Removal of turbines and associated infrastructure such as control buildings / sub-stations.	None	
Visual and Cumulative Visual Effects		
Construction: Site preparation and construction of associated infrastructure (tracks, borrow pits, control buildings / sub-stations, contractors' facilities, site access and electrical cabling).	Effects on views and visual amenity resulting from visibility of the proposed construction activities within ~2km distance to include for views from tops of adjacent summits and ridgelines, subject to detailed viewpoint analysis.	Limited numbers of recreational receptors and potentially a small proportion of residents in the closest communities.
Construction and Operation: Turbine erection and operation	Effects on views and visual amenity resulting from visibility and movement of the proposed wind turbines within up to approximately 10 km distance, subject review of ZTVs and detailed viewpoint analysis. Views of the proposed aviation warning lights and adverse effects on night-time views within ~5-10km distance, subject to detailed viewpoint analysis.	Residential receptors in communities substantially within hub height ZTV within the LVIA study area. Recreational receptors using regionally promoted routes including Glamorgan Ridgeway Walk; the Taff Trail; Taff Ely Ridgeway; and the Rhymney Valley Ridgeway Walk. Recreational receptors using PRoW networks and locally promoted cycle and mountain bike routes substantially within hub height ZTV within 5 km of Proposal Site boundary but outwith built-up areas and woodlands with a high proportion of coniferous species. Recreational receptors using sections of NCR 4); NCR 8, NCR 47; RCR 881; RCR 883; RCR 475; RCR 477 and RCR 478) routed through the LVIA study area and partially within the hub height ZTV. Recreational receptors in extensive upland Access Areas (where not included in other categories). Recreational receptors at visitor attractions such as Country Parks and Golf Clubs in LVIA study area and partially within the hub height ZTV. Vehicular receptors travelling along 'A' and 'B' roads and any promoted tourist routes including A4233; A4046; A470(T); and A4054.

Activity	Effect	Receptor
Decommissioning: Removal of turbines and associated infrastructure such as control buildings / sub-stations.	None	None

5.3.10 The LVIA receptors scoped out from further assessment in the Environmental Statement as a result of the characteristics of the LVIA study area, the distribution of baseline receptors and the characteristics of the Proposed Development, are landscape and visual receptors that would not be significantly affected in the context of the EIA Regulations. These landscape and visual receptors that are therefore scoped out from further assessment as follows:

- Cumulative Assessment:
  - Limit the cumulative baseline of all operational and consented wind energy development and other applications for wind energy development to within 23km of the Proposal Site to accord with the defined LVIA Study Area;
  - Single turbine wind energy developments that are located more than 10 km from the boundary of the proposal site. Review of **Table 5.1** shows that application of this criterion scopes out the following wind energy developments; Pengarnddu Industrial Estate (plot 3 and plot 5); Pengarnddu Industrial Estate (St Merryn Meat Factory); Tir Cook Farm; Groesfaen Farm; Cefn Bach Farm; Bryn Ysgawen Farm; Castell Llwyd Farm; Tyle Crwth; G24i; Pen-y-Fan Industrial Estate; Pen Y Fan Ganol Farm; Cruglwyn; Penrhiwgwaith Farm; Gelli-wen Farm; Pen-yr-heol Farm; Bedlwyn Farm; Parc Stormy, Stormy Down; Newton Down; G24i; Newlands Farm and Tafamaubach Industrial Estate; plus
  - Exclude other scoping stage and pre-application schemes in line with SNH guidance.
- Receptors outwith the ZTV:
  - All receptors within the LVIA Study Areas that are outwith the blade tip ZTV would have ***no view*** of the Proposed Development and are scoped out.
- Local / regional receptors:
  - Local / regional receptors beyond 10 km distance from the Proposed Development, subject to viewpoint analysis should be scoped out. This would include local landscape designations, and all visual receptors. The viewpoint analysis and field survey will be used to confirm if a receptor can be scoped out and viewpoint analysis used to identify a conservative distance or 'threshold' for significant landscape and visual effects.
- Wales Coast Path:
  - Review of **Figure 5.2** shows that ZTV periodically extents as far as some section of the coast and hence the Coast Path between Cardiff and east of Porthcawl. The sections of the Coast Path within the ZTV will have a minimum separation distance of 20 km from the Proposed Development and receptors' attention is more likely to be focused on views along the coast and out to sea. The more easterly Coast Path sections are also routed through extensive urban areas in Cardiff, Penarth, Barry and south of Cardiff Airport. In these circumstances it is highly unlikely that recreational receptors using any sections of the Coast Path within the LVIA study area would be able to discern turbines at the Proposed Development. If views were to be available and weather conditions favourable, the Mynydd-y-Glyn turbines would

always be viewed incrementally in the context of a proportion of the turbines at the numerous other operational wind energy developments listed in **Table 5.1**.

- Brecon Beacons National Park:
  - As shown in **Figure 5.2** a substantial majority of the Brecon Beacons National Park is located beyond 23 km of the proposal site. It is a minimum of 17 km to the north of the proposal site and only 78 km² (5.9 %) of the National Park is located within the LVIA study area. It is also pertinent to note that where the proposed turbines would be visible in favourable weather conditions, they would be highly likely to be seen in the visual context of other, more numerous turbines at wind energy schemes listed in **Table 5.1**. In these circumstances it is considered that there will be minimal potential for landscape effects to significantly affect the special qualities of the National Park. A viewpoint in the National Park is proposed for inclusion in the visual assessment as set out in **Table 5.2** to demonstrate that the proposed turbines would be likely to be indiscernible in casual views from the closest part of the National Park around Penderyn.
- Glamorgan Heritage Coast:
  - As shown on **Figure 5.2,** the majority of the Heritage Coast is within the defined LVIA study area and 14 km² (29.0%) is within the blade tip ZTV. However, over a minimum separation distance of 20 km any effects pathway would be entirely dependent upon views being available. However, practical experience with existing wind farms in south Wales demonstrates that over such distances, especially from low lying coastal areas where views are focused out to sea, views would be rarely available and could not result in significant adverse effects upon the designation's special qualities.
- Other specific landscape receptors:
  - All LANDMAP Aspect Areas within 10 km of the boundary of the Proposed Development that do not fulfil criteria set out in **Table 5.3** which are based upon current version of LANDMAP Guidance Note 46.
  - Local landscape designations that that are located beyond 10 km and those that are substantially or completely outside the ZTVs as shown on **Figure 5.3**. These are the Caerphilly VILLs and the following Rhondda Cynon Taff SLAs:
    - S1-Llanharry Surrounds: almost entirely outside blade tip ZTV;
    - S2-Talygarn Surrounds: minimum 9 km separation distance, low tranquillity due to M4 presence and separated from proposal site by large areas of intervening built development.
    - S3-Ely Valley at Miskin: minimum 8 km separation distance, low tranquillity due to M4 presence and separated from proposal site by large areas of intervening built development.
    - N5-Cynon Valley Northern Slopes: only partly within 10 km and mostly forested.
    - N6-Cwm Orci: only partly within 10 km and adjacent presence of Maerdy Wind Farm.
    - N7-Rhondda Valley Northern Cwm: mostly beyond 10 km and nearby presence of Maerdy, Mynydd Bwllfa and Pen-y-Cwmoedd Wind Farms.
    - N8-Hirwaun Common: almost entirely beyond 10km and nearby presence of Mynydd Bwllfa and Pen-y-Cwmoedd Wind Farms.

- Construction period landscape receptors – Host Cultural Landscape Aspect Area (Designated Landscape Areas) as it is very extensive, described in CL17 as being "*Large expanses of mostly upland and moorland landscape that are present throughout the Study Area.*". The CLAA's inclusion would introduce an element of double counting in the landscape assessment given the inclusion of 17 SLAs as set out in **Table 5.3**.

- All Decommissioning Activities:
  - All decommissioning activities, including use of on-site cranes, will be short-lived within context of proposed 30 years operational period. No additional permanent elements will be introduced that could be visible beyond the site boundary and no additional landscape elements will be lost (other than those associated with the operation of the Proposed Development). In landscape and visual contexts, the decommissioning period is a short extension of the effects identified for the operational period, which after 30 years will be well-established components of the revised landscape and visual baseline. It is highly unlikely that the temporary introduction of one or two on-site cranes and some ground level plant and movement would generate any new adverse landscape and visual impacts whose magnitude would be sufficient to change previously non-significant effects into significant effects for any receptors.

5.4 Assessment methodology

5.4.1 A description of the proposed landscape, visual and cumulative assessment methodology is set out in **Appendix 5.1** and includes methodology for the Night-time Lighting Assessment and a Residential Visual Amenity Assessment (RVAA).

5.4.2 The methodology for the LVIA would be undertaken in accordance with the Landscape Institute and IEMA *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition (GLVIA 3), and other best practice guidance listed in **Appendix 5.1**. A summary of that assessment is provided here.

Assessment of Landscape Effects

5.4.3 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern … is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. … The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the proposed development may influence in a significant manner."

5.4.4 The potential landscape effects occurring during the construction and operational periods may therefore include, but are not restricted to, the following:

- Changes to landscape elements: the addition of new elements (wind turbines, met mast(s) and ground level infrastructure elements) or the potential removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the host LANDMAP aspect areas;

- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of host LANDMAP aspect areas or contribute to the landscape value of local landscape designations;

- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall landscape character within LANDMAP aspect areas and/or landscape designations; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

5.4.5 Development may have a direct (physical) effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, or other areas of landscape, outside the host LANDMAP aspect areas. This is usually, but not always exclusively, via a visual effect pathway.

Assessment of Visual Effects

5.4.6 Visual Effects are concerned wholly with the effect of the construction and operation of the proposed development on views, and the general visual amenity, and are defined by the Landscape Institute in GLVIA 3 paragraphs 6.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of individuals or groups of people may be specifically affected by changes in the context and character of views."

5.4.7 Visual effects are identified for different receptors (people) who would experience the view(s) at their places of residence, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view(s); and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

Cumulative Landscape and Visual Impact Assessment

5.4.8 The assessment of cumulative effects is essentially the same as for the assessment of the landscape and visual effects of the proposed wind farm in the absence of other consented and proposed wind energy developments, 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. Cumulative assessment however considers the magnitude of change posed by multiple developments.

5.4.9 The cumulative assessment would accord with SNH guidance and will be prepared to ensure that, as well as the effects of the Proposed Development (LVIA), the 'additional' cumulative effects and the 'combined' cumulative effects (CLVIA) are also reported to account for three cumulative Scenarios as follows:

- Existing + the Proposed Development:

  The primary effect in the context of the current baseline of operational wind energy developments as summarised in **Table 5.1**.

- Scenario 1: Existing + Consented + the Proposed Development:

The additional and combined cumulative effects of any consented wind energy developments with the Proposed Development are assessed.

- Scenario 2: Existing + Consented + Applications + the Proposed Development:

  The additional and combined cumulative effects of the existing and consented wind energy developments and any live applications (which would include schemes at planning appeal), with the Proposed Development are assessed. At present only one application has been identified in the CLVIA study area.

5.4.10 In addition, the cumulative assessment takes account of the timescales for the operation of the existing and consented developments and assumes that these will be decommissioned within the operational life of the Proposed Development.

Night-time Lighting Assessment

5.4.11 Aviation warning lights attached to turbine hubs and towers are required on all proposed wind turbines ≥150 m in accordance with Article 222 of the UK Air Navigation Order (ANO) 2016, subject to any proposed lighting mitigation strategy. A proportionate Night-time Assessment of the proposed aviation lighting will be undertaken to accord with the draft SNH guidance. The assessment would be supported by maps indicating the ZTV of any proposed aviation warning lights and three Night-time Viewpoints. The proposed Night-time Viewpoints have been selected as representative of locations where there are likely to be people at night and include roads and settlements as follows:

- Viewpoint 1 – Hafod Wen, Tonyrefail – nearest part of the closest large community;
- Viewpoint 2 – Rhiwinder – representative of smaller communities in the more rural area to the south where baseline night-time lighting levels are likely to be low; and
- Viewpoint 4 – A4233 in Porth – representative of extensive communities located in this area.

5.4.12 A night-time ZTV of the turbine lighting positions at hub height and half tower height would accompany the visualisations which would aid the assessment.

5.4.13 The extent of the study area is likely to be restricted to 10 km from the outer turbine positions according to the technical criteria of the proposed candidate light fixtures.

Residential Visual Amenity Assessment

5.4.14 Residential amenity is a planning matter that involves a wide number of effects (such as noise and shadow flicker) and benefits, of which residential visual amenity is just one component. A Residential Visual Amenity Assessment (RVAA) will be undertaken to assess effects on residential visual amenity likely to be experienced at residential properties within 2 km of the proposal site boundary. The RVAA will accord with the advice in GLVIA 3, the Landscape Institute's *Residential Visual Amenity Assessment*: Technical Guidance Note, 2019.

5.4.15 The adoption of the specified 2 km radius RVAA study area will include a substantial number of residential properties in the settlements of Porth (including Llwyncelyn, Cymmer, Glynfach and Trebanog), eastern Tonyrefail, Rhiwinder, western edges of Hopkinstown and Maersycoed in Pontypridd and Trehafod as well as a smaller number of outlying properties. In these settlements, properties sharing similar key attributes will be grouped together in the RVAA. This grouping will minimise repetition and will serve to ensure that the RVAA possesses a manageable scope.

5.4.16 As a minimum the visual effects on the views from each property group included in the assessment will be illustrated by a wireline.

Determining the Significance of Effects

5.4.17 The level of landscape and visual effect (and whether this is significant) is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change likely to be brought about by the proposed Mynydd-y-Glyn Wind Farm. The time limited period for the assessment would cover the construction of the Mynydd-y-Glyn Wind Farm and its operation for a period of 30 years. The assessment process would reflect any iterative design mitigation measures adopted to reduce or 'design out' landscape and visual impacts throughout the operation period.

5.4.18 In accordance with the relevant EIA Regulations, it is important to determine whether the predicted effects are likely to be significant. Significant landscape and visual effects are highlighted in bold in the text and in most cases, relate to all those effects that result in a '**Substantial**' or a '**Substantial / Moderate**' effect as indicated in **Table 5.4**. 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 in **bold** and explained as part of the assessment, where they occur.

5.4.19 The type of effect is also considered and may be direct or indirect; temporary or permanent (reversible); cumulative; and positive, neutral or negative. The assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

Table 5.4 Evaluation of Landscape and Visual Effects

Magnitude of Change	Landscape and Visual Sensitivity			
	High	**Medium**	**Low**	**Negligible**
High	**Substantial**	**Substantial / Moderate**	**Moderate**	Slight
Medium	**Substantial / Moderate**	**Moderate**	Slight	Slight / Negligible
Low	**Moderate**	Slight	Slight / Negligible	Negligible
Negligible	Slight	Slight / Negligible	Negligible	Negligible

5.4.20 In line with the emphasis placed in GLVIA 3 upon application of professional judgement, the adoption of an overly mechanistic approach through reliance upon a matrix as presented in **Table 5.4** will be avoided. This will be achieved by the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor over and above the outline assessment provided by use of the matrix. Matrices for landscape and visual effects will be provided as a summary in support of the narrative explanations. Wherever possible cross references will be made to baseline figures and/or to photomontage visualisations to support the rationale.

Assumptions

5.4.21 The LVIA scoping chapter has been drafted on the overarching assumption that a 'reasonable worst-case' scenario is adopted which accords with the approach required under GLVIA3. An example is the assumption that receptors present at the more distant viewpoints benefit from optimal weather conditions that would facilitate views be available for the required distance to the site. Similarly, it is assumed that PRoWs and Access Land identified on Ordnance Survey maps are present on the ground and/or can be readily accessed by recreational receptors (and the LVIA assessors).

6. Historic Environment

6.1 Introduction

6.1.1 The Historic Environment is defined in Conservation Principles as[12]:

"All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and deliberately planted or managed".

6.1.2 This is represented by features, or assets, including buildings, archaeological remains and artefact scatters. Some historic assets have been designated as Scheduled Monuments, Listed Buildings or Conservation Areas, Register Park and Gardens, Historic Landscapes and Historic Battlefields. These and non-designated assets are managed in the planning process in accordance with national and local planning policy and guidance.

6.1.3 The historic environment assessment will consider the potential likely significant effects on heritage assets that may arise from the construction and operation and decommissioning of the Proposed Development, including cumulative impacts from other relevant developments in the area.

6.2 Policy, legislation and guidance

6.2.1 This Scoping Report chapter has been prepared in line with national policy as well as in accordance with published advice on the historic environment, including:

- Historic Environment (Wales) Act 2016.
- Planning Policy Wales (Edition 11, February 2021).
- Technical Advice Note 24: The Historic Environment, May 2017.
- Best-practice guidance issued by Cadw and the Chartered Institute for Archaeologists (CIfA):
  - Cadw. Heritage Impact Assessment in Wales, May 2017
  - Cadw. Setting of Historic Assets in Wales, May 2017
  - Cadw. Managing Historic Character in Wales, May 2017
  - CIfA. Standard and guidance for historic environment desk-based assessment, December 2014
  - CIfA. Standard and guidance for stewardship for the historic environment, December 2014

[12] Conservation Principles for the Sustainable Management of the Historic Environment in Wales, Cadw, Welsh Government, 2011, definitions p. 36

6.3 Baseline conditions

Data sources

6.3.1 An initial desk-based assessment has been undertaken, comprising data from the regional Gwent and Glamorgan Archaeological Trust Environment Record (GGAT HER), the National Monument Record (NMR) and records held by Cadw, in order to determine the present baseline conditions. This study will be reappraised and expanded as part of the EIA process.

6.3.2 Data has been collected for a study area extending 1km from the site boundary, and out to 10km for designated heritage assets as discussed further below.

6.3.3 The data provided by the GGAT HER include information on several different aspects of the historic environment including known surviving assets, records of former structures or sites found through documentary evidence and findspots of artefacts. Due to the range of data included within the GGAT HER these records must be considered not only for their historical value but also for their archaeological potential. Many former assets may have already been entirely removed; findspots may indicate former activity but are not, in themselves, evidence for buried archaeological remains. This consideration also takes into account any former archaeological events that may have occurred within the study area, for example archaeological monitoring or excavation, the data for which is also provided within the GGAT HER dataset (**Appendix 6.1**).

Current baseline

Designated historic assets

6.3.4 There are no designated historic assets located within the Site boundary. Thirteen Listed Buildings (LB) lie within the 1km study area. These are located to the north of the Site, at a distance of over 800m. No Scheduled Monuments (SM) or Registered Park and Garden (RPG), Conservation Areas, World Heritage Sites or Registered Battlefields are located within the 1km study area. All designated historic assets within the study area are listed in **Table 6.1**.

Table 6.1 Designated Historic Assets within the 1km study area

List Entry	Grade	Name	Location relative to site boundary
Listed Buildings			
Cadw 13119	II*	Former Lewis Merthyr Colliery lamproom and fan house	c.930m N
Cadw 13120	II*	Former Lewis Merthyr Colliery Bertie pithead, headframe, tram circuit and tippler	c.915m N
Cadw 13121	II*	Former Lewis Merthyr Colliery Trefor pithead and headframe	c,930m N
Cadw 13122	II*	Former Lewis Merthyr Colliery Trefor winding engine house	c.905m N
Cadw 13123	II	Former Lewis Merthyr Colliery fanhouse	c.940m N
Cadw 13124	II*	Former Lewis Merthyr Colliery Bertie winding engine house	c.885m N
Cadw 13129	II	Cymmer Independent Chapel (also known as Hen Capel Y Cymmer)	c.870m NW

List Entry	Grade	Name	Location relative to site boundary
Cadw 17110	II	Church of St John	c.750m NW
Cadw 17116	II	Former Empire Cinema	c.915m NW
Cadw 17117	II	Gateway to Welsh Hills Works	C.830m NW
Cadw 17118	II	Public Library	c.890m NW
Cadw 17126	II	Former Lewis Merthyr Colliery chimney	c.925m NE
Cadw 17127	II	Lower Eirw bridge	c.960m NE

6.3.5 The northern area of the Site lies within The Rhondda registered historic landscape. The Rhondda represents a rare and important historic landscape and as such is included in the national Register of Landscapes of Historic Interest in Wales: Part 2:2: Landscapes of Special Historic Interest (2001).

6.3.6 Between 1km and 5km from the Site there are eight Scheduled Monuments, the closest being Hetty Pit (Cadw 2257) at 1.67km from the Site to the north-east, one Registered Park and Garden at c.3km to the east, and seven Conservation Areas to the east, the closest being Troedrhiw-Trwyn at 1.95km. There are numerous listed buildings within 1km-5km.

6.3.7 All designated historic assets (with the exception of listed buildings) within the 1-5km study area are listed in **Table 6.2**.

Table 6.2 Designated Historic Assets within the 1-5km study area

List Entry	Grade	Name	Location relative to site boundary
Scheduled Monument			
Cadw 2257	-	Hetty Pitt	c.1670m NE
Cadw 2230	-	Pontypridd Bridge	c.3330m E
Cadw 3766	-	Ring cairn and standing stones	c.3830 E
Cadw 1487	-	Y Garreg Siglo Bardic Complex	c.3981 E
Cadw 2279	-	Carn-y-Wiwer Cairnfield and platforms	c.3730 N
Cadw 2891	-	Pen-y-Coedcae Roman Camp	c.2200 E
Cadw 315	-	Tarran Deusant Sculptured Rock and Spring	c.1890 SE
Cadw 3110	-	Lle'r Gaer	c.1850 SE
Historic Park and Garden			
GM3	II	Pontypridd: Ynysangharad Park	c.3130 E

List Entry	Grade	Name	Location relative to site boundary
Conservation Areas			
	-	Troedrhiw-Trwyn	c.1935m E
	-	Graigwen, Pontypridd	c.2805m E
	-	Taff, Pontypridd	c.3335m E
	-	Pontypridd Town Centre	c.2940m E
	-	Broadway, Treforest	c.3500m E
	-	Old Park Terrace, Treforest	c.3710m E
	-	Castle Square, Treforest	c. 3850m E
	-	Llantrisant	c. 4910m S

Non-designated historic assets

6.3.8 There are three records of non-designated historic assets located within the Site boundary, and these are listed in **Table 6.3**. There are a further 25 HER records within a 1km study area (**Appendix 6.1**).

Table 6.3 Non-designated historic assets located within the site boundary

HER Ref	Name	Easting	Northing	Period	Type
GGAT01740m	Hafod, Rhiwgarn	302590	189730	Medieval	Long Hut
GGAT08528m	Trig Pillar (TP5050), Mynydd-Y-Glyn (intact)	303585	189448	Modern	Triangulation Point
GGAT08529m	Trig Pillar (TP10087), Mynydd-Y-Glyn (destroyed)	303585	189449	Modern	Triangulation Point

Overview of site history

6.3.9 The northern part of the Site is also within the GGAT historic landscape character area (HLCA) *035: Mynydd-y-Glyn Mountain or upland sheepwalk, relict upland agricultural and industrial landscape with modern reclamation and forestation*. The historic landscape area of Mynydd-y-Glyn is an area of upland landscape, predominantly located outside the designated boundary of the Rhondda Special Historic Landscape. A significant proportion of the area has been heavily exploited for coal tipping and was formerly characterised by industrial features, such as old quarries (1st edition OS 1884) and the extensive tips, now reclaimed, connected by a tramway incline (with engine house) to Coedcae Colliery (2nd edition OS 1900), later Lewis Merthyr Consolidated Collieries (1921 edition OS map), at Hafod in the valley below. Other quarries and tips are indicated in the area above Glynfach.

6.3.10 The GGAT HER includes several historic asset records for the structures associated with Lewis Merthyr colliery, as well as further colliery, quarry and rail structures in the area, highlighting the industrial history of the area.

6.3.11 Earlier features recorded on OS mapping are primarily associated with the use of the area as upland sheepwalk and include post-medieval sheepfolds and upland boundaries of drystone and post-and-wire construction.

6.4 Scope of the assessment

Potential receptors

6.4.1 The Proposed Development could affect the historic environment through:

- Direct disturbance of historic assets;
- Changes to the settings of historic assets, affecting their significance; and
- Changes to historic landscape.

Direct disturbance

6.4.2 Any effects arising from direct disturbance to historic assets would be expected to occur during the construction phase and are permanent and irreversible but restricted to the footprint of the Proposed Development.

6.4.3 Direct disturbance would arise only from physical disturbance caused by the construction of the Proposed Development. Therefore effects on known historic assets will be considered only where these are located within the footprint of the Proposed Development. Direct effects on historic assets outside the footprint of the Proposed Development will not occur and are scoped out.

6.4.4 There is a potential for previously unrecorded historic assets to be directly affected by the Proposed Development. Such effects will be considered with reference to a characterisation of the potential presence of such historic assets developed from an understanding of the historic landscape context, and reference to appropriate cartographic and documentary sources.

Effects on setting

Changes to setting

6.4.5 The setting of heritage assets is defined in Cadw guidance as[13]:

"The setting of a historic asset includes the surroundings in which it is understood, experienced and appreciated, embracing present and past relationships to the surrounding landscape".

6.4.6 Cadw guidance identifies a staged approach to the assessment of effects on settings, with the first stage being the identification of the historic assets which may be affected. In accordance with guidance, this has been done with reference to the Zones of Theoretical Visibility (ZTV) (LVIA **Figures 5.2** and **5.3**) and also considering:

- the location, size and scale of the proposed development; and
- the location of the identified historic assets.

6.4.7 On this basis, designated assets within 5km of the Site boundary which fall within the initial ZTV will be included in the assessment. At distances of 5-10km only the most sensitive and significant

[13] Cadw 2017 Setting of Historic Assets in Wales

historic assets which fall within the initial ZTV have the potential to be significantly affected. Significant effects in these cases are only likely to occur where the proposed turbines will intervene in specific views that make a substantial contribution to the significance of an asset.

6.4.8 As a minimum the EIA will include an assessment of effects on the settings of the following historic assets:

- Troedrhiw-Trwyn Conservation Area.
- Castellau House (Cadw 13503).
- Castellau Congregational Chapel (23948).
- Trferig Isha (24276).
- Pant y Ddraenan (24280).
- Llanilid (24277).
- Trealaw Chapel Cemetery (18268) and associated monuments (18269, 18270, 18271).

Historic landscape

6.4.9 As the northern area of the Site lies within The Rhondda registered historic landscape there is potential for effects on this landscape as a result of physical and visual impacts. As such, the methodology of the Assessment of the Significance of the Impact of Development on Historic Landscapes (ASIDHOL) will be required, which is the staged process for assessing the significance of the impact of development on historic landscape areas on the Register.

Likely significant effects

6.4.10 The likely significant historic environment effects that will be taken forward for assessment in the Environmental Statement are summarised in **Table 6.4**.

Table 6.4 Likely significant historic environment effects

Activity	Effect	Receptor
Construction: **Site preparation and construction of associated infrastructure (tracks, control buildings / sub-stations, contractors' facilities, site access and electrical cabling).**	Direct disturbance to, or loss of, historic assets located within the development footprint.	Historic assets located within the site boundary, including those identified in Table 6.2, The Rhonda registered historic landscape, GGAT historic landscape character area (HLCA) 035: Mynydd-y-Glyn Mountain, and any currently unidentified assets.
Construction and Operation: **Turbine erection and operation.**	Changes to the significance of assets through change to their settings.	Historic assets and historic landscape assets which fall within the ZTV as listed above.

6.4.1 The effects scoped out from further assessment in the Environmental Statement are:

- All other designated historic assets – it is considered that due to a combination of location, distance, intervening topography and the nature of the assets themselves, there are no other historic assets whose settings would be significantly affected by the Proposed Development.

6.4.2 Measures to avoid known assets, including any identified during the assessment, and to identify and record any assets where disturbance cannot be avoided, will be set out to ensure that adverse direct effects can be effectively mitigated.

6.5 Assessment methodology

Direct disturbance

6.5.1 An historic environment desk-based assessment will be undertaken, including a description of known historic assets and a discussion of the potential for further, as yet unknown, historic assets.

6.5.2 The desk-based study will include relevant records and sources of information held at the following repositories:

- Cadw, for designated asset data;
- the Glamorgan Gwent Archaeological Trust Historic Environment Record (GGAT HER);
- the National Monument Record (NMR), RCAHMW;
- the National Library of Wales; and
- Gwent Archives.

6.5.3 Relevant published sources and internet sources will also be consulted.

6.5.4 A site visit to support the desk-based assessment will also be undertaken. This will involve walking over the Proposed Development site as well as visiting key assets that may experience indirect effects.

6.5.5 The assessment will identify the potential direct and indirect effects of the Proposed Development on historic assets. Information within a 500m study area will be used to inform the archaeological potential of the site. Indirect effects on designated assets will be considered primarily within 5km of the site boundary, as discussed in paragraph 6.3.7.

6.5.6 A final list of assets with the potential to be subject to indirect effects will be established with reference to calculated ZTVs, wireframe and photomontage visualisations as appropriate. Consultation will be held with Cadw to ensure that potential receptors and effects are appropriately assessed.

6.5.7 The assessment will determine the significance of historic assets within the Site boundary and the contribution of setting to that significance, in accordance with guidance provided by Cadw in The Setting of Historic Assets in Wales (2017) and Conservation Principles (2011).

6.5.8 The EIA will include a description of the research undertaken and results obtained, as well as an assessment of the nature and potential significance of the effects of the Proposed Development. Consideration will be given to any necessary mitigation, following consultation with the Applicant and consultees. All work will be completed in accordance with the Chartered Institute for Archaeologists (ClfA) Code of Conduct and Standard and Guidance for Archaeological Desk-Based Assessments.

Determining the significance of effects

6.5.9 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation

or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are "*likely to be significantly affected by the development*".

6.5.10 The EIA Regulations do not define significance and it will be necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect as set out in **Table 6.7**. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.

6.5.11 For the purposes of assessing the significance of effects in EIA terms, heritage significance has also been assigned to one of four classes, with reference to the heritage interests described in Conservation Principles and relying on professional judgement as informed by policy and guidance. The hierarchy given in **Table 6.5** reflects the TAN24 distinction between designated and non-designated heritage assets. The TAN24 further distinguishes between designated assets of the highest heritage significance (i.e. scheduled monuments, protected wreck sites, Registered Battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites) and other designated heritage assets. **Table 6.5** details the basis for assessing receptor value (heritage significance).

Table 6.5 Establishing the heritage significance of assets

Heritage significance	Summary rationale	Examples
High	Asset has significance for an outstanding level of archaeological, architectural, historic and/or artistic interest	All designated heritage assets or non-designated assets of demonstrably schedulable quality
Medium	Asset has significance for a high level of archaeological, architectural, historic and/or artistic interest	Locally listed buildings and buildings of merit. Regionally significant non-designated historic assets of archaeological interest.
Low	Asset has significance for elements of archaeological architectural, historic or artistic interest	Locally-significant historic assets of archaeological interest and important hedgerows
Negligible	Due to its nature of form/condition/survival, cannot be considered as an asset in its own right	Non-extant Historic Environment Record (HER) references

6.5.12 **Table 6.6** details the basis for assessing magnitude of change.

Table 6.6 Establishing the magnitude of change

Magnitude	Criteria
High	Loss of significance of an order of magnitude that would result from total or substantial demolition/disturbance of a heritage asset or from the disassociated of an asset from its setting.
Medium	Loss of significance arising from partial disturbance or inappropriate alteration of asset which will adversely affect its importance. Change to the key characteristics of an asset's setting, which gives rise to harm to the significance of the asset but which still allows its archaeological, architectural or historic interest to be appreciated.
Low	Minor loss to or alteration of an asset which leaves its current significance largely intact. Minor and short-term changes to setting which do not affect the key characteristics and in which the historical context remains substantially intact.
Negligible	Minor alteration of an asset which does not affect its significance in any discernible way. Minor and short term or reversible change to setting which does not affect the significance of the asset.

6.5.13 The matrix in **Table 6.7** has been prepared to guide the assessment of whether effects on the historic environment for the purposes of EIA are to be considered significant or not. The classification of the effect is judged on the relationship of the magnitude of impact to the assessed heritage significance of the resource. As a general rule, major and moderate effects (shaded in **Table 6.6**) are considered to be significant and minor and negligible effects are considered to be not significant. However, professional judgement is applied, where appropriate, to determine significance of effect.

Table 6.7 Significance evaluation matrix

		Heritage significance of receptor			
		Negligible	**Low**	**Medium**	**High**
Magnitude	**Negligible**	Negligible	Negligible	Minor	Minor
	Low	Negligible	Minor	Minor	**Moderate**
	Medium	Minor	Minor	**Moderate**	**Major**
	High	Minor	**Moderate**	**Major**	**Major**

Assumptions

6.5.14 No assumptions have been made with respect the scope of the Historic Environment assessment.

7. Biodiversity

7.1 Introduction

7.1.1 This chapter describes the proposed scope of the assessment of effects with respect to biodiversity arising from the Proposed Development. The biodiversity assessment will consider the potentially significant effects on terrestrial and freshwater habitats and legally protected and notable species (birds are considered separately under Ornithology (**Chapter 8**).

7.1.2 This chapter describes:

- The biodiversity policy and legislative context.
- Baseline conditions, including data sources.
- Potential ecological features and likely significant effects of the development on biodiversity.
- The proposed assessment methodology.

7.2 Policy and legislation

7.2.1 The policy and legislation relevant to the biodiversity assessment is detailed in **Table 7.1**. Further information on policies relevant to the EIA and their status is set out in **Chapter 3: Legislation and planning policy overview**, which should be read in conjunction with this chapter.

Table 7.1 Policy and legislation relevant to biodiversity assessment

Legislation/Planning policy	Description
Legislation	
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	The Habitat Regulations transpose the Habitats Directive[14] into English and Welsh law. The regulations provide for the designation and protection of European sites, the protection of certain species (referred to as European Protected Species or EPS) and the adaptation of planning and other controls for the protection of European sites
The Environment (Wales) Act 2016	The Act makes provisions within Wales for the planning and managing of natural resources at national and local level. Section 6 of the Act introduces the biodiversity and resilience of ecosystems duty whereby public authorities are required to seek to maintain and enhance biodiversity so far as it is consistent with the proper exercise of those functions. Section 7 of the Act introduces a list of living organisms and types of habitat in Wales, known as Species or Habitats of Principal Importance, which in Wales are considered of key significance to sustain and improve biodiversity.
The Wildlife And Countryside Act 1981 (as amended) (WACA)	This act consolidates and amends existing national legislation to implement the Bern Convention[15] This piece of legislation remains the primary UK mechanism for statutory site designations (e.g. Sites of Special Scientific Interest, SSSI) and the protection of individual species listed under Schedules 5 and 8 of the Act, each subject to varying levels of protection.

[14] Council Directive 92/43/EEC on the Conservation of natural habitats and wild flora and fauna, May 1992
[15] The Convention on the Conservation of European Wildlife and Natural Habitats, 1982

Legislation/Planning policy	Description
Countryside & Rights of Way Act 2000	This act details further measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation.
The Hedgerows Regulations 1997	The Hedgerows Regulations is intended to protect important countryside hedges from damage or destruction.
Protection of Badgers Act 1992	The Protection of Badgers Act provides protection to badgers and their places of shelter (setts).
Policy	
Future Wales; National Development Framework 2021	The Welsh national development framework sets the direction for development in Wales to 2040, and includes a Habitats Regulations Assessment. Policy 9 – Resilient Ecological Networks and Green Infrastructure outlines measures to ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure.
Planning Policy Wales – Chapter 6 Distinctive and Natural Places (11th Ed.; 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government's objectives for Distinctive and Natural Places theme of planning policy topics covers historic environment, landscape, biodiversity and habitats, coastal characteristics, air quality, soundscape, water services, flooding and other environmental (surface and sub-surface) risks. In particular, the Biodiversity and Resilience of Ecosystems section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by Natural Resources Wales.
Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009)	Welsh Governments (WG) policy on positive planning for nature conservation and developments affecting designated sites and habitats, along with protected priority habitats and species.
Rhondda Cynon Taf Local Development Plan (LDP) up to 2021 (Adopted 2011)	The LDP identifies where allocations for new developments such as housing, employment, community facilities, and roads have been made. It provides a framework for local decision making and brings together both development and conservation interests to ensure that any changes in the use of land are coherent and provides maximum benefits to the community.
Rhondda Cynon Taf Supplementary Planning Guidance (SPG) Nature Conservation 2011	The Rhondda Cynon Taf Supplementary Planning Guidance (SPG) on Nature Conservation was produced in 2011 and provides additional guidance to support the Local Development Plan (LDP) policies. The purpose of the SPG is to assist those submitting and determining planning applications in Rhondda Cynon Taf to ensure that nature conservation is protected and conserved when development is proposed.
Rhondda Cynon Taf Biodiversity Action Plan (Action for Nature) 2000 (updated 2008)	The national strategy for biodiversity is delivered at local level via Local Biodiversity Action Plans (LBAP). Rhondda Cynon Taf LBAP (Action for Nature) is the driver to protect, enhance and manage the biodiversity resource, by setting out objectives, targets and actions for the conservation of biodiversity within Rhondda Cynon Taf.

7.3 Baseline conditions

Data sources

7.3.1 The biodiversity assessment in the EIA will be based on industry-standard best-practice guidance including:

- CIEEM (2019)[16] Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine (updated September 2019) Edition [online]. Available at:

[16] The CIEEM guidelines were published in September 2018 and updated September 2019, hereafter referenced as CIEEM 2019

https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.1.pdf. Accessed 29.04.20.

- Joint Nature Conservation Committee (2010) Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit; JNCC, Peterborough.
- Collins J., (2016) Bat Surveys for Professional Ecologists. Good Practice Guidelines (3rd Edition). Bat Conservation Trust, London;
- SNH, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust (BCT) (2019). Bats and Onshore Wind Turbines: Survey Assessment and Mitigation;
- Jones, P.S., Stevens, D.P., Blackstock, T.H., Burrows, C.R. and Howe, E.A. (2003) Priority Habitats of Wales – A Technical Guide; and
- Countryside Council for Wales (2010) Assessing the Impact of Windfarm Developments on Peatlands in Wales.

7.3.2 Given the potential for the Proposed Development to affect biodiversity resources located off – as well as on-site, a desk study was undertaken in April 2020 to obtain the following data:

- European protected sites within 10km, or downstream of the Site boundary;
- SSSIs within 2km, or downstream of the Site boundary;
- Other statutory and non-statutory sites designated for their nature conservation interest within 2km;
- Protected species, species of principal importance[17] for the conservation of biodiversity, or other conservation-notable species recorded within 2km;
- Habitats of principal importance[3] for the conservation of biodiversity, or other conservation-notable habitats recorded within 2km; and
- Records for bat roosts within 10 km.

Table 7.2 Sources of desk study data

Data	Data source
Statutory biodiversity sites	South East Wales Biological Records Centre (SEWBReC), Joint Nature Conservation Committee (JNCC) and the Multi-Agency Geographic Information for the Countryside (MAGIC) website[18]
Non-statutory biodiversity sites	Rhondda Cynon Taf County Borough Council Ecologist
Ancient woodland	SEWBReC and the Multi-Agency Geographic Information for the Countryside (MAGIC) website.
Records for priority species	SEWBReC

[17] Species (or habitats) of "*principal importance for the conservation of biodiversity*" are those listed by Welsh Government pursuant to Section 7 of the Environment (Wales) Act 2016. They are referred to as 'Section 7' habitats or species.
[18] Magic www.magic.gov.uk (accessed 7 April 2021)

Data	Data source
Ponds – (potential great crested newt (*Triturus cristatus*) breeding habitat	The geographical context of the Site was examined using the relevant Ordnance Survey 1:10 000 scale maps and freely available satellite imagery. These were used to identify key landscape features that may be important for great crested newts. In particular, the location and connectivity of ponds and other waterbodies within 500m of the Site to be determined.
Peat	UK Soil Observatory Map Viewer http://mapapps2.bgs.ac.uk/ukso/home.html

Current baseline

7.3.3 The existing ecological information for the site and current baseline is summarised in **Table 7.3**; the biodiversity data used in the preparation of this chapter has been sourced from:

- the 2020 desk study;
- an extended Phase 1 Habitat Survey of the Site undertaken in April and June 2020;
- a suite of bat survey work undertaken May 2020 to February 2021; and
- a reptile survey of the Site.

Table 7.3 Identified ecological features and summary of baseline conditions

Ecological feature / Survey	Survey / Data Sources	Last Surveyed	Summary of existing data / baseline
Statutory and Non-Statutory Sites	Desk study	May 2020	There are two SAC's within 10km of the Site boundary, Blackmill Woodlands SAC (9.5km from site) designated for its old sessile oak woods and Cardiff Beech Woods SAC (9.3km from site) designated for its Asperulo-Fagetum beech forest (Figure 4.1, **Appendix 7.1** Preliminary Ecological Appraisal (PEA)). There are two SSSI's within 2km; Nant Gelliwion Woodland SSSI (1.2km from site) designated for its mixed deciduous woodland and Rhos Tonyrefail SSSI (448m from the Site) designated for its grassland habitats, wet heath and blanket mire and population of marsh fritillary butterflies. (Figure 4.2, **Appendix 7.1** Preliminary Ecological Appraisal (PEA)). There are six Sites of Importance for Nature Conservation (SINC's) within 2 km of the Site; Mynydd y Glen, upland peat bog (within the Site), Bronwydd Woods, ancient woodland (1km from site), Trebanog Slopes, notable habitat mosaic, (158m from site), The Glyn, woodland and grassland habitats (632m from site), Tonyrefail East, woodland and grassland habitats (1km from site) and Mynydd Gelliwion and Gellwion Slopes, bog, grassland and woodland mosaic (within the site)(Figure 4.3, **Appendix 7.1** Preliminary Ecological Appraisal (PEA)).

Ecological feature / Survey	Survey / Data Sources	Last Surveyed	Summary of existing data / baseline
Habitats / extended Phase 1 Survey	Desk study/ extended Phase 1 survey	July 2020	Acid semi-improved grassland is the dominant habitat on site. Other habitats found at the Site include poor semi-improved grassland; dry heath/acid grassland; wet heath/acid grassland; blanket bog, continuous bracken; dense and scattered scrub; broad-leaved woodland – plantation and bare ground.
Bats	Desk study/ extended Phase 1 survey. The extended Phase 1 Survey conducted an assessment as to whether trees and buildings on-site have the potential to contain features which could be used by bats to roost and whether the Site is likely to provide an important foraging resource for a significant population of bats. A suite of bat survey work completed between April 2020 and February 2021 within the bat survey area (site boundary +266m buffer), this includes: Built structures: external inspection surveys (where access allowed) for roosting bats Trees: ground level roost assessment and winter potential roosting feature (PRF)/hibernation endoscope inspection of trees with high level roosting potential Bat activity surveys: manual transects, two walked transect routes were completed monthly between May and October. Bat activity surveys: automated detectors, six automated detectors recorded for ten nights in May, July and September (spring, summer, autumn) at provisional turbine locations.	February 2021	Full methods and results of the bat surveys undertaken to date are provided in the Interim Bat Survey Report (**Appendix 7.2**). At least 12 species of bats have been recorded within 10km of the Site, activity records for common pipistrelle, soprano pipistrelle, noctule and long-eared bat species, have been recorded within 1km of the Site, with roosts for common pipistrelle, Pipistrellus Species and Unidentified Bat Species recorded within 1km of the Site. The habitats are considered to provide moderate suitability to support foraging and commuting bats with a mosaic of semi-improved acid grassland, dry and wet heath and bog with continuous bracken with bordering scrub and broadleaved woodland and off-site conifer plantation at the boundary. Built structure surveys for roosting bats identified four buildings with bat roosting potential (one with high roosting potential, one with moderate roosting potential and one with low roosting potential) all of which were outside the site boundary. Tree surveys for roosting bats within the bat survey area identified two trees with high potential and 11 trees with moderate potential to support roosting bats, no roosts were found. Activity surveys identified at least seven species of bat are using the Site, (common pipistrelle, soprano pipistrelle, noctule, long-eared bats, Myotis species, and lesser and greater horseshoe bats). Low levels of activity (as classified by Ecobat) were recorded for the Annex II species lesser and greater horseshoe bats. Common pipistrelle, soprano pipistrelle and noctule are the species recorded on site with higher risk for collision with turbines, the automated surveys and subsequent Ecobat analysis indicates that activity levels for common pipistrelle are categorised as 'Moderate to High', soprano pipistrelle ' Low to Moderate' and Noctule 'Moderate'.
Otter	Desk study/ extended Phase 1 survey. The extended Phase 1 Survey visited watercourses on and adjacent to the Site, employing standard searches for field signs.	May 2020	The desk study returned five records of otter within 2km of the Site boundary with the nearest ~974m away, no evidence of otter was recorded at the time of the extended Phase 1 survey. There are several narrow slow flowing watercourses across the Site, and two waterbodies present within

Ecological feature / Survey	Survey / Data Sources	Last Surveyed	Summary of existing data / baseline
			the boundary. The watercourses have limited potential to support otter commuting and resting sites and do not offer potential holt creation given the open nature of the Site and lack of mature trees on the banks.
Water vole	Desk study/ extended Phase 1 survey. The extended Phase 1 Survey visited water courses on and adjacent to the Site employing standard searches for field signs, but also considered the wider site as this species can be less dependent on water courses in upland environments.	May 2020	There were no records of water vole returned within 2km of the Site boundary. The watercourses within the Site offer low suitability for water vole being not more than ~50cm in height with water levels unstable. There is also limited connectivity to the wider network of ditches/watercourses and very few opportunities for above ground nesting sites. Water vole are not considered further in this chapter and will be scoped out from detailed assessment in the EIA.
Great crested newts	Desk study/ extended Phase 1 survey/eDNA surveys. 20 ponds within the Site and 500m of the Site were sampled through eDNA surveys.	April 2020	Full methods and results of the great crested newt (GCN) surveys undertaken to date have been provided in the PEA report (**Appendix 7.1**). There were no records of great crested newt (GCN) found within 2km of the Site boundary. The habitats on the Site, including tussocky/rough grassland, heath and woodland provides suitable terrestrial habitat for GCN, however the intensive grazing, topography and open, exposed landscape reduce suitability for the species. Four waterbodies were identified within 500m of the Site during the desk study and extended Phase 1 survey. All waterbodies were assessed using the Habitat Suitability Index (HSI) scoring system, two were dry, one was classed Below Average and one classed as Average suitability to support GCN. Environmental DNA (eDNA) surveys for GCN presence/absence were undertaken on all accessible waterbodies supporting water. All samples returned negative for GCN. GCN are not considered further in this chapter and will be scoped out from detailed assessment in the EIA.
Badgers	Desk study/ extended Phase 1 survey. Searches for evidence of badgers were undertaken during the extended Phase 1 habitat survey.	February 2021	The desk study returned no records of badger within 2km of the Site. The habitats present on and adjacent to the Site comprising open grassland, heath, woodland, and scattered/continuous scrub have the potential to support badger foraging, sett building and commuting. No evidence of badger setts or activity was recorded on-site or within 30m of its boundary during the extended Phase 1 habitat survey. Badger are not considered further in this chapter and will be scoped out from detailed assessment in the EIA.

Ecological feature / Survey	Survey / Data Sources	Last Surveyed	Summary of existing data / baseline
Reptiles	Desk study/ extended Phase 1 survey. The extended Phase 1 Survey assessed the Site and its surrounds for their potential to provide sheltering, foraging and breeding habitats for reptile species. A seven-visit presence/absence survey for reptiles was carried out between May and September 2020 in the areas of habitat that were highlighted during the extended Phase 1 survey to have the potential to support reptiles.	September 2020	Records for common lizard and grass snake were identified within 2km of the Site with the nearest record for both species being 647m of the Site. Common lizard was observed within the Site during the ornithology surveys and suitable habitat for reptile foraging, refuging and hibernation was recorded across the Site. During the presence/absence survey grass snake, common lizard and slow worm were recorded in suitable habitat within the Site boundary with results indicating the presence of a low population of slow worm and grass snake and a good population of common lizard.
Marsh Fritillary	Desk study/ extended Phase 1 survey.	July 2020	The desk study returned 32 records of marsh fritillary within 2km of the Site, the closest being 523m to the west. The majority of the Site is considered to provide unsuitable habitat for marsh fritillary, being heavily grazed with short sward grassland and an absence of devil's bit scabious. Small areas of longer sward grassland are present within the Site that are subject to less intensive grazing which provide more suitable habitat for this species however no devil's bit scabious has been identified in these areas during survey in May and July. Marsh fritillary are not considered further in this chapter and will be scoped out from detailed assessment in the EIA.
Section 7 priority species	Desk study and extended Phase 1 survey.	May 2020	The desk study identified nine notable invertebrate species within 2km of the Site including the small pearl bordered fritillary and small heath within the Site. The desk study identified hedgehog (990m) and polecat (1535m) within 2km of the Site. The majority of the Site is heavily grazed providing limited suitability for notable invertebrates, areas of suitable habitat for Section 7 invertebrate species recorded in the desk study are restricted to the areas of heath, pockets of less intensely grazed grassland and blanket bog. The upland site with limited hedgerow, scrub and tree cover is considered to have low suitability for hedgehog and polecat.
Peat	Desk study and extended Phase 1 survey	May 2020	The desk study reported in **Chapter 10: Ground Conditions** identified that limited areas of peat are recorded in a band which runs east-west through the central part of the site and in areas of blanket bog and marshy grassland.

Baseline surveys

7.3.4 The biodiversity field survey programme has been designed to provide sufficient information on legally protected and conservation notable species, and the general status and condition of all habitats within the study area.

7.3.5 The study area comprises the land within the Site and additional areas of search that were determined based on best practice guidance, and a high level overview of the types of ecological features present and the potential effects that could occur. The search areas were defined on a precautionary basis to ensure that the Zone of Influence (ZoI)[19] relevant to each ecological feature was covered during baseline data collection activities. As the design process is iterative the study area will be regularly reviewed to ensure that its extent is adequate to enable the assessment of likely significant effects on the ecological features identified.

7.3.6 The field data will provide the basis for a robust EcIA[20] to be undertaken for the Proposed Development. **Table 7.4** provides further information on the survey programme.

Table 7.4 Ecological features and potential survey scope

Receptor / Survey	Proposed Scope of Survey
Desk Study	Desk study completed May 2020.
Extended Phase 1 Survey	Survey complete May 2020. The Phase 1 habitat survey outlined the Site is predominantly heavily grazed semi-improved acid grassland habitats, with pockets of poor semi-improved grassland and areas of dry and wet heath/acid grassland and blanket bog present. The desk study returned records of possible unimproved acid grassland at the site from NRW's remote sensed phase 1 layer. Unimproved grassland habitat was not recorded at the time of survey with habitats identified as semi-improved acid grassland. The habitats on Site are not considered to support rare communities of plants and the Phase 1 survey and botanical update are considered suitable to accurately identify the presence and status of any Section 7 priority habitats.

[19] The ZoI in this context is the area over which an individual ecological feature may be subject to a potentially significant effects resulting from changes in the baseline environment due to the Proposed Development.
[20] Ecological Impact Assessment

Receptor / Survey	Proposed Scope of Survey
Bats	**Roost surveys** Between May 2020 and February 2021 built structure external inspection surveys and tree ground level roost assessments and winter PRF/hibernation endoscope inspections have been completed within the bat survey area. These surveys have identified the roosting potential of trees and built structures and established whether they support hibernation roosts. Roost surveys in 2021 will focus on establishing the presence of roosts within moderate and high potential trees and low to high potential-built structures within the bat survey area. Where access allows built structures will be subject to dusk emergence survey visits between May and September 2021 following the Bat Conservation Trust (BCT) third edition of Good Practice Guidelines. Due to the very remote nature of the site dawn surveys are excluded on the basis of health and safety and safe access to survey locations prior to dawn. Where access allows trees will be subject to a PRF inspection using an endoscope and torch, once during the summer period (May-September) in 2021. The full rationale for the roost survey scope is detailed in Section 6 of the Interim Bat Survey Report (**Appendix 7.2**) **Bat activity surveys** The automated detector and manual transect surveys completed between May and October 2020 have allowed for the identification of the bat species using the site and provide an index of bat activity to understand the value of site for bats and potential collision risk. Additional automated detector surveys are being undertaken at all proposed turbine locations between April and June 2021, completing 10 days monitoring in each month to provide activity data where proposed turbine locations have moved since monitoring was undertaken and to confirm activity/collision risk and inform the mitigation design. The full rationale for the activity survey scope is detailed in Section 6 of the Interim Bat Survey Report (**Appendix 7.2**).
Otter	A number of small watercourses were identified within, and within ~250m of the Site boundary. A detailed assessment of these watercourses is required to confirm the presence/likely absence of otter.
Reptiles	Reptile surveys have been undertaken to establish the distribution of reptiles across the Site comprising seven visits during between May and September under suitable weather conditions. The presence of common lizards, grass snake and slow worms which are common and widespread species of reptiles is unlikely to pose a significant constraint to the development, primarily because the development would have a small footprint and would therefore only directly affect a small area of habitat likely to be used by these reptile species. Seven visits has allowed for reptile distribution to be established to inform sensitive scheme design, the mitigation approach and sufficient to inform the impact assessment. No further surveys are proposed.
Section 7 priority species	Specific surveys for Section 7 species will not be undertaken unless the scheme is likely to affect sensitive habitats in areas previously avoided. The footprint of the development is likely to be small compared to the area of habitat involved, and should it be possible to micro-site the turbines away from the more valuable habitats (i.e. to locate them within areas of improved grassland). The desk study results, extended Phase 1 and habitat-based assessment is considered sufficient to inform the assessment for these species.
Peat	As detailed in **Chapter 10: Ground Conditions** a further Phase 1 peat walkover survey will be completed, the results of which will determine the requirement for further detailed peat surveys.

7.4 Scope of the assessment

Potential ecological features

7.4.1 The starting point for defining which ecological features[21] will be taken forward to the detailed assessment stage will be to use the baseline data be collected through the desk study and field surveys to determine which of the identified ecological features are 'important' at the level of the project. Following CIEEM (2019) guidance, the importance of ecological features will be determined using a geographic scale and described in relation to UK legislation and policy, and with regard to the extent of habitat or size of population that may be affected by the Proposed Development.

7.4.2 The importance of ecological features can therefore differ from that which would be conferred solely by legislative protection or identification as a conservation notable species. For example, a small length of hedgerow (a Section 7 habitat), even if deemed to be 'important' with regard to the Hedgerow Regulations, is unlikely to be considered to have greater than 'local' importance due to the extent of this habitat type across a given county.

7.4.3 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features will be used to inform the categorisation and determine importance at the project level. Where detailed criteria or contextual data are not available, professional judgement will be used to determine importance. A justification of all determinations of importance are provided in **Table 7.5.**

Table 7.5 Importance of the Proposed Development for Ecological Features

Geographic context of importance	Description
International or European	• European sites including SPAs, SACs, candidate SACs and Sites of Community Importance (SCI). Potential SPAs (pSPA), and Ramsar sites (designated under international convention). • Areas of habitat or populations of species which meet the published selection criteria based on discussions with Natural England and field data collected to inform the EcIA for designation as a European site, but which are not themselves currently designated at this level.
National (UK context)	• A nationally designated site including SSSIs and National Nature Reserves (NNRs). • Areas (and the populations of species which inhabit them) which meet the published selection criteria guidelines for selection of biological SSSIs but which are not themselves designated based on field data collected to inform the EcIA, and in agreement with NRW. • Section 7 habitats and species, Red listed and legally protected species that are not addressed directly in Part 2 of the "*Guidelines for Selection of Biological SSSIs*" but can be determined to be of national importance using the principles described in Part 1 of the guidance. • Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.
Wales National / UK Regional	• Regularly occurring Section 7 habitats or populations of Section 7 species, Red listed and legally protected species may be of regional (Wales) importance in the context of published information on population size and distribution.

[21] The Chartered Institute for Ecology and Environmental Management (CIEEM) refer to biodiversity receptors within technical guidance as ecological features. This term is therefore used in this chapter in place of 'receptors' but for the purposes of the assessment they are the same.

Geographic context of importance	Description
County (Rhondda Cynon Taf)	• LNRs and Non-Statutory Designated sites including: SINCs of County Importance. • Areas which based on field data collected to inform the EcIA meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans) but which are not themselves designated.
Local	• Section 7 habitats and species, Red listed and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above. • Common and widespread semi-natural habitats occurring within the study area in proportions greater than may be expected in the local context. • Common and widespread native species occurring within the study area in numbers greater than may be expected in the local context.
Negligible	• Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. • Areas of heavily modified or managed land uses (e.g. hard standing used for car parking, as roads etc.)

7.4.4 Where protected species are present and there is the potential for a breach of the legislation, those species will be considered as 'important' features. With the exception of such species receiving specific legal protection, or those subject to legal control (e.g. invasive species), all ecological features determined to be important at negligible level will be scoped out of the assessment. Further, ecological features of local importance, where there is a specific technical justification, will also be scoped out. This is because effects on them would not influence the decision-making about whether or not consent should be granted for the development (in other words a significant effect in EIA terms could not occur). This approach is consistent with that described in CIEEM 2019.

7.4.5 All legally protected species and ecological features that are of sufficient importance will then be taken through to the next stage of the scoping assessment.

Likely significant effects

7.4.6 In accordance with the EIA Regulations 2017, the EIA for Mynydd y Glyn Wind Farm will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant effect.

7.4.7 **Table 7.6** outlines the ecological features affected, potential environmental changes and broad effects resulting from the Proposed Development, and are therefore being considered within this scoping assessment and will be taken forward for consideration in the EIA.

Table 7.6 Likely biodiversity effects requiring assessment

Activity	Effect	Ecological features
Construction		
Permanent or temporary land-take/changes to habitats	Degradation and/or loss of habitat (including through soil compaction). Reduction in the availability of foraging and commuting habitat and resting or breeding sites	Terrestrial habitat Terrestrial flora and fauna including otters and bats

Activity	Effect	Ecological features
	Killing or injury of fauna through the removal of occupied resting or breeding sites. Loss of ecological connectivity through severance of habitats resulting in fragmentation. Introduction or spread of invasive species.	Features of sites designated for nature conservation
Use of temporary lighting for security purposes or to illuminate construction working areas	Disturbance and displacement of fauna sensitive to lighting resulting in indirect loss of foraging and commuting habitat or resting or breeding sites. Disruption of the physiology of species reliant on natural day/night and seasonal light level changes resulting in loss of fitness and reduction in survival rates. Loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation.	Bats (various species) Otters Badgers Water vole
Introduction of aural and visual stimuli and vibration from construction activities such as vehicular movements, piling or site personnel	Disturbance and displacement of species susceptible to noise/visual disturbance resulting in a reduction of energy intake and/or an increase in energy expenditure potentially leading to a reduction in survival and productivity rates.	Bats (various species) Otters Badgers Water vole
Temporary hydrological changes (changes to sub-surface and surface water flows)	Changes to local hydrology resulting in changes or loss of surrounding habitats with subsequent effects on the fauna they support.	Terrestrial and freshwater habitat Terrestrial and freshwater flora and fauna including, otters and bats Features of sites designated for nature conservation
Creation of airborne particles (e.g. dust) during construction activities and vehicle movements	Loss or damage of sensitive flora through smothering resulting in effects on habitat composition and the fauna that it supports. Deposition of dust resulting in enrichment of sensitive HPIs, including those contained within statutory designated sites, leading to alteration of flora through changes in baseline conditions and the species which they support. Direct effects on invertebrates through ingestion or direct deposition on sedentary species.	Terrestrial and freshwater habitats (and supported fauna) Terrestrial Invertebrates Features of sites designated for nature conservation
Contamination of site run-off	The introduction of toxic pollutants or sediments into the environment resulting in changes, loss or damage to terrestrial or freshwater environments and the fauna they support.	Terrestrial and freshwater Habitats Associated flora and fauna Features of sites designated for nature conservation
Increase in vehicle movements and changes in movement patterns and timings during construction activities	Potential killing or injury of fauna through road traffic collisions.	Bats (various species) Otters Badgers

Activity	Effect	Ecological features
Operation		
Physical changes to the spatial environment	Potential killing or injury to fauna in flight, through direct collision with moving turbine blades or barotrauma.	Bats
Vehicle movements	Potential killing or injury of fauna through road traffic collisions.	Bats (various species) Otters Badgers
Temporary hydrological changes (changes to sub-surface and surface water flows)	Changes to local hydrology resulting in changes or loss of surrounding habitats with subsequent effects on the fauna they support.	Terrestrial and freshwater habitat Terrestrial and freshwater flora and fauna including, otters and bats. Features of sites designated for nature conservation
Use of lighting for security or aviation safety purposes	Disturbance and displacement of fauna sensitive to lighting resulting in indirect loss of foraging and commuting habitat or resting or breeding sites. Disruption of the physiology of species reliant on natural day/night and seasonal light level changes resulting in loss of fitness and reduction in survival rates. Loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation.	Bats (various species) Otters Badgers
Decommissioning		
As per construction phase		

Potential effects not requiring further assessment

7.4.8 The internationally designated sites Blackmill Woodlands SAC (9.5km from site) designated for its old sessile oak woods and Cardiff Beech Woods SAC (9.3km from site) designated as for its Asperulo-Fagetum beech forest and nationally designated site Nant Gelliwion Woodland SSSI (1.2km from site) designated for its mixed deciduous woodland will be scoped out of the EIA.

7.4.9 The distance between these designated sites and the Proposed Development, and the lack of hydrological connectivity (as outlined in **Chapter 9: Water Environment**), means that there is a lack of a clear effect pathway with regard to the habitats/ species for which sites have been designated. Therefore, it is not considered there will be significant impacts on the ecological interest of these designated sites (alone or cumulatively) as a result of the wind farm proposal. As such the internationally designated sites will also be scoped out at this stage from further consideration under Habitat Regulations Assessment (HRA), and it is not considered HRA screening or any other steps under the HRA process is required.

7.4.10 Rhos Tonyrefail SSSI (448m from the Site) designated for its grassland habitats, wet heath and blanket mire and population of marsh fritillary butterflies will be taken forward for detailed consideration in the EIA.

7.4.11 No other potential effects are scoped out at this stage. This will be further confirmed once the programme of baseline surveys has been completed and data have been analysed relative to the Proposed Development activities.

7.5 Assessment methodology

7.5.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4**, and specifically in Section 4.6. However, whilst this will inform the approach used in the biodiversity assessment, it is necessary to align with the standard industry guidance provided by CIEEM (2019).

7.5.2 The assessment will be based upon not only the results of the desk study and field surveys, but also relevant published information (for example on the status, distribution, sensitivity to environmental changes and ecology of the features scoped in to the assessment, where this information is available), and professional knowledge of ecological processes and functions.

7.5.3 For each scoped-in ecological feature effects will be assessed against the predicted future baseline conditions for that feature during construction, operation and decommissioning.

7.5.4 Throughout the assessment process, the initial results of the assessment regarding potentially significant effects will be used to inform whether additional baseline data collection is required, together with the identification of environmental measures that should be embedded into the development proposals to avoid or reduce adverse effects or to deliver enhancements.

7.5.5 Where part of a designated site is located within the ecological ZoI relating to a particular biophysical change as a result of the Proposed Development, an assessment will be made of the effects on the designated site as a whole. A similar approach will be taken for areas of notable habitat.

7.5.6 For species that occur within the ZoI, the assessment will consider the total area that is used by the affected individuals or the local population of the species (e.g. for foraging or as breeding territories).

Significance evaluation methodology

Overview

7.5.7 CIEEM (2019) defines a significant effect as one "*that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*".

7.5.8 When considering potentially significant effects on ecological features, whether these be adverse or beneficial, the following characteristics of environmental change are taken into account[22]:

- Extent – the spatial or geographical area over which the environmental change may occur;
- Magnitude – the size, amount, intensity or volume of the environmental change;
- Duration – the length of time over which the environmental change may occur;
- Frequency – the number of times the environmental change may occur;
- Timing – the periods of the day/year etc. during which an environmental change may occur;
- Reversibility – whether the environmental change can be reversed through restoration actions.

[22] The definitions of the characteristics of environmental change are based on the descriptions provided in CIEEM (2019). Other chapters in this ES may use some of the same terms albeit with a different definition.

Magnitude of change

7.5.9 Although the characteristics described above are all important in assessing effects by using information about the way in which habitats and species are likely to be affected, a scale for the magnitude of the environmental change, as a result of the Proposed Development, has been described in **Table 7.7** to provide an understanding of the relative change from the baseline position, be that adverse or beneficial changes.

Table 7.7 Guidelines for the Assessment of the Scale of Magnitude

Scale of change	Criteria and resultant effect
High	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a change in the level of importance of the receptor in the context of the project.
Medium	The change permanently (or over the long term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a change in the level of importance of this receptor in the context of the project.
Low	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability and they are not expected to result in any permanent change in the conservation status of the species/habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the receptor in terms of its importance.
Very Low	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species receptors or the integrity of designated sites.
Negligible	A change, the level of which is so low, that it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project and result in a neutral position.

Determining Significance - adverse and beneficial effects

7.5.10 Adverse effects are assessed as being significant if the favourable conservation status of an ecological feature would be lost as a result of the Proposed Development. Beneficial effects are assessed as those where a resulting change from baseline improves the quality of the environment (e.g. increases species diversity, increases the extent of a particular habitat etc., or halts or slows down an existing decline). For a beneficial effect to be considered significant, the conservation status would need to positively increase in line with a magnitude of change of "high" as described in **Table 7.7.**

7.5.11 Conservation status is defined as follows (as per CIEEM 2019):

- *"For habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and typical species within a given geographical area;*
- *For species, conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area".*

7.5.12 The decision as to whether the conservation status of an ecological feature would alter has been made using professional judgement, drawing upon the information produced through the desk study, field survey and assessment of how each feature is likely to be affected by the Proposed Development.

7.5.13 A similar procedure is used where designated sites may be affected by the Proposed Development, except that the focus is on the effects on the integrity of each site; defined as:

- *"The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified".*

7.5.14 The assessment of effects on integrity draws upon the assessment of effects on the conservation status of the features for which the site has been designated.

Approach to mitigation and compensation

7.5.15 The mitigation hierarchy will be applied to biodiversity (CIEEM 2019) to ensure designs first seek to avoid significant harm, to mitigate where it is unavoidable, and, as a last resort, to compensate for residual effects that remain after avoidance and mitigation measures are implemented. The avoidance of significant harm is being considered through the design process and potential mitigation measures associated with conservation notable and legally protected flora and fauna will also be actively considered. These measures include determining the extent and distribution of suitable habitats required within the development to account for the likely effects on legally protected (e.g. reptiles, bats etc.) and other conservation notable species, the types of habitats that they may require and how these can be incorporated within developing designs. As more information becomes available from the ongoing field survey programme and as the development design and construction phase plans develop mitigation plans will evolve.

7.5.16 In addition, the development will identify potential ecological enhancements that would be proportionate to the scheme and which would deliver ecological benefits commensurate to the wind farm. Such enhancements would be proposed following consultation with relevant stakeholders to ensure that any measures proposed were compatible with ongoing management of the Site.

8. Ornithology

8.1 Introduction

8.1.1 This chapter describes the proposed scope of the assessment of effects with respect to ornithology arising from the Proposed Development terrestrial and freshwater ecology are dealt with separately under **Chapter 7: Biodiversity**.

8.1.2 This chapter describes:

- The biodiversity policy and legislative context (with particular focus on ornithology).
- Baseline conditions, including data sources and the proposed approach for baseline data collection.
- Potential ornithological features and likely significant effects of the development on biodiversity.
- The assessment methodology and proposed approach to the assessment.

8.2 Policy and legislation

8.2.1 This section identifies the relevant policy and legislation which has informed the scope of the assessment presented in **Chapter 8: Ornithology**. Further information on policies relevant to the EIA and their status is set out in **Section 3: Legislation and planning policy overview**, which should be read in conjunction with this chapter. The policy and legislation relevant to ornithology is detailed in **Table 8.1**.

Table 8.1 Summary of policy and legislation relevant to the ornithology assessment

Legislation/Planning policy	Description
Legislation	
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019	The Habitat Regulations transpose the Habitats Directive[23] into English and Welsh law. The regulations provide for the designation and protection of European sites, the protection of certain species (referred to as European Protected Species or EPS) and the adaptation of planning and other controls for the protection of European sites.
The Environment (Wales) Act 2016	The Act makes provisions within Wales for the planning and managing of natural resources at national and local level. Section 6 of the Act introduces the biodiversity and resilience of ecosystems duty whereby public authorities are required to seek to maintain and enhance biodiversity so far as it is consistent with the proper exercise of those functions. Section 7 of the Act introduces a list of living organisms and types of habitat in Wales, known as Species or Habitats of Principal Importance, which in Wales which are considered of key significance to sustain and improve biodiversity.

[23] Council Directive 92/43/EEC on the Conservation of natural habitats and wild flora and fauna, May 1992

Legislation/Planning policy	Description
The Wildlife And Countryside Act 1981 (as amended) (WACA)	All birds and their nests are protected under the Wildlife and Countryside Act 1981 (as amended). Under the Act it is an offence to move, damage or destroy an active nest at any part of the nesting cycle. A subset of species are listed under Schedule 1 of the Wildlife and Countryside Act and are afforded additional levels of protection that include protection from disturbance.
Policy	
Planning Policy Wales – Chapter 6 Distinctive and Natural Places (11th Ed.; 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government's objectives for Distinctive and Natural Places theme of planning policy topics covers historic environment, landscape, biodiversity and habitats, coastal characteristics, air quality, soundscape, water services, flooding and other environmental (surface and sub-surface) risks. In particular, the Biodiversity and Resilience of Ecosystems section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by Natural Resources Wales. In this sense PPW now requires information of ecosystem resilience as well as protected and priority species as outlined by Section 6 and Section 7 of the Environment (Wales) Act 2016.
Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009)	Welsh Governments (WG) policy on positive planning for nature conservation and developments affecting designated sites and habitats, along with protected priority habitats and species.
Rhondda Cynon Taf Local Development Plan (LDP) 2011	The LDP is a land use document which sets out how the County Borough will be developed over 15 years (covering years 2006-2011). The LDP provides a framework for decisions on developments and how land is used within the County Boundary. The overall aim of the document is to provide a focus for sustainable regeneration and high-quality development and contribute to achieving progress and benefits for residents. One of the aims of the LDP is to protect the rich biodiversity and landscape of Rhondda Cynon Taf.
Action for Nature Local Biodiversity Action Plan for Rhondda Cynon Taff 2008	The national strategy for biodiversity is delivered at local level via Local Biodiversity Action Plans (LBAP). Rhondda Cynon Taff's LBAP is the driver to conserve and enhance the biodiversity resource, by setting out objectives, targets and actions for the conservation of biodiversity within Blaenau Gwent.

8.3 Baseline conditions

Data sources

8.3.1 Data was obtained via desk study in April 2020 for the following:

- European protected sites (Special Protected Areas (SPA) and Ramsar Sites) within 20km of the development area;
- National Statutory Sites (Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR) within 10km of the development area;
- Other statutory and non-statutory sites designated for their nature conservation interest within 2km;

- Protected species, Species of Principal Importance (SPI) for the conservation of biodiversity (as listed in Section 7 of The Environment (Wales) Act 2016) and species included on the Red List in Birds of Conservation Concern 4 (Eaton *et al* 2015)[24] within 2km.

8.3.2 Data for Statutory biodiversity sites and protected species was sought from South East Wales Biological Records Centre (SEWBReC), Natural Resources Wales (NRW) Designated Site Search[25], Joint Nature Conservation Committee (JNCC) and the Multi-Agency Geographic Information for the Countryside (MAGIC) website[26].

Table 8.2 Statutory and non-statutory sites within 10km and 2km of the Site that include birds as designated features or within their description

Site name	Type of designation	Designated features	Approximate distance (m) and direction from the Site
Nelson Bog	SSSI	Designated for its range and diversity of mire plant communities, the site also support a diverse assemblage of birds with more than 90 species recorded.	9,500 NE
Trebanog Slopes	SINC	There is excellent ffridd bird habitat. Species recorded include breeding whinchat, meadow pipits, skylarks, whitethroats, willow warbler, bullfinch, wren, blackbird, linnets, kestrel and buzzard.	158 N
The Glyn	SINC	A wooded valley and associated marshy grassland, which lies along the eastern edge of part of the Rhos Tonyrefail SSSI. The valley includes good bird habitat.	632 SW
Tonyrefail East	SINC	The SINC includes the upper section of the Nant Muchudd which supports dipper and grey wagtail.	1,017 SW
Mynydd Gelliwion and Gelliwion Slopes	SINC	Very large mosaic SINC which encompasses a range of habitats. Plantation forestry supports goshawk, siskin and crossbill. Connecting stream, river valleys and ponds support a diverse assemblage of birds.	1,000 E

Current baseline

8.3.3 There are no Special Protected Areas (SPAs) or Ramsar sites within 20 km of the Site boundary. **Table 8.2** provides descriptions of statutory and non-statutory sites within 10km and 2km, respectively, that include birds as part of the site description. No statutory sites were identified that are designated for birds specifically.

8.3.4 Using a search radius of 2 km, the desk study returned 65 records of notable[27] species (25 species) from the last 20 years. **Table 8.3** summarises these records.

[24] Eaton, M., Aebischer, N., Brown., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D, and Gregory, R. (2015) Birds of Conservation 4: The population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108, December 2015, 708-746

[25] 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 (accessed 28 April 2020)

[26] Magic www.magic.gov.uk (accessed 7 April 2020)

[27] Notable species includes all species included on the EU Birds Directive (Annex 1), Wildlife and Countryside Act 1981 (as amended) – Schedule 1, The Environment (Wales) Act – Section 7 and Birds of Conservation Concern 4 – Red List

Table 8.3 Summary of notable bird species records from the desk study

Species	Conservation Status	No. Records	Most Recent Record	Closest distance (m) and direction
Black-headed Gull	S7, BoCC Amber	1	2001	1,444 NW
Bullfinch	S7, BoCC Amber	8	2018	252 E
Common Crossbill	Sch 1, BoCC Green	1	2017	1,167 E
Cuckoo	S7, BoCC Red	5	2019	291 N
Dipper	BoCC Amber	8	2015	729 N
Dunnock	S7, BoCC Amber	2	2016	1,469 N
Golden Plover	S7, BoCC Green	2	2010	Within Site
House Sparrow	S7, BoCC Red	3	2016	783 E
Kestrel	S7, BoCC Amber	1	2015	657 NE
Meadow Pipit	BoCC Amber	3	2018	Within Site
Mistle Thrush	BoCC Red	3	2018	Within Site
Peregrine	Sch 1, BoCC Green	1	2010	203 W
Red Kite	Sch 1, BoCC Gren	3	2015	203 W
Redwing	Sch 1, BoCC Red	1	2010	203 W
Reed Bunting	S7, BoCC Amber	2	2014	523 W
Scaup	Sch 1, BoCC Red	1	2015	914 N
Skylark	S7, BoCC Red	3	2018	Within Site
Song Thrush	S7, BoCC Red	3	2011	545 E
Spotted Flycatcher	S7, BoCC Red	1	2017	1,159 S
Starling	S7, BoCC Red	1	2010	545 E
Tree Pipit	S7, BoCC Red	1	2004	647 W
Willow Tit	S7, BoCC Red	1	2015	657 NE
Willow Warbler	BoCC Amber	6	2015	545 E
Wood Warbler	S7, BoCC Red	3	2016	1,088 N
Yellowhammer	S7, BoCC Red	1	2013	1,049 SE

8.3.5 Baseline surveys started in April 2020 (see following subsection) have identified a number of notable species on the Site, including four species listed as Schedule 1 on the Wildlife and Countryside Act 1981 (as amended); common crossbill, hobby, merlin and red kite. Records of hobby and merlin were recorded during passage periods and are likely to represent migratory individuals passing through the Site.

8.3.6 The Site has also been found to support other notable species, including lesser redpoll, linnet, mistle thrush, skylark, song thrush and tree pipit which are all SPI and included on the Red list in BoCC 4.

Baseline surveys

8.3.7 The ornithological field survey programme has been designed to provide sufficient information on all legally protected species, SPI and all other conservation notable species. **Table 8.4** provides further information on the ornithological survey programme. Baseline surveys may identify requirements for additional species-specific surveys these will be considered and added to the programme as required.

Table 8.4 Summary of proposed baseline survey programme for ornithology

Receptor / Survey	Proposed Scope of Survey	Survey Timing
Breeding Bird Surveys – Territory Mapping	A breeding bird survey has been carried out following an adapted method based on the British Trust for Ornithology's (BTO's) Common Bird Census (CBC) methodology (Gilbert et al., 1998[28]). Six survey visits (one in late-March, two in April [early to mid-month and late in the month], two in May [at broadly two week intervals from the late April visit], and an early-mid June visit) have been carried out within the Site boundary with coverage of an additional 100m buffer. The Site has been subdivided into four survey areas, each of which was covered by a single surveyor. On completion of the six surveys, results have been collated and analysed and will be provided as maps of centroids calculated across all the visits. These data will be used to estimate the breeding densities, distribution and overall number of territories of each species within the survey area.	March – June 2020
Breeding Raptor Surveys – Goshawk, Red Kite, Peregrine	Following the completion of baseline surveys in 2020 and review of desk study, goshawk and red kite were identified as having the potential in the immediate surrounding area. During the 2021 breeding season, dedicated surveys for raptors will be completed following Hardey *et al* (2013)[29] to identify active nests within a 1km buffer (for goshawk) and 2km buffer (for red kite and peregrine). The survey approach will use a combination of informal vantage point watches to identify potential nest locations and dedicated searching and monitoring of any identified nests. All raptor surveys will be completed by staff holding a relevant NRW Schedule 1 licence. The results will be used to estimate the number and distribution of breeding raptors close to the Site, to enable the generation of an accurate baseline for use in assessment.	March 2021 – July 2021

[28] Gilbert, G, Gibbons, D.W. & Evans, J. (1998). Bird Monitoring Methods: A manual of techniques for key UK species. RSPB, Bedfordshire.
[29] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office, Edinburgh.

Receptor / Survey	Proposed Scope of Survey	Survey Timing
Vantage Point Surveys (Breeding season)	Vantage Point surveys have been completed following the Scottish Natural Heritage (SNH) guidance note 'Recommend bird survey methods to inform impact assessment of onshore wind farms[30]'. In order to quantify the potential collision risk associated with the proposed development, a minimum of 36 hours of vantage point surveys need to be undertaken during the breeding season from two vantage point to form a representative sample of bird flight activity. Each month, each of the two vantage point locations will receive 2-4 3-hour watches with all flights within a 2km viewshed recorded. Surveyors will record the approximate route, length and height of each overflight to enable analysis using Collision Risk Modelling (CRM) following Band *et al* 2007[2]. Target species include: All geese, swans and ducks (excluding mute swan, Canada goose and mallard); All Schedule 1 and Annex I raptors and owls; and other notable species including long-eared owl and nightjar.	April – June 2020 April – June 2021
Vantage Point Surveys (Migratory period)	Vantage point surveys adopting the same methodology as above will be undertaken during migratory seasons to ascertain the levels of overflight for birds passing through on migration. The timing of these surveys will cover the key periods of the autumn and spring migration period. Following the results of the first year of survey the requirements for additional effort (above the standard recommendations) has been amended. The number of hours of observation during the migratory period will be combined with the breeding and wintering observation period ensuring even coverage throughout 2021 and 2022.	July – October 2020 July – October 2021
Vantage Point Surveys (Winter season)	Vantage point surveys will be undertaken across the winter period to form a representative sample of bird flight activity throughout this season. Surveys will adopt the same methodology as vantage point surveys in the breeding and migratory seasons and will be used to inform collision risk monitoring.	November 2020 – March 2021 November 2021 – March 2022
Non-Breeding Season Walkover Surveys	Walkover surveys have been undertaken during the non-breeding season (September 2020 – March 2021) to record overwintering and resident species present on the Site and within a 500m buffer (where appropriate). The survey focused particularly on open areas including all areas of moorland, grassland, pasture and early-stage woodland re-growth. The approximate locations, number and behaviour of all wildfowl and waders, all Section 7 species (as listed on the Environment (Wales) Act 2016), all Schedule 1 species, species listed as "Red List" in Birds of Conservation Concern 4 (2015) and aggregations/flocks of 20+ of any bird species have been recorded.	October 2020 – March 2021

Baseline surveys – summary of results

Vantage point surveys

8.3.8 As described in **Table 8.4** a programme of vantage point surveys, following SNH Guidance (SNH 2014) was commenced in April 2020 covering the breeding season (taken to cover April-June), migratory period (covering July-October) and winter season (covering November – February). Two vantage points were identified and have been positioned to provide coverage of the proposed

[30] Scottish Natural Heritage (2014) - Scottish National Heritage Vantage Point Guidance: https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf

[2] Band, W, Madders, M, & Whitfield, D.P. (2007) Developing field and analytical methods to assess avian collision risk at wind farms. In: Janss, G, de Lucas, M & Ferrer, M (eds.) Birds and Wind Farms. Quercus, Madrid. 259-275

development site, taking into account the locations of the proposed turbines and the turbine designs currently being considered for use. 36 hours of monitoring per season, per vantage point has been completed to date with a total of 108 hours monitoring completed at each vantage point location.

8.3.9 Following initial assessment of the site and the desk study, additional monitoring above the minimum requirement (as defined by the survey methodology) was included covering the period between July and October. This additional monitoring was included to capture any additional evidence of post-breeding dispersal of breeding raptors such as goshawk and red kite which had previously been identified as breeding on or close to site. This additional monitoring was also included to capture migratory species such as osprey and honey buzzard which breed elsewhere in Wales but have the potential to move through the site as part of their annual migration.

8.3.10 **Table 8.5** provides a summary of the target species recorded and the number of flights for each species per season. Full reporting, including collision risk analysis will be provided as part of any final assessment.

Table 8.5 Summary of number of flights for target species recorded during vantage point surveys 2020-2021

Species	Breeding	Migration	Winter	Total
Golden plover	0	12	78	90
Red kite	14	5	25	44
Peregrine	4	0	1	5
Goshawk	0	1	4	4
Hen harrier	0	0	4	4
Merlin	1	0	1	2
Hobby	1	0	0	1

8.3.11 Seven target species have been identified during the surveys to date. The most frequently recorded species has been golden plover with a total of 90 flights recorded in the migratory and winter periods. Golden plover were recorded roosting and feeding on the summit of the hill with flocks of birds often making long flights circling the hill top. Numbers peaked during December 2020 with a peak count of 322 individuals. Red kite was the only other species recorded regularly, recorded in every season. Flights were typically of individual birds passing through the survey area.

8.3.12 Peregrine, goshawk, hen harrier, merlin and hobby were all recorded on a small number of occasions (<6 flights). Hen harrier, merlin and hobby were presumed to be migratory species passing through the site.

8.3.13 Full assessment and analysis of flight line data using collision risk modelling will be completed and presented as part of the final assessment.

Breeding birds – territory mapping and nightjar surveys

8.3.14 Six visits were completed between March 2020 and June 2021 to complete territory mapping following the common bird census methodology (Gilbert *et al* 1998) covering the proposed development site and an additional 100m buffer around the development boundary.

8.3.15 A total of 30 bird species were identified as holding territory (and therefore presumed present as a breeding species) within the survey area. Sections of woodland, wooded valleys along streams and areas of scrub within the buffer supported a more diverse breeding bird assemblage, including notable species such as tree pipit, lesser redpoll, mistle thrush and song thrush. Grassland and moorland habitats, the primary habitats where turbines will be placed, supported an assemblage that included skylark, meadow pipit, stonechat, reed bunting and linnet.

8.3.16 **Table 8.6** provides a summary of the notable species recorded within the survey area.

Table 8.6 Summary of notable bird species identified as holding territory within the survey area

Species	Section 7 Environment (Wales) Act 2016	Birds of Conservation Concern (Eaton *et al* 2015)	Birds of Conservation Concern Wales (Johnstone & Bladwell 2016)[31]
Cuckoo	X	Red	Red
Dunnock	X	Amber	Green
House Sparrow	X	Red	Amber
Linnet	X	Red	Red
Lesser Redpoll	X	Red	Amber
Mistle Thrush		Red	Amber
Reed Bunting	X	Amber	Amber
Skylark	X	Red	Amber
Song Thrush	X	Red	Amber
Tree pipit	X	Red	Amber

8.3.17 Breeding raptor surveys were undertaken between March 2021 and June 2021. These have focused on searches of suitable habitat to identify and breeding locations for goshawk, peregrine or red kite.

8.3.18 Surveys to date have identified a single goshawk nest within 1km of the Site. Monitoring of this nest site is ongoing with the location remaining confidential to ensure protection of the nest. No nest sites for peregrine or red kite have been identified within 2km of the Site

[31] Johnstone,I & Bladwell, S. (2016). Birds of Conservation Concern in Wales 3: the population status of birds in Wales. Birds in Wales, Volume 13, No. 1 September 2016.

Winter walkover survey

8.3.19 Winter walkover surveys were completed between October 2020 and March 2021. These surveys focused on open areas of the site to identify habitats which were regularly used by migratory or wintering bird species with a particular focus on waders or waterfowl which can occur in large flocks outside of the breeding season.

8.3.20 The only waders recorded on site during these surveys includes flocks of golden plover (as described in the vantage point survey results) and small numbers of snipe (1 or 2 individuals only). Other notable species recorded includes flocks of mobile wintering species such as redwing and fieldfare and resident species such as crossbill, reed bunting and mistle thrush.

8.4 Scope of the assessment

Potential ecological features

8.4.1 The starting point for defining which ecological features[32] will be taken forward to the detailed assessment stage will be to use the baseline data collected through the desk study and field surveys to determine which of the identified ecological features are 'important' at the level of the project. Following CIEEM (2019) guidance, the importance of ecological features will be determined using a geographic scale and described in relation to UK legislation and policy, and with regard to the extent of habitat or size of population that may be affected by the Proposed Development.

8.4.2 The importance of ecological features can therefore differ from that which would be conferred solely by legislative protection or identification as a conservation notable species. For example, house sparrow is important at a national level (in policy terms) because it is a Section 7 species and features on the Birds of Conservation Concern red list. However, a small population that could be affected by a development might be assessed as being of local importance only due to the large, albeit declining, UK population (in excess of 5 million pairs).

8.4.3 Wherever possible, information regarding the extent and population size, population trends and distribution of the ecological features will be used to inform the categorisation and determine importance at the project level. Where detailed criteria or contextual data are not available, professional judgement will be used to determine importance. A justification of all determinations of importance are provided in **Table 8.7.**

[32] The Chartered Institute for Ecology and Environmental Management (CIEEM) refer to biodiversity receptors within technical guidance as ecological features. This term is therefore used in this chapter in place of 'receptors' but for the purposes of the assessment they are the same

Table 8.7 Importance of the Proposed Development for Ecological Features

Geographic context of importance	Description
International or European	• European sites including SPAs, SACs, candidate SACs and Sites of Community Importance (SCI). Potential SPAs (pSPA), and Ramsar sites (designated under international convention). • Areas of habitat or populations of species which meet the published selection criteria based on discussions with Natural England and field data collected to inform the EcIA for designation as a European site, but which are not themselves currently designated at this level.
National (UK context)	• A nationally designated site including SSSIs and National Nature Reserves (NNRs). • Areas (and the populations of species which inhabit them) which meet the published selection criteria guidelines for selection of biological SSSIs but which are not themselves designated based on field data collected to inform the EcIA, and in agreement with NRW. • Section 7 habitats and species, Red listed and legally protected species that are not addressed directly in Part 2 of the "*Guidelines for Selection of Biological SSSIs*" but can be determined to be of national importance using the principles described in Part 1 of the guidance. • Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.
Wales National / UK Regional	• Regularly occurring Section 7 habitats or populations of Section 7 species, Red listed and legally protected species may be of regional (Wales) importance in the context of published information on population size and distribution.
County (Rhondda Cynon Taf[33])	• LNRs and Non-Statutory Designated sites including: SINCs of County Importance. • Areas which based on field data collected to inform the EcIA meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans) but which are not themselves designated.
Local	• Section 7 habitats and species, Red listed and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above. • Common and widespread semi-natural habitats occurring within the study area in proportions greater than may be expected in the local context. • Common and widespread native species occurring within the study area in numbers greater than may be expected in the local context.
Negligible	• Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. • Areas of heavily modified or managed land uses (e.g. hard standing used for car parking, as roads etc.)

8.4.4 Where protected species are present and there is the potential for a breach of the legislation, those species will be considered as 'important' features. With the exception of such species receiving specific legal protection, or those subject to legal control (e.g. invasive species), all ecological features determined to be important at negligible level will be scoped out of the assessment. Further, ecological features of local importance, where there is a specific technical justification, will also be scoped out. This is because effects on them would not influence the decision-making about whether or not consent should be granted for the development (in other words a significant effect in EIA terms could not occur). This approach is consistent with that described in CIEEM 2019.

[33] Note, the avian ecology assessment applies 'county' level to the area covered by Glamorgan (includes the pre-1996 counties of West, South and Mid Glamorgan. Post 1996, Glamorgan includes the administrative boundaries of Bridgend, Merthyr Tydfil, Rhondda Cynon Taf, Cardiff, Vale of Glamorgan, Neath Port Talbot, Swansea and the western half of Caerphilly) as bird data is reported at this scale.

8.4.5 All legally protected species and ecological features that are of sufficient importance will then be taken through to the next stage of the scoping assessment.

8.4.6 Based on the findings of the desk study and initial survey results the following potential species or species groups have been identified:

- Schedule 1 Breeding Birds – to include red kite and crossbill.
- SPI Breeding Birds – to include skylark, tree pipit, lesser redpoll and linnet.
- Migratory and wintering raptors – to include hen harrier, merlin and hobby.
- Migratory and wintering waders/wildfowl – to include species including golden plover.

8.4.7 Following completion of the baseline surveys, the full breeding and wintering bird assemblage will be considered with species or species groups taken through to assessment where appropriate and following agreement with relevant consultees.

Likely significant effects

8.4.8 In accordance with the EIA Regulations 2017, the EIA for Mynydd y Glyn Wind Farm will consider those impacts where there is a risk of a likely significant effect only. The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant effect.

8.4.9 The likely significant effects relating to ornithology that will be taken forward for assessment in the Environmental Statement are summarised in **Table 8.8**.

Table 8.8 Likely significant effects relating to ornithology

Activity	Effect	Receptor
Construction		
Change of land use including ground clearance for construction sites (including laydown areas, staff facilities etc.), enabling works and accesses	Degradation and/or loss of habitat (including through soil compaction). Reduction in the availability of foraging, resting and breeding sites. Loss of ecological connectivity through severance of habitats resulting in fragmentation.	Breeding bird assemblage to include Schedule 1 breeding birds (red kite and crossbill) and SPI breeding birds (skylark, tree pipit, lesser redpoll and linnet). Non-breeding bid assemblage to included migratory and wintering raptors (hen harrier, hobby, merlin) and migratory and wintering waders (golden plover).
Introduction of aural and visual stimuli and vibration from construction activities such as vehicular movements, piling or site personnel	Disturbance and displacement of species susceptible to noise/visual disturbance resulting in a reduction of energy intake and/or an increase in energy expenditure potentially leading to a reduction in survival and productivity rates.	
Construction/alteration of drainage to facilitate construction works	Changes to local hydrology resulting in changes or loss of surrounding habitats with subsequent effects on birds that they support.	
Use of chemicals (e.g. fuels, solvents etc.) and liberation of pollutants and fine material through excavation, demolition or surface water	The introduction of toxic pollutants or sediments into the environment resulting in changes, loss or damage to terrestrial or freshwater environments and the birds they support.	

Activity	Effect	Receptor
flows during rainfall events		
Operation		
Permanent changes to the landscape	Presence and operation of wind turbine may result in indirect habitat loss with birds being displaced from nesting, feeding or resting sites.	All receptors as listed above
Operation of wind turbines	Collision with turbine blades, overhead wires and guy lines resulting in injury or death.	
Decommissioning		
Change of land use including ground clearance for construction sites (including laydown areas, staff facilities etc.), enabling works and accesses	Degradation and/or loss of habitat (including through soil compaction). Reduction in the availability of foraging, resting and breeding sites. Loss of ecological connectivity through severance of habitats resulting in fragmentation.	All receptors as listed above
Production of aural and visual stimuli and vibration from construction activities such as vehicular movements, piling or site personnel	Disturbance and displacement of species susceptible to noise/visual disturbance resulting in a reduction of energy intake and/or an increase in energy expenditure potentially leading to a reduction in survival and productivity rates.	
Use of chemicals (e.g. fuels, solvents etc.) and liberation of pollutants and fine material through excavation, demolition or surface water flows during rainfall events	The introduction of toxic pollutants or sediments into the environment resulting in changes, loss or damage to terrestrial or freshwater environments and the birds they support.	

Potential effects not requiring further assessment

Habitat Regulations Assessment (HRA) and other designated sites

8.4.10 There are no SPAs or ornithological Ramsar sites within 20km of the Site. On this basis, it is considered that an HRA for the development will not be required with respect to ornithological features.

8.4.11 Similarly, no statutory or non-statutory designated sites that include birds as a designated feature have been identified within 10km of the Site. Therefore, designated sites can also be scoped out at this stage.

Other considerations

8.4.12 No other potential effects are scoped out at this stage. This will be determined once the programme of baseline surveys has been completed and data have been analysed relative to the Proposed Development activities.

8.5 Assessment methodology

8.5.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 4**. However, whilst this will inform the approach used in the ornithology assessment, it is necessary to align with the standard industry guidance provided by CIEEM (2019).

8.5.2 The assessment will be based upon not only the results of the desk study and field surveys, but also relevant published information (for example on the status, distribution, sensitivity to environmental changes and ecology of the features scoped in to the assessment, where this information is available), and professional knowledge of ecological processes and functions.

8.5.3 For each scoped-in ecological feature effects will be assessed against the predicted future baseline conditions for that feature during construction, operation and decommissioning.

8.5.4 Throughout the assessment process, the initial results of the assessment regarding potentially significant effects will be used to inform whether additional baseline data collection is required, together with the identification of environmental measures that should be embedded into the development proposals to avoid or reduce adverse effects or to deliver enhancements.

8.5.5 Where part of a designated site is located within the ecological Zone of Influence (ZoI)[34] relating to a particular biophysical change as a result of the Proposed Development, an assessment will be made of the effects on the designated site as a whole. A similar approach will be taken for areas of notable habitat.

8.5.6 For species that occur within the ZoI, the assessment will consider the total area that is used by the affected individuals or the local population of the species (e.g. for foraging or as breeding territories).

Significance evaluation methodology

Overview

8.5.7 CIEEM (2019) defines a significant effect as one "*that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*".

8.5.8 When considering potentially significant effects on ecological features, whether these be adverse or beneficial, the following characteristics of environmental change are taken into account[35]:

- Extent – the spatial or geographical area over which the environmental change may occur;
- Magnitude – the size, amount, intensity or volume of the environmental change;
- Duration – the length of time over which the environmental change may occur;
- Frequency – the number of times the environmental change may occur;
- Timing – the periods of the day/year etc. during which an environmental change may occur;
- Reversibility – whether the environmental change can be reversed through restoration actions.

[34] The ZoI in this context is the area over which an individual ecological feature may be subject to a potentially significant effects resulting from changes in the baseline environment due to the Proposed Development.
[35] The definitions of the characteristics of environmental change are based on the descriptions provided in CIEEM (2019). Other chapters in this ES may use some of the same terms albeit with a different definition.

Magnitude of change

8.5.9 Although the characteristics described above are all important in assessing effects by using information about the way in which habitats and species are likely to be affected, a scale for the magnitude of the environmental change, as a result of the proposed development, has been described in **Table 8.9** to provide an understanding of the relative change from the baseline position, be that adverse or beneficial changes.

Table 8.9 Guidelines for the Assessment of the Scale of Magnitude

Scale of change	Criteria and resultant effect
High	The change permanently (or over the long-term) affects the conservation status of a habitat/species, reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a large area of habitat or large proportion of the wider species population is affected. For designated sites, integrity is compromised. There may be a change in the level of importance of the receptor in the context of the project.
Medium	The change permanently (or over the long term) affects the conservation status of a habitat/species reducing or increasing the ability to sustain the habitat or the population level of the species within a given geographic area. Relative to the wider habitat resource/species population, a small-medium area of habitat or small-medium proportion of the wider species population is affected. There may be a change in the level of importance of this receptor in the context of the project.
Low	The quality or extent of designated sites or habitats or the sizes of species' populations, experience some small-scale reduction or increase. These changes are likely to be within the range of natural variability and they are not expected to result in any permanent change in the conservation status of the species/habitat or integrity of the designated site. The change is unlikely to modify the evaluation of the receptor in terms of its importance.
Very Low	Although there may be some effects on individuals or parts of a habitat area or designated site, the quality or extent of sites and habitats, or the size of species populations, means that they would experience little or no change. Any changes are also likely to be within the range of natural variability and there would be no short-term or long-term change to conservation status of habitats/species receptors or the integrity of designated sites.
Negligible	A change, the level of which is so low, that it is not discernible on designated sites or habitats or the size of species' populations, or changes that balance each other out over the lifespan of a project and result in a neutral position.

Determining Significance - adverse and beneficial effects

8.5.10 Adverse effects are assessed as being significant if the favourable conservation status of an ecological feature would be lost as a result of the Proposed Development. Beneficial effects are assessed as those where a resulting change from baseline improves the quality of the environment (e.g. increases species diversity, increases the extent of a particular habitat etc., or halts or slows down an existing decline). For a beneficial effect to be considered significant, the conservation status would need to positively increase in line with a magnitude of change of "high" as described in **Table 8.9.**

8.5.11 Conservation status is defined as follows (as per CIEEM 2019):

> *"For habitats, conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and typical species within a given geographical area;*

For species, conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area".

8.5.12 The decision as to whether the conservation status of an ecological feature would alter has been made using professional judgement, drawing upon the information produced through the desk study, field survey and assessment of how each feature is likely to be affected by the Proposed Development.

8.5.13 A similar procedure is used where designated sites may be affected by the Proposed Development, except that the focus is on the effects on the integrity of each site; defined as:

"The coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified".

8.5.14 The assessment of effects on integrity draws upon the assessment of effects on the conservation status of the features for which the site has been designated.

Approach to mitigation and compensation

8.5.15 The mitigation hierarchy will be applied to biodiversity (CIEEM 2019) to ensure designs first seek to avoid significant harm, to mitigate where it is unavoidable, and, as a last resort, to compensate for residual effects that remain after avoidance and mitigation measures are implemented. The avoidance of significant harm is being considered through the design process and potential mitigation measures associated with conservation notable and legally protected flora and fauna will also be actively considered. These measures include determining the extent and distribution of suitable habitats required within the development to account for the likely effects on legally protected (e.g. reptiles, bats etc.) and other conservation notable species, the types of habitats that they may require and how these can be incorporated within developing designs. As more information becomes available from the ongoing field survey programme and as the development design and construction phase plans develop mitigation plans will evolve.

8.5.16 In addition, the development will identify potential ecological enhancements that would be proportionate to the scheme and which would deliver ecological benefits commensurate to the wind farm. Such enhancements would be proposed following consultation with relevant stakeholders to ensure that any measures proposed were compatible with ongoing management of the Site.

Assumptions

8.5.17 No assumptions have been made with respect the scope of the Ornithology assessment.

9. Water Environment

9.1 Introduction

9.1.1 This chapter describes the proposed scope of the assessment with respect to the Water Environment. The chapter should be read in conjunction with the description of the Proposed Development presented in **Chapter 2** and with respect to relevant parts of other chapters (**Chapter 7: Biodiversity**), where common receptors have been considered and where there is an overlap or relationship.

9.1.2 The scope of the assessment is based on a high-level review of baseline information and will be confirmed through review of additional data sources, a site visit and consultation with stakeholders including, but not limited to the following: Natural Resources Wales (NRW), Rhondda Cynon Taf County Borough Council as the Lead Local Flood Authority (LLFA) and the Local Planning Authority (LPA).

9.2 Baseline conditions

Data sources

9.2.1 The EIA scoping exercise has been undertaken with reference to **Chapter 2: The proposed development**, supported by a number of data sources. The principal data sources used to inform this chapter comprise the following:

- British Geological Survey Geoindex Onshore – Aquifer Designation (available online http://mapapps2.bgs.ac.uk/geoindex/home.html; accessed 27/05/2020)
- British Geological Survey (BGS) Geology of Britain Viewer for geological information (available online http://www.bgs.ac.uk/data/mapViewers/home.html accessed 26/05/2020); accessed);
- Cranfield University – LandIS Soilscapes viewer for soil classification (available online http://www.landis.org.uk/soilscapes/; accessed 26/05/20);
- Local Ordnance Survey (OS) mapping: topography and location of springs;
- National Library of Scotland – historical maps (available online https://maps.nls.uk/geo/explore/#zoom=14&lat=51.72994&lon=-3.15008&layers=161&b=1; accessed);
- Natural Resources Wales - Geo Portal for Wales (Lle) for Source protection zones (available online http://lle.gov.wales/catalogue/item/SourceProtectionZonesSPZMerged/?lang=en; accessed 27/05/20);
- Natural Resources Wales – Water Framework Directive (WFD) Cycle 2 Rivers and waterbodies for WFD waterbodies and status (available online https://nrw.maps.arcgis.com/apps/webappviewer/index.html accessed May 25 2020; accessed);
- Natural Resources Wales Flood Risk Maps for flood risk mapping (available online https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en; accessed 26/05/20);

- Rhondda Cynon Taf County Borough Council (2015) – Local Flood Risk Management Plan (available online: https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/FloodRiskManagementPlanFinal.pdf; accessed 26/05/20);
- Rhondda Cynon Taf County Borough Council (2011) – Preliminary Flood Risk Assessment (available online: https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/PreliminaryFloodRiskAssessment.pdf; accessed 26/05/2020); and
- Rhondda Cynon Taf County Borough Council (2008) – Strategic Flood Consequence Assessment (available online: https://www.rctcbc.gov.uk/EN/Resident/PlanningandBuildingControl/LocalDevelopmentPlans/LDPEvidenceBaseLibraryandAnnualMonitoringRe/RelateddocumentsEvidenceBase/EB59a.pdf; accessed 10/06/20).

Current baseline

Introduction

9.2.2 This section provides a review of the current baseline environmental characteristics for the Proposed Development and surrounding areas, with particular reference to the water environment. The baseline conditions will be confirmed through review of additional data sources, site visit and consultation with stakeholders during the next stages of the EIA.

9.2.3 The geographical extent of the study area extends 1.5km from the Proposed Development boundary. This nominated study area is considered conservative and sufficient for the purposes of this baseline appraisal, based on hydrological knowledge of the area and professional experience. Key hydrological features within the study area are identified on **Figure 9.1**.

Land use and topography

9.2.4 The Site of the Proposed Development covers an area of approximately 200 hectares (ha) and is located in an upland area dominated by agricultural land use. Historical maps show that the area has been undeveloped since the 19th century. The surrounding area has a history of heavy industry and mining works. The closest buildings are located to the southeast, at Langton Court Farm, and to the east at Rhiw-garn-fach and Rhiw-garn-fawr. The closest towns/villages include Porth approximately 600m northwest, Tonyrefail approximately 900m southwest and Pontypridd approximately 2 km east of the Proposed Development site. The A4058 and A423 roads are located to the north and west, respectively, of the Proposed Development site connecting Porth with Pontypridd and Tonyrefail (**Figure 9.1**).

9.2.5 The Proposed Development is located on Mynydd-y-Glyn which peaks at 377 m AOD near the northern edge of the Proposed Development site. The highest elevations are located on the northern half and towards the centre of the Proposed Development site with ground levels falling in all directions but more steeply on the western edge. The Proposed Development site boundary roughly flanks the 300 m AOD elevation contour. The Afon Rhondda Fawr valley is to the north, Nant Muchudd valley is to the southwest, and Nant Gelliwion valley is to the southeast of the Proposed Development site.

Hydrology

9.2.6 The Proposed Development site extends over two hydrological catchments, the northern part draining to the Afon Rhondda Fawr and the southern part draining to the Nant Muchudd. The Afon Rhondda Fawr joins the Afon Taf 1.3 km east of the study area whilst Nant Muchudd joins Afon Elai 3.7 km south of the study area. A number of tributaries of the Afon Rhondda Fawr and Nant Muchudd issue within the study area. The Afon Rhondda Fawr, Afon Taf and Afon Elai are classified by NRW as Main Rivers whilst their tributaries are ordinary watercourses (**Figure 9.1**).

9.2.7 The Afon Rhondda Fawr flows southeast within the northern edge of the study area. Six tributaries of the Afon Rhondda Fawr issue within the northern and western edges of the Proposed Development site with additional tributaries issuing in the wider study area. One of these tributaries is Nant Gelliwion which flows to the east before joining the Afon Rhondda Fawr in Pontypridd. Two tributaries of Nant Muchudd issue within the southern edge of the Proposed Development site with several additional tributaries issuing in the wider study area. One of these tributaries is Nant Castellau which flows to the south and joins Nant Muchudd approximately 2.4 km south of the study area (**Figure 9.1**).

9.2.8 The study area is located within the Severn River Basin District and within the catchments of three Water Framework Directive (WFD) surface water bodies: Nant Muchudd (source to confluence with Afon Elai) surface water body in the south of the Proposed Development area, the Afon Rhondda Fach (confluence Afon Rhondda Fach to Afon Taf) surface water body in the north of the Proposed Development site and the Afon Elai (source to the confluence with the Nant Clun) surface water body on western edge of study area and outside the Proposed Development site. The Nant Muchudd WFD surface water body and the Afon Rhondda Fawr WFD surface water body achieved an overall classification of 'Good', whilst the WFD surface water body Afon Elai achieved an overall classification of 'Moderate' in the 2016 WFD classification (Cycle 2) (**Table 9.1**).

Table 9.1 Summary of the WFD surface water body and its associated status definitions within study area

	Nant Muchudd (source to confluence with Afon Elai) Surface Water Body	**Afon Rhondda Fawr (confluence with Afon Rhondda Fach to confluence with Afon Taf) Surface Water Body**	**Afon Elai (source to confluence with Nant Clun) Surface Water Body**
Type	River	River	River
Water body identifier	GB109057027110	GB109057027230	GB109057027260
Catchment	South East Valleys	South East Valleys	South East Valleys
HMWB	No	No	No
Overall status [a]	Good	Good	Moderate
Ecological status [a]	Good	Good	Moderate
Chemical status [a]	Good	Good	Good

Notes: HMWB- heavily modified water body
Source: https://nrw.maps.arcgis.com/apps/webappviewer/index.html?id=2176397a06d64731af8b21fd69a143f6 (accessed 29/04/20).
Status definitions from 2016 WFD classification (Cycle 2).

9.2.9 The OS map shows eight springs/issues within the Proposed Development site, four in the north flowing into Afon Rhondda Fawr, two in the east flowing into Nant Gelliwion (tributary of Afon Rhondda Fawr) and two in the south flowing into Nant Muchudd (**Figure 9.1**). There are numerous springs/issues in the wider study area, those on the north and west associated with the tributaries of Afon Rhondda Fawr and those on the south and east associated with tributaries of Nant Muchudd. The majority of these springs/issues are located on the west of the study area and within the Site of Special Scientific Interest (SSSI) Mynydd Gelliwion Woods on the northeast of the study area.

9.2.10 The OS map shows one pond/lake within the Proposed Development site at an elevation of 350 m Above Ordnance Datum (AOD) and a further nine ponds/lakes are located within the wider study area (**Figure 9.1**).

Geology and Soils

9.2.11 The BGS online geology mapping indicates that there are limited superficial deposits across the Proposed Development site. These comprise localised areas of peat in the centre and till in the north of the Proposed Development site. Within the wider study area, superficial deposits are mainly present as isolated peat pockets and areas of alluvium, Glaciofluvial Deposits, River Terrace Deposits and till in the valley floors. The Afon Rhondda Fawr flows over alluvium deposits (clay, silt, sand and gravel), Glaciofluvial Deposits (sand, and gravel), River Terrace Deposits (sand and gravel) and Till. The Nant Muchudd and its tributaries, Nant Gelliwion and Nant Castellau flow over till.

9.2.12 The regional bedrock geology is dominated by a thick sequence of Carboniferous sedimentary rocks which are preserved in and around the South Wales Coalfield Basin, a structurally complex, west-northwest-trending trough-shaped structure that extends westwards into Pembrokeshire. These Carboniferous rocks include the Carboniferous South Wales Upper Coal Measures Formation which underlie the study area[36]. This is described as grey (productive) coal-bearing mudstones/siltstones with seat-earths and minor grey, quartz-rich sandstones, coals, and ironstones. There are numerous coal seams within the sequence, most of which have been worked. The South Wales Upper Coal Measures Formation beneath the Proposed Development site comprises sandstones of the Brithdir and Rhondda Members and alternating bands of mudstone, siltstone and sandstone of the Rhonda Member. The Brithdir and Rhonda Members are described as Pennant Sandstones with thin mudstone/siltstone and seat-earth interbeds and mainly thin coals. In the wider study area, the Hughes Member (sandstone) is present to the south and the Llynfi Member (mudstone, siltstone and sandstone) is present to the west of the Proposed Development site. BGS boreholes in the centre of the Proposed Development site describe the bedrock geology as cyclical layers of shale and coal. A northwest-southeast fault crosses the centre of the Proposed Development site.

9.2.13 The Proposed Development site is dominated by a very acidic loamy upland soil with a wet peaty surface. The peaty soils are associated with areas of blanket bog and marshy grassland. Surrounding this soil type and covering much of the wider study area is freely draining acid loamy soil. Soils to the south, southeast and west of the study area include a slowly permeable wet very acid upland soil with a peaty surface. Soils to the east of the study area and those associated with Afon Rhondda Fawr to the north of the study area comprise freely draining slightly acid loamy soils.

[36] NRW (2014) National Landscape Character. NLCA37. South Wales Valleys. (Available online https://naturalresources.wales/media/682625/nlca37-south-wales-valleys-description-1.pdf; accessed April 2021)

Hydrogeology

9.2.14 The bedrock underlying the study area (South Wales Upper Coal Measures) is classified by NRW as a Secondary A Aquifer. The superficial deposits alluvium, Glaciofluvial Deposits and River Terrace Deposits are also classified as Secondary A aquifers. Secondary A Aquifers are defined as "*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers*". These are generally aquifers formerly classified as minor aquifers. The till is classified as a Secondary Undifferentiated aquifer. This is assigned in cases where it has not been possible to attribute either category Secondary A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type. The peat deposits are classified as unproductive strata. This classification is assigned to rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow[37].

9.2.15 The groundwater vulnerability of the bedrock and superficial deposits is categorised as High Vulnerability the north and south and Medium Vulnerability in the centre, southeast and southwest of the study area.

9.2.16 The South Wales Upper Coal Measures underlying the study area is a designated WFD groundwater body (SE Valleys Carboniferous Coal Measures GB40902G201900) and achieved 'Good' quantitative status and 'Poor' chemical status in the 2016 WFD classification (Cycle 2).

9.2.17 The Proposed Development site and the wider study area are not within a source protection zone (SPZ). The closest SPZ is located approximately 10 km south-west of the Proposed Development. SPZs show the risk of contamination from any activities that might cause pollution to public drinking water supplies.

Flood Risk

Terminology

9.2.18 In this report, the probability of a flood occurring is expressed in terms of Annual Exceedance Probability (AEP), which is the inverse of the annual maximum return period. For example, the 100-year flood can be expressed as the 1% AEP flood, i.e. a flood that has a 1% chance of being exceeded in any year.

9.2.19 **Table 9.2** is provided to clarify the use of the AEP terminology as well a description of the Flood Zone definitions as used by the NRW, and the Welsh Flood Zones set out in the Welsh Assembly Government's Technical Advice Note 15 (TAN15 (2004)) Development Advice Map (DAM) and associated guidance. Consultation on an updated version of TAN15 has recently been completed (January 2020). The draft update includes a range of changes to the guidance, in particular it removes reference to the Development Advice Map (DAM) and refers to a "Wales Flood Map" held by NRW. However, the consultation draft clearly states that TAN15 (2004) remains current until such a time that the replacement is confirmed. TAN15 (2004) has therefore been used to underpin this assessment.

[37] See: http://apps.environment-agency.gov.uk/wiyby/117020.aspx

Table 9.2 Flood Zone definitions and associated annual exceedance probability

WAG TAN15 DAM Flood Zone	NRW Flood Zones	Probability of flooding	AEP	Definition
Flood Zone A	Flood Zone 1	Low Probability	<0.1% AEP of river or sea flooding	Land with less than 1 in 1,000 probability of flooding from rivers or the sea, in any given year
Flood Zone C1 (developed and served by significant flood defences) / Flood Zone C2 (no significant flood defences)	Flood Zone 2	Medium Probability	1% - 0.1% AEP of river flooding 0.5% – 0.1% AEP of sea flooding	Land with between a 1 in 100 and 1 in 1,000 of river flooding; or land having between a 1 in 200 and 1 in 1,000 probability of sea flooding
Flood Zone B	N/A	N/A	N/A	Geological indicators of flooding
N/A	Flood Zone 3	High Probability	>1% AEP of river flooding >0.5% AEP of sea flooding	Land having a 1 in 100 or greater probability of river flooding in any year; or Land having a 1 in 200 probability or greater of sea flooding in any year.

Historical flooding

9.2.20 NRW's online mapping of local historical flood extents[38] does not show historical flooding records at or close to the Proposed Development site. The Rhondda Cynon Taf County Borough Council Preliminary Flood Risk Assessment (PFRA) and Strategic Flood Consequence Assessment (SFCA) show that the region is affected by flooding from a variety of sources and have a record on the occurrence and numbers of floods from each source. However, there are no records of flooding within the Proposed Development site.

Fluvial and Tidal Flood Risk

9.2.21 The NRW mapping for flood risk from rivers and the sea (**Figure 9.2**) shows that the Proposed Development site lies entirely in Flood Zone 1. In the wider study area, there are areas of both Flood Zones 2 and 3, associated with the Afon Rhondda Fawr to the north, the Nant Muchudd to the south and the Nant Gelliwion to the east of the Proposed Development site. The area of extent for both Flood Zone 2 and 3 is larger along the Afon Rhondda Fawr than the Nant Muchudd and the Nant Gelliwion.

9.2.22 NRW Development Advice Map shows that the Proposed Development site is located in Flood Zone A (**Figure 9.3**). In the wider study area, Afon Rhondda Fawr is located in areas of Flood Zones B, C1 and C2 and the Nant Muchudd and Nant Gelliwion are located in Flood Zone C2. Flood Development zones C1 and C2 match Flood Zones 2 and 3.

9.2.23 The risk of flooding from the sea is minimal due to the elevation of the Proposed Development site and wider study area, which ranges from 377 m AOD in the centre at the Mynydd y Glyn peak to 300 m AOD around the Proposed Development site perimeter and 180 m AOD on the southern edge of the study area.

[38] NRW online mapping of local historical flood extents. (available online: http://lle.gov.wales/catalogue/item/HistoricFl/?lang=en; accessed April 2021)

9.2.24 This suggests that the risk of fluvial flooding to the Proposed Development is low. The locality is not at risk of tidal flooding on account of the elevation above sea level.

Surface Water Flood Risk

9.2.25 Surface water flooding occurs when the intensity of rainfall is greater than the local drainage and infiltration capacity, causing water to flow overland. Where low-points or barriers to flow are present, particularly deep areas of flooding may occur. These areas are not limited to river corridors or floodplains.

9.2.26 NRW's mapping for surface water flood risk (**Figure 9.4**) shows that the majority of the Proposed Development site and the wider study area is at very low risk of flooding (0.1% AEP) from this source. Small areas of low to high flood risk (0.1% to >3.3% AEP) are shown on localised lower-lying areas and flow pathways associated with the Nant Muchudd, Nant Gelliwion, Nant Castellau and the Afon Rhondda Fawr and other associated tributaries in the study area. Within the Proposed Development site the mapping shows four surface water pathways predominantly at low risk of flooding (0.1 to 1% AEP), one pathway to the north associated with a tributary of Afon Rhondda Fawr, two pathways to the east associated with Nant Gelliwion and one pathway to the south associated with a tributary of Nant Muchudd.

Groundwater Flood Risk

9.2.27 Groundwater flooding occurs as a result of water issuing to the surface from the underlying aquifers. This tends to occur after long periods of sustained high rainfall, with areas most at risk being situated on permeable geology and low-lying compared to the local water table.

9.2.28 Rhondda Cynon Taf County Borough Council Local Flood Risk Management Plan (LFRMP) and PFRA does not report historical groundwater flooding within the borough area.

9.2.29 The Proposed Development site has limited superficial cover. The underlying bedrock (Brithdir and Rhondda Members) consists of a cyclical sequence of sandstone, mudstone, siltstone and coal seam layers and is classified as a Secondary A aquifer. Historical mining activities within Rhondda Cynon Taf County Borough Council area have disrupted the natural groundwater regime within the coal measures and it is likely that the interconnection between many of the collieries has resulted in cross catchment groundwater flow in certain parts of Rhondda Cynon Taf. However, although the Coal Measures are a Secondary A aquifer, the contribution of groundwater to even low flows is modest[39]. Although groundwater emergence may be possible, any flows are expected to be limited/small as the Proposed Development site is on a topographic high and the underlying geology comprises bands of both higher and lower permeability bedrock layers. This is consistent with the EA Areas Susceptible to Groundwater Flooding Map[40] which shows that the risk of groundwater flooding in the Proposed Development site is less than 25%. This suggests that although some groundwater may be encountered during excavations in the Proposed Development site, groundwater is unlikely to be found in significant quantities, and is not considered to be a significant potential flood risk.

[39] Rhondda Cynon Taf County Borough Council Preliminary Flood Risk Assessment (2011). Available online: https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/PreliminaryFloodRiskAssessment.pdf.

[40] Provided in Rhondda Cynon Taf County Borough Council Local Flood Risk Management Strategy (2015). Available online: https://www.rctcbc.gov.uk/EN/Resident/ParkingRoadsandTravel/Roadspavementsandpaths/FloodAlleviation/RelatedDocuments/FloodRiskManagementPlanFinal.pdf

Sewer Flood Risk

9.2.30 Sewer flooding occurs when the local capacity of the underground drainage network is exceeded resulting in the surcharging of water to the surface. The discharge of the drainage network into watercourses can also be affected by overall system capacity (i.e. where pumped), or high-water levels in the receiving waters obstructing the drainage of network outfalls.

9.2.31 It is anticipated that there are no/few sewer drainage networks within the Proposed Development site due to its remote location and absence of built development. In the wider study area, sewer drainage networks are likely to serve the towns/villages of Porth, Trebanog, Trehafod and Tonyrefail and. However, these areas are at significantly lower elevation than the Proposed Development, and sewers are unlikely to constitute a source of flooding to the Proposed Development. On this basis, the risk of sewer flooding in the Proposed Development is likely to be low.

Artificial Flood Risk

9.2.32 The NRW Reservoir Flood Risk Map (**Figure 9.5**) shows that the Proposed Development area is not within a flood risk zone. In the wider study area, flooding from artificial sources is predicted along the Afon Rhondda Fawr and its tributaries upstream of Porth. This is associated with potential failure/breach of reservoirs upstream of the study area, such as the Lluest-wen and Castell Nos Reservoirs in the with flood water flowing south along the Rhondda Fach valley.

Sites designated for nature conservation

9.2.33 A number of designated sites for nature conservation have been identified within and near the study area in **Chapter 7: Biodiversity**. These include two statutory designated sites (Nant Gelliwion Woodland SSSI and Rhos Tonyrefail SSSI) and several non-statutory designated sites (Sites of Importance for Nature Conservation (SINC)).

9.2.34 Nant Gelliwion Woodland SSSI is an actively managed mixed deciduous woodland on the free-drainage valley slopes of Nant Gelliwion, downstream of the Proposed Development, but unlikely to have water dependent habitats. The Rhos Tonyrefail SSSI is a lowland site with marshy, neutral and acid grassland, as well as wet heath and blanket mire. This site is located to the west and south of the Proposed Development site, around many of the tributaries of the Nant Muchudd, and contains water dependent habitats which could potentially be affected by the Proposed Development.

9.2.35 Statutory designated sites outside the study area include Blackmill Woodlands Special Area of Conservation (SAC) and Cardiff Beech Woods SAC, located over 9 km away from the Proposed Development. These sites are broad-leaved deciduous woodland sites which are unlikely to have water dependent habitats and therefore unlikely to be affected by the Proposed Development.

9.2.36 A description of the SINCs within 2 km of the Proposed Development which have a water component, and therefore can potentially be impacted by the Proposed Development is provided in **Table 9.3,** where information is available. Additional information on the conservation sites will be collected through consultation with stakeholders during the next stages of the EIA in order to confirm the sites which are considered to be water-dependant and therefore likely to be affected by the Proposed Development.

9.2.37 The peaty soils within the Proposed Development site are associated with areas of blanket bog which are water dependent and therefore likely to be affected by the Proposed Development. As indicated in **Chapter 10: Ground Conditions**, additional information on the peaty soils will be collected during the next stages of the EIA through a Phase 1 peat walkover survey and, if required, a Phase 2 peat probing exercise.

Table 9.3 Non-statutory designated sites for nature conservation with a water component within 2 km of the Proposed Development

Site	Ecological interest	OS Grid Reference	Distance (m) from Proposed Development
Mynydd y Glyn SINC	Area of upland peat bog with surrounds that have been variously semi improved	ST031894	Within boundary
Trebanog Slopes SINC	Very large hillside mosaic site with ffridd, marshy grassland, acid grassland and heath and colliery spoil	ST028904	158 N
The Glyn SINC	A valley containing of woodland and marshy grassland	ST023888	632 SW
Mynydd Gelliwion and Gellwion Slopes SINC	Bog mosaic site of forestry plantation, ffridd marshy and acid grassland, woodlands, ponds and colliery spoil	ST052898	1000E
Tonyrefail East SINC	A wooded valley with marshy grassland and neutral grasslands	ST021880	1017 SW

Future baseline

9.2.38 Hydrological and hydrogeological baseline conditions may change even if the Proposed Development is not constructed, for the following reasons:

- Climate change will result in increased rainfall seasonality, with generally wetter winters and drier summers, high-intensity rainfall events will become more common. This will lead to greater variation in river flows (low flows and high flows), and increases in flood risk;
- The location and rate of surface water and groundwater abstractions in the area could vary over time and may result in changes to the WFD surface water and groundwater body status and SPZ designations;
- Improvements to WFD waterbody status associated with improvements to individual quality elements (i.e. phosphate reduction) would result in higher-quality, more sensitive waterbodies; and
- Other new development (e.g. urbanisation settlements) within the study area may result in changes in hydrological baseline such as surface water runoff (flow and pathways) and increase the number of development receptors.

9.3 Scope of the assessment

Potential receptors

9.3.1 The water environment receptors identified during this high-level assessment which could potentially be affected by the Proposed Development comprise:

- Afon Rhondda Fawr (Main River and WFD surface water waterbody) and tributaries (ordinary watercourses) which flows along the northern edge of the study area and outside the Proposed Development site;
- Nant Muchudd and tributaries (ordinary watercourses and WFD surface water waterbody), which issue on the southern edge of the Proposed Development site and western slopes of Mynydd y Glyn in the wider study area. Nant Muchudd joins Afon Elai (WFD surface water body) approximately 3.7 km south of the study area;

- Nant Gelliwion and tributaries (ordinary watercourses) which issue in the eastern edge of the Proposed Development area and eastern slopes of Mynydd y Glyn in the wider study area;
- Nant Castellau and tributaries (ordinary watercourses) which issue in the south-eastern edge of the study area and outside the Proposed Development site. Nant Castellau joins Nant Muchudd approximately 2.4 km south of the study area;
- Pond/lakes (one within the Proposed Development boundary and nine within the wider study area);
- Local springs/issues (eight within the Proposed Development area and several more within the wider study area);
- Groundwater in the Brithdir and Rhondda Members of the South Wales Upper Coal Measures (WFD groundwater body);
- Local surface water and groundwater abstractions (if present);
- Local conservation sites that are likely to be water-dependent (Rhos Tonyrefail SSSI and five SINCs);
- Peaty soils which are associated with areas of blanket bog and are water dependent (additional information to be collected during the next stages of the EIA through a Phase 1 peat walkover survey and, if required, a Phase 2 peat probing exercise);
- Humans, properties and infrastructure which could receive increased surface runoff from the Proposed Development site (local visitors to Mynydd y Glyn area, humans/properties/infrastructure downslope of the Proposed Development site including at Porth, Trehafod, Trebanog, and Tonyrefail).

Likely significant effects

9.3.2 The likely significant water environment effects for the construction, operational and decommissioning phases of the Proposed Development that will be taken forward for assessment in the Environmental Statement are summarised in **Table 9.4**. The effects for the decommissioning phase are similar in nature to the construction phase. As far as is practicable the Proposed Development infrastructure will be removed. Decommissioning effects will typically be temporary, short term effects that will occur during the breakupand removal of infrastructure.

Table 9.4 Likely significant water environment effects

Activity	Effect	Receptor
Construction and Decommissioning Phase		
Land preparation (earthworks, excavation)	Release of pollutants (e.g. chemicals, hydrocarbons and other construction materials) directly (e.g. accidental spillages into the ground/surface water) or indirectly (via surface water runoff) leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD surface water and groundwater bodies and deterioration in conditions supporting local conservation sites and blanket bog water-dependent habitat	Watercourses (WFD surface water bodies Afon Rhondda Fawr and Nant Muchudd and their tributaries including Nant Gelliwion and Nant Castellau). Local ponds/lakes. Local springs. Groundwater in Brithdir and Rhondda Members (WFD groundwater body). Local surface water and groundwater abstractions (if present). Local designated site for nature conservation that are water-dependent. Blanket bog water-dependent habitat.
Land preparation (earthworks, excavation)	Temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in the surface water quality environment and deterioration in the status of WFD surface water bodies	Watercourses (WFD surface water bodies Afon Rhondda Fawr and Nant Muchudd and their tributaries including Nant Gelliwion and Nant Castellau). Ponds/lakes. Local surface water abstractions (if present).
Impermeable land associated with temporary access tracks and construction areas	Increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow	Flood risk receptors: local visitors to Mynydd y Glyn area, humans/properties/infrastructure downslope of the Proposed Development site including at Porth, Trehafod, Trebanog, and Tonyrefail.
Introduction of temporary infrastructure (e.g. site compound) near watercourses and potential temporary watercourse crossings (to be confirmed within final designs)	Temporary changes to watercourse flow conveyance leading to deterioration in the status of WFD surface water bodies and deterioration of conditions supporting local designated sites for nature conservation and blanket bog water-dependent habitat	Watercourses (WFD surface water bodies Afon Rhondda Fawr and Nant Muchudd and their tributaries including Nant Gelliwion and Nant Castellau). Local surface water abstractions (if present). Local designated sites for nature conservation that are water-dependent. Blanket bog water-dependent habitat.
Operational Phase		
Impermeable land take (solid concrete foundations for turbines, substation and access tracks)	Increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow	Flood risk receptors: local visitors to Mynydd y Glyn area, humans/properties/infrastructure downslope of the Proposed Development site including at Porth, Trehafod, Trebanog, and Tonyrefail.

9.3.3 Whilst the Proposed Development lies entirely within Flood Zone A, a Flood Consequence Assessment (FCA) will be produced in accordance with the TAN15 as the site of the Proposed Development covers an area of approximately 200 ha and has the potential to result in new/severed flow pathways and concentration/redirection of surface water runoff. The FCA will demonstrate how flood risk to the Proposed Development and any potential to increase flood risk to third parties due to the Proposed Development, will be managed over its lifetime. As part of this, the effects of climate change will be given due consideration. The FCA will include an outline surface water drainage strategy, which will ensure that surface water runoff from the Proposed Development is managed and attenuated on site, so that the risk of flooding is not increased off-

site. The most suitable surface water drainage strategy for the Proposed Development will be ascertained by undertaking a high-level SuDS Assessment considering the SuDS hierarchy.

9.3.4 No identified potential water receptors or effects have been scoped out of the assessment at this stage.

9.4 Assessment methodology

General approach

9.4.1 This section describes the approach for the assessment of the effects of the Proposed Development on the water receptors. The proposed approach will be confirmed with the NRW, LLFA and LPA during the next stages of the EIA.

9.4.2 The significance of an effect resulting from the Proposed Development is primarily determined by the value of a given water feature and the magnitude of the effect. In terms of the hydrology, the key determinands of magnitude relate to surface water quantity (level and flow), and water quality. However, depending on the effects of surface water flows, there may also be indirect effects on downstream morphology and sediment dynamics, river water quality and flood risk. The method and criteria used to determine value, magnitude, and significance of effect are described in the following sections.

Determination of significance

9.4.3 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are "*likely to be significantly affected by the development*".

9.4.4 The EIA Regulations do not define significance and it will be necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.

9.4.5 **Table 9.5** details the basis for assessing receptor sensitivity. The value of water features is normally related to the importance of the surface water or groundwater feature that might be at risk from effects. The criteria used by Wood in the assessment of water feature value are semi-quantitative, so some professional judgement by the assessor has been required.

Table 9.5 Establishing the sensitivity of water receptors

Sensitivity	Criteria	Receptor type*	Examples
High	Features with a high yield, quality or rarity with little potential for substitution.	Aquatic environment	Conditions supporting a site with an international conservation designation (Special Area of Conservation (SAC), Special Protection Area (SPA), Ramsar site), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall High status, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body.

Sensitivity	Criteria	Receptor type*	Examples
			WFD surface water body (or part thereof) with High status for morphology.
	Water use supporting human health and economic activity at a regional scale.	Water use	Regionally important public surface water or groundwater supply (and associated catchment/GWMU) or permitted discharge.
	Features with a high vulnerability to flooding.	Flood risk	Land use type defined as 'Emergency Services' in the TAN15 development categories (e.g. hospitals, ambulance/police stations that are required to operate during flooding and buildings used to provide emergency shelter in time of flood) and essential infrastructure equivalent (i.e. critical national infrastructure, such as essential transport and utility infrastructure).
Medium	Features with a medium yield, quality or rarity, with a limited potential for substitution.	Aquatic environment	Conditions supporting a site with a national conservation designation (e.g. SSSI, National Nature Reserve (NNR)), where the designation is based specifically on aquatic features. WFD surface water body (or part thereof) with overall 'Good' status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. WFD groundwater body (or part thereof) with overall 'Good' status.
	Medium quality watercourse morphology	Watercourse morphology	A watercourse in natural equilibrium and exhibiting a natural range of fluvial processes and morphological features, with little or no modification or anthropogenic influence.
	Water use supporting human health and economic activity at a local scale.	Water use	Local public surface water and groundwater supply (and associated catchment/GWMU) or permitted discharge. Licensed non-public surface water and groundwater supply abstraction (and associated groundwater catchment) which is relatively large relative to available resource, or where raw water quality is a critical issue, e.g. industrial process water, or permitted discharge.
	Features with a medium vulnerability to flooding.	Flood risk	Land use type defined as 'Highly vulnerable development' in the TAN15 development categories (e.g. educational institutions, most types of residential development and vulnerable industrial development)
Low	Features with a low yield, quality or rarity, with some potential for substitution.	Aquatic environment	Conditions supporting a site with a local conservation designation (e.g. Local Nature Reserve (LNR), County Wildlife Site (CWS)), where the designation is based specifically on aquatic features, or an undesignated but highly/moderately water-dependent ecosystem, including a Local Wildlife Site (LWS) and a GWDTE. WFD surface water body (or part thereof) with overall Moderate or lower status/potential, also any associated upstream non-reportable WFD surface water body or non-WFD surface water body. Groundwater body (or part thereof) with overall Poor status.
	Low quality watercourse morphology	Watercourse morphology	A watercourse showing signs of modification and recovery to a natural equilibrium, and currently exhibiting a limited range of fluvial processes and morphological features affected by modification or anthropogenic influence.

Sensitivity	Criteria	Receptor type*	Examples
	Water use supporting human health and economic activity at household/individual business scale.	Water use	Licensed non-public surface water and groundwater supply abstraction (and associated catchment/GWMU), which is relatively small relative to available resource, or where raw water quality is not critical, e.g. cooling water, spray irrigation, mineral washing or permitted discharge. Unlicensed potable surface water and groundwater abstraction (and associated catchment) e.g. private domestic water supply, well, spring or permitted discharge.
	Features with a low vulnerability to flooding.	Flood risk	Land use type defined as 'Less vulnerable development' in the TAN15 development categories excluding water compatible development equivalent (e.g. general industrial, employment, commercial and retail development, transport and utilities infrastructure, mineral extraction sites (except sand and gravel)).
Very Low	Commonplace features with very low yield or quality with good potential for substitution.	Aquatic environment	Conditions supporting an undesignated and low water-dependent ecosystem, including an LWS, GWDTE and pond. Non-reportable WFD surface water body (or part thereof), or non-WFD surface water body, not associated with any downstream WFD surface water body. Non-reportable WFD groundwater body (or part thereof), or non-WFD groundwater body.
	Very low quality watercourse morphology	Watercourse morphology	A highly-modified watercourse changed by channel modification or other anthropogenic pressures, currently exhibiting no active flow processes or morphological diversity.
	Water use does not support human health, and of only limited economic benefit.	Water use	Unlicensed non-potable surface water and groundwater abstraction (and associated catchment) e.g. livestock supply.
	Features that are resilient to flooding.	Flood risk	Land use type defined as 'Less vulnerable development' in the TAN15 development categories which is water compatible development equivalent (e.g. amenity open space, nature conservation and biodiversity, sand and gravel workings, docks, marinas, flood control infrastructure, water transmission infrastructure) and undeveloped land.

*Receptor types map onto receptor lists as follows:

- Aquatic environment –watercourses/WFD surface water bodies, aquifers/WFD groundwater bodies, conditions supporting GWDTEs and designated conservation sites
- Water use – springs, abstractions
- Flood risk – humans, properties and infrastructure.

The watercourse morphology receptor type is only relevant when 'in-channel' works are proposed.

9.4.6 **Table 9.6** details the basis for assessing magnitude of change. The magnitude of change on water receptors is independent of the value of the receptor, and its assessment is semi-quantitative, based professional judgement.

Table 9.6 Establishing the magnitude of change

Magnitude	Criteria	Receptor type*	Example**, ***
High	Results in major change to feature, of sufficient magnitude to affect its use/integrity.	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to sustained, permanent or long-term breach of relevant conservation objectives (COs) or non-temporary downgrading (deterioration) of status of WFD surface water body (including downgrading of individual WFD elements) or dependent receptors, or resulting in the inability of the surface water body to attain Good status in line with the measures identified in the RBMP. Deterioration in groundwater levels, flows or water quality, leading to non-temporary downgrading of status of WFD groundwater body or dependent receptors, or the inability of the groundwater body to attain Good status in line with the measures identified in the RBMP.
		Watercourse morphology	Loss or extensive damage to geomorphological habitat and processes due to extensive modification and/or fine sediment input. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive change to channel planform.
		Water use	Complete or severely reduced water availability and/or quality, compromising the ability of water users to abstract.
		Flood risk	Change in flood risk resulting in potential loss of life or major damage to the property or infrastructure.
Medium	Results in noticeable change to feature, of sufficient magnitude to affect its use/integrity in some circumstances.	Aquatic environment	Deterioration in river flow regime, morphology or water quality, leading to periodic, short-term and reversible breaches of relevant COs, or potential temporary downgrading of status of surface water body status (including potential temporary downgrading of individual WFD elements) or dependent receptors, although not affecting the ability of the surface water body to achieve future WFD objectives. Deterioration in groundwater levels, flows or water quality, leading to potential temporary downgrading of status of WFD groundwater body or dependent receptors, although not affecting the ability of the groundwater body to achieve future WFD objectives.
		Watercourse morphology	Partial loss or damage to geomorphological habitat and processes due to modifications and/or fine sediment input. Replacement of the natural bed and/or banks with artificial material (total length is more than 3% of water body length).
		Water use	Moderate reduction in water availability and/or quality, which may compromise the ability of the water user to abstract on a temporary basis or for limited periods, with no longer-term impact on the purpose for which the water is used.
		Flood risk	Change in flood risk resulting in potential for moderate damage to the property or infrastructure.
Low	Results in minor change to feature, with insufficient magnitude to affect its use/integrity in most circumstances.	Aquatic environment	Slight change in river flow regime, morphology or water quality, but remaining generally within COs, and with no short-term or permanent change to status of WFD surface water body (of overall status or element status) or dependent receptors. Slight deterioration in groundwater levels, flows or water quality, but with no short-term or permanent downgrading of status of WFD groundwater body or dependent receptors.

Magnitude	Criteria	Receptor type*	Example**, ***
		Watercourse morphology	Slight change or deviation from baseline conditions, or partial loss or damage or improvement/ gain to in channel habitat and geomorphological processes due to modifications and/or fine sediment input.
		Water use	Minor reduction in water availability and/or quality, but unlikely to affect the ability of a water user to abstract.
		Flood risk	Change in flood risk resulting in potential for minor damage to property or infrastructure.
Very Low	Results in little or no change to feature, with insufficient magnitude to affect its use/integrity.	Aquatic environment	No or very slight change in river flow regime or surface water quality, and no consequences in terms of COs or status of WFD surface water body or dependent receptors. No or very slight change in groundwater levels or groundwater quality, and no consequences in terms of status of WFD groundwater body or dependent receptors.
		Watercourse morphology	Very slight change from surface water baseline conditions, approximating to a 'no change' situation.
		Water use	No, or very slight change in water availability or quality and no change in ability of the water user to exercise licenced rights or continue with small private abstraction.
		Flood risk	Increased frequency of flood flows, but which does not pose an increased risk to property or infrastructure.

*The watercourse morphology receptor type is only relevant when 'in-channel' works are proposed.
**For the purposes of this assessment of change, relevant WFD elements for surface water body classification include:

- all biological quality elements e.g. fish, macrophytes, invertebrates;
- all physico-chemical quality elements e.g. dissolved oxygen, phosphate;
- hydromorphological supporting elements;
- Priority Hazardous Substances;
- Priority Substances;
- Specific Pollutants; and
- For Artificial and Heavily Modified Water Bodies, the mitigation measures assessment.

Significance evaluation methodology

9.4.7 The significance of water-related effects is derived by considering both the value of the feature and the magnitude of change. In this assessment, effects are considered to be significant or not significant according to the matrix in **Table 9.7,** with *'Major'* and *'Moderate'* effects taken to be *'Significant'*. Significance can be *'Beneficial'*, *'Adverse'* or *'Neutral'*.

Table 9.7 Significance evaluation matrix relating to the water environment

Value/importance/value	Magnitude of change: High	Medium	Low	Very Low
High	Major (Significant)	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)
Medium	Major (Significant)	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)
Low	Moderate (Potentially significant)	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)
Very Low	Minor (Not significant)	Negligible (Not significant)	Negligible (Not significant)	Negligible (Not significant)

Note: 'Significant' effects are those identified as 'Major'. 'Moderate' effects would normally be deemed to be 'significant', however, there may be some exceptions, depending on the application of professional judgment.

9.4.8 In this assessment, only the potential and residual significance of change with respect to the water environment (groundwater levels, flows and quality, and river flows, quality and morphology) and flood risk are considered. It is important to recognise that a *'Significant'* change in the water environment does not necessarily result in a *'Significant'* change to ecological features. Indeed, because of the different benchmarks and magnitude criteria used by the two assessments, it is possible that a *'Not Significant'* change in the water environment can still sit alongside a *'Significant'* change in an associated ecological water feature, and vice-versa.

Assumptions

9.4.9 The scope of the assessment is based on a high-level review of desk-based baseline information and will be confirmed through review of additional data sources, site visit and consultation with stakeholders (NRW, LLFA, LPA) during the next stages of the EIA. A site visit will be conducted to confirm the desk reviews of the geological/hydrological and hydrogeological environment and review if the local mapped water features are hydrologically active.

10. Ground Conditions

10.1 Introduction

10.1.1 This chapter describes the proposed scope of the assessment of effects, with respect to Ground Conditions, arising from the Proposed Development. It includes consideration of geology, land contamination, and soil receptors. The chapter should be read in conjunction with the description of the Proposed Development presented in **Chapter 2: Description of the Proposed Development**, and with respect to relevant parts of other chapters, such as **Chapter 9: Water Environment** and **Chapter 7: Biodiversity**, and **Section 13.5 Climate** where there is an overlap or relationship, e.g., hydrogeology.

10.1.2 The scope of the assessment is based on a review of desk-based baseline information and will be confirmed through review of additional data sources and a site walkover, the findings of which will be reported in the Environmental Statement.

10.2 Policy and Legislation

10.2.1 This scoping report chapter has been prepared in line with the relevant planning policy documents outlined in **Chapter 3: Legislation and Planning Policy Overview**. In particular, attention has been paid to the documents listed in **Table 10.1**.

Table 10.1 Policy and legislation relevant to ground engineering

Legislation/Planning policy	Description
Legislation	
The Environment (Wales) Act 2016	The Act makes provisions within Wales for the planning and managing of natural resources at national and local level.
Well-being of Future Generations (Wales) Act (2015)	The Act does not refer explicitly to soils; however, it requires public bodies in Wales to think about the long-term impact of their decisions. It requires them to act in accordance with sustainable development principles, with the aim of achieving well-being goals, including maintaining and enhancing a biodiverse natural environment with healthy functioning ecosystems that support social, economic, and ecological resilience and the capacity to adapt to change (for example climate change).
Policy	
Planning Policy Wales, Edition 11 2021	The 2021 Planning Policy Wales document, Distinctive and Natural Linkages chapter, page 124, states that decisions on planning applications must consider the policy topics of the Distinctive and Natural Places theme, including "*opportunities in all areas to improve the resilience of ecosystems by addressing building on floodplains, diffuse pollution, soil compaction and sealing, ensuring the protection of peat resources*" and "*opportunities to improve health and well-being are taken, in particular, to… ensure water sensitive design, address soil carbon management… so as to improve capacity for adaptability to the challenges of climate change such as flood risk and increased temperatures*". Chapter 6, Section 6.4 Biodiversity and Ecological Networks states that development proposals must consider the need to: "*safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat*". Chapter 6, Section 6.9.16 Land Contamination sates that "*Whenever development or re-development potential exists the planning system will be the preferred means of addressing potential land contamination.*"

Legislation/Planning policy	Description
	It also states that "*Where land contamination issues arise, the planning authority will require evidence of detailed investigation and risk assessment prior to the determination of the application*" as well as "*If contamination cannot be overcome satisfactorily, the authority may refuse planning permission.*" **Minerals** In relation to the coal deposits likely to underlie the Proposed Development site, the Welsh Government's Planning Policy Wales Edition 11 (2021), 5.7.7 notes the benefits of renewable and low carbon energy, as part of the Welsh Government's overall commitment to tackle the climate change emergency and increase energy security, and states that the planning system should maximise renewable and low carbon energy generation and move away from the extraction of energy minerals. See also 'Minerals' note below in relation to the Rhondda Cynon Taf Local Development Plan in relation to the Pennant sandstone resources underlying the Proposed Development site.
Rhondda Cynon Taf Local Development Plan (LDP) up to 2021, Adopted March 2011	The LDP identifies where allocations for new developments such as housing, employment, community facilities, and roads have been made. It provides a framework for local decision making and brings together both development and conservation interests to ensure that any changes in the use of land are coherent and provides maximum benefits to the community. **Soils** Policy AW 8 – Protection and Enhancement of the Natural Environment, states that: "Rhondda Cynon Taf's distinctive natural heritage will be preserved and enhanced by protecting it from inappropriate development and development proposals will only be permitted where:- 1. They would not cause harm to the features of a Site of Importance for Nature Conservation (SINC) or Regionally Important Geological Site (RIGS) or other locally designated sites, unless it can be demonstrated that:- a) The proposal is directly necessary for the positive management of the site; or b) The proposal would not unacceptably impact on the features of the site for which it has been designated; or c) The development could not reasonably be located elsewhere and the benefits of the proposed development clearly outweigh the nature conservation value of the site. 2. There would be no unacceptable impact upon features of importance to landscape or nature conservation, including ecological networks, the quality of natural resources such as air, water and soil, and the natural drainage of surface water." **Ground conditions including land contamination** Policy AW 10 - Environmental Protection and Public Health states that "development proposals will not be permitted where they would cause or result in a risk of unacceptable harm to health and / or local amenity because of:- … 4. Contamination; 5. Landfill gas; 6. Land instability; 7. Water pollution; … 9. Or any other identified risk to the environment, local amenity and public health or safety unless it can be demonstrated that measures can be taken to overcome any significant adverse risk to public health, the environment and / or impact upon local amenity." **Minerals** Policy AW 14 – Safeguarding of Minerals defines mineral resources that shall be safeguarded from any development which would unnecessarily sterilise them or hinder their extraction. These include resources of sandstone underlying the Proposed Development site and surrounding area, as shown on the proposals map[41]. Chapter 5 of the LDP, paragraph 5.92 states that "the Pennant sandstone covers approximately 70% of the surface area of Rhondda Cynon Taf. The deposits are generally centrally located running north to south. Previous studies to establish the quality of the deposits and refine the potential safeguarding areas to the most important deposits, have determined that their quality was in the main remarkably uniform."

[41] http://www.cartogold.co.uk/rhondda/Rhondda.htm

10.3 Baseline conditions

Data sources

10.3.1 The EIA scoping exercise has been undertaken with reference to **Chapter 2: Description of the Proposed Development**, supported by a number of data sources. The principal data sources used to inform this chapter comprise the following:

- Multi-Agency Geographic Information for the Countryside (MAGIC) interactive map for topography and features (available online https://magic.defra.gov.uk/MagicMap.aspx; accessed April 2021);
- British Geological Survey (BGS) GeoIndex Onshore for geological information, including exploratory hole records (available online https://mapapps2.bgs.ac.uk/geoindex/home.html; accessed April 2021);
- Coal Authority Interactive Map for mining information (available online https://mapapps2.bgs.ac.uk/coalauthority/home.html; accessed April 2021);
- National Library of Scotland for historical maps (available online https://maps.nls.uk/; accessed April 2021);
- LandIS Soilscapes Map, (available online http://www.landis.org.uk/soilscapes/#; accessed April 2021);
- Welsh Government and Natural Resources Wales Lle Geo-Portal, Unified Peat Map of Wales (available online http://lle.gov.wales/map#m=-3.39055,51.59686,14&b=europa&l=1738; accessed April 2021);
- Welsh Government and Natural Resources Wales Lle Geo-Portal, Predictive Agricultural Land Classification Map (available online http://lle.gov.wales/map/alc2#m=-3.4,52.5,8&b=europa&l=1724h;1653h;1652h;1662h;1661h;1689h;1647h;1646h;1645h;1660h;1642h;1833; accessed April 2021); and
- Mynydd y Glyn Wind Farm Scoping Report produced by Hyder (reference 0001-UA005281-UE31-01 and dated June 2014).

Current baseline

10.3.2 This section provides a high-level review of the current baseline environmental characteristics for the Proposed Development, with reference to the ground conditions, which are described under the subheadings of 'soils', 'geology', 'mining' and 'land contamination'. The baseline conditions will be confirmed through review of additional data sources, site visits, ground investigation and consultation with stakeholders during the next stages of the EIA.

10.3.3 The topography and environmental setting of the Proposed Development site are also summarised in this section as these conditions affect the sensitivity of the receptors discussed in Section 10.4.

Study area

10.3.4 The study area for ground conditions includes a 500m buffer surrounding the Proposed Development boundary. This is considered appropriate based upon professional experience in land contamination assessment and geotechnical site assessment. Impacts on soil receptors, including peat, caused by development generally occur within the Proposed Development boundary and the study area for these receptors is, therefore, focused on this Site.

Current and historical land use within the Proposed Development site and study area

10.3.5 Inspection of historical maps (available online from the National Library of Scotland) indicates that the Proposed Development site has been mostly undeveloped since the 19th century, although there is evidence of quarrying and coal mining in the vicinity of the Proposed Development. For example, OS County Series maps dating from the 1870s show quarries and the Glynfâch, Llwyncelyn and Coedcae Collieries, and later the Lewis Merthyr Navigation Colliery, to the north of the site and the Glyn Colliery to the immediate west. The site would seem to be free of buildings. There are buildings to the south-east just beyond the Proposed Development (Langton Court Farm) and two clusters of buildings to the west at Rhiw-garn-fâch and Rhiw-garn-fawr. Quarries and areas of waste disposal are shown on or close to the northern boundary of the Proposed Development in maps dating from the 1950s.

Topography

10.3.6 A detailed description of topography is presented in **Chapter 9: Water Environment**. In summary, the Proposed Development is located around Mynydd y Glyn, which is situated between Trebanog and Tonyrefail, to the west, and Pontypridd to the east. The highest point of the site (the summit of Mynydd y Glyn) is set at 377 m AOD, within the north-western area of the site. There is a secondary peak at an elevation of 375 m AOD, which is almost at the centre of the Proposed Development.

Soils

10.3.7 Information reviewed on the LandIS Soilscapes map[42] indicates the likely soil types within the Proposed Development comprise very acid loamy upland soils with a wet peaty surface, a peaty texture and high carbon content (type 16), and, freely draining acid loamy soils over rock, with a loamy texture and medium carbon content (type 13).

10.3.8 The Unified Peat Map of Wales shows six discrete areas of peat deposits located within a band running roughly west to east in the central area of the Proposed Development site.

10.3.9 The Predictive Agricultural Land Classification (ALC) Map 2[43] indicates that the agricultural land classification within the Proposed Development is Grade 4 or lower and, therefore, is not likely to include any 'best and most versatile' (BMV) land (categories 1, 2 or 3a), and consequently potential for significant effects of the Proposed Development on agricultural soils has been scoped out of the EIA.

10.3.10 Wood's Extended Phase 1 Habitat Survey (see **Chapter 7: Biodiversity**) identified habitat types that indicate peat is present or potentially present, comprising blanket bog in the central and northeast areas of the Proposed Development, and areas of wet heath/acid grassland in the north. There are also several areas of improved and semi-improved grassland in the Proposed Development site and a small area of coniferous forest plantation is in the northeast; these habitat types can potentially contain deep peat deposits (>0.5m thickness of surface peat) despite the vegetation cover providing no indication of peat.

10.3.11 A previous Mynydd y Glyn Wind Farm Scoping Report produced by Hyder (reference 0001-UA005281-UE31-01 and dated June 2014) records that a limited peat probing survey was undertaken and this encountered peat within areas of blanket bog and marshy grassland.

[42] http://www.landis.org.uk/soilscapes/#, accessed April 2021
[43] Lle - Map - Predictive Agricultural Land Classification (ALC) Map 2 (gov.wales), accessed April 2021

10.3.12 A geo-environmental desk study will be produced for the Proposed Development site to update the baseline in relation to potential slope stability issues.

Geology

10.3.13 The British Geological Survey (BGS) GeoIndex[44] 1:50,000 scale mapping shows that superficial deposits are thin or absent in the majority of the site. This indicates that bedrock is close to surface (<10m below ground level) or at surface. Limited areas of peat are shown in a band which runs east-west through the central part of the site. Additionally, an area of till (diamicton) is shown in the north of the Proposed Development site, and at the western and southern boundaries.

10.3.14 The BGS GeoIndex 1:50,000 scale bedrock geological mapping shows the Proposed Development site is underlain by the Rhondda and Brithdir Members of the Pennant Sandstone Formation. Both geological units are described as "*green-grey, lithic arenites ("Pennant sandstones") with conglomerate lenses at bases of units; thin mudstone/siltstone and seatearth interbeds and mainly thin coals*". Several linear features are shown within the Proposed Development site, two marine bands are present running roughly northwest to east through the central area of the site, and inferred coal seams are shown at the boundary between the Rhondda and Brithdir Members.

10.3.15 The BGS GeoIndex has three borehole records located in the central part of the Proposed Development site, identified as Cymmer Colliery No.16 B.H, Cymmer Colliery No.17 B.H and Cymmer Colliery No.18 B.H45. All three boreholes were progressed underground in the Cymmer Colliery to investigate "*from the lower 5-feet to the upper 5-feet*". The boreholes encountered shale and coal. The elevations of the tops of the boreholes are recorded as being 228.9m BOD, 212.4m BOD and 213.2m BOD respectively.

10.3.16 A geo-environmental desk study will be produced for the Proposed Development site to update the baseline in relation to potential ground stability issues/geohazards associated with the site geology.

Geodiversity

10.3.17 The MAGIC interactive database[46] indicates that there are no geological SSSIs located within the Proposed Development site or in the wider study area.

10.3.18 The Natural Resources Wales datasets for Regionally Important Geodiversity Sites (RIGS) and Geological Conservation Review (GCR) Site Boundaries[47] were consulted and indicate there are no RIGS or GCR sites within the Proposed Development site or in the wider study area.

10.3.19 Given the absence of non-statutory and statutory geological designations within the Proposed Development site or in the study area, these receptors have been scoped out.

[44] Available online at https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.64110447.1775017917.1618840483-643719028.1584428973; accessed April 2021
[45] BGS ID: 375792: BGS Reference: ST08NW14, British National Grid (27700): 303398,189396,
[46] https://magic.defra.gov.uk/MagicMap.aspx, accessed March 2021
[47] https://data.gov.uk/dataset/8aafe661-c368-4135-9be1-0423b6366bab/regionally-important-geological-and-geomorphological-sites-rigs, accessed March 2021

Mining and Minerals

10.3.20 Inspection of historical maps indicates that coal mining has occurred in the vicinity of the Proposed Development, and as described in 10.3.14 inferred coal seams are present on the Proposed Development site and two marine bands.

10.3.21 Furthermore, inspection of the Coal Authority Interactive Map for mining information[48] indicates that the site is situated within a Coal Mining Reporting Area. The interactive map indicates that, within or in the vicinity of the Proposed Development site, there exist:

- mine entries;
- mine entry potential zones of influence;
- past shallow coal mine workings;
- surface coal resource areas;
- coal outcrops; and
- development high risk areas.

10.3.22 A geo-environmental desk study will be produced for the Proposed Development site to update the baseline in relation to potential ground stability or other issues associated with historical mining activity.

10.3.23 Based on the review of the Coal Authority Interactive Map, a mining risk assessment is needed, and this will be produced for the Proposed Development site to update the baseline.

10.3.24 With respect minerals, due to the small development footprint of the Proposed Development in relation to the red line boundary and the large area of Rhondda Cynon Taf covered by the Pennant sandstone, significant effects on the Pennant sandstone resource are not considered likely and such effects will not be considered further in the EIA, subject to consultation and the Scoping Opinion.

Contamination

10.3.25 Historical mapping shows disused quarries and collieries surrounding the site; there is therefore the potential for contamination or waste from these activities to be present on the site. Additionally, the Hyder report (reference 0001-UA005281-UE31-01 and dated June 2014) indicates that there are a number of potential contamination sources in the form of historical landfills surrounding the site, e.g., the quarry at Rhiwinder Fawr Farm, located approximately 400m west of site which accepted industrial, commercial, and household waste until 1987.

Environmental setting: hydrogeology, hydrology and sensitive land uses

10.3.26 A detailed description of hydrogeology is presented in **Chapter 9: Water Environment**. In summary, the South Wales Upper Coal Measures is classified by NRW as a Secondary A Aquifer. The superficial deposits of alluvium, Glaciofluvial Deposits and River Terrace Deposits are also classified by NRW as Secondary A aquifers. The till is classified as a Secondary Undifferentiated aquifer. The groundwater vulnerability of the bedrock and superficial deposits is categorised as High Vulnerability in the north and south and Medium Vulnerability in the centre, southeast and southwest of the study area. The South Wales Upper Coal Measures underlying the study area is a designated WFD groundwater body and achieved 'Good' quantitative status and 'Poor' chemical

[48] Available online https://mapapps2.bgs.ac.uk/coalauthority/home.html; accessed May 2020

status in the 2016 WFD classification (Cycle 2). The Proposed Development area and the wider study area are not within a source protection zone (SPZ).

10.3.27 A detailed description of hydrology is presented in **Chapter 9: Water Environment**. In summary, the Proposed Development site extends over two hydrological catchments, the northern part draining to the Afon Rhondda Fawr (c.750 m north) and the southern part draining to the Nant Muchudd (c.750m south). Six tributaries of the Afon Rhondda Fawr issue within the northern and western edges of the Proposed Development site. One of these tributaries is Nant Gelliwion which flows to the east before joining the Afon Rhondda Fawr in Pontypridd. Two tributaries of Nant Muchudd issue within the southern edge of the Proposed Development site with several additional tributaries issuing in the wider study area.

10.3.28 There are no sites with statutory nature conservation designations within 250m of the proposed Development site.

10.3.29 There are two non-statutory designated sites within the Proposed Development site, these comprise the Mynydd y Glen Site of Important Nature Conservation (SINC) which is an area of upland peat bog occupying the west central portion of the site, and Mynydd Gelliwion and Gelliwion Slopes, a SINC comprising bog, grassland and woodland mosaic in the northeast of the site and extending over a larger area to the northeast of the Proposed Development site.

10.4 Scope of the assessment

Potential receptors

10.4.1 The principal receptors that have been identified as being potentially subject to likely significant effects are listed below and discussed in **Table 10.2**:

- human health for future site users and adjacent site users;
- controlled waters;
- property (built environment, crops, grazing animals); and
- soils (topsoil and subsoil including peat deposits if/where present).

10.4.2 The Proposed Development could potentially result in effects on receptors due to land instability due to the presence of peat or due to former mining activity as listed below**:**

- Human health for future site users and adjacent site users;
- Soils (topsoil and subsoil);
- Controlled waters; and
- Property (crops, grazing animals, built environment including services).

10.4.3 The Proposed Development has the potential to have significant effects on soils (topsoil and subsoil) including peat, through ground disturbance activity, compaction, soil sealing and the temporary or permanent displacement of soil during construction.

Likely significant effects

10.4.4 The likely significant ground conditions effects that will be taken forward for assessment in the Environmental Statement are summarised in **Table 10.2**.

Table 10.2 Likely significant ground condition effects

Activity	Effect	Receptor
Construction		
Construction activities on land where peat is potentially present: • **Use of plant and machinery, vehicle movements** • **Excavation including temporary or permanent displacement of soil to construct foundations and tracks or temporary tracks and hardstanding for cranes and compounds** • **Temporary storage of soils and dewatering activities**	Permanent loss of soils including soil sealing due to construction of hard surfaced areas, leading to changes in site hydrology	Soils (topsoil and subsoil) Controlled waters: groundwater and surface water
Construction activities on land where mining has taken place: • **Use of plant and machinery, vehicle movements** • **Excavation including temporary or permanent displacement of soil to construct foundations and tracks or temporary tracks and hardstanding for cranes and compounds** • **Temporary storage of soils and dewatering activities**	Potential for changes in site hydrology and hydrogeology (including mine water flows), potential for changes in the site's ground gas regime	Soils (topsoil and subsoil) Controlled waters: groundwater and surface water
Construction activities located on land potentially affected by contamination	Mobilisation of contaminants due to ground disturbance e.g., dust generation, contaminated run-off, creation of new pollutant migration pathways during excavation or construction, failure to manage and segregate excavated materials appropriately	Human health: future site users and adjacent site users (by direct contact, inhalation or ingestion pathways) Controlled waters: groundwater and surface water Property (crops, grazing animals, built environment) Soil (topsoil and subsoil)

10.4.5 The effects scoped out from further assessment in the EIA are:

- Potential effects on geology, due to the absence of sensitive geological receptors on the Proposed Development site or in the study area.
- Potential effects on best and most versatile agricultural land, due to the Predictive Agricultural Land Classification (ALC) Map 2 showing the absence of any land above Grade 4.
- Potential effects on land (or water) quality during the construction phase due to accidental release of contaminants (including oils, fuels, chemicals and waste) from construction plant or machinery or waste storage points e.g., accidental spillages or leaks. These risks can be adequately managed through the Construction Environmental Management Plan (CEMP), and significant effects are, therefore, unlikely.

- Potential effects on soil and land during the operational phase, as following construction the majority of the Proposed Development site will be returned to its current use.

10.4.6 Impacts during decommissioning are likely to be similar to those during the construction phase. However, dependent on the exact nature of the decommissioning activities that take place, it is likely that ground disturbance would be much less. Mitigation similar to that implemented during the construction and operational phases (updated to reflect changes in legislation/guidance) should also help to ensure that the significance of such impacts is minimised. It is therefore proposed that consideration of decommissioning effects is 'scoped out' of the EIA.

10.4.7 The stability of the ground, in so far as it affects land use, is a material consideration that is taken into consideration in planning application decisions. Land stability in relation to the ground conditions on the Proposed Development site will be addressed throughout the design and construction process by compliance with the Construction (Design and Management) Regulations 2015 and will be informed by the geo-environmental desk study, the mining risk assessment, the Phase 1 peat depth survey, and any further relevant surveys undertaken. It will not be considered further during the EIA process.

10.5 Assessment methodology

General approach

10.5.1 This section describes the approach to the assessment of potential effects relating to ground conditions arising from the Proposed Development on receptors. The proposed approach will be confirmed with Natural Resources Wales (NRW) and the Local Planning Authority (LPA) during the next stages of the EIA.

10.5.2 The generic project-wide approach to the assessment methodology is set out in **Chapter 4: The Environmental Impact Assessment process**. This section describes how this methodology will be applied, and adapted as appropriate, to address the specific needs of the geology assessment.

10.5.3 The effect of the Proposed Development will be assessed through a desk-based study to understand the baseline environment relevant to geology, soil type and contamination status. Consultations with NRW and the LPA will be undertaken to obtain more local detailed information.

Land contamination approach

10.5.4 The effect of the Proposed Development will be assessed through a desk-based study to understand the baseline environment relevant to geology, soil type and contamination status. Consultations with NRW and the LPA will be undertaken to obtain more detailed local information.

Risk assessment

10.5.5 With respect potential contaminated land, the process of managing land contamination, as set out in the Environment Agency guidance *Land Contamination: Risk management* (LCRM), is based on risk assessment. The assessment of risks from contaminated land is based upon the identification and subsequent assessment of a contaminant linkage. A contaminant linkage requires the presence of:

- a source of contamination;
- a receptor capable of being adversely affected by the contamination; and
- an active pathway capable of exposing a receptor to the contaminant.

10.5.6 The risk assessment aims to assess the significance of each potential contaminant linkage. The key to the classification is that the designation of risk is based upon the consideration of both of the following.

- The magnitude of the potential consequence (for instance, severity). It takes into account both the potential severity of the hazard and the sensitivity of the receptor.
- The magnitude of probability (for instance, likelihood). It takes into account both the presence of the hazard and receptor and the integrity of the pathway.

10.5.7 The definitions for the qualitative risk assessment have been taken from "*Guidance for the Safe Development of Housing on Land Affected by Contamination*" Annex 4 R&D Publication 66: 2008 Volume 2.

10.5.8 The likelihood classifications for the contaminant linkages being realised is presented in **Table 10.3**.

Table 10.3 Likely significant ground condition effects

Classification	Definition	Examples
High Likelihood	There is contaminant linkage and an event would appear very likely in the short-term and almost inevitable over the long-term, or there is evidence at the receptor of harm or pollution	a) Elevated concentrations of toxic contaminants are present in soils in the top 0.5m in a residential garden. b) Ground/groundwater contamination could be present from chemical works, containing a number of USTs, having been in operation on the same site for over 50 years.
Likely	There is contaminant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.	a) Elevated concentrations of toxic contaminants are present in soils at depths of 0.5-1.0m in a residential garden, or the top 0.5m in public open space. b) Ground/ groundwater contamination could be present from an industrial site containing a UST present between 1970 and 1990. The tank is known to be single skin. There is no evidence of leakage although there are no records of integrity tests.
Low Likelihood	There is contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a long period such an event would take place and is less likely in the shorter term.	a) Elevated concentrations of toxic contaminants are present in soils at depths >1m in a residential garden, or 0.5-1.0m in public open space. b) Ground/groundwater contamination could be present on a light industrial unit constructed in the 1990s containing a UST in operation over the last 10 years – the tank is double skinned but there is no integrity testing or evidence of leakage.
Unlikely	There is contaminant linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.	a) Elevated concentrations of toxic contaminants are present below hardstanding. b) Light industrial unit <10 yrs old containing a double skinned UST with annual integrity testing results available.

10.5.9 The magnitude of the potential consequence of a contaminant linkage gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is based on full exposure *via* the linkage being examined. The classification of consequence is presented in **Table 10.4**.

Table 10.4 Classification of consequence

Classification	Human Health	Controlled Water	Ecology	Property / Structures/ Crops and animals	Examples
Severe	Highly elevated concentrations likely to result in "significant harm" to human health as defined by the EPA 1990, Part 2A, if exposure occurs.	Equivalent to Environment Agency (EA) Category 1 pollution incident including persistent and/or extensive effects on water quality; leading to closure of a potable abstraction point; major impact on amenity value or major damage to agriculture or commerce.	Major damage to aquatic or other ecosystems, which is likely to result in a substantial adverse change in its functioning or harm to a species of special interest that endangers the long-term maintenance of the population.	Catastrophic damage to crops, buildings or property.	Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (e.g. cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions. Major fish kill in surface water from large spillage of contaminants from site. Highly elevated concentrations of Hazardous or priority substances present in groundwater close to small potable abstraction (high sensitivity). Explosion, causing building collapse (can also equate to immediate human health risk if buildings are occupied).
Medium	Elevated concentrations which could result in "significant harm" to human health as defined by the EPA 1990, Part 2A if exposure occurs.	Equivalent to EA Category 2 pollution incident including significant effect on water quality; notification required to abstractors; reduction in amenity value or significant damage to agriculture or commerce.	Significant damage to aquatic or other ecosystems, which may result in a substantial adverse change in its functioning or harm to a species of special interest that may endanger the long-term maintenance of the population.	Significant damage to crops, buildings or property.	Significant harm to humans is defined in the Contaminated Land Statutory Guidance as death, life threatening diseases (e.g. cancers), other diseases likely to have serious impacts on health, serious injury, birth defects, and impairment of reproductive functions.. Damage to building rendering it unsafe to occupy e.g. foundation damage resulting in instability. Ingress of contaminants through plastic potable water pipes.
Mild	Exposure to human health unlikely to lead to "significant harm".	Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water quality; marginal	Minor or short-lived damage to aquatic or other ecosystems, which is unlikely to result in a substantial adverse change in its functioning or harm to a species	Minor damage to crops, buildings or property.	Exposure could lead to slight short-term effects (e.g. mild skin rash). Surface spalling of concrete.

Classification	Human Health	Controlled Water	Ecology	Property / Structures/ Crops and animals	Examples
		effect on amenity value, agriculture or commerce.	of special interest that would endanger the long-term maintenance of the population.		
Minor	No measurable effects on humans	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.	Repairable effects of damage to buildings, structures and services.	The loss of plants in a landscaping scheme. Discoloration of concrete.

10.5.10 The risk matrix to link the likelihood and consequence is shown in **Table 10.5.**

Table 10.5 Risk Matrix

	Likelihood:			
Potential Consequence:	**Unlikely**	**Low Likelihood**	**Likely**	**High Likelihood**
Severe	Moderate/low risk	Moderate Risk	High Risk	Very High Risk
Medium	Low	Moderate/low risk	Moderate Risk	High Risk
Mild	Very low risk	Low Risk	Moderate/low risk	Moderate Risk
Minor	Very low risk	Very low risk	Low Risk	Low Risk

10.5.11 The overall risk definitions are summarised in **Table 10.6.**

Table 10.6 Risk Definitions

Risk	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to be site owner/or occupier. Investigation is required as a matter of urgency and remediation works likely to follow in the short-term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without remediation action. Realisation of the risk is likely to present a substantial liability to the site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely, that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine the potential liability to site owner/occupier. Some remediation works may be required in the longer term.
Low	It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the site owner/or occupier would face substantial liabilities from such a risk. Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.
Very Low	It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

10.5.12 It is important that the assessment and classification of risk is carried out prior to environmental measures being embedded into the development proposals. This then allows the environmental measures to be targeted at the risks and the assessment of significance of the change in risk resulting from the Proposed Development to be carried out with the measures embedded to be consistent with approach used in respect of other environmental topic assessments.

10.5.13 Where a risk classification of moderate or greater has been determined, it is considered that the source–pathway–target contaminant linkage requires some form of risk management or intervention.

10.5.14 As the first step, such risk management or intervention would normally take the form of either further investigation, with the additional knowledge gained allowing the risk to be more accurately assessed and potentially the classification may be lowered. However, if the risk classification remains at moderate or above then remediation, in the form of embedded mitigation, may be

required to reduce or remove the source of contamination or disrupt the pathway to the target or receptor.

Significance evaluation methodology

10.5.15 To use risk assessment as the basis for the evaluation of the significance of effects, it is necessary to evaluate the change in risk from baseline conditions to those during and following the Proposed Development. In order to define the baseline risk the initial assessment and classification of risk is carried out for the study area in its pre-development state. A separate assessment of risk will then be conducted for the site post-development (including environmental measures inherently embedded in the development) to enable an evaluation of the change in risk due to the Proposed Development.

10.5.16 **Table 10.7** uses the risk classification pre- and post-development as the basis for a significance evaluation matrix for the purposes of EIA.

Table 10.7 Land quality (contamination) significance evaluation matrix

Risk Pre-development			Risk Post-development (Including Embedded Measures)					
			Very Low	**Low**	**Moderate / Low**	**Moderate**	**High**	**Very High**
Existing Receptors		**Very High**	Major Positive (Significant)	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)
		High	Major Positive (Significant)	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)
		Moderate	Moderate Positive (Potentially Significant)	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)
		Moderate / Low	Moderate Positive (Potentially Significant)	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)
		Low	Minor Positive (Not Significant)	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)
		Very Low	Negligible (Not Significant)	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)
No Receptor Present Pre-development		**N/A**	Minor Negative (Not Significant)	Moderate Negative (Potentially Significant)	Moderate Negative (Potentially Significant)	Major Negative (Significant)	Major Negative (Significant)	Major Negative (Significant)

Risks that remain at moderate, high or very high post-development are unlikely to be considered acceptable and further mitigation will be required to enable the development to proceed.

10.5.17 If the embedded measures are effective the risks post development should be less than moderate or the risks from the Proposed Development are likely to be considered unacceptable.

10.5.18 However, there may be circumstances where development can proceed, and moderate and above risks remain, e.g. groundwater contamination where cost benefit analysis indicates that remediation is not warranted.

10.5.19 Guidance on the protection of the environment will be used to assist with the development of mitigation e.g. NRW and CIRIA. The assessment will be based on the implementation of those mitigation measures identified, which will feed into the construction environmental management

plan (CEMP), method statements and procedures for the Proposed Development. In particular, these will cover the control of drainage runoff from excavations and access tracks and the formation of turbine footings. These measures will reflect current best practice in the industry and will serve to prevent increases in pollution and sediment-loading.

10.5.20 The Environmental Statement chapter will summarise the findings of the desk study, this forming the baseline against which the potential impact of the Proposed Development, alone and cumulatively with other developments, would be assessed. The assessment will be based on both receptor importance and the nature and magnitude of the impact as a result of the Proposed Development and all mitigation considered necessary will be identified and residual effects with this in place will be determined.

Soils and Peat approach

10.5.21 As peat is present within the Proposed Development site, an initial Phase 1 peat depth survey will be completed across the entire Proposed Development site on a 100 x 100m grid to establish the baseline conditions of the site. At the same time as the Phase 1 survey, salient geomorphological features will be mapped to inform peat landslide risk assessment.

10.5.22 The results of the Phase 1 survey (and subsequent surveys if necessary) will be presented in a series of drawings showing the proposed wind farm layout overlain by peat depths as a set of colour coded points. In addition, the proposed layout will also be overlain by an interpolated peat depth map.

10.5.23 If the Phase 1 peat depth survey confirms the presence of deep peat, and the relevant area cannot be avoided, this will be followed up with a higher resolution Phase 2 peat survey targeting the proposed locations of the wind farm infrastructure. In the absence of any guidance from NRW the Phase 2 survey will be conducted in accordance with best practice guidance document "*Peatland Survey. Guidance on Developments on Peatland*" published by the Scottish Government and NatureScot. The survey will comprise:

- A 10m x 10m grid of peat depth probing points within the turbine micro-siting areas, substation and temporary construction compound (if required).
- Peat depth probing locations every 50m along any new or upgraded access tracks with a probe point 10m perpendicular to either site of the proposed access tracks.
- Additional peat depth probing at the crane pads and turning heads as required.

10.5.24 In addition to peat depth probing, the Phase 2 survey will also include the collection of soil/peat cores where peat depths are >0.5m. This will enable the full thickness of peat to be characterised in accordance with the von Post humification scale and enable the collection of samples for total organic carbon, soil moisture, organic matter content and bulk density testing. This information can be used to inform the carbon balance calculation for the Proposed Development (see **Section 13.5**).

10.5.25 If necessary, based on the findings of the Phase 1 and 2 peat depth surveys detailed information and plans for peat management will be included in a Peat Management Plan presented as a Technical Appendix to the Environmental Statement. The Peat Management Plan will include details on the:

- Distribution of peat across the Proposed Development (depicted on peat depth maps with the wind farm elements overlain.
- Characteristics of the peat.

- Measures taken to avoid deep peat and minimise disturbance. Where necessary measures to re-use, restore or rehabilitate disturbed peat will be included.
- Quantities of acrotelmic, catotelmic and amorphous peat potentially disturbed by each part of the Proposed Development.
- Management of peat during construction (e.g., temporary storage locations and measures).

10.5.26 If development on peat is unavoidable, the EIA will also look for opportunities to restore, improve or protect peatland habitats and where necessary compensate for the peat disturbance as a result of the Proposed Development.

10.5.27 If peat is present on the site, a Peat Landslide Risk Assessment will also be undertaken in accordance with Scottish Government guidance document "*Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments*" (2017).

10.5.28 This approach is in accordance with published best practice guidance[49] and the Welsh Government Environment (Wales) Act 2016 with regard to the protection of natural resources and The Well-being of Future Generations (Wales) Act (2015) with regard to sustainable development and can help support Welsh Government policy relating to peat[50] including supporting improvements to peatland ecosystem resilience.

10.5.29 The magnitude / consequence of the loss or damage to soil and peat resources is based upon:

- The likely nature and scale of soils effects (positive, neutral or negative) during the construction and the operational phases of the project.
- The likelihood of the Proposed Development to result in significant effects.
- The issues requiring further assessment and the methods to be applied.

10.5.30 The approach to assigning levels of sensitivity will be based on the Design Manual for Roads and Bridges (DMRB) LA 109[51] guidance, as summarised in Table **10.8.**

10.5.31 Peat is not referred to specifically in the DMRB guidance and **Table 10.8**, therefore, includes additional description for peat soils (shown in italics) that will be used in the assessment for the Proposed Development. The sensitivity of the soil on the Proposed Development site will be assigned on the basis of the findings of the Phase 1 peat survey and other relevant survey or desk-based information. The classifications in **Table 10.8** are intended to reflect the importance of peat soils in relation to their soil organic matter content and climate change resilience and mitigation, and biodiversity and flood management functions, and the Welsh Government's Peatland Policy[52].

49 Currently, best practice in the UK is reflected in the guidance published by the Scottish Government and NatureScot, as outlined in this chapter.
50 https://naturalresources.wales/about-us/strategies-and-plans/national-peatland-action-programme/?lang=en
51 Highways England, (2019), Design Manual for Roads and Bridges, Sustainability & Environment Appraisal, LA 109 Geology and Soils https://www.standardsforhighways.co.uk/dmrb/search/adca4c7d-4037-4907-b633-76eaed30b9c0.
52 https://gov.wales/welsh-government-launches-national-peatlands-action-programme-help-lock-carbon-and-reinvigorate

Table 10.8 Sensitivity classifications for soils

Value / Sensitivity	Description Example
Very high	Soils: soils *(other than peat)* directly supporting an EU designated site (e.g. SAC, SPA, Ramsar) *Peat: designated peatlands (any statutory designation including SSSI)*
High	Soils: soils *(other than peat)* directly supporting a UK designated site (e.g. SSSI) *Peat: deep peat with no designation*
Medium	Soils: Soils *(other than peat)* supporting non-statutory designated sites (e.g. Local Nature Reserves (LNR), LGS's, Sites of Nature Conservation Importance (SNCIs)) *Peat: peaty soils*
Low	Soils: soils *(other than peat)* supporting non-designated notable or priority habitats
Very Low	Soils: soils *(other than peat)* on previously developed land formerly in 'hard uses' with little potential to return to agriculture

10.5.32 The approach to assigning the consequence of any damage or loss will be based on the DMRB LA 109 guidance summarised in **Table 10.9**.

Table 10.9 Magnitude classifications soils

Magnitude	Description Example
Major	Soil: physical removal or permanent sealing of soil resource or agricultural land.
Moderate	Soils: permanent loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource.)
Minor	Soils: temporary loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource.)
Negligible	Soils: no discernible loss / reduction of soil function(s) that restrict current or approved future use.
No change	Soils: no loss / reduction of soil function(s) that restrict current or approved future use.

10.5.33 The determination of significance will combine the sensitivity and magnitude using the matrix presented in **Table 10.10**. Where professional judgement is applied in assigning a sensitivity or magnitude (e.g., in relation to peat, which is not referred to directly in the DMRB LA 109 guidance), this will be clearly defined, and the resulting assessment conclusions clarified in the Environmental Statement.

Table 10.10 Soil effects significance evaluation matrix

		Magnitude of change				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Sensitivity/importance/value	**Very high**	Neutral	Slight	**Moderate or large**	**Large or very large**	**Very large**
	High	Neutral	Slight	Slight or moderate	**Moderate or large**	**Large or very large**
	Medium	Neutral	Neutral or slight	Slight	Moderate	**Moderate or large**
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

Note: Significant effects are those identified as 'Very large' or 'large'. 'Moderate' effects have the potential to be significant, and indeed they would normally be deemed to be significant. However, there may be some exceptions, depending on the environmental topic and the application of professional judgment.

Assumptions

10.5.34 The scope of the assessment is based on a high-level review of available desk-based information and will be confirmed through further desk-based review and surveys, including a geo-environmental desk study, a Phase 1 peat depth survey and a mining risk assessment.

11. Traffic and Transport

11.1 Introduction

11.1.1 This chapter sets out the proposed scope of the Traffic and Transport assessment, which will assess the impact of the various different stages of the Proposed Development on the existing road network in the area. Reference will also be made to applicable policies, guidance and strategies.

11.1.2 The study area for the Traffic and Transport assessment will include all transport routes associated with the Proposed Development and will consider the impact of the construction, operational and decommissioning phases on the transport haulage routes.

11.2 Policy and Legislation

11.2.1 This scoping report chapter has been prepared in line with the relevant planning policy documents outlined in **Chapter 3: Legislation and planning policy overview**. In particular, attention has been paid to the policy documents listed in **Table 11.1**.

Table 11.1 Policy and Legislation relevant to Traffic and Transport

Legislation/Planning policy	Description
Legislation	
Guidelines for the Environmental Assessment of Road Traffic, Institute of Environmental Management and Assessment (IEMA), (1993)	The Guidelines sets out the assessment methodology to determine the study area for assessment and the 'rules' to determine this.
Policy	
Planning Policy Wales, Edition 11, Welsh Government (2021)	Sets out the land use policies for the Welsh Government including strategic search areas for onshore wind.
South East Wales Valleys, Local Transport Plan (2015)	The five South East Wales Valleys local authorities of Blaenau Gwent, Caerphilly, Merthyr Tydfil, Rhondda Cynon Taf and Torfaen jointly developed this Local Transport Plan (LTP). The LTP programme provides details of the transport schemes and aspirations of the SE Wales Valleys local authorities at the current time.

11.3 Baseline conditions

Data sources

11.3.1 The sources of information used to inform the Traffic and Transport scoping chapter and the assessment, are listed in **Table 11.2**.

Table 11.2 Sources of information used for the Traffic and Transport Assessment

Source	Data
Google Earth/Google Maps	Online mapping
Crashmap	Personal Injury Accidents (PIAs)
Department for Transport	Traffic Counts (AADT)

Current baseline

11.3.2 It is anticipated that the Abnormal Indivisible Loads (AILs) [transporting the turbine equipment] will travel by road from the Port of Swansea, which is the closest port in the region capable of handling wind turbine equipment. The Port of Swansea has been frequently used for the delivery of wind turbine components in this region, for example being the selected port of entry for the Brechfa Forest Wind Farm, located to the north of Carmarthen.

11.3.3 The sections of the road network included within the assessment will be determined on the basis of the potential effect of increased traffic associated with the Proposed Development on identified sensitive receptors. It is understood that the Site will be accessed from the public highway from the west via an existing gated access point located on Collenna Road, a few metres north of the junction with Llantrisant Road. On this basis, traffic will route from the M4 (Welsh Trunk Road Network) in the south, continuing north on the A4119 for approximately 11km, before taking the A4233 at Tonyrefail for 1km to Collenna Road. The A4119 is a major single carriageway road, largely separated from residential and other sensitive receptors by wooded corridors either side of the carriageway. This route is therefore considered to have minimal environmental constraints.

11.4 Scope of the assessment

11.4.1 Based on professional experience and an understanding of the nature of the Proposed Development, it is expected that the majority of traffic movements will be generated during the construction phase.

11.4.2 Once operational, it is envisaged that the amount of traffic movements associated with the Proposed Development would be minimal. Occasional visits may be made to the Site for maintenance checks. The vehicles used for these site visits are likely to be 4x4 or similar and there may be an occasional need for a heavy goods vehicle (HGV) to access the site for maintenance and repairs.

11.4.3 It is considered that the effects of operational traffic would be negligible and it is therefore proposed that the assessment of the operational phase of the development is 'scoped out' from detailed assessment in the EIA.

11.4.4 On the assumption that below ground infrastructure and access tracks will remain in situ, less traffic will be generated during decommissioning than during construction. Even if tracks were to be removed, less traffic would be generated during this phase than during this phase than operation. The traffic baseline is likely to be different (typical trend of annual increases in background traffic) to the current baseline traffic conditions when decommissioning is undertaken after the 30-year operational phase. The effects on the road network are likely to be similar in nature, though of lower magnitude, than that relating to the construction phase as less vehicle movements would be required (for example stone for tracks left in situ or turbine bases left in situ create less vehicle movements).

11.4.5 Given the above, it is proposed that the assessment of traffic and transport effects during the decommissioning phase of the development is 'scoped out' from detailed assessment the EIA.

Potential receptors

11.4.6 The roads likely to be impacted as a result of traffic movements associated with the Proposed Development will be assessed once the final HGV routing is known. Receptors identified along the haul roads will form the scope of the assessment in relation to potential traffic-related effects. Receptors are users or beneficiaries of highway network assets and facilities, such as pedestrians, cyclists, equestrians and drivers who travel within the vicinity of the Proposed Development.

11.4.7 Guidelines for the Environmental Assessment of Road Traffic (GEART) identifies the following groups and special interest groups that may be affected:

- People at home;
- People at work;
- Sensitive groups including children, elderly and the disabled;
- Sensitive locations such as hospitals, churches, schools and historical buildings;
- Pedestrians;
- Cyclists;
- Open spaces, recreational and shopping areas;
- Sites of ecological and nature conservation value; and
- Sites of tourist / visitor attractions.

Likely significant effects

11.4.8 The likely significant Traffic and Transport effects that will be taken forward for assessment in the Environmental Statement are summarised in **Table 11.3**.

Table 11.3 Likely significant Traffic and Transport effects

Environmental effect	Description	Receptor
Severance	Separation of people from places and other people or impede pedestrian access to essential facilities.	Pedestrians, cyclists, equestrians.
Driver Delay	Traffic delays to non-development traffic.	Other road users.
Pedestrian Amenity	Effect on the relative pleasantness of a pedestrian journey as a result of changes in traffic flow, traffic composition and pavement width / separation from traffic.	Pedestrians, cyclists, equestrians.
Pedestrian Delay	Ability of people to cross the road as a result of changes in traffic volume, composition and speed, the level of pedestrian activity, visibility and general physical conditions of the Proposed Development.	Pedestrians, cyclists, equestrians.
Fear and Intimidation	May be experienced by people as a result of an increase in traffic volume and its proximity or lack of protection caused by such factors as narrow pavements widths.	Pedestrians, cyclists, equestrians.

Environmental effect	Description	Receptor
Accidents and Safety	Risk of accidents occurring where the Proposed Development is expected to produce a change in the character of traffic.	Other road users, pedestrians, cyclists, equestrians.

11.5 Assessment methodology

11.5.1 The guidance used when assessing the potential significance of road traffic effects is summarised in *Guidelines for the Environmental Assessment of Road Traffic* (GEART) (IEA, 1993), which states that:

> "*The detailed assessment of impacts is…likely to concentrate on the period during which the absolute level of an impact is at its peak, as well as the hour at which the greatest level of change is likely to occur.*" (Paragraph 3.10).

11.5.2 To assess the impact at its peak, the likely percentage increase in traffic is determined by comparing estimates of traffic generated by the Proposed Development with future predicted baseline traffic flows on the roads used by construction traffic in vicinity of the Site.

Determination of significance

11.5.3 The EIA Regulations recognise that developments will affect different environmental elements to differing degrees, and that not all of these are of sufficient concern to warrant detailed investigation or assessment through the EIA process. The EIA Regulations identify those environmental resources that warrant investigation as those that are "*likely to be significantly affected by the development*".

11.5.4 The EIA Regulations do not define significance and it will be necessary to state how this will be defined for the EIA. The significance of an effect resulting from a development during construction or operation is most commonly assessed by reference to the sensitivity (or value) of a receptor and the magnitude of the effect. This approach provides a mechanism for identifying areas where mitigation measures may be required and to identify the most appropriate measures to alleviate the risk presented by the development.

11.5.5 GEART provides two rules that are used to establish whether an environmental assessment of traffic effects should be carried out on receptors:

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

11.5.6 It should be noted that, according to GEART, predicted traffic flow increases below 10% are generally not considered to be significant as daily variations in background traffic flow may fluctuate by this amount. Changes in traffic flows below this level are, therefore, assumed not to result in significant environmental effects and have therefore not been assessed further as part of this study.

11.5.7 The main transportation impacts associated with a wind farm relate to the construction phase of the development. This would include the movement of HGV traffic travelling to and from a site bringing in material for the construction of the access, tracks, foundations, crane hard standing etc. The assessment will identify the number of HGV movements required for the Proposed Development.

11.5.8 Other construction impacts relate to the delivery of the turbine components. These components, by their nature are large and require abnormal load delivery. The assessment will identify the number of abnormal loads required for the Proposed Development.

11.5.9 The assessment will include the identification of the baseline data through relevant survey information for all the roads associated with the different elements of the Proposed Development. The assessment will identify the:

- Existing traffic flows;
- Potential impacts (of changes in traffic flows) on local roads;
- Potential impacts (of changes in traffic flows) on users of those roads; and
- Potential impacts (of changes in traffic flows) on land uses and environmental resources and sensitive receptors fronting those roads, including the relevant occupiers and users.

11.5.10 **Table 11.4** summarises the rationale used to determine the sensitivity against the corresponding receptors as part of the assessment as contained in GEART. Professional judgement is also used to determine the sensitivity of the receptor.

Table 11.4 GEART Receptor Sensitivity Rationale

Sensitivity	Description/ reason	Receptor
High	Receptors of greatest sensitivity to traffic flows: schools, colleges, playgrounds, accident blackspots, retirement homes and urban/residential homes without footways that are used by pedestrians and cyclists.	Residents/workers travelling to and from work or home on foot and by bicycle, school children, leisure walkers and equestrians.
Medium	Traffic flow sensitive receptors including: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycle ways, community centres, parks, recreation facilities.	Residents/workers travelling to and from work or home on foot and by bicycle, people visiting these land uses.
Low	Receptors with some sensitivity to traffic flows: places of worship, public open space, nature conservation areas, listed buildings, tourist/visitor attractions and residential areas with adequate footway provision.	Residents/workers travelling to and from work or home on foot or bicycle and people visiting these land uses.
Negligible	Receptors with low sensitivity to traffic flows: Motorway and Dual Carriageways and/or land uses sufficiently distant from affected routes and junctions.	Residents/workers travelling by foot or by bicycle.

11.5.11 The sensitivity of each highway link included in the assessment will be assigned a sensitivity in accordance with GEART. This is based on the proximity of sensitive receptors to the highway link and the highway environment. Sensitivity judged as High or Medium results in Rule 2 (sensitive areas where traffic flows are predicted to increase by 10% or more) being considered. Sensitivity judged as Low or Negligible results in Rule 1 being considered (where traffic flows are predicted to increase by more than 30% (or where the number of HGVs is predicted to increase by more than 30%)).

11.5.12 The classification of a likely traffic and transport effect will then be derived by considering the sensitivity of the receptor against the magnitude of change, with the details of the assessment presented in the Environmental Statement.

11.5.13 **Table 11.5** provides a summary of the magnitude of change for each transport effect, with the thresholds used to determine this being based on guidance within GEART.

Table 11.5 Magnitude of Change Summary

	Magnitude of Change			
Transport Effect	**Major**	**Moderate**	**Minor**	**Negligible**
Severance	Change in total traffic or HGV flows over 91%	Change in total traffic or HGV flows of 61-90%	Change in total traffic or HGV flows of 31-60%	Change in total traffic or HGV flows of less than 30%
Driver Delay	Change in total traffic or HGV flows over 91%	Change in total traffic or HGV flows of 61-90%	Change in total traffic or HGV flows of 31-60%	Change in total traffic or HGV flows of less than 30%
Pedestrian Amenity and Delay	Change in total traffic or HGV flows over 91%	Change in total traffic or HGV flows of 61-90%	Change in total traffic or HGV flows of 31-60%	Change in total traffic or HGV flows of less than 30%
Accidents and Safety	Informed by a review of existing collision patterns and trends based upon the existing personal injury accident records and the forecast increase in traffic.			

11.5.14 The classification of a likely traffic and transport effect is derived by considering the sensitivity of the receptor (derived from **Table 11.4**) against the magnitude of change (derived from **Table 11.5**) as defined in **Table 11.6** below. The shading indicates those significance ratings that are deemed to be 'significant' effects.

Table 11.6 Significance Criteria

		Magnitude of change			
		Major	**Moderate**	**Minor**	**Negligible**
Sensitivity	**High**	Major	Major / Moderate	Moderate	Minor / Negligible
	Medium	Major / Moderate	Moderate	Minor	Negligible
	Low	Moderate	Minor	Minor	Negligible
	Negligible	Minor / Negligible	Negligible	Negligible	Negligible

11.5.15 Major, Major/Moderate and Moderate effects (shaded in table above) are considered to be significant in terms of the EIA Regulations, whilst Minor, Minor/Negligible and Negligible effects are considered to be not significant.

11.5.16 Consideration will also be given as to whether any of the receptors which would be taken forward for assessment are likely to be subject to cumulative effects because of the Traffic and Transport effects generated by other proposed developments, and if this is likely to be the case a cumulative assessment would be undertaken.

Assumptions

11.5.17 The scope of the assessment is based on a desk-based review of currently available information and will be confirmed through review of additional data sources, site visit and consultation with stakeholders during the next stages of the EIA.

11.5.18 For the purposes of this scoping assessment it has been assumed that turbine equipment would be delivered from the Port of Swansea and that below ground infrastructure would remain in situ post-operation.

12. Noise

12.1 Introduction

12.1.1 This chapter describes the proposed scope of the assessment of effects with respect to noise arising from the Proposed Development.

12.1.2 The proposed scope of the noise assessment would consist of an assessment of the noise effects arising from construction, operation and decommissioning of the Proposed Development, including cumulative noise impacts from proposed, consented and operational wind energy developments in the area.

12.2 Relevant legislation, policy, and guidance

12.2.1 **Table 122.1** outlines the policy and policy guidance relevant to noise for the Proposed Development. The table also provides a comment on the implication of the policy and guidance with respect to the scope of the EIA.

Table 12.1 Relevant legislation, policy, and guidance

Activity	Comment
National Policy Statements	NPS EN-1 advises that applicants include a noise assessment to consider both construction and operation effects where appropriate. EN-3 at 2.7.56 states that the applicant's assessment of noise from the operation of the wind turbines should use ETSU-R-97, taking account of the latest industry good practice.
Welsh Assembly Government: Technical Advice Note (TAN) 8: Renewable Energy (2005)	TAN 8 provides general guidance and advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. In addition, it cites ETSU-R-97 as guidance which offers a reasonable degree of protection to wind farm neighbours, without placing unreasonable restrictions on wind farm development.
Welsh Assembly Government: Technical Advice Note (TAN) 11:Noise (2007)	TAN 11 provides general advice on noise and refers to TAN 8 for guidance regarding noise from wind turbines and wind farms.
ETSU-R-97, 'The Assessment and Rating of Noise from Wind Farms', The Working Group on Noise from Wind Turbines	Information and advice to developers and planners on the environmental assessment of noise from wind turbines. The guidance offers a framework for the measurement of wind farm noise and gives indicative noise levels thought to offer a reasonable degree of protection to wind farm neighbours.
The Institute of Acoustics 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (2013)	Presents current good practice in the application of ETSU-R-97 for all wind turbine developments above 50kW. The good practice guide gives information to assist consultants, developers and local planning authorities in using the correct technical and procedural methods for the assessment and determination of wind farm applications, reflecting the original principles within ETSU-R-97 and the results of research carried out and experience gained since its publication.
BS5228:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites - Part 1: Noise'	Detailed guidance on assessing noise from construction sites.

Activity	Comment
Environmental Protection Act 1990, Part III – as amended by the Noise and Statutory Nuisance Act 1993	An Act to make provision for the improved control of pollution arising from certain industrial and other processes, including noise pollution.
Control of Pollution Act 1974	An Act to make further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health; and for the purposes connected with the matters aforesaid.

12.3 Baseline conditions

Data sources

12.3.1 The primary data source used to inform this chapter is aerial imagery from Google Earth Pro Version 7.3.3.7699, 2020, which was used in combination with the preliminary layout for the Proposed Development.

Study area

12.3.2 The study area for scoping is based on a radius of 10 km from the Proposed Development.

12.3.3 Within the 10 km study area, other wind farm developments (including those that are consented but not built or at planning stage) would be considered during the EIA process as part of the assessment of cumulative effects. It will be assessed whether these other wind farms would have a significant contributory effect on noise levels at residential receptors most affected by the Proposed Development.

Current baseline

12.3.4 The Proposed Development is located in a rural area, with a number of villages in the vicinity. The most notable likely existing noise sources are road traffic on the A4058—approximately 1 km to the north of the Proposed Development boundary, and the A4233—approximately 1.3 km west from the Proposed Development boundary.

12.3.5 There have been no recent surveys undertaken to quantify baseline conditions. If required as a result of initial screening assessments (see 12.4.4), a programme of baseline measurements would be taken to inform the EIA, as outlined in Section 12.5.

Future baseline

12.3.6 It is unlikely that the future baseline will alter markedly in the short to medium term as many of the potential forces for change within and around the Proposed Development are in relative statis. Wind energy developments that are relevant to the cumulative assessment i.e. located within the edge of the 10 km study area, including those that are consented but not built or are at planning stage are listed in **Table 122.2** and illustrated in **Figure 5.4**.

Table 12.2 Wind Farms relevant to the cumulative assessment

Name of wind farm	Grid reference (x,y)	Local authority	Number of wind turbines	Height to blade tip (m)	Status
Llwyncelyn Farm	303425, 192816	Rhondda Cynon Taf	2	138.5	Consented
Bryntail Farm	309621, 190099	Rhondda Cynon Taf	2	71	In Planning
Mynachdy Farm	303892, 195603	Rhondda Cynon Taf	2	67	Operational
Ferndale	298950, 196600	Rhondda Cynon Taf	8	74	Operational
Abergorki	295695, 199536	Rhondda Cynon Taf	3	149.9	Operational
Mynydd Bwllfa	294440, 202740	Rhondda Cynon Taf	9	115/125	Operational
Pen-y-Cymoedd	293020, 202000	Rhondda Cynon Taf	76	145	Operational
Ffynnon Oer	284615, 198826	Neath Port Talbot	16	91	Operational
Foel Trawsnant	283915, 194076	Neath Port Talbot	11	145	Consented (subject to s106 agreement)
Maerdy	295469, 198505	Rhondda Cynon Taf	8	145	Operational
Bwllfa Farm, Gelli	296107, 193618	Rhondda Cynon Taf	1	76	Operational
Nant-y-Gwyddon	297707, 193908	Rhondda Cynon Taf	1	121.5	Operational
Fforch Nest	296235, 191746	Rhondda Cynon Taf/ Bridgend	11	115	Operational
Pant-y-Wal	296835, 190866	Rhondda Cynon Taf /Bridgend	10	115	Operational
Taf Ely	298052, 186478	Rhondda Cynon Taf	20	53.5	Operational
Headwind Taff Ely	298317, 186308	Rhondda Cynon Taf	7	110	Operational
Mynydd Portref	298832, 186003	Rhondda Cynon Taf	11	86	Operational
Mynydd Portref Extension	299752, 185568	Rhondda Cynon Taf	7	110	Operational
Graig Fatha Farm	300732, 185688	Rhondda Cynon Taf	1	126	Operational
West of Rhiwfelin Farm	303647, 185413	Rhondda Cynon Taf	1	100	Operational
Llynfi Afan	288205, 193436	Bridgend	12	118	Operational
Newlands Farm	281472, 183898	Neath Port Talbot	1	77	Operational
Parc Stormy, Stormy Down	284112, 180123	Bridgend	1	100	Operational
Newton Down	284127, 179418	Bridgend	2	125	Operational
Mynydd Brombil	279002, 188788	Neath Port Talbot	5	100	Operational
Melin Court	284900, 200600	Neath Port Talbot	5	145	Consented

12.4 Scope of the assessment

Potential receptors

12.4.1 By reviewing the Proposed Development and surrounds using current Aerial Photography, the following Noise Sensitive Receptors could potentially be significantly affected by wind turbine noise (all distance approximate):

- Rhiw-garn-fach, 800 m west of the Proposed Development;
- Rhiw-garn-fawr, 800 m west of the Proposed Development;
- Glyn, 800 m west of the Proposed Development;
- Llan, 1 km south east of the Proposed Development;
- Cefn-coed Farm, 1 km east of the Proposed Development;
- Tyla-winder, 1.1 km east of the Proposed Development;
- Residential properties on the outskirts of Trehafod. 900 m east of the Proposed Development;
- Residential properties in Trebanog, 1.1 km west of the Proposed Development;
- Residential properties in Rhiw-garn, 1.8 km north west of the Proposed Development;
- Residential properties in Tonyrefail, 1.2 km south west of the Proposed Development;
- Rhiwinder, 1.4 km south west of the Proposed Development;
- Tre-boeth/Ty'n-y-cwm, 1 km west of the Proposed Development;
- The Lawn, 1.5 km south of the Proposed Development;
- Rackett Cottages, 1.3 km south of the Proposed Development;
- Residential properties in Maesycoed, 2.5 km south of the Proposed Development;
- Residential properties in Trehafod, 1 km north of the Proposed Development;
- Residential properties in Cymmer, 1 km north west of the Proposed Development;
- Langton Court Farm, 800 m east of the Proposed Development; and
- Ty-draw, 1.5 km east of the Proposed Development.

12.4.2 A set of key receptors representing these areas will be chosen as prediction points within the noise model for the Proposed Development and for noise monitoring locations if required.

Likely significant effects

12.4.3 The likely significant noise effects that will be taken forward for assessment in the Environmental Statement are summarised in **Table 12.3**.

Table 12.3 Potential significant noise effects

Activity	Effect	Receptor
Impact piling (if required as part of the construction of the Development)	Noise disturbance to receptors in the area of activities.	Nearest Noise Sensitive Receptors (identified in 12.4.1)
Construction traffic movements	Disturbance to receptors on the construction traffic route.	Nearest Noise Sensitive Receptors along construction traffic route.
Operational turbine noise	Noise disturbance from wind turbine.	Nearest Noise Sensitive Receptors (identified in 12.4.1)

12.4.4 Aerodynamic noise occurs from the movement of the wind turbine blades passing through the air. At higher wind speeds, aerodynamic noise is usually masked by the increasing sound of wind blowing through trees and around buildings. The level of masking determines the perceived audibility of the wind farm. The proposed impact assessment establishes the relationship between wind turbine noise and the natural masking of noise resulting from features of the surrounding environment and assesses noise levels against established standards. The scoping in of a full operational noise assessment will be dependent on an initial screening assessment based on exceedances of the 35 dB L_{A90} daytime limit of ETSU-R-97. If a full noise assessment is not deemed to be required, the screening assessment will be included within the ES.

12.4.5 The effects scoped out from the further assessment in the Environmental Statement are:

- **Blasting** would be very unlikely, however, if any blasting is to occur it would be controlled via a blasting management plan as part of a planning condition requirement.
- Noise emissions from **construction activities other than piling** (including vehicles on haul routes, but not on existing roads) are unlikely to be high enough, given the distance of the Proposed Development to Noise Sensitive Receptors, to warrant a noise assessment. However, planning conditions regarding standard times of work should apply.
- **Operational traffic** noise during the operation of the Proposed Development is scoped out as the amount of traffic associated with development operation would be minimal.
- The effects of **decommissioning** on any Noise Sensitive Receptors are likely to be similar in nature but of lower magnitude than those during the construction phase. As a result, it is not proposed to assess the decommissioning phase of the development in addition to that of the construction phase.

12.5 Assessment methodology

12.5.1 The main objective of the noise assessment is to compare baseline noise levels in the study area to those that would exist should the development proceed and to determine the acceptability for relevant Noise Sensitive Receptors. In this case, such receptors are restricted to those living in residential properties close to elements of the development, those outlined in 12.4.1.

12.5.2 The ES Chapter will present a review of relevant policy and how it guides the noise assessment, the results of any noise measurements undertaken, and finally the assessment of noise predictions against noise limits, as outlined in 12.5.8 and 12.5.9.

Construction noise

12.5.3 In order to undertake construction noise calculations, details of the construction programme, phasing of the works and types and number of plant are required. Such data would only become available once the contract(s) to construction the Proposed Development have been finalised. Notwithstanding the above, a worst-case scenario for construction noise assessment, based upon experience of similar projects, will be presented in the ES. Construction noise from piling would be predicted and assessed in accordance with 5228-1:2009 + A1:2014 *Code of practice for noise and vibration control on construction and open sites Part 1 – Noise*.

12.5.4 The noise impact from construction traffic on receptors along the local road network would be predicted using the methodology within Calculation of Road Traffic Noise (1998) to form a Basic Noise Level for the existing and with development scenarios. The difference between the existing traffic flows and 'with development' traffic flows would be assessed using the magnitude criteria within the Design Manual for Roads and Bridges *'LA 111 – Noise and Vibration'* (2020).

12.5.5 In most cases, construction noise (including construction traffic) is controlled through the implementation of mitigation measures (such as limiting hours during which construction can be undertaken via a planning condition), and undertaking construction works in accordance with good practices as descried in BS 5228-1:2009 + A1:2014 (such as using well maintained and serviced plant, and the appointment of a Site contact to whom complaints/queries can be directed).

Operational noise

12.5.6 The proposed operational noise assessment would be undertaken in accordance with *ETSU-R-97: The Assessment and Rating of Noise from Wind Farms* (ETSU-R-97 Guidance, 1996) and the assessment methodology advocated within the Institute of Acoustics *A Good Practice Guide to Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (IoA GPG, 2013).

12.5.7 If the screening described in 12.4.4 identifies a need for a full ETSU-R-97 assessment, an understanding of the change in background noise levels with wind speed at receptors is required to provide the necessary criteria. This is achieved by monitoring background noise levels at sensitive receptors and simultaneously measuring the variation in wind speed and direction at the wind farm site, using either a >50 m met mast with anemometers at dual heights, or by a LiDAR or SoDAR system. Noise and wind speed measurements are taken as a series of simultaneous 10-minute averaged measurements, over a period of at least two weeks. From this data, regression analysis is performed to determine typical background noise levels for each receptor across a range of wind speeds (4 m/s- 12 m/s).

12.5.8 Noise limits are defined separately for daytime and night-time. During quiet daytime periods (18:00 - 23:00 weekdays, 13:00 - 23:00 Saturdays and 07:00 - 23:00 Sundays), noise limits are as follows:

- 5 dB above the background noise curve in this period for wind speeds up to 12 m/s;
- where background noise levels are below 30 - 35 dB $L_{A90,10\ min}$, the lower limit should be fixed at 35 - 40 dB; and
- For properties with a financial interest in the scheme, the lower limit is fixed at 45 dB.

12.5.9 For night-time periods (23:00 - 07:00 every day), noise limits are as follows:

- 5 dB above the background noise curve in this period for wind speeds up to 12 m/s;
- The lower limit is fixed at 43 dB; and
- For properties with a financial interest in the scheme, the lower limit is fixed at 45 dB.

12.5.10 For the cumulative assessment, the quiet daytime lower limit will be set at 40 dB.

12.5.11 The initial screening noise modelling will be used to identify locations in the event a baseline noise survey is required. These locations will be agreed with the relevant Environmental Health Representative at Rhondda Cynon Taf Council. Measurements at the chosen monitoring locations will depend upon arranging access to the properties. It is likely they will encompass at least the following locations:

- a location representing Rhiw-garn-fach, Rhiw-garn-fawr and Glyn; and
- a location representing Cefn-coed Farm, Tyla-winder and Langton Court Farm.

12.5.12 Noise modelling would be undertaken using software adopting methodologies advocated by the Institute of Acoustics Good Practice Guide, The assessment will take into account shear and issues regarding low frequency noise, tonality and amplitude modulation. A cumulative noise assessment will be included within the EIA. This assessment will identify other wind turbine developments (operational, consented, or subject to an application) in the area that may impact on sensitive receptors together with the Proposed Development. A cut-off date for the assessment will be identified in the Environmental Statement and a list of wind turbine developments identified for the cumulative assessment will be created.

12.5.13 The majority of noise related guidance and standards (including the ETSU guidance) are not directly related to the concepts of 'significant' and 'not significant' effects that underpin EIA. However, for the purposes of the assessment, the determination of effect significance for the operational phase of the Proposed Development is based upon compliance with the applicable noise limit i.e. a breach of noise limits indicates a significant effect, whereas compliance with noise limits indicates an effect which is not significant.

12.5.14 As noise levels exceeding the ETSU guidance noise limits are deemed to be significant, they would require further consideration, with a view to identifying appropriate mitigation to ensure compliance with the specified limits. These may include adoption of quieter turbines, reducing the power rating, and thus the noise emission of particular turbines in particular wind environments; or design of a noise management plan which varies the operation of the wind turbines depend on the existing wind direction.

Assumptions

12.5.15 This scoping chapter has been written based upon the following assumptions:

- Blasting will not take place during the construction of the wind farm;
- Any construction activities other than piling will be an insignificant source of noise;
- Operational traffic noise will be limited to minimal operational movements and occasional maintenance vehicles;
- The decommissioning activities are likely to be similar to those in the construction phase of the project, but without piling; and
- The noise assessment is being undertaken on the assumption that were would be noise sensitive receptors falling inside the screening area at 35 dB L_{A90} at 10ms.

13. Infrastructure and other issues

13.1 Existing Infrastructure, Telecommunications and Broadcast Services

13.1.1 The Environmental Statement will consider the potential effects of the proposed wind farm on existing infrastructure, television, aviation, and radar and radio-communication signals.

13.1.2 During the preparation of the Environmental Statement the responses of consultees will be collated and reported to the design team. The consultees will be identified from the contact details provided within TAN 8[53]. Should infrastructural constraints be identified, revision to the turbine layout may be necessary to avoid electronic interference or disruption to services. Technical solutions to any infrastructural constraint will be sought during this process to minimise effects upon it.

13.2 Shadow Flicker

13.2.1 Shadow Flicker is a phenomenon that can occur in sunny weather when turbines are operating and the rotating blades cause a flickering effect inside a building where sunlight passes through an opening such as a window or door.

13.2.2 For shadow flicker to occur, the receptor must be directly in line with the wind turbines when the sun is low in the sky and within 10 rotor diameters of a turbine where they are located within 130 degrees either side of north of any turbine. In these circumstances, the moving turbine blade briefly blocks / reduces the intensity of light entering an opening to a room on each rotation, causing a flickering to be perceived. In the open, shadow flicker is generally not perceived as light outdoors is reflected from all directions.

13.2.3 If, after design development, any properties were to be located within a 130 degree segment either side of due north, relative to the turbines and within ten rotor diameters of a turbine (as per guidance) they will be assessed for shadow flicker.

13.2.4 Where properties meet both of the criteria for there to be a potential shadow flicker effect, the seasonal duration of this effect will be calculated from the geometry of the turbine and the latitude of the Proposed Development site, to assess potential impacts upon the amenity of local residents. Mitigation measures will be proposed in the ES should they be necessary.

13.3 Socio-economics

13.3.1 Wind farms have the potential to have both beneficial and negative effects on socio-economics, tourism and recreation.

13.3.2 In order to assess the potential socio-economic effects of the Proposed Development, it is necessary to gain a view as to the current position of the local economy. The character of the local economy will therefore be examined as part of the EIA to provide an overview of potential linkages with the Proposed Development. Tourist and recreation attractions along with any core paths or public rights of way (PRoW) within or surrounding the Site and identified within the LVIA will form

[53] It is acknowledged that TAN8 is now revoked

part of the assessment (while direct effects on existing public access will be considered within the assessment, amenity effects for those using access routes will be considered within the LVIA).

13.3.3 The assessment will also examine the level of construction activity and job creation and the potential linkages with the wider local economy. This will include an assessment of potential multiplier effects within the local economy and the degree to which local businesses could benefit from the construction, operation and decommissioning of the Proposed Development. Potential community effects will also be examined and, whilst it is considered unlikely to be significant, the assessment will also qualitatively consider the potential for the Proposed Development to have an effect on other existing business activity.

13.3.4 There is no standard approach to this element within an EIA, however the general approach will be to outline the areas of the Proposed Development where there will be the potential for some economic/social effect within the wider area (including tourism, etc.). This will be undertaken with a view to examining the significance of these effects. Where possible (i.e. with quantifiable effects), the significance will be assessed by way of comparison of the factor (e.g. construction jobs) with the variance of related factors within the local economy. Where effects cannot be quantified, the assessment of significance will be undertaken using professional judgement and experience.

13.4 Population and human health

13.4.1 The potential effects on population and human health arising from the Proposed Development would be considered in the context of the other factors identified in Schedule 4(2) of the 2017 EIA Regulations given that any environmentally related health issues (both beneficial and adverse) are likely to result from, for example, exposure to traffic, changes in living conditions resulting from noise, and increased employment opportunities. It is therefore proposed that population and human health effects of the Proposed Development are incorporated within the relevant technical chapters such as socio-economics, traffic and transport, Noise, shadow flicker and landscape & visual (in respect of residential amenity in particular).

13.4.2 However, to clearly demonstrate that population and human health effects are included in the Environmental Statement, and to assist with ease of reference, it is proposed to include a summary table that identifies the potential effects and a cross-reference to the relevant Environmental Statement chapter that considers each aspect in more detail.

13.5 Climate

13.5.1 The vulnerability of the Proposed Development to climate change and extreme climate events will be considered within the engineering design and it is not proposed that a separate Environmental Statement chapter is prepared.

13.5.2 Climate change specialists will work with the engineering design team to scope in or out potential climate change impacts based on climate projections, best practice and expert judgement. This will ensure that the design of the Proposed Development is in-line with local, regional and national policies regarding adaptation to climate change. The design of the Proposed Development will consider the UK Climate Projections 2018 (UKCP18) for a variety of environmental parameters (e.g. extreme rainfall, temperature, drought etc.) to ensure that appropriate mitigation measures are embedded within the design. The climatic conditions at the end of the design life of the Proposed Development will be considered.

13.5.3 Any alterations to the design of the Proposed Development to take account of future climate conditions will be outlined in the Design and Access Statement.

13.5.4 A carbon balance calculation will be completed using an appropriate, industry recognised tool. This will be reported in a Renewable Energy Policy and Carbon Balance section or appendix within the Environmental Statement. The Site has been identified as having areas of blanket bog and peaty soils. The carbon balance will consider the impact of the Proposed Development disturbing the peat resource since it has the potential to release Carbon Dioxide (CO_2) into the atmosphere. Details of the peat surveys to be undertaken are described in **Chapter 10: Ground Conditions**.

13.5.5 The calculation will include a full lifecycle assessment to determine the carbon benefit of the Proposed Development compared to a reference energy mix within the context of carbon budgets for Wales and the UK. This will include consideration of Greenhouse Gas (GHG) emissions in the production, transportation, erection, operation and decommissioning phases of the Proposed Development together with the loss of peat should such areas not be avoided. Given the inherent carbon benefit of wind farms, a standalone GHG Environmental Statement chapter is not required.

13.6 Sustainable resource use

13.6.1 Although wind turbine developments can encompass large areas of land, the actual built developments cover a relatively small area and, in most circumstances, farming and other land based activities can continue in and around the turbines. As a result of, the Proposed Development would only result in a small land take, which is unlikely to result in significant environmental effects in terms of land use.

13.6.2 In terms of soil and peat, the design of tracks, turbine foundations, hardstanding etc. would minimise the amount of soil disturbance. Where soils and peat would be excavated, they would be stored on the development site in accordance with a Peat Management Plan and the CEMP, which would be produced prior to construction and then used in the restoration of the development site post construction to minimise the loss of soil and peat resource.

13.6.3 With regards to water, the key environmental effects on this natural resource would be its use during the construction, operational and decommissioning phases, the potential increase in flood risk and the disturbance of surface and groundwater as a result of construction activities. With regards to construction works, the water resource would be managed in accordance with the CEMP.

13.6.4 The potential effects of the Proposed Development on biodiversity would be addressed within the Biodiversity and Ornithology assessments within the Environmental Statement, within which appropriate mitigation will be set out in order to minimise the potential damage to habitats and species during the construction, operation and decommissioning. Mitigation measures will also be detailed in a Habitat Management Plan, which it is expected would be required by planning condition, and also within the CEMP.

13.6.5 As a result, it is not proposed that sustainable resource use is considered as a discrete assessment of the Environmental Statement for the Proposed Development.

13.7 Major accidents and disasters

13.7.1 Paragraph (8) of Schedule 4 of the EIA Regulations states that an Environmental Statement should describe "*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*".

13.7.2 The scope for the EIA to consider major accidents and disasters has been initially considered in **Table 13.1**. Major accidents or disasters have been scoped in where they represent a risk to the Proposed Development, either from the proposed location or from the project itself. A high risk is

considered to be where there is reasonable likelihood of the accident or disaster occurring, or where the effect of the accident or disaster would lead to the requirement for mitigation which is beyond the usual scope of construction or operational activities. Where an accident or disaster has been scoped in, the Environmental Statement chapter(s) identified will consider the matter in more detail. This further detail may show that no further assessment is needed, or it may lead onto an appropriate level of assessment and/or identification of appropriate mitigation.

Table 13.1 Major accidents and disasters

Major Accident or Disaster	Risk due to location	Risk due to project	Scoped in/out due to risk	Rationale	Environmental Statement Chapter
Biological hazards: epidemics	Very low	Very low	Out	The probability of epidemics which would affect the construction or operation of the proposed Development is considered to be very low.	N/A
Biological hazards: animal and insect infestation	Very low	Very low	Out	The probability of animal and insect infestations which would affect the construction or operation of the Proposed Development is considered to be very low.	N/A
Earthquakes	No	No	Out	Any earthquakes in the vicinity of the Proposed Development would be of a very small magnitude and the design of turbine foundations etc. is adequate to withstand such low magnitude events.	N/A
Tsunamis / tidal waves / storm surges	No	No	Out	The general location of the Proposed Development and its distance from the coast means there is no risk of these phenomena affecting the Proposed Development.	N/A
Volcanic eruptions	No	No	Out	There are no active volcanos in the vicinity of the Proposed Development.	N/A
Famine / food insecurity	Negligible	Very low	Out	The probability of famine / food insecurity which would affect the construction or operation of the Proposed Development is considered to be negligible.	N/A
Displaced populations	Negligible	Very low	Out	The probability of displaced populations affecting the construction or operation of the Proposed Development is considered to be negligible.	N/A
Landslide / subsidence	Low	Low	In	A peat slide risk assessment will be undertaken if required (based on the finding of a Phase 1 peat survey). The Site is situated within a Coal Mining Reporting Area and historical maps indicate that quarrying and coal mining has occurred in the vicinity of the Proposed Development. An assessment of potential impacts upon the Proposed Development from this previous mining activity, for example from subsidence movements will be undertaken.	Ground Conditions chapter

Major Accident or Disaster	Risk due to location	Risk due to project	Scoped in/out due to risk	Rationale	Environmental Statement Chapter
Severe weather: storms	Medium	No	Out	Turbines are equipped with lightning conductors and automatically shut down when wind speeds are at a level which could damage internal components.	N/A
Severe weather: droughts	Very Low	No	Out	The probability of severe drought occurring in the vicinity of the Proposed Development is considered to be very low. Furthermore, turbines would be unaffected by drought conditions.	N/A
Severe weather: extreme temperatures	Low	Very Low	In – severe cold weather could lead to ice build-up on blades.	Ice build-up could lead to ice throw, or to blade damage and throw.	The Proposed Development chapter
Floods	Low	Very Low	In – a high level flood consequences assessment would be undertaken as part of the EIA.	Damage to turbines or infrastructure from flooding, or increase in flood risk elsewhere from development in flood zones.	Wind farm site selection and design and Water Environment chapters.
Terrorist incidents	No	No	Out	N/A	N/A
Cyber attacks	No	No	Out	N/A	N/A
Disruptive industrial action	No	No	Out	N/A	N/A
Public disorder	No	No	Out	N/A	N/A
Wildfires	No	No	Out	N/A	N/A
Severe space weather	No	No	Out	N/A	N/A
Poor air quality events	No	No	Out	N/A	N/A
Transport accidents	No	Yes	In – abnormal loads and increase in traffic from construction.	Abnormal loads or an increase in traffic could lead to an increased risk of accidents. Road network may be unsuitable for such traffic, further increasing accident risk.	Wind farm site selection and design and Traffic and Transport chapters.
Industrial accidents	No	Yes	In – from construction and maintenance activities.	Manual labour, working at height and use of specialist plant all bring risk of industrial accidents. Relevant UK health and safety legislation will be adhered to; site construction management practices will include, but are not limited to, temporary diversions of public rights of way, relevant signage and fencing as potentially hazardous construction areas where appropriate.	Construction activities are covered by separate H&S legislation and guidelines. Wind farm site selection and design, Water

Major Accident or Disaster	Risk due to location	Risk due to project	Scoped in/out due to risk	Rationale	Environmental Statement Chapter
					Environment and Biodiversity chapters.
Electricity, gas, water supply or sewerage system failures	Yes	No	In – site contains electricity transmission cables.	Construction activities or turbine collapse could damage electricity infrastructure. All relevant health and safety legislation will be followed, and industry best practice guidance adhered to. HSE GS6 *Avoiding danger from overhead power lines* will be followed.	Wind farm site selection and design; and Infrastructure and Other Issues chapters.
Urban fires	No	No	Out	The Proposed Development is not in close proximity to any urban areas.	

14. Summary of scope

14.1.1 **Table 14.1** summarises the technical topics to be scoped in and scoped out from further detailed assessment as part of the EIA of the Proposed Development.

Table 14.1 Summary of scope

Environmental topic	Summary of proposed scope of assessment	Element proposed to be scoped out
Landscape and Visual	Landscape and cumulative landscape effects during construction (site preparation and construction): • Direct localised effects on some parts of the Site's landscape character, characteristics and landscape elements • Indirect effects upon adjacent local landscape designation Landscape and cumulative landscape effects during construction and operation (turbine erection and operation): • Direct effects on the host landscape character, characteristics and potentially the landscape elements within ~3-5km. • Indirect effects related to the visibility of the turbines and their effect on landscape character and perceptual characteristics • Night-time effects resulting from aviation warning lights • Based on the preliminary ZTVs 16 of the local landscape designations entirely or partly located within 10 km of the Proposed Development could sustain significant indirect landscape effects, plus Mynydd-y-Glyn SLA potential direct and indirect landscape effects. Visual and cumulative visual effects during construction (site preparation and construction): • Effects on views and visual amenity resulting from visibility of the proposed construction activities within ~2km distance to include for views from tops of adjacent and host ridgelines, subject to detailed viewpoint analysis Visual and cumulative visual effects during construction and operation (turbine erection and operation): • Effects on views and visual amenity resulting from visibility and movement of the proposed wind turbines within up to approximately 10 km distance, subject review of ZTVs and detailed viewpoint analysis • Views of the proposed aviation warning lights and adverse effects on night-time views within ~5-10km distance, subject to detailed viewpoint analysis	Cumulative assessment of wind energy developments beyond 23km of the Site. Cumulative assessment of single turbine wind energy developments located more than 10km from the Site Boundary. Cumulative assessment of other scoping stage and pre-application schemes. All receptors outwith the blade tip ZTV. Local/regional receptors beyond approximately 10km from the Proposed Development. Brecon Beacons National Park given there will be minimal potential for landscape effects. Glamorgan Heritage Coast given the low likelihood for significant adverse effects upon the designation's special qualities. Wales Coastal Path, given the distance from the Site, intervening built form along the more easterly sections, and the incremental context of any views of the Proposed Development All LANDMAP Aspect Areas within the Study Area that do not fulfil criteria based upon Guidance Note 46. Local landscape designations beyond 10 km and those within 10 km that are substantially or completely outside the ZTVs. Construction period landscape receptors. All decommissioning activities.
Historic Environment	Direct disturbance to, or loss of, historic assets located within the development footprint during construction. Changes to the significance of historic assets and historic landscape assets within the ZTV through change to their	All other designated historic assets due to a combination of location, distance, intervening topography and the nature of the assets themselves.

Environmental topic	Summary of proposed scope of assessment	Element proposed to be scoped out
	settings during construction (turbine erection) and operation.	
Biodiversity	Effects of permanent or temporary land take during construction and decommissioning: • Degradation and/or loss of habitat • Reduction in the availability of foraging and commuting habitat and resting or breeding sites • Killing or injury of fauna through the removal of occupied resting or breeding sites • Loss of ecological connectivity through severance of habitats resulting in fragmentation • Introduction or spread of invasive species Effects of use of temporary lighting during construction and decommissioning: • Disturbance and displacement of fauna sensitive to lighting resulting in indirect loss of foraging and commuting habitat or resting or breeding sites • Disruption of the physiology of species reliant on natural day/night and seasonal light level changes resulting in loss of fitness and reduction in survival rates • Loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation Introduction of aural and visual stimuli and vibration produced from construction activities during construction and decommissioning: • Disturbance and displacement of species susceptible to noise/visual disturbance resulting in a reduction of energy intake and/or an increase in energy expenditure potentially leading to a reduction in survival and productivity rates Effects of temporary hydrological changes during construction and decommissioning: • Changes to local hydrology resulting in changes or loss of surrounding habitats with subsequent effects on the fauna they support Effects of creation of airborne particles during construction and decommissioning: • Loss or damage of sensitive flora through smothering resulting in effects on habitat composition and the fauna that it supports • Deposition of dust resulting in enrichment of sensitive HPIs, including those contained within statutory designated sites, leading to alteration of flora through changes in baseline conditions and the species which they support • Direct effects on invertebrates through ingestion or direct deposition on sedentary species Effects of contamination of site run-off during construction and decommissioning: • The introduction of toxic pollutants or sediments into the environment resulting in changes, loss or damage to terrestrial or freshwater environments and the fauna they support	Designated Sites (Blackmill Woods SAC, Cardiff Beech Woods SAC and Nant Gelliwion Woodland SSSI) given the distance from the Proposed Development and lack of hydrological connectivity.

Environmental topic	Summary of proposed scope of assessment	Element proposed to be scoped out
	Effects of increased vehicle movements and changes in movement patterns during construction and decommissioning: • Potential killing or injury of fauna through road traffic collisions Effects of physical changes to the spatial environment during operation: • Potential killing or injury to fauna in flight, through direct collision with moving turbine blades or barotrauma Effects of vehicle movements during operation: • Potential killing or injury of fauna through road traffic collisions Effects of temporary hydrological changes during operation: • Changes to local hydrology resulting in changes or loss of surrounding habitats with subsequent effects on the fauna they support Effects of use of lighting during operation: • Disturbance and displacement of fauna sensitive to lighting resulting in indirect loss of foraging and commuting habitat or resting or breeding sites. Disruption of the physiology of species reliant on natural day/night and seasonal light level changes resulting in loss of fitness and reduction in survival rates. Loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation	
Ornithology	Effects of changing land use during construction and decommissioning: • Degradation and/or loss of habitat (including through soil compaction) • Reduction in the availability of foraging, resting and breeding sites • Loss of ecological connectivity through severance of habitats resulting in fragmentation Introduction of aural and visual stimuli and vibration produced from construction activities during construction and decommissioning: • Disturbance and displacement of species susceptible to noise/visual disturbance resulting in a reduction of energy intake and/or an increase in energy expenditure potentially leading to a reduction in survival and productivity rates Effects of construction/alteration of drainage: • Changes to local hydrology resulting in changes or loss of surrounding habitats with subsequent effects on birds that they support Effects of use of chemicals and liberation of pollutants and fine material during construction and decommissioning: • The introduction of toxic pollutants or sediments into the environment resulting in changes, loss or damage	Habitat Regulations Assessment as there are no SPAs or ornithological Ramsar sites within 20km. Designated Sites as none have been identified within 10km that include birds as a designated feature.

Environmental topic	Summary of proposed scope of assessment	Element proposed to be scoped out
	to terrestrial or freshwater environments and the birds they support Effects of permanent changes to the landscape during operation: • Presence and operation of wind turbine may result in indirect habitat loss with birds being displaced from nesting, feeding or resting sites Effects of operation of wind turbines: • Collision with turbine blades, overhead wires and guy lines resulting in injury or death	
Water Environment	Effects of land preparation during construction and decommissioning: • Release of pollutants directly or indirectly (via surface water runoff) leading to deterioration in the surface water and groundwater quality environment, deterioration in the status of WFD surface water and groundwater bodies and deterioration in conditions supporting local conservation sites and blanket bog water-dependent habitat • Temporary increase in sediment-loading of surface water runoff from construction/dismantling areas leading to deterioration in the surface water quality environment and deterioration in the status of WFD surface water bodies Effects of impermeable land associated with access tracks and construction/dismantling areas during construction and decommissioning: • Increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow Effects of temporary infrastructure near watercourse and potential temporary watercourse crossings during construction and decommissioning: • Temporary changes to watercourse flow conveyance leading to deterioration in the status of WFD surface water bodies and deterioration of conditions supporting local designated sites for nature conservation and blanket bog water-dependent habitat Effects of impermeable land take during the operational phase: • Increase in surface water runoff and therefore increase in flood risk downstream and, increase in potential erosional power of surface overland flow	
Ground Conditions	Effects of construction activities on land where peat is potentially present: • Permanent loss of soils including soil sealing due to construction of hard surfaced areas, potential for changes in site hydrology Effects of construction activities on land where mining has taken place:	Potential effects on geology. Potential effects on best and most versatile agricultural land. Potential effects on land (or water) quality during the construction phase due to accidental release of contaminants.

Environmental topic	Summary of proposed scope of assessment	Element proposed to be scoped out
	• Potential for changes in site hydrology and hydrogeology (including mine water flows), potential for changes in the site's ground gas regime Effects of construction activities located on land potentially affected by contamination: • Mobilisation of contaminants due to ground disturbance e.g., dust generation, contaminated run-off, creation of new pollutant migration pathways during excavation or construction, failure to manage and segregate excavated materials appropriately	Potential effects on soil and land during the operational phase, as following construction the majority of the Proposed Development site will be returned to its current use Decommissioning effects.
Traffic and Transport	Construction phase effects: • Severance • Driver Delay • Pedestrian Amenity • Pedestrian Delay • Fear and Intimidation • Accidents and Safety	Effects of operational traffic. Effects during the decommissioning phase.
Noise	Noise disturbance to receptors in the area of construction activities (impact piling if required). Disturbance to receptors on the construction traffic route due to construction traffic movements. Noise disturbance from operation wind turbine noise.	Effects from blasting if it was to occur as it would be controlled via a blasting management plan. Noise emissions from construction activities other than piling. Operational traffic noise during operation of the wind farm. The effects of decommissioning on any noise sensitive receptors.
Infrastructure and Other Issues	Potential effects on existing Infrastructure, Telecommunications and Broadcast Services: • Television • Aviation • Radar • Radio-communication signals Shadow Flicker (if after design, any properties are located within 10 rotor diameters of a turbine and within a 130 degree segment either side of due north). Socio-economics including: • Tourism and recreation attractions • Core paths or Public Rights of Way • Construction activity and job creation including potential multiplier effects • Community effects Climate: Carbon balance assessment including a full lifecycle assessment to determine carbon benefit, considering GHG emissions in the production, transportation, erection, operation and decommissioning phases. Major Accidents or Disasters in respect of: • Landslide / subsistence (Ground Conditions chapter) • Severe weather – extreme temperatures and floods (The Proposed Development chapter, and Site	Population and Human Health: Effects of the Proposed Development will be incorporated into the relevant technical chapters of the ES such as Socio-economics, Traffic and Transport, Noise, Shadow Flicker and LVIA. Climate: Vulnerability of the Proposed Development to climate change and extreme climate events as this will be considered within the engineering design. Sustainable Resource Use: Potential effects would be addressed within other chapters of the ES and mitigation measures implemented through a HMP and CEMP. Major Accidents or Disasters in respect of: • Biological hazards • Earthquakes • Tsunamis / tidal waves / storm surges • Volcanic eruption • Famine / food insecurity • Displaced populations • Severe weather – storms and droughts • Terrorist incidents • Cyber attacks • Disruptive industrial action • Public disorder • Wildfires

Environmental topic	Summary of proposed scope of assessment	Element proposed to be scoped out
	Selection and Design and Water Environment chapters) • Transport accidents (Site Selection and Design and Traffic and Transport chapters) • Industrial accidents (Site Selection and Design, Water Environment and Biodiversity chapters)	• Severe space weather • Poor air quality events • Urban fires

Figures

Appendix Contents

Appendix 5.1
LVIA Methodology and Glossary

1.1 Introduction

1.1.1 The Landscape and Visual Impact Assessment (LVIA) and cumulative landscape and visual impact assessment (CLVIA) identifies, predicts, and evaluates the likely significant landscape and visual effects that may result from the Proposed Development. This assessment assesses the effects of the Proposed Development described in **Chapter 2: The proposed development** of the EIA Scoping Report.

1.1.2 Essentially, the landscape and visual effect (and whether it is significant) is assessed by considering the landscape or visual sensitivity to the Proposed Development, with reference to the susceptibility and value of the receptor, against the magnitude of change in order to identify a level of effect that would be brought about by the Proposed Development, were it to be implemented. The level of effect is also described in terms of its scale, geographical extent and duration, and subsequently whether the effect would be significant.

1.1.3 The type of effect is also considered and may be direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse. The assessment has also considered the cumulative effects resulting from the Proposed Development in combination with other existing and consented wind farms, and wind farms at the planning application stage.

1.1.4 The time period for the assessment covers phases of development related to the construction of the Proposed Development and associated infrastructure and its operation for a period of 30 years.

1.1.5 Landscape and visual assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

1.1.6 **Appendix 5.1** has been structured as follows:

- General Methodology;
- Landscape Assessment;
- Visual Assessment;
- Cumulative Landscape and Visual Assessment (CLVIA);
- Evaluation of Cumulative Landscape and Visual Effects;
- Visual Assessment of Views from Residential Properties;
- Night-time assessment;
- Production of ZTVs and Visualisations; and
- Abbreviations and Glossary.

1.2 General Methodology

1.2.1 The methodology for the LVIA and CLVIA has been undertaken in accordance with best practice guidance including, but not limited to, the following:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute and IEMA, May 2013;

- Siting and Designing Windfarms in the Landscape, Version 3a, SNH, August 2017;
- Wind Farm Design Guidance in Wales – Designing Wind Farms in Wales, Design Council for Wales, 2012;
- LANDMAP Guidance Note 46: Using LANDMAP in Landscape and Visual Impact Assessments GN46. Natural Resources Wales, June 2021.
- Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments, SNH, 2012;
- Residential Visual Amenity Assessment (RVAA). Technical Guidance Note 02/19. Landscape Institute, March 2019
- Visual Representation of Windfarms, Version 2.2, SNH, February 2017; and
- Visual Representation of Development Proposals. Technical Guidance Note 06/19. Landscape Institute, September 2019.

1.2.2 The landscape and visual effects of wind turbines can be directly experienced through the observation of existing wind farms within this area whose location is shown on **Figure 5.4**. Noticeably, wind farm development can co-exist with other features of the landscape, rather than replacing or removing them, as in the case of more conventional built development, although they can alter the landscape character of an area. Wind farm development is also visually permeable and although views may be interrupted, they are not blocked or prevented. Generally, wind farms have a 'small' development footprint that preserves much of the physical elements of the landscape, but entails the addition of tall structures, which are unavoidably visible over longer distances, leading to greater visual effects. A further, important difference is the reversibility of almost all of the landscape and visual effects as a result of the decommissioning stage.

1.2.3 Wind farms give rise to a wide range of opinions, from strongly negative to strongly positive. However, LVIA is not an assessment of public opinion, although a precautionary approach has been taken, which assumes that the nature of the effects would be adverse or neutral unless otherwise stated.

Defining the LVIA Study Area

1.2.4 Current NRW guidance[1] advises that the LVIA Study Area for wind turbines of this height should be based on a specified search area that is 23 km distant from each of the proposed turbine locations as illustrated in **Figure 5.1**. This is termed the defined LVIA study area. It is important to note that the boundary of the defined LVIA study area is not the limit of potential visibility. Furthermore, NRW Guidance allied with conclusions and observations made in undertaking numerous LVIAs for wind farms developments in South Wales and across other regions in Wales concludes that significant landscape and visual effects are highly likely to be restricted to an area up to 10 km from each of the proposed turbine locations. This is termed the detailed LVIA study area and is also shown in **Figure 5.1**.

1.3 Landscape Assessment

1.3.1 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

[1] *LANDMAP Guidance Note 46: Using LANDMAP in Landscape and Visual Impact Assessment GN46*. Natural Resources Wales, June 2021

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the development may influence in a significant manner."

1.3.2 The potential landscape effects, occurring during the construction, operation and decommissioning period may therefore include, but are not restricted to the following:

- Changes to landscape elements: the addition of new elements (wind turbines, met mast(s) and ground level infrastructure elements) or the potential removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the host LANDMAP aspect areas;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of host LANDMAP aspect areas or contribute to the landscape value of adjacent local landscape designations;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall landscape character within LANDMAP aspect areas and/or landscape designations; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

1.3.3 Development may have a direct (physical) effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, or other areas of landscape, outside the host LANDMAP aspect areas. This is usually, but not always exclusively, via a visual effect pathway.

Evaluating Landscape Sensitivity to Change

1.3.4 The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value. The overall sensitivity is described as High, Medium, Low, or Negligible. Landscape sensitivity often varies in response to both the type of development proposed and the particular site location, such that landscape sensitivity needs to be considered on a case by case basis. This should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Park may be described as inherently of high sensitivity on account of its designation, although it may prove to be less sensitive to particular development and/or of variable sensitivity across the geographical area of the National Park. Alternatively, an undesignated landscape may be of high sensitivity to a particular development regardless of the lack of local or national designation.

1.3.5 The main factors considered are discussed as follows:

Landscape Susceptibility

1.3.6 Landscape susceptibility according to GLVIA3 means "*the ability of the landscape to accommodate the development without undue consequences for maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*". In the case of wind farm development there may be local or regional spatial strategies and/or landscape studies that can assist in broad

scale judgements about the overall landscape capacity or sensitivity to wind farm development[2]. Attention, however, must be paid to the purpose, scope and methodology of these documents, as whilst providing assistance for strategic planning, they are not usually suitable for the assessment of specific wind farm proposals and should not be directly applied to individual applications. Rather, they provide broad information that should be considered as part of the more detailed landscape assessment.

1.3.7 Judgements on landscape susceptibility include references to both the physical and aesthetic landscape characteristics, and the potential scope for mitigation. Landscape susceptibility varies according to different areas of landscape character and whilst accepting that wind farm development is likely to lead to high levels of landscape change in most circumstances, factors that commonly indicate lower landscape susceptibility to wind farm development include landscape characteristics of larger scale, uniformity of land cover, simple landform and skylines with limited landscape features. Generally speaking, lower landscape susceptibility together with lower landscape value tends to indicate lower landscape sensitivity to development. Conversely, higher landscape susceptibility and value tend to indicate higher landscape sensitivity to development.

1.3.8 Common indicators of landscape susceptibility[3] to wind farm development are as follows:

- Landscape Scale:

  A large-scale landscape is generally considered to be less susceptible to wind farm development in comparison to a small-scale landscape.

- Landform and Topography:

  A simple landform with smooth, regular, rolling, undulating, or flowing landforms that might include plains, undulating or rolling lowlands, and plateaus that are generally considered to be less susceptible to wind farm development in comparison to more complex landforms which might include narrow glens, valleys, dramatic rugged and/or distinct landform features or pronounced undulations.

- Openness and Enclosure:

  Open landscapes are generally considered to be less susceptible to wind farm development, but could entail wider visibility, conversely enclosed landscapes could offer more screening potential, limiting visibility to a smaller area, but are also likely to be of smaller scale.

- Land Cover Pattern:

  Simple, regular landscapes with extensive areas of uniform ground cover (moorland / grassland, unenclosed land, forestry, large regular field patterns, parliamentary enclosures) are generally considered to be less susceptible to wind farm development in comparison to landscapes with more complex or irregular land cover (smaller fields, medieval enclosures, smaller scale 'patchwork' landscapes of mixed fields with small woodland copses).

- Presence of Development:

  Areas where there are existing large-scale developments (industry, mineral extraction, masts pylons, other turbines, urban fringe / large settlement, major transport routes) are generally considered to be less susceptible to wind farm development in comparison to areas

[2] A good example is *Heads of the Valleys Smaller Scale Wind Turbine Development Landscape and Sensitivity Study Final Report* (April 2015) prepared by Gillespies, although as noted in the main text the proposed Mynydd-y-Glyn Wind Farm's capacity exceeds the largest capacity category utilised in the Study.
[3] Scottish Natural Heritage, A Guide to Commissioning a Landscape Capacity Study, 2015.

characterised by smaller scale development (smaller, generally historic villages with dense settlement patterns and smaller scale associated buildings such as churches).

- Landmarks:

  Landscapes that contain large scale landmarks which may include other wind farms and infrastructure and large-scale developments are generally less susceptible to wind farm development although development needs to be carefully sited to manage landscape foci and avoid 'visual clutter' or cumulative impacts. Historic landmarks such as important views to distinctive church spires and towers, particular 'landmark' landforms (prominent hills or peaks) or 'land art' generally increase susceptibility.

- Settlement:

  Landscapes which are un-settled or with lower levels of population are generally considered to be less susceptible to wind farm development in comparison to more densely populated areas.

- Skyline:

  Prominent and distinctive skylines, horizons (including indented ridges / peaks, key views and or vistas) or skylines with important landmark features that are identified in LANDMAP commentaries and responses, are generally considered to be more susceptible to wind farm development in comparison to broad, simple skylines which lack landmark features or contain other turbines / tall infrastructure features.

- Windiness and Rational:

  Areas that appear to be windy / windswept which may also be elevated or exposed are generally considered to be less susceptible to wind farm development in comparison to more sheltered areas.

- Change and Movement:

  Landscapes which contain movement (traffic, wind turbines, other moving infrastructure and waves / tides) or are subject to high levels of change (large scale forestry operations, mineral extraction, man-made change and development) are generally considered to be less susceptible to wind farm development in comparison to landscapes that are still or appear to be unchanging and/or notably historic with notable 'time depth'.

- Remoteness, Naturalness, Wildness / Tranquillity:

  Notably wild or tranquil landscapes are generally considered to be more susceptible to wind farm development in comparison to cultivated or farmed / developed landscapes where perceptions of 'wildness' and tranquillity are less tangible. Landscapes which are either remote or natural may vary in their susceptibility to wind farm development.

- Landscape Context and Adjacent Landscapes:

  The location and visual connection to adjacent landscapes may also have a bearing on the overall susceptibility of the landscape to wind farm development. This consideration is pertinent to the ridgeline and valley topography that characterises the parts of south Wales including the defined study area.

Landscape Value

1.3.9 This includes the consideration of a range of features which may include the presence or absence of landscape designation, special landscape qualities, rarity / representativeness, conservation interests, recreational value, perceptual qualities such as tranquillity and historical or cultural

associations, as set out in GLVIA 3, page 84, Box 5.1. The importance attached to a landscape, often as a basis for designation or recognition, which expresses national or local consensus, because of its quality including cultural associations, scenic or aesthetic qualities. Landscape value may be indicated by the presence or absence of a landscape planning designation such as an Area of Outstanding Natural Beauty (AONB) or Special Landscape Area (SLA) (higher value) indicating a landscape of national or local value accordingly or an undesignated landscape (lower value).

1.3.10 The absence of a landscape planning designation should not assume an area of 'low' landscape value and undesignated areas of landscape are often of some local value. Indications of this are likely to be present in the form of documented, locally valued, cultural / natural heritage and scenic or aesthetic qualities such as 'wildness' or the presence of viewing platforms or benches. It should be noted that a landscape of high value may not always equate to areas of high landscape quality and that areas of low landscape value may contain areas of higher landscape quality. The state of repair or condition of the elements of a particular landscape, its integrity and intactness and the extent to which its distinctive character is apparent are also relevant. The quality of a landscape element or characteristic may also be influenced by the degree to which it may contribute to the overall landscape character type/area, its rarity, fragility, and potential for replacement or mitigation. Landscapes of lower quality tend to include those under intensive agriculture, forestry or urban fringe situations where the landscape elements and patterns have been eroded, landscapes with man-made development such as infrastructure or other wind farms and areas of derelict or vacant land, areas of mineral extraction and / or land fill.

Evaluating the Magnitude of Landscape Change

1.3.11 The 'magnitude' or 'degree of change' resulting from a particular development is described as High, Medium, Low, Negligible or None. This is assessed by considering the scale, geographical extent and duration of the proposed change, which may include the loss or addition of particular features (primarily wind turbines), changes to landscape quality and changes to landscape character. As such this needs to be considered on a case by case basis. It may be possible for some mitigation measures to reduce the magnitude of change and consequently the residual landscape effects, and for these reasons the landscape design of the wind farm should form an iterative part of the assessment process. The main factors to be considered are discussed as follows.

- Loss, Alteration, or Addition to Landscape Elements:

  Development may result in the loss, alteration, or addition of landscape elements such as trees, hedgerows, or development components such as wind turbines anemometry masts and new access tracks. These can be quantified objectively;

- Loss, Alteration, or Addition to Landscape Characteristics / Quality:

  Development may result in the loss, alteration, or addition of physical landscape characteristics, such as wooded areas, landscape patterns, or development components such as wind turbines, which can be quantified objectively. Perceptual characteristics and effects on scenic quality or wildness also need to be considered, albeit subjectively, with reference made to objective and documented opinion; and

- Change to Landscape Character (As represented by LANDMAP Aspect Areas):

  All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation', meaning that they may accommodate wind farm development and 'change' whereby the landscape character could be altered to create new landscapes for the accommodation of wind farm development and / or forestry or to provide areas or development resulting in townscape or peri-urban

development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape character areas and their overall integrity.

1.3.12 In addition to the scale or magnitude of the effect, GLVIA3 advises that consideration should also be given to the following aspects of a landscape effect:

Geographical Extent

1.3.13 Landscape effects should be described in terms of the geographical extent or physical area that would be affected (described as a linear or area measurement e.g. spatial extent of the hub height and/or blade tip ZTVs). This should not be confused with the scale of the proposed development or its physical footprint. Landscape effects occurring over a larger geographical extent and over a higher proportion of a landscape designation or LANDMAP aspect area are more likely to be regarded as significant.

Duration and Reversibility

1.3.14 Landscape effects should also be described in terms of the duration of the effect and whether this would be permanent, temporary or reversible. Duration can be considered as ranging between temporary (short to long term and time limited) or permanent. Although 'long term' some development such as housing should be regarded as permanent, whilst mineral extraction works usually entail several phases of development, followed by restoration to a 'new' landscape character. Wind farm development usually operates for a long term, time limited operational period, in the case of the proposed Mynydd-y-Glyn Wind Farm 25 years followed by a decommissioning period that would allow the landscape effects to be reversed. Reversibility is only assessed as part of the decommissioning stage and cannot factor into the assessment of the time limited operational effects.

1.3.15 Further guidance on the evaluation of landscape sensitivity and magnitude are provided in **Table A5.1**.

1.3.16 The level of landscape effect is evaluated through the combination of landscape sensitivity and magnitude of change, a process assisted by the matrix in **Table A5.3**, which is used to guide the assessment. In those instances where there would be no change to the landscape, the magnitude has been recorded as 'Zero' and the level of effect as 'None'.

1.3.17 Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' as required by the relevant EIA Regulations. Further information is also provided about the nature of the effects (whether these would be direct / indirect, temporary / permanent / reversible, cumulative, or beneficial, neutral or adverse).

1.3.18 In describing the level of landscape effect the assessment text clearly and transparently sets out the professional judgements that have been made in determining sensitivity and how the value and susceptibility of the landscape receptor has been assessed; and in determining magnitude and how the size and scale, geographical extent and duration of the effect has been taken into account.

Table A5.1 Landscape Sensitivity and Magnitude

Examples of Landscape Sensitivity	
High	Landscape character, characteristics, and elements with no or limited landscape capacity or scope for landscape change and higher landscape value and susceptibility to the proposed development. Often includes landscapes which are nationally, internationally or regionally designated and have a high landscape value. In relation to landscape designations, the documented Special Landscape Qualities qualities[4] are such that there would be no or limited landscape capacity or scope for landscape change of the type posed by the proposed development.
Medium	Landscape character, characteristics, and elements with some landscape capacity or some scope for landscape change. Often includes landscapes of medium landscape value and quality as assessed in the relevant VSAA LANDMAP responses which may be locally designated or undesignated and have a medium landscape value. In relation to landscape designations, the documented Special Landscape Qualities and wild land qualities are such that there would be some landscape capacity or scope for change or accommodation.
Low	Landscape character, characteristics and elements which display greater landscape capacity or scope for landscape change to accommodate the proposed development as part of spatial strategy for example. Usually applies to landscapes which are undesignated with indicators of lower landscape susceptibility to development. May also apply to landscapes that may have been subject to intensive agriculture, blanket forestry or other man-made development and have a low landscape value.
Negligible	Landscape character, characteristics and elements where there is a high landscape capacity or a planned desire for landscape change of the type proposed as part of spatial strategy for example. Usually applies to landscapes with a lower landscape susceptibility to development. May also apply to derelict landscapes, or vacant land, areas of mineral extraction and / or land fill for example.
Examples of Landscape Magnitude	
High	A total or large-scale change and / or extent that may include the loss of key landscape characteristics / special qualities or the addition of new uncharacteristic features or elements, that would become the dominant characteristics of the landscape, and change the overall landscape quality, and character over a large area.
Medium	A medium-scale change of limited scale and extent including the loss of some key landscape characteristics / special qualities or elements, or the addition of some new uncharacteristic features or elements that would potentially change the landscape quality and character of a localised area or part of a landscape character type/area.
Low	A low-scale change affecting small areas of landscape character / special qualities, including the loss of lower value landscape elements, or the addition of new features or elements of limited characterising influence.
Negligible	A negligible change affecting smaller areas of landscape character and quality, including the loss of some landscape elements or the addition of features or elements, which are either of low value or hardly noticeable in terms of their contribution to the landscape character.
None	There would be no change to the receptor.

1.4 Visual Assessment

1.4.1 Visual Effects are concerned wholly with the effect of the development on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of

[4] As set out in a National Park Management Plan or the several Special Landscape Area reviews that have been commissioned by individual or consortia of local authorities in south Wales.

individuals or groups of people may be specifically affected by changes in the context and character of views."

1.4.2 Visual effects are identified for different receptors (people) who will experience the view(s) at their places of residence, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view(s); and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

1.4.1 The level of visual effect (and whether this is significant) is determined through consideration of the 'sensitivity' of each visual receptor (or range of sensitivities for receptor groups) and the 'magnitude of change' that would be brought about by the construction and operation proposed development. Visual assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion is sought through consultation and internal peer review.

Zone of Theoretical Visibility (ZTV)

1.4.3 Plans mapping the Zone of Theoretical Visibility (ZTV) are used to analyse the extent of theoretical visibility of development or part of a development, across the defined and detailed LVIA Study Areas and to assist with viewpoint selection. For proposed wind farm developments ZTVs are calculated for the turbines' hub heights and their blade tips. The ZTVs does not take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures). As a result, there may be roads, tracks and footpaths within the LVIA study areas which, although shown as falling within the ZTV, are screened or filtered by built form and vegetation, which would otherwise preclude visibility.

1.4.4 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

Viewpoint Analysis

1.4.5 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints identified and agreed upon with consultees within the LVIA Study Area. The purpose of this is to assess both the level of visual impact for particular receptors and to help guide the design process and focus the LVIA. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which there would be no further significant visual effects.

1.4.6 The assessment involves visiting the viewpoint location and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

1.4.7 The assessors have also viewed the electronic photomontages in animated form as part of the office-based software used for their production so the effects of blade rotation can be assessed. The turbines are always viewed as though facing towards the viewer to provide maximum potential visibility, although during operation, the turbines would face into the wind. The prevailing wind direction, likely to occur during the operational period is therefore also informative to the

assessment, particularly if this tends to be variable or directional. In south Wales the prevailing wind direction is from the south-west.

Evaluating Visual Sensitivity to Change

1.4.8 In accordance with paragraphs 6.31-6.37 of *GLVIA 3* the sensitivity of visual receptors takes account of the susceptibility of the receptor to visual change and the value of the baseline view available to them.. Sensitivity is assessed as High, Medium, Low, or Negligible, although in practice 'negligible' sensitivity is not used.

Visual Assessment: Susceptibility

1.4.9 The main factors to consider are the activity or occupation of the receptor at the viewpoint or receptor location and the extent to which their attention or interest may be focused on the view and visual amenity of the surrounding landscape. Whilst it is accepted that people will undertake a range of different activities, their visual experience of a development will change according to where they are, and what they are doing, and susceptibility is assessed as follows:

- People at nationally recognised viewpoints, people at views/vistas attached to heritage features (such as Gardens and Designed Landscapes) or other locations recognised nationally in art or literature, are assessed as of high susceptibility. People in their communities including those engaged in out-door recreation (e.g. users of public open spaces), where the focus of the activity is on enjoyment of the landscape and there is a high frequency of use, are also considered to be of high susceptibility;
- People on local footpaths routed through undesignated, landscapes that may be of lower scenic quality, and people engaged in sport, or travelling / commuting, especially on motorways, trunk roads and other 'A' roads are considered as to be of less susceptibility (medium); and
- People at their place of work where views are not an important contributor to the quality of working life possess the least (low) susceptibility.

Visual Assessment: Value

1.4.10 In relation to value, consideration is given to the value of the view(s) through reference to local or national scenic landscape designation. Other factors to consider include the importance or popularity of the view(s) and/or the likely numbers of viewers and the location and context of the viewpoint (in terms of the main primary or secondary views from a receptor location). The visual experience from a tourist destination, for example, could involve either the key views to, or from the main attraction, or those from the car-park / service area, and this context will affect the sensitivity and value of the views. Whilst views from car-parks / service areas may still be experienced by receptors of inherently higher sensitivity, these types of views should not be considered of higher value or sensitivity.

1.4.11 Landmarks / tourist attractions and national trails visited and used by large numbers of people are likely to be of higher value and more sensitive than those which are less visited. Occasionally there may be exceptions such as motorways where, although there are higher numbers of receptors these are generally considered to be of lower value. Conversely some less well visited footpaths within remote areas, may be of higher value precisely because of the lower visitor numbers.

Evaluating the Magnitude of Change to the View

1.4.12 The magnitude of change is described as High, Medium, Low, Negligible or Zero, and is assessed by consideration of possible changes caused by the Proposed Development, which may affect the view. For visual receptors for whom the Proposed Development would not be visible and there would be no change to their view, the magnitude has been recorded as 'zero' and the level of effect as 'no view'.

1.4.13 The magnitude of visual change is described by reference to the following:

- Scale of Change:

  The scale of change in the view (including horizontal and vertical FoV[5] affected), is determined by the loss or addition of features in the view and changes in the composition and extent of view affected. This can in part be described objectively by reference to numbers of new objects visible and the horizontal / vertical extents of the FoV affected.

- Contrast:

  The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of mass, scale, colour, movement, form and texture. Proposed Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and to generate a higher magnitude of change.

- Distance:

  The proximity or distance from the Proposed Development can be described objectively and often provides a strong indicator of magnitude, subject to any intervening screening by landform, vegetation, or buildings.

- Speed of Travel:

  The speed at which the Proposed Development may be viewed will affect how long the view is experienced and the likelihood of the Proposed Development being particularly noticed by people travelling in cars compared to those who may be walking and able to stop and 'take in' a view.

- Angle of View (AoV):

  The AoV from the main viewing direction may be considered in terms of whether the Proposed Development is experienced directly or at an oblique angle from the visual receptors' main viewing direction. Road users are generally more aware of the views in the direction of travel, whilst train passengers are more aware of views perpendicular to their direction of travel. Elevated views are likely to reveal more of the Proposed Development, whereas low level views are more likely to be screened by intervening built form and vegetation.

- Screening:

  The Proposed Development may be wholly or partly screened by landform, vegetation (seasonal) and or built form. Conversely open views, particularly from landscapes where LANDMAP identifies their availability as a characteristic, are likely to reveal more of a development.

[5] Field of View.

- Skyline / Background:

  Whether the Proposed Development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude, for example, skyline developments may appear more noticeable, particularly where they affect open and uninterrupted horizons. Conversely, wind turbines may also appear more noticeable when viewed against a darker background landscape, such as forestry.

- Nature of Visibility:

  The nature of visibility, whether this is subject to various phases of development change and the manner in which the development may be viewed such as intermittently or continuously, and / or seasonally, due to periodic management or leaf fall, is a further factor for consideration.

1.4.14 In addition to the scale or magnitude of the effect, GLVIA 3 advises that consideration should also be given to the following aspects of a visual effect:

Geographical Extent

1.4.15 A visual effect is also considered in terms of the geographical extent, physical area or location over which it would be experienced (described as a linear or area measurement). Visual effects affecting a large geographical area are more likely to be regarded as significant.

Duration and Reversibility

1.4.16 A visual effect is also considered in terms of the duration over which the effect would be experienced and whether this would be permanent, temporary or reversible. Duration can be considered as ranging between temporary (short to long term and time limited) or permanent. Although 'long term' some development such as housing should be regarded as permanent, whilst mineral extraction works usually entail several phases of development, followed by restoration. Wind farm development usually operates for a long term, time limited period, for the proposed Mynydd-y-Glyn Wind Farm 30 years followed by a decommissioning period that would allow the visual effects to be reversed. Reversibility is only assessed as part of the decommissioning stage and cannot factor into the assessment of the time limited operational effects. Permanent visual effects (not time limited) are more likely to be regarded as significant.

1.4.17 Further guidance on the evaluation of visual sensitivity and magnitude is provided in **Table A5.2**.

Table A5.2 Visual Receptor Sensitivity and Magnitude

Examples of Visual Sensitivity	
High	People in their communities and on long distance, strategic footpaths or popular footpaths and tourist destinations, viewing important landscape features, beauty spots and picnic areas, where the activities are focused on the landscape. Receptors include groups of high susceptibility to change such as residents, tourists / visitors, and walkers travelling through the landscape, viewing and experiencing landscapes of high value and quality.
Medium	People within outdoor sports based recreational spaces such as and golf courses, using local or less well used recreational routes of viewing landscapes of high or medium value. Receptors include groups of medium susceptibility to change receptors such as some walkers, cyclists, road users, and other recreational receptors travelling through the landscape / seascape. Viewing and experiencing landscapes of medium value and quality.
Low	People working on the land or sea, at their place of work, or taking part in activities such as team sports that do not involving an appreciation of the landscape, including vehicular receptors travelling on motorways and other busy trunk and 'A' roads. Often viewing and experiencing landscapes of medium to low value and quality.

Examples of Visual Sensitivity	
Negligible	Not used.
Examples of Visual Magnitude	
High	A major change or obstruction of a view that may be directly visible, appearing as the dominant and contrasting feature appearing in the fore or middle ground.
Medium	A prominent change or partial view of a new element within the view that may be readily noticeable, directly or obliquely visible including glimpsed, partly screened or intermittent views, appearing as a prominent feature in the middle ground or background landscape.
Low	A noticeable or small level of change, affecting a small part of the view that may be obliquely viewed or partly screened and/or appearing in the background landscape although noticeable. May include views experienced whilst travelling at speed.
Negligible	A small or intermittent change to the view that may be obliquely viewed and mostly screened and/or appearing in the distant background or viewed at high speed over short periods and capable of being missed by the casual observer.
None	There would be no change to the view.

1.4.18 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change, a process assisted by the matrix in **Table A5.3**, which is used to guide the assessment. In those instances where there would be no change or no visibility or view of the Proposed Development, the magnitude has been recorded as 'Zero' and the level of effect as 'No View'.

1.4.19 Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' as required by the relevant EIA Regulations. Further information is also provided about the nature of the effects (whether these would be direct / indirect, temporary / permanent / reversible, cumulative, or beneficial, neutral or adverse).

1.5 Cumulative Landscape and Visual Assessment

1.5.1 The assessment of cumulative effects is essentially the same as for the assessment of the primary landscape and visual effects, in that the level of landscape and visual effect is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change. Cumulative assessment however, considers the magnitude of change posed by multiple development.

1.5.2 A cumulative landscape or visual effect simply means that more than one type of development is present or visible within the landscape. Other forms of existing development and landuse 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 capacity for cumulative development, 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.

1.5.3 Detailed guidance on the cumulative assessment of wind farm development is provided in the SNH document '*Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*' (2012). This assessment distinguishes between 'additional' cumulative effects that would result from adding the Proposed Development to other cumulative wind farm development and 'combined' cumulative effects that assess the total cumulative effect of the Proposed Development

and other cumulative wind farm development. In the latter case a significant cumulative effect may result from the Proposed Development or one of more other existing, under-construction or consented wind farms, or other wind farm applications. In those cases, the main contributing wind farm(s) is identified in the assessment.

1.5.4 Types of cumulative effect are defined as follows:

- Cumulative Landscape Effects: Where more than one wind development may have an effect on a landscape designation or particular area of landscape character as define by LANDMAP Aspect Areas;
- 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:
  - 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[6];
  - 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
  - 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.

1.5.5 The SNH document '*Siting and Designing Wind farms in the Landscape' (Version 3a)* explains that the development of multiple wind farms within a particular area may create different types of cumulative effect, such as where:

"The wind farms are seen as separate isolated features within the landscape character type, too infrequent and of insufficient significance to be perceived as a characteristic of the area;

The wind farms are seen as a key characteristic of the landscape, but not of sufficient dominance to be a defining characteristic of the area; [a landscape with wind farms] and

The wind farms appear as a dominant characteristic of the area, seeming to define the character type as a 'wind farm landscape character type."

1.5.6 Wind farm development that results in the creation of a '*wind farm landscape*' as opposed to a '*landscape with wind farms'* or '*landscape with occasional wind farms*' is likely to be assessed as significant. Equally the 'additional effect' of a proposed wind farm development, adding to a scenario where there are already a number of other existing or consented wind farms, may be less than the effect of the Proposed Development either on or primary basis or in an area where there are few or no wind farms existing. This is because wind farm development has already been established as a characterising influence and the additional effect of further development may or may not alter this.

1.5.7 Whilst the CLVIA considers other wind farm development, it should not be considered as a substitute for individual LVIA assessment in respect of each of the other cumulative developments included in the CLVIA.

[6] Note: A person's field of view is variable but is approximately 90° when facing in one direction.

Defining the Cumulative Study Area

1.5.8 The cumulative search area and study area is the same as the defined LVIA Study Area as illustrated in **Figure 5.1**. Other existing, under-construction, consented and application wind energy sites included within this area are noted and considered in terms of their likely relevance to the CLVIA. Sites within the Cumulative Search Area which are considered likely to contribute to a significant cumulative effect in 'addition' or in 'combination' with the Proposed Development are included in the CLVIA.

1.5.9 Those developments at pre-planning or scoping stage are excluded in accordance with SNH guidance, unless there is a justified / exceptional circumstance for their inclusion in the assessment.

Predicting Cumulative Landscape Effects

1.5.10 The CLVIA considers the extent to which the Proposed Development, in combination with other existing, consented and proposed[7], may change landscape character through either an 'additional' or 'in combination' effect on characteristic elements, landscape characteristics and quality of the baseline landscape character as defined in LANDMAP. Identified cumulative landscape effects are described in relation to each individual scoped in LANDMAP Aspect Area and for any scoped in designated landscape areas assessed within the LVIA Study Area.

Predicting Cumulative Visual Effects

1.5.11 The assessment of cumulative visual effects involves reference to the cumulative visibility ZTV maps and the cumulative viewpoint analysis. The cumulative visibility of other existing and consented wind energy developments and applications is established in the first instance using the computer programme (Resoft Wind Farm© software) to identify areas where wind energy developments are theoretically visible. Cumulative visibility maps are analysed to identify the visual receptor locations and routes where cumulative visual effects on the landscape and people may occur as a result of the Proposed Development.

1.5.12 With potential receptor locations identified, cumulative effects on individual receptor groups are then explored through viewpoint analysis, which involves site visits informed by wireline illustrations that include other wind energy developments. The computer programme itself can also be used to 'drive' particular routes to assess the visibility of different wind energy developments and inform the assessment of sequential cumulative effects that may occur along a route or journey, and compared to actual visibility experienced along a route during the site visit.

Evaluation of Cumulative Landscape and Visual Effects

1.5.13 The evaluation of cumulative effects is assisted by the matrix in **Table A5.3**, which is used to guide the assessment.

1.5.14 The cumulative assessment has been prepared to ensure that, as well as the primary effect of the Proposed Development (LVIA) the 'additional' cumulative effects and the 'combined' cumulative effect (CLVIA) is also reported to account for two cumulative Scenarios as follows:

- Existing + Proposed Development:
  - The primary effect in the context of the current baseline of operational wind energy developments as summarised in **Table 5.1**.
- Scenario 1: Existing + Consented + the Proposed Development:

[7] Planning application submitted or at public inquiry.

- The additional and combined cumulative effects of any consented wind energy developments with the Proposed Development are assessed.

- Scenario 2: Existing + Consented + Applications + the Proposed Development:
  - The additional and combined cumulative effects of the existing and consented wind energy developments and any live applications (which would include schemes at planning appeal), with the Proposed Development are assessed. At present no live applications have been identified in the CLVIA study area.

1.5.15 In addition, the cumulative assessment takes account of the timescales, as far as practicable.

1.5.16 Due to the numbers of other wind energy developments scoped into the CLVIA, the overall cumulative effects may be greater than for the primary effect or additional effect for the Proposed Development assessed in the main LVIA. The resulting level of cumulative effect may remain at the same level of effect or increase to a higher level of effect. The point at which these effects become significant or not significant in landscape and visual terms is still a matter for professional judgement, although four scenarios or combinations of cumulative effect, taking account of other wind energy development can occur as follows:

- 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;
- 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;
- A non-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
- 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 effect is still termed 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.

1.5.17 The nature of a cumulative effect may also be described as direct / indirect, temporary / permanent, or beneficial/ adverse. The probability of a cumulative effect occurring may also be described (certain, likely or uncertain / unknown).

1.6 Evaluating Landscape and Visual Effects

1.5.18 The level of effect relating to landscape and visual effects and / or cumulative landscape and visual effects is determined by the combination of sensitivity (ranging from High to Negligible) and magnitude of change (ranging from High to Zero), which is assisted by the matrix illustrated in **Table A5.3**. In addition to the scale or magnitude of the effect, the GLVIA 3 advises that consideration should also be given to the geographical extent and duration or reversibility of the effect as described earlier.

Types of Landscape and Visual Effect

1.5.19 The relevant EIA Regulations also require that the level of effect is described in terms of its 'type' or 'nature' of effect (whether the effect is permanent / temporary, direct / indirect, beneficial/neutral/adverse and or cumulative) as well as the scale over which the effect would occur. For example, an effect may be locally significant, or significant with respect to a small number of receptors, but not significant when judged in a wider context. These terms are defined below:

- Temporary or Short Term / Long term / Permanent:

  The time period over which an effect may occur is referred to as temporary / short term, long term, or permanent. Wind farm development is considered 'in perpetuity' due to the long-term periods of operation typically occurring over 25-30 years. However, the Proposed Development is time-limited and the effects would also be reversible upon completion of the Proposed Development's decommissioning.

- Direct / Indirect effects:

  Direct effects relate to the host landscape elements and LANDMAP Aspect Areas and concern both physical and perceptual effects on these receptors. Indirect effects relate to those LANDMAP Aspect Areas, designated landscapes and visual receptors which separated by distance or remote from the Proposed Development. Such receptors can only be impacted via of visual or perceptual effects pathways. The Landscape Institute also defines indirect effects as those which are not a direct result of the Proposed Development but are often produced elsewhere or from a complex pathway e.g. localised road widening to facilitate delivery of turbines along the proscribed access route.

- Beneficial / Neutral / Adverse:

  The landscape and visual effects generated may be beneficial, neutral, or adverse. The LVIA assumes that the nature of the effects would be 'adverse' unless otherwise stated i.e. adopts a worst-case scenario and in the case of wind farm development, the most noticeable effects and changes are likely to be visual. However, GLVIA 3 cautions against the automatic assumption that all change would result in an adverse effect.

  - In Landscape Terms: a beneficial effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include changes that neither add nor detract from the quality and character of an area including development that may be reasonably accommodated within the scale and capacity of the landscape in the context of landscape management and change as defined in LANDMAP commentaries, and negligible magnitudes of change. An adverse effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction or operation that exceeds landscape capacity, leading to a reduction in landscape quality and character of a LANDMAP Aspect Area or a landscape designation;

  - In Visual Terms: beneficial or adverse effects are less easy to define or quantify and require subjective consideration of a number of aesthetic factors affecting the view, which may be beneficial, neutral, or adverse. Not all change, including high levels of change, is necessarily an adverse experience. Public opinions as to the visual effects of wind farms vary widely, however this LVIA is not an assessment of public opinion. Rather, an LVIA considers architectural and aesthetic factors such as the visual composition of the landscape in the view together with the wind farm design, which may or may not be reasonably accommodated within the scale and character of the landscape as perceived from the receptors' location. Neutral visual effects would include changes that are not dominating, overbearing, or oppressive. They include development that appears reasonably well accommodated within the scale and landscape setting or context and also includes

negligible magnitudes of change. An adverse effect may include poor visual design quality such as overlapping ('stacking') turbines, inappropriate scale of development relative to the underlying landscape, or other visual factors that may reduce scenic quality, such that the wind farm would appear dominating, overbearing, or oppressive.

Probability of Cumulative Effect

1.5.20 The probability of cumulative effects is variable. Those effects related to existing wind energy development and those under construction are considered as certain; effects related to development with planning consent are considered as likely. Wind energy development sites for which there is a submitted planning application are considered as uncertain.

Determining the Significance of Effects

1.5.21 In accordance with the relevant EIA Regulations it is important to determine whether the predicted effects, resulting from the Proposed Development, are likely to be significant. Significant landscape and visual effects are highlighted in **bold** in the text and in most cases, relate to all those effects that result in a '**Substantial**' or a '**Substantial / Moderate**' effect as indicated in **Table A5.3**. 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 in bold and explained as part of the assessment, where they occur.

1.5.22 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 A5.3 Evaluation of Landscape and Visual Effects

		Landscape and Visual Sensitivity			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	**High**	**Substantial**	**Substantial / Moderate**	**Moderate**	Slight
	Medium	**Substantial / Moderate**	**Moderate**	Slight	Slight / Negligible
	Low	**Moderate**	Slight	Slight / Negligible	Negligible
	Negligible	Slight	Slight / Negligible	Negligible	Negligible
	Zero	None / No View			

1.6.1 In line with the emphasis placed in GLVIA 3 upon application of professional judgement, the adoption of an overly mechanistic approach through reliance upon a matrix as presented in **Table A5.3** will be avoided. This will be achieved by the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor over and above the outline assessment provided by use of the matrix. Matrices for landscape and visual effects are provided as a summary in support of the narrative explanations. Wherever possible cross references will be made to baseline figures and/or to photomontage visualisations to support the rationale

Residential Visual Amenity Assessment

1.6.2 Residential amenity is a planning matter that involves a wide number of effects (such as noise and shadow flicker) and benefits, of which residential visual amenity is just one component. The

Residential Visual Amenity Assessment (RVAA) is limited to the consideration of visual effects on residential amenity and the methodology accords with the advice in GLVIA 3, the Landscape Institute's *Residential Visual Amenity Assessment: Technical Guidance Note*, 2019.

1.6.1 Planning law contains a widely understood principle that the outlook or view from a private property is a private interest and not therefore protected by the UK planning system. However, the planning system also recognises situations where the effects on residential visual amenity are considered as a matter of public interest. This matter has been examined at a number of public inquiries in Wales (as well as in Scotland and England) where the key determining issue was not the identification of significant effects on views, but whether the proposed turbines would have an overbearing effect and/or result in unsatisfactory living conditions, leading to a property being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live.

1.6.2 The visual assessment methodology consequently provides for a much more detailed assessment of the closest residential properties in communities. This allows the assessor. and the determining authority. to make a judgement as to whether the residents at these properties and communities would be likely to sustain unsatisfactory living conditions which it would not be in the public interest to create. Reviews of decisions demonstrate that significant visual effects or changes to the views available from residential properties and their curtilage are not the decisive consideration, rather it is the residential amenity and, with regard to an LVIA, residential *visual* amenity that is determinate.

1.6.3 The methodology for assessing the visual effects on views from residential properties is therefore slightly different from the assessment of other visual receptors and allows for two stages of assessment as follows:

- Stage 1: Undertake a visual assessment to identify any significant effects upon residents in communities; and
- Stage 2: Undertake a Residential Visual Amenity Assessment (RVAA).

1.6.4 A residential property, for the purposes of environmental impact assessment, should be one that was designed and built/converted for that purpose and currently (at the time of the assessment) remains in a habitable condition, of a safe construction, wind and water tight with appropriate vehicle access, and services (drinking water, sanitation, and power supply). Other buildings such as barns/outbuildings, garages, huts and derelict properties should generally be excluded from the RVAA, unless they form part of the curtilage of an existing residence.

1.6.5 The assessment of residential properties or groups of residential properties is limited to those which appear on the Ordnance Survey 1:25,000 scale map and any expectations such as known recent 'new-builds'. Planning permissions and conversions are not included. Whilst most of the properties can be viewed at close range from public roads and footpaths, or have otherwise been visited, some of these properties are accessed via private or gated roads and due to these access limitations, they have been assessed from the nearest public road or footpath which may be at greater distance from the property. Where this is the case, the RVAA should be regarded as a 'best estimate' of the likely visual effects.

1.6.6 Baseline conditions across many parts of the Valleys area in south Wales are such that communities are often located within the proscribed 2 km radius RVAA study area with these communities containing large numbers of residential properties. This situation is applicable to the proposed Mynydd-y-Glyn Wind Farm. Undertaking visual assessments and subsequently RVAAs at individual residential properties in these communities is neither practical nor desirable. Residential properties in communities are therefore grouped together based upon shared relevant characteristics as listed in paragraph 5.6.11 under Stage 2: Residential Visual Amenity Assessment.

Stage 1: Visual Assessment

1.6.7 A visual assessment is undertaken to identify those properties where a significant visual effect on a view from the property available to the resident(s) is likely to occur. The methodology for this is set out above and combines an assessment of the residents' 'sensitivity' with an assessment of 'magnitude'.

1.6.8 The sensitivity of individual residential receptors in the community has been assessed as 'High' due to the high susceptibility of residents in accordance with GLVIA 3, paragraph 6.33. The value of the view is also likely to be regarded as high by the residents themselves, but the views in the closest communities to the proposed Mynydd-y-Glyn Wind Farm are not nationally and only infrequently locally designated for their scenic value and generally accord a medium value in this respect.

1.6.9 Other wind energy development may be visible to residents in some communities within the 2 km radius RVAA study area. However, it is considered unlikely that it would contribute to an effect on the RVAA because as shown in **Table 5.1** and **Figure 5.4,** the wind energy developments that are the closest (within 10 km) and which are most likely to be visible from these communities are scattered individual turbines under 100m blade tip height.

Stage 2: Residential Visual Amenity Assessment

1.6.10 The second stage is to consider the residential visual amenity and whether, in terms of the wider public interest, the visual effects would result in unsatisfactory living conditions, leading to properties being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live. Relevant information considered as part of the Stage 2 assessment may include, but is not limited to the following:

- Scale of Wind Farm:
  - Number and height of visible turbines;
  - The horizontal and vertical extent or AoVs of the visible turbine array;
  - Separation distance (closest and furthest visible turbines); and
  - Height differentials in metres Above Ordnance Datum (AOD) between the property groups in the valleys and the turbine bases on the ridgeline.
- Description of property groups, as far as this can be ascertained and as applicable to a majority of individual properties in a defined group:
  - Orientation and size of properties and whether views from the properties towards the wind farm would be direct or oblique;
  - Location of principal rooms and main living areas such as living/dining rooms, kitchens and conservatories, as opposed to upstairs rooms (bedrooms / bathrooms), working areas such as farm buildings and utility areas;
  - Location of principal garden areas which may include patios and seating areas as opposed to less well used areas within curtileges such as paddocks or garages; and
  - The effects of any screening by landform, vegetation or nearby built development.
- Location and context:
  - The aspect of the property in terms of the overall use and relationship to the garden areas and surrounding landscape;
  - The principal direction of main views and visual amenity;

- The context and nature of any intervening structures e.g. other existing wind farm development, farm buildings or forestry.

1.6.11 The RVAA will be supported by aerial and ground level photography as well as map-based data, the production of ZTV plots and visualisations such as wirelines. The RVAA will take account of the likely views from the ground floors of properties and main garden areas but excludes upper floors and other non-residential land that may be associated with the properties. These areas cannot usually be assessed from public areas, unless they have been subject to further on-site assessment with the resident's permission.

1.6.12 Other factors affecting residential amenity such as noise and shadow flicker are not considered as part of the RVAA.

1.7 Night-time Assessment

1.7.1 The night-time assessment follows the same methodology used for the assessment of landscape, visual and cumulative effects. The only difference is that it is conducted during periods of dawn to dusk and assesses the baseline night-time environment against the proposed additional, artificial lighting, in this case aviation warning lights, to be fitted to the proposed turbines.

1.7.2 The study area for the night-time assessment is also the same as the detailed LVIA Study Area.

1.7.3 As with the landscape and visual assessment, the sensitivity of the visual receptor to the Proposed Development (aviation warning lights) and the magnitude of change are combined to determine the level of effect likely to result from the aviation warning lights. The evaluation of significance and the nature of these effects is also described following the methodology used for the assessment of landscape, visual and cumulative effects.

1.7.4 Importantly, the night-time assessment is not a technical lighting impact assessment based on quantitative measurement of light levels, rather the assessment relies on professional judgement of what the human eye can reasonably perceive.

1.7.5 The night-time assessment is supported by a baseline night-time environment or darkness survey and ZTV plots, baseline photography, wirelines and photomontages from selected viewpoints. These visualisations help to assess both the level of night-time visual impact for particular visual receptors and focus the assessment.

Night-time Viewpoint Analysis

1.7.6 A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer limit, beyond which there would be no further significant night-time effects.

1.7.7 The night-time viewpoint analysis involves visiting the viewpoint locations during periods of dawn or dusk and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with clear skies and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

Baseline Night-time Environment or Darkness Survey

1.7.8 During site visits a baseline night-time environment survey or 'darkness survey' is carried out at each viewpoint location. The purpose of the darkness survey is to establish the existing light levels perceived by the landscape architects at the viewpoints and determine their sensitivity to change. The following observations are recorded:

- Areas of darkness with no artificial light;
- Direct artificial lighting (where the light source is directly visible from the viewpoint);
- Indirect artificial lighting (where the light source is not visible but the light emanating from the light source is visible as in the case of 'sky glow');
- Static lighting, for example emanating from built development or street lighting; and
- Mobile or transient lighting, for example associated with moving vehicles, trains or aircraft.

1.7.9 Baseline photographs at each of the night-time assessment viewpoints are obtained and presented.

1.8 Production of ZTVs and Visualisations

1.8.1 Zones of Theoretical Visibility (ZTVs) and visualisations (wirelines / wirelines and photomontages) are graphical images produced to assist and illustrate the LVIA and the cumulative assessment. The methodology accords with the SNH guidance *Visual Representation of Wind Farms*, Version 2.2, February 2017. Further, additional guidance is provided by the Landscape Institute Technical Guidance Note: *Visual Representation of Development Proposals*, 17 September 2019.

Methodology for Production of ZTVs

1.8.1 The ZTVs are calculated using Resoft Wind Farm© software to generate the zone of theoretical visibility of the proposed Mynydd-y-Glyn Wind Farm. This software creates a 3D computer model of the existing landscape and the development using Ordnance Survey Terrain 5. This data provides a digital record of the existing landform of Great Britain based on 5m grid squares and models representing the specified geometry and position of the proposed turbines. The computer model includes the defined and detailed LVIA Study Area and takes account of atmospheric refraction and the Earth's curvature.

1.8.2 The resulting ZTV plots are overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing/graphic design software.

1.8.3 Resoft Wind Farm© software is also used to calculate cumulative ZTV plots based on the intervisibility of the Proposed Development with other existing, consented and application wind farms included in the CLVIA. In addition to the methods as described above, the layouts and geometries of the surrounding existing, consented and application wind farms are loaded into the same computer programme.

Methodology for Baseline Photography

1.8.4 Once a viewpoint has been selected, it is visited, confirmed, and assessed with the aid of a wireline or similar visualisation in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy. All site photography included in the LVIA is taken in accordance with *Visual Representation of Development Proposals. Technical Guidance Note 06/19.* Landscape Institute, September 2019.

1.8.5 The following photographic information is recorded:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5 m;
- GPS recorded Above Ordnance Datum (AOD) height data;

- The focal length of lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to Target Site (Proposed Development).

1.8.6 All photographs included in this assessment were recorded with a digital SLR camera set to produce photographs equivalent to that of a manual 35 mm SLR camera with a fixed 50mm or 75mm focal length lens as required.

1.8.7 All the resulting visualisations have been prepared to show other cumulative wind energy development in order that they may assist the cumulative assessment as well as the LVIA.

1.8.8 Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the Proposed Development, based on current information and photomontage methodology.

Methodology for Production of Visualisations

1.8.9 The view from each viewpoint located within 11 km will be illustrated with a photograph, a wireline and a photomontage indicating the Proposed Development. It should be noted however, that the SNH guidance advises that beyond 20 km the visibility of turbines in the printed photomontages is difficult to see or reproduce realistically. Consequently, the view from the most distant proposed viewpoint (Craig-y-Fan Du, Brecon Beacons National Park) at ~20 km will only be produced as a wireline.

1.8.10 The wirelines and photomontages are produced using Resoft Wind Farm© software to generate a perspective view of the wind farm. This software creates a 3D computer model of the existing landscape and the development using digital terrain data and models representing the specified geometry and position of the proposed turbines. The computer model includes the entire LVIA Study Area and all visualisations take account of the effects caused by atmospheric refraction and the Earth's curvature. The computer model does not take account of the screening effects of any intervening objects and forestry, unless specified (see individual figures).

1.8.11 A wireline of the Proposed Development and the existing landform is generated for each viewpoint within the LVIA Study Area. These wirelines are used to assist the assessment on location at each viewpoint, the position of which, if required, is adjusted on site to achieve the most visible vantage-point of the Proposed Development (e.g. to avoid buildings, forestry, and general foreground clutter, potentially interfering with the view). Photographs are then taken using a digital SLR camera in combination with a panoramic head equipped tripod. Detailed information is then recorded on site to enable the accurate alignment of the photographs with the wireline model (data such as: GPS grid co-ordinates; ground level information; compass bearings; and any other known references and viewpoint information).

1.8.12 The photographs from the viewpoint are then joined to form a planar or cylindrical projection image or panorama as required by the SNH guidance, using computer software to remove 'barrel distortion' caused by the camera lens. This panorama, combined in Resoft Wind Farm© with the data recorded on site, enables the wireline to be superimposed and aligned. To produce the photomontage, the wireline turbines are rendered to appear 'life-like' taking into account the time of the photography and weather conditions occurring on the day.

1.8.13 Site infrastructure, including the site access, on-site access tracks and crane hard standing areas, the substation and possible on-site borrow pits may also be illustrated in the photomontages for viewpoints within 10 km.

1.8.14 The completed panoramas, wirelines, photomontages and accompanying data are then presented as figures using desktop publishing/graphic design software in accordance with referenced SNH and Landscape Institute guideline.

Printing of Maps and Visualisations

1.8.15 All electronic visualisations and maps should be printed out and viewed at the correct scale as noted on the document.

1.9 Glossary of Terms and Abbreviations

1.9.1 Note: Those descriptions marked with an asterisk are as per the terminology provided in the GLVIA 3 glossary.

Term/abbreviation	Definition
AOD	Above Ordnance Datum
AoV	Angle of View
Artificial light	Light produced by electrical means.
BT	Blade Tip
Candela	A unit of measure of luminous intensity, in a given direction.
CLVIA	Cumulative Landscape and Visual Impact Assessment
Constant light	Uninterrupted light source over a given time period.
Cumulative effects	Additional changes caused by a proposed development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (SNH, 2012)
Cumulative landscape effects	Effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it' (SNH, 2012)
Cumulative visual effects: In combination In succession Sequentially	Effects that can be caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint' and/or sequential effects which 'occur when the observer has to move to another viewpoint to see different developments' (SNH 2012) • In combination: Where two or more developments are or would be within the observer's arc of vision at the same time without moving his/her head (GLVIA3, 2013 Table 7.1). • In succession: Where the observer has to turn his/her head to see the various developments – actual and visualised (GLVIA3, 2013 Table 7.1). • Sequential cumulative effect. Occurs where the observer has to move to another viewpoint to see the same or different developments. Sequential effects may be assessed for travel along regularly used routes such as major roads or popular paths (GLVIA3, 2013 Table 7.1).
Darkness survey	Visual survey the night-time environment and the identification of artificial light sources.
Development*	Any proposal that results in change to the landscape and/or visual environment.

Term/abbreviation	Definition
Degree of change	A combination of the scale, extent and duration of an effect also defined as 'magnitude'.
Designated Landscape*	Areas of landscape identified as being of importance at international, national or local levels, either defined by statue or identified in development plans or other documents.
Direct light	The artificial light source is visible. Note that light emanating from the window of a building is considered to be a 'direct' light source.
EIA	Environmental Impact Assessment
Elements*	Individual parts which make up the landscape, such as, for example, trees, hedges and buildings.
Enhancement*	Proposals that seek to improve the landscape resource of the site and its wider setting beyond its baseline condition.
Environmental fit	The relationship of a development to identified environmental opportunities and constraints in its setting.
Feature*	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines OR a particular aspect of the project proposal.
FoV	Field of View – the horizontal angle of the view illustrated in a visualisation.
Geographical Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
GLVIA 3	Guidelines for Landscape and Visual Impact Assessment, Third Edition, published jointly by the Landscape Institute and Institute of Environmental Management and Assessment, 2013.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
HH	Hub Height
Historic Landscape Characterisation (HLC) and Historic Land-use Assessment (HLA)	Historic characterisation is the identification and interpretation of the historic dimension of the present-day landscape or townscape within a given area. HLC is the term used in England and Wales, HLA is the term used in Scotland.
Indirect effects*	Direct effects relate to the host landscape and concern both physical and perceptual effects on the receptor. Indirect effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of visual or perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.
Indirect light	The light source is not visible but the light emanating from the source is apparent.
Infrared light	A type of light not visible to the human eye.
Iterative design process	The process by which project design is amended and improved by successive stages of refinement which respond to growing understanding of environmental issues.

Term/abbreviation	Definition
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
LANDMAP	LANDMAP is a whole landscape approach that covers all landscapes, designated and non-designated, it covers the natural, rural, peri-urban and urban areas in Wales, (excluding the Cities of Cardiff and Swansea), it includes inland waters and coastal areas to the low water mark. LANDMAP is an all-Wales GIS (Geographical Information System) based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. In Wales, LANDMAP is the formally adopted methodology for landscape assessment and is advocated by Planning Policy Wales.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity.
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 landscapes distinctive. The process results in the production of a Landscape Character Assessment.
Landscape capacity	The ability of a landscape to accommodate different amounts of change or development of a specific type. Capacity reflects the landscape's sensitivity to the type of change, and the value attached to the landscape, and is therefore dependent on judgements about the desirability of retaining landscape characteristics and the acceptability of their loss. (http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-resource-library/glossary-of-terms/).
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 classification	A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape.
Landscape constraints	Components of the landscape resource such as views or mature trees recognised as constraints to development. Often associated with landscape opportunities.
Landscape effects*	Effects on the landscape as a resource in its own right. An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern here is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. (GLVIA3 2013, Para 5.1).
Landscape fit	The relationship of a development to identified landscape opportunities and constraints in its setting.
Landscape patterns	Spatial distributions of landscape elements combining to form patterns, which may be distinctive, recognisable and describable e.g. hedgerows and stream patterns.

Term/abbreviation	Definition
Landscape quality (condition)*	A measure of the 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 qualities	A term used to describe the aesthetic or perceptual and intangible characteristics of the landscape such as scenic quality, tranquillity, sense of wildness or remoteness. Cultural and artistic references may also be described here.
Landscape receptors *	Defined aspects of the landscape resource that have the potential to be affected by a proposal
Landscape resource	The combination of elements that contribute to landscape context, character, and value.
Landscape sensitivity	The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value.
Landscape strategy	The overall vision and objectives for what the landscape should be like in the future, and what is thought to be desirable for a particular landscape type or area as a whole, usually expressed in formally adopted plans and programmes or related documents.
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. The value of the Landscape Character Types or Areas that may be affected, based on review of any designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value.
Level of effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of change brought about by the development.
Lux	A unit of illumination, the amount of light on a surface per unit area.
Magnitude (of effect)*	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration.
Mitigation	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible remedy identified effects. (GLVIA3, 2013 Para 3.37).
NRW	Natural Resources Wales
Natural light	Light supplied by the sun, directly or indirectly, the moon and stars.
Perception	Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences).
Perceptual Aspects	A landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity. (GLVIA3, 2013 Box 5.1)
Photomontage*	A visualisation which superimposes an image of the proposed development upon a photograph or series of photographs.
Beneficial or Adverse Types of Landscape Effect	The landscape effects may be beneficial, neutral, or adverse. In landscape terms – a beneficial effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include low or negligible changes that may be considered as part of the 'normal' landscape processes such as maintenance or harvesting

Term/abbreviation	Definition
	activities. A adverse effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction leading to a reduction in the landscape quality and character of an area.
Beneficial or Adverse Types of Visual Effect	The visual effects may be beneficial, neutral, or adverse. In visual terms – beneficial or adverse effects are less easy to define or quantify and require a subjective consideration of a number of factors affecting the view, which may be beneficial, neutral, or adverse. Opinions as to the visual effects of wind energy developments vary widely, however it is not the assumption of this assessment that all change, including substantial levels of change is a adverse experience. Rather this assessment has considered factors such as the visual composition of the landscape in the view together with the design and composition, which may or may not be reasonably, accommodated within the scale and character of the landscape as perceived from the receptor location.
Probability of Effect	The probability of a landscape and visual effect occurring as a result of this Development should be regarded as certain, subject to the stated project design and the continuance of the existing, baseline landscape resource, including known changes such as other permitted wind farm development. The probability of cumulative effects however is variable. Whereas those effects related to existing wind energy development and those under construction are considered as certain, effects related to development with planning consent are only considered as likely. Wind energy development sites for which there is a submitted planning application are considered as uncertain and other wind energy development for which no planning application has been made are considered as uncertain / unknown, as the level of uncertainty would be greater.
Proximity activated lighting	Lighting which is turned on by the detection of moving objects, such as aircraft detected by radar.
Rarity	The presence of rare elements or features in the landscape or the presence of a rare Landscape Character Type. (GLVIA3 2013, Box 5.1)
RD	Rotor Diameter
Receptor	Physical landscape resource, special interest, or viewer group that will experience an effect.
Recreation Value*	Evidence that the landscape is valued for recreational activity where experience of the landscape is important. (GLVIA3 2013, Box 5.1)
Representativeness*	Whether the landscape contains a particular character and/or features or elements which are considered particularly important examples.
Residual effects	Likely environmental effects, remaining after mitigation.
Scale Indicators	Landscape elements and features of a known or recognisable scale such as houses, trees, and vehicles that may be compared to other objects, where the scale of height is less familiar, to indicate their true scale.
Scenic quality	Depends upon perception and reflects the particular combination and pattern of elements in the landscape, its aesthetic qualities, its more intangible sense of place or 'genius loci' and other more intangible qualities. (GLVIA3 2013, Box 5.1)
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Sense of Place (genius loci)	The essential character and spirit of an area: 'genius loci' literally means 'spirit of the place'.

Term/abbreviation	Definition
Sensitivity*	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Significant Effects	It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described. Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement. Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible'. The Concise Oxford Dictionary. Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.
Sky glow	The brightness of the night sky in a built-up area as a result of light pollution, apparent as a diffuse artificial light in the sky above major towns and cities.
SNH	Scottish Natural Heritage
Susceptibility*	The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.
Sustainability*	The principle that the environment should be protected in such a condition and to such a degree that ensures new development meets the needs of the present without compromising the ability of future generations to meet their own needs.
Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 25 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
Time depth	Historical layering – the idea of landscape as a 'palimpsest', a much written-over asset of landscape.
Townscape	The character and composition of the built environment including the buildings and the relationships between them, the different types of urban open space, including green spaces, and the relationship between buildings and open spaces.
True View Visuals	A mobile 3D augmented reality (AR) tool used to aid with the assessment. The True View Visuals tool indicates visibility of the Proposed Development to assist in confirming viewpoint positions as well as indicating limited or no visibility of turbines in particular locations. Whilst the images are indicative only, the AR tool provides a comparable image to the accurate wirelines produced.
Type or Nature of effect	Whether an effect is direct or indirect, temporary or permanent, beneficial (positive), neutral or adverse (negative) solus or cumulative.
Viewpoints	Selected for illustration of the visual effects fall broadly into three groups: Representative Viewpoints: selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example certain points may be chosen to represent the view of users of particular public footpaths and bridleways;

Term/abbreviation	Definition
	Specific Viewpoints: chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, such as landscapes with statutory landscape designations or viewpoints with particular cultural landscape associations. Illustrative Viewpoints: chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations. (GLVIA3 2013, Para 6.19)
Visual amenity	The overall views and surroundings, which provide a visual setting or backdrop to the activities of people living, working, participating in recreational activities, visiting or travelling through an area.
Visual dominance	A visual effect often referred to in respect of residential properties that in relation to development would be subject to blocking of views, or reduction of light / shadowing, and high levels of visual intrusion.
Visual effect*	Effects on specific views and on the general visual amenity experienced by people.
Visual Receptors*	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Visual sensitivity	The sensitivity of visual receptors such as residents, relative to their location and context, to visual change proposed by development.
Visualisation	Computer visualisation, photomontage, or other technique to illustrate the appearance of the development from a known location.
Wireline / Wireframe	A computer-generated line drawing of the DTM (digital terrain model) and the proposed development from a known location.
Zone of Theoretical Visibility (ZTV)*	A map, usually digitally produced, showing areas of land within which, a development is theoretical visible.

Appendix 6.1
Historic Environment - Non-designated Historic Assets

Table 6.1 Non-designated historic assets within study area (GGAT HER)

HER Ref.	Name	Easting	Northing	Period	Type
GGAT01483m	Stone Axe, Tyla-Winder	305000	189000	Neolithic	Axe
GGAT01559m	Llwyncelyn	303000	191000	Post Medieval	Coin Hoard
GGAT01609m	Bwlch Gwyn	303640	188180	Post Medieval	House
GGAT01740m	Hafod, Rhiwgarn	302590	189730	Medieval	Long Hut
GGAT03815m	Trig Point, Pontypridd	305071	189901	Post Medieval	Triangulation Point
GGAT03816m	Quarry, Trehafod	304476	190435	Post Medieval	Quarry
GGAT04941m	Trebannog Deserted Industrial Village	301950	190210	Post Medieval	Village
GGAT06021m	Glyn Colliery (Phase 1), Tonyrefail	302520	188890	Post Medieval	Colliery
GGAT06097m	Cymmer Colliery, Porth	302837	190989	Post Medieval	Colliery
GGAT06136m	Glyn Colliery (Phase 2), Tonyrefail	302560	188740	Post Medieval	Colliery
GGAT06443m	Rails, Gellifelen, Tonyrefail, Rhondda	302854	188269	Unknown	Railway Transport Site
GGAT06603m	Mount Zion Baptist Church, Trebanog	301560	189661	Modern	Church
GGAT08160m	Dyllas Road Over Bridge	302870	190940	Post Medieval	Road Bridge
GGAT08161m	Clifton Row Retaining Wall, Porth	303450	190960	Post Medieval	Wall
GGAT08528m	Trig Pillar (Tp5050), Mynydd-Y-Glyn	303585	189448	Modern	Triangulation Point
GGAT08529m	Trig Pillar (Tp10087), Mynydd-Y-Glyn	303585	189449	Modern	Triangulation Point

Table 6.2 Events recorded within study area (GGAT HER)

HER Ref.	Name	Easting	Northing	Event Type
GGATE006005	Uplands Survey East Glamorgan	308570	194550	Field Survey
GGATE003757	Coach and Horses Public House, Caerwent	347105	190473	Evaluation

HER Ref.	Name	Easting	Northing	Event Type
GGATE004025	Mount Zion Baptist Church, Trebanog	301560	189661	Photographic Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	303411	190921	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	303310	190940	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302490	191320	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302495	191277	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302546	191227	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302489	191321	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302500	192970	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302480	192460	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302430	192400	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302420	191680	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302500	191290	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302862	190973	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302445	191333	Building Survey
GGATE003465	site visit to Mynydd-y-Glyn	302618	189716	Field Visit

Appendix 7.1
Preliminary Ecological Appraisal

Pennant Walters

Mynydd y Glyn Wind Farm

Preliminary Ecological Appraisal

Wood Group UK Limited – April 2021

Report for

Pennant Walters

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Document revisions

No.	Details	Date
1	42864-WOOD-XX-XX-RP-OE-0001_S0_P01	April 2021

Contents

1. Introduction

1.1 Background

Wood Group UK Ltd (Wood) was commissioned by Pennant Walters to undertake a Preliminary Ecological Appraisal (PEA) of an area known as Mynydd y Glyn (hereafter referred to as 'the Site'). An agreement has been secured to develop a wind farm at the Site, which is located at National Grid Reference (NGR) ST 03626 89459 and measures approximately 168.53 hectares (ha) and shown in **Figure 1.1 (Appendix A).**

This PEA has been informed by the completion of a desk study and an extended Phase 1 habitat survey. The approach taken broadly follows that detailed in the *Guidelines for Preliminary Ecological Appraisal*[1], with the standard Phase 1 habitat survey[2] methodology being extended to identify the presence, or potential presence, of legally protected species, habitats and species that are of importance for biodiversity conservation, and legally controlled species as detailed in the *Guidelines for Baseline Ecological Assessment*[3].

1.2 Purpose of this report

This report has been prepared as part of an EIA relating to the Site. This report is intended to enable the early identification of potential ecological constraints; inform additional survey or mitigation requirements; and to establish the ecological baseline of the Site.

This report details the methods adopted and results of the extended Phase 1 habitat survey and makes recommendations for further work in relation to establishing the ecological baseline where required.

1.3 Proposed development

The Proposed Development is to construct and operate a wind farm of seven turbines and associated infrastructure including access tracks, transformer and a substation.

1.4 Site context

The Site is situated within the Rhondda Valley and is located approximately 3km west of Pontypridd. The Site comprises a plateau of extensive semi-improved acid grassland used for grazing livestock with steep-sloping sides. Blanket bog is present within the Site, which is designated as a Site of Importance for Nature Conservation (SINC). The site is bordered by habitats synonymous with those on-Site, as well as conifer plantation woodland in the northeast. The Site is accessed through a farmyard in Rhiwinder so the southwest of the Site, or on foot from an unnamed road southeast of the Site using a Public right of Way (PRoW). In the wider landscape surrounding land use is dominated by livestock grazing agriculture, with plantation conifer woodland managed for forestry, and small urban settlements.

[1] CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. Chartered Institute of Ecology and Environmental Management, Winchester.
[2] JNCC (2010). Phase 1 Habitat Survey – a Technique for Environmental Audit. JNCC, Peterborough.
[3] *IEA (1995) Guidelines for Baseline Ecological Assessment.* E & F Spon, London.

2. Legislative and policy context

A number of sites, habitats and species are protected through either statute or national or local policy: details of these are provided in Boxes 1 and 2 below. Policies relevant to biodiversity conservation are listed in **Table 2.1**, along with an outline of the issues included in these policies that need to be considered when undertaking an ecological appraisal.

Box 1 Designated Wildlife Sites, and Priority Habitats and Species

Statutory nature conservation sites

Internationally important sites: Special Areas of Conservation (SACs) and candidate SACs, Special Protection Areas (SPAs) and proposed SPAs, Sites of Community Importance, Ramsar sites and European offshore marine sites.

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not subject to international designations and National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as nature conservation. Their level of importance is defined by their other statutory or any non-statutory designation (e.g. if an LNR is also an SSSI but is not an internationally important site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory nature conservation sites

Non-statutory biodiversity Sites in South East Wales are designated as Sites of Importance for Nature Conservation (SINCs).

Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, Habitats of Principal Importance (HoPI) for the conservation of biodiversity in Wales (under Section 7 of the 'The Environment (Wales) Act 2016) are identified as of national species/habitat importance reflecting the fact that these species/habitats have been defined at a national level. The level of importance therefore pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued, other than for waterfowl, for which thresholds have been defined for national/international 'population importance'.

- International importance: populations of species or areas of habitat for which European sites are designated;
- International importance: populations of birds meeting the threshold for European importance (1% of the relevant international population);
- National importance: Section 7 of the 'The Environment (Wales) Act 2016' introduces a list of living organisms and types of habitat in Wales, known as Habitats and Species of Principal Importance, which in Wales are considered of key significance to sustain and improve biodiversity. These are listed on: https://www.biodiversitywales.org.uk/Environment-Wales-Act.
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern[4] Red List.
- National importance: Nationally Scarce species, which are species recorded from 16-100 10x10km squares of the national grid;
- National importance: Populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data are available);
- National importance: Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600);
- County importance: Species and habitats listed in Local Biodiversity Action Plan for Rhonda Cynon Taf.

[4] Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. and Gregory, R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds*, 108:708–746.

Box 2 Legally Protected and Controlled Species

Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding:
  - species that are only protected in relation to their sale (see Section 9[5] and 13[2]), reflecting the fact that the proposed development does not include any proposals relating to the sale of species; and
  - species that are listed on Schedule 1 but that are not likely to breed on or near the Site, given that this schedule is only applicable whilst birds are breeding;
- Species included on Schedules 2 and 5 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*
- Badgers, which are protected under the *Protection of Badgers Act 1992*.

A summary of the legislation pertaining to faunal species that may occur on the Site is provided in **Appendix B**

Legal control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

Table 2.1 Policy Issues Considered

Policy Reference	Policy Issue
Future Wales; National Development Framework 2021	The Welsh national development framework sets the direction for development in Wales to 2040 and includes a Habitats Regulations Assessment. Policy 9 – Resilient Ecological Networks and Green Infrastructure outlines measures to ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure.
Planning Policy Wales – Chapter 6 Distinctive and Natural Places (11th Ed.; 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government's objectives for Distinctive and Natural Places theme of planning policy topics covers historic environment, landscape, biodiversity and habitats, coastal characteristics, air quality, soundscape, water services, flooding and other environmental (surface and sub-surface) risks. In particular, the Biodiversity and Resilience of Ecosystems section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by Natural Resources Wales.
Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009)	Welsh Governments (WG) policy on positive planning for nature conservation and developments affecting designated sites and habitats, along with protected priority habitats and species.
Rhondda Cynon Taf Local Development Plan (LDP) up to 2021 (Adopted 2011)	The LDP identifies where allocations for new developments such as housing, employment, community facilities, and roads have been made. It provides a framework for local decision making and brings together both development and conservation interests to ensure that any changes in the use of land are coherent and provides maximum benefits to the community.
Rhondda Cynon Taf Supplementary Planning	The Rhondda Cynon Taf Supplementary Planning Guidance (SPG) on Nature Conservation was produced in 2011 and provides additional guidance to support the Local Development Plan (LDP)

Guidance (SPG) Nature Conservation 2011	policies. The purpose of the SPG is to assist those submitting and determining planning applications in Rhondda Cynon Taf to ensure that nature conservation is protected and conserved when development is proposed.
Rhondda Cynon Taf Biodiversity Action Plan (Action for Nature) 2000 (updated 2008)	The national strategy for biodiversity is delivered at local level via Local Biodiversity Action Plans (LBAP). Rhondda Cynon Taf LBAP (Action for Nature) is the driver to protect, enhance and manage the biodiversity resource, by setting out objectives, targets and actions for the conservation of biodiversity within Rhondda Cynon Taf

3. Methodology

3.1 Desk study

A data-gathering exercise was undertaken to obtain information relating to statutory and non-statutory nature conservation sites, habitats of principle importance and species, and legally protected and controlled species (see Boxes 1 and 2). The data were obtained from South East Wales Biodiversity Records Centre (SEWBReC), from the MAGIC website, from aerial photographs and from Ordnance Survey mapping. Data for the last ten years were gathered for:

- statutory designated biodiversity sites of international importance within 10km of the Site;
- statutory designated biodiversity sites of national/ local importance within 2km of the Site;
- non-statutory designated biodiversity sites areas within 2km of the Site;
- records of legally protected/important species within 2km of the Site, and bat roosts within 10km of the Site;
- European Protected Species Mitigation Licences (EPSMLs) within 5km of the Site;
- waterbodies within 500m of the Site; and
- Habitats of Principal Importance for the conservation of biodiversity in Wales and the Habitats of Principal Importance for Rhondda Cynon Taf within 2km of the Site.

Waterbodies were identified by reference to 1:25,000 scale Ordnance Survey mapping and online aerial photography[5]. In the absence of significant barriers to movement, 500m is the maximum distance that great crested newts (GCNs) generally move from their breeding ponds to occupy surrounding areas of suitable terrestrial habitats. Natural England (NE) therefore recommends that, where a proposed development is located within 500m of a water body, consideration be given to the potential for the water body to support breeding GCNs.

3.2 Field survey

An extended Phase 1 habitat survey of the Site, including a 250m buffer from the boundary, was undertaken by an ecologist from Wood[6] on the 29 April and 1 May 2020. An additional survey was undertaken on the 30 July 2020 to gather detail on species throughout the growing season, recording plants that are more visible at different times and support broad habitat classifications.

During the survey, distinct habitats were identified, and any features of interest subjected to a more detailed description were target noted (TN)[7]. As the standard phase 1 habitat survey methodology is mainly concerned with vegetation communities, the survey was extended[8] to allow for the provision of information on other ecological features, including identification of the presence or potential presence of legally protected and otherwise notable species.

It should be noted that while every effort has been made to provide a comprehensive description of the Site, this survey is intended to identify habitat types and does not constitute a full botanical survey.

[5] https://www.google.co.uk/intl/en_uk/earth/
[6] Claire Neale Senior Consultant Ecologist MSc MCIEEM
[7] Joint Nature Conservation Committee (2007). *Handbook for Phase 1 habitat survey - a technique for environmental audit*. JNCC, Peterborough.
[8] Institute of Environmental Assessment (1995). *Guidelines for Baseline Ecological Assessment*. E&FN Spon, London.

Protected and otherwise notable species

The methodologies used to establish the presence or potential presence of specific species and/ or species groups are summarised below. These relate to those species or biological taxa that the desk study and habitat types present indicated could occur on the Site.

The survey methods that were employed during the extended Phase 1 habitat survey to identify presence of legally protected/priority species are detailed below. **Appendix B** summarises relevant legislation relating to these species. Species are referred to by common name in the main text of the report, with scientific names provided in **Appendix C**.

Where possible, the survey area included the entirety of the Site and adjoining areas of land up to 250m from the Site boundary, albeit noted access had not been agreed for all land adjacent to the Site, therefore these areas were viewed from the Site boundary and from public rights of way (PRoW).

Badger

During the survey the habitats on the Site were assessed for their potential to provide suitable areas for sett excavation and badger foraging. Any evidence of badger activity was also recorded, such as:

- Setts - comprising either single holes or a series of holes likely to be connected underground;
- Hairs - usually with a white root, black band, white tip (often caught in sett entrances/ fences/ vegetation);
- Footprints – located in soft mud, often in sett entrances;
- Evidence of foraging – usually in the form of 'snuffle holes' (small scrapes created by badgers searching for insects and earthworms);
- Latrines - badgers usually deposit faeces in holes or scrapes in the ground; and
- Paths - particularly around setts or leading to feeding areas.

Mammal paths and snuffle holes were assumed to be created by badgers if the character of the path (in terms of size) was appropriate, and if other field signs were in close vicinity.

Bats

A general assessment of the suitability of the habitats on the Site to support roosting, foraging and commuting bats was made. During the survey, an initial assessment of the trees and buildings on and bordering the Site was undertaken to determine if further, more detailed preliminary roost assessments would be required to identify features with the potential to support roosting bats.

Dormouse

Hedgerows, scrub and woodland habitats within or bordering the Site were assessed for their suitability to support populations of dormice. This included an assessment of the suitability of the Site for foraging by dormice, e.g. availability of hazel and honeysuckle, and the connectivity between habitats on the Site and other suitable habitat in the wider landscape.

Otter

The Site was assessed for its potential to provide habitats that would support otter. Such habitats may include the presence of any drainage ditches, streams, rivers, water bodies and other foraging habitat. Water

of a significant depth and the presence of fish are important for foraging; however, otters will use sub-optimal habitat to commute through

Water vole

Water courses on and bordering the Site were assessed for their suitability and potential to support water voles. Water voles generally prefer wide swathes of riparian vegetation both growing from the bank and in the water in which to forage and shelter. Earth banks are generally required for burrows and the species prefers slow-flowing water more than 1m deep[9].

Great crested newt

The Site was assessed for its potential to provide suitable aquatic and terrestrial habitat that could support a population of GCN. This involved considering the provision of potential breeding and foraging habitats, as well as the provision of potential refugia e.g. log piles, hedgerows, grassland, ruderal and scrub habitat etc.

Habitat Suitability Index Assessment

Where accessible the water bodies identified within 500m of the Site, a habitat-based assessment was used to categorise the suitability of water bodies to support GCN using the Habitat Suitability Index (HSI) assessment. The HSI assessment process takes into account criteria developed by Oldham et al (2000)[10], which is based on ten indices relating to the suitability of a waterbody for GCN. The method calculates a score (between 0 and 1) which indicates the suitability of a waterbody to support GCN. It is a recognised tool for identifying waterbodies with greatest suitability to support this species and conversely assists in identifying unsuitable ponds or ditches that can be 'scoped-out' of further survey work.

The categorisation of HSI pond scores are as follows:

- <0.5 = Poor;
- 0.5 - 0.59 = Below Average;
- 0.6 – 0.69 = Average
- 0.7 – 0.79 = Good
- > 0.8 = Excellent

Presence/likely absence surveys

The ponds identified within the desk study and confirmed as present during the extended Phase 1 survey underwent a single Environmental DNA (eDNA)[11] to determine presence/likely absence. This method requires one daytime visit to collect the samples, between 15 April and 30 June.

The eDNA surveys involved collecting water samples from an individual pond that were then subject to analysis to detect the presence of GCN DNA, which is deemed to provide an appropriate test to establish the presence/likely absence of this species (Natural England, 2015)[12]. eDNA sampling and analysis was undertaken

[9] Strachan, R.,Moorhouse, T. and Gelling, M. (2011). *Water vole Conservation Handbook. Third edition*. Wildlife Conservation Research Unit, Oxford

[10] Oldham, R.S., Keeble, J., Swan, M.J.S., Jeffcote, M (2000), Evaluating the Suitability of Habitat for Great Crested Newt (Triturus cristatus). Herpetological Journal.

[11] This is one of the two methods accepted by Natural England for presence/likely absence surveys for GCN, the other being visits to the pond between mid-March and mid-June employing methods such as torch survey, bottle trapping, hand netting or egg searches

[12] Natural England (2015) *Guidance Great Crested Newts: Surveys and Mitigation for Development Projects*. https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects [Accessed Online].

in accordance with best practice guidance (Biggs et al., 2014)[13], with samples analysed by SureScreen Scientifics[14]. This involved taking and combining 20 sub-samples of 30ml of pond water; representatively sampling pond habitats (i.e. areas of open water suitable for courtship displays, or vegetation suitable for egg-laying), and spaced around the pond as evenly as possible. The sub-samples were mixed, before six separate 50ml aliquots[15] were taken and sent for laboratory analysis by SureScreen Scientific.

All eDNA surveys were undertaken by licenced Wood ecologists Claire Neale (NRW GCN Survey Licence Number: S087691/1) and Gary Lindsay (NRW GCN Survey Licence Number: S088151/1).

Reptiles

The Site and its surrounds were assessed for their potential to provide sheltering, foraging and breeding habitats for the four widespread reptile species: slow worm, viviparous lizard, grass snake and adder. These native reptile species generally require open areas with mixed-height vegetation, such as heathland, rough grassland, open scrub or (in the case of grass snake) water body margins. Suitable well drained and frost-free areas are needed so that they can survive the winter.

Birds

The Site was assessed for its potential to provide nesting habitat for breeding birds and/or its potential to support important assemblages of rare or notable bird species.

Other notable/priority species

An assessment was made of the potential for the Site to support any other species considered to be of value for biodiversity conservation, including those that were identified as occurring within the local area during the desk study.

Legally controlled species

The presence of any legally controlled, non-native, invasive plant species (see **Box 2**), such as Japanese knotweed, giant hogweed and Himalayan balsam was noted.

3.3 Constraints

Some of the areas were within the 250m buffer immediately outside of the Site boundary were steeply sloped and therefore could not be safely accessed. Although full access was not possible it is considered an accurate mapping of the habitat could be undertaken from adjacent land.

There is grazing access to sheep across the entire Site, and as a result of the intense grazing, and in some areas, exposure to wind, the sward of the grassland was generally short making species identification difficult.

[13] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.
[14] https://www.surescreenscientifics.com/forensic-ecology/
[15] A representative liquid sample taken from a larger amount of liquid.

4. Results

4.1 Desk Study

Statutory designated sites

Two statutory designated biodiversity sites of international importance were identified within 10km of the Site boundary, and two statutory designated biodiversity sites of national importance were identified within 2km. These sites are detailed in **Table 4.1** & **Table 4.2** and the locations of these sites are shown in **Figure 4.1** & **Figure 4.2 (Appendix A).**

Table 4.1 Sites with international statutory designation for biodiversity conservation sites within 10km.

Site	Type of designation	Approximate area (ha)	Ecological interest	OS Grid Reference	Approximate distance (m) and direction from the Site
Blackmill Woodlands	SAC	70.05	Designated as an example of old sessile oak woods at the southern extreme of the habitat's range in Wales and contributes to representation of the habitat in Wales and in south-west England.	SS929859	9,500 SW
Cardiff Beech Woods	SAC	114.45	Designated as one of the largest concentrations of Asperulo-Fagetum beech forest in Wales. The site also supports TilioAcerion forests of slopes, scress and ravines.	ST118824	9,300 SE

Table 4.2 Sites with national statutory designation for biodiversity conservation sites within 2km.

Site and Map Reference Number	Type of designation	Approximate area (ha)	Ecological interest	OS Grid Reference	Approximate distance (m) and direction from the Site
Nant Gelliwion Woodland	SSSI	11.67	The Nant Gelliwion Woodland SSSI (Coed Gelli Draws) occupies a small tributary valley of the Rhondda which flows over Pennant Sandstone and superficial deposits of boulder clay. The mixed deciduous woodland is dominated by stands of sessile oak which occur with a scattering of beech on the free-drainage valley slopes. Alder dominates areas of wetter ground while birch, ash, hazel, hawthorn, sallow and rowan are locally abundant.	ST 059887	1,248 SE

Rhos Tonyrefail	SSSI	244.71	Rhos Tonyrefail is a large lowland site of special interest for its marshy grassland, acid flush, species-rich neutral grassland, acid grassland, wet heath and blanket mire. These habitats are associated with areas of woodland. The site is also of special interest for its population of marsh fritillary butterfly.	ST005895, ST020875 and ST020890	448 SW

Non-statutory designated sites

SEWBReC returned records of six SINCs within 2km of the Site. These are detailed in **Table 4.3** below and the location of these sites is shown in **Figure 4.3 (Appendix A)**.

Table 4.3 Sites with non-statutory designation for biodiversity conservation within 2 km of the Site.

Site	Type of designation	Approximate area (ha)	Ecological interest	OS Grid Reference	Approximate distance (m) and direction from the Site
Mynydd y Glyn	SINC	74.34	Area of upland peat bog. The core of which is good condition peat bog, with surrounds that have been variously semi improved.	ST 031894	**Within site**
Bronwydd Woods	SINC	7.19	Ancient woodland with associated hillside ffridd.	ST 021912	1,005 N
Trebanog Slopes	SINC	153.3	Very large hillside mosaic site with ffridd, marshy grassland, acid grassland and heath and colliery spoil.	ST 028904	158 N
The Glyn	SINC	9.701	A valley SINC of woodland and marshy grassland.	ST023888	632 SW
Tonyrefail East	SINC	26.85	A wooded valley with marshy grassland and neutral grasslands.	ST021880	1,017 SW
Mynydd Gelliwion and Gellwion Slopes	SINC	261.1	Bog mosaic SINC of forestry plantation, ffridd marshy and acid grassland , woodlands, ponds and colliery spoil.	ST052898	**Within site**

Habitats of Principal Importance

SWBReC provided a list of habitats that may contain HoPI within 2km of the Site, listed below:

- Dry acid-heath;

- Unimproved acid grassland;
- Semi-natural broadleaved woodland;
- Intact hedge;
- Semi-improved acid grassland;
- Acid/neutral flush;
- Semi-improved neutral grassland;
- Standing water;
- Marshy grassland;
- Wet heath/acid grassland mosaic;
- Basic dry heath/calcareous grassland mosaic;
- Wet heath;
- Blanket bog;
- Fen;
- Modified valley mire;
- Valley mire; and
- Acid/neutral inland cliff.

Ancient woodland

There is no ancient woodland recorded within the Site, the closest area is ancient semi natural woodland 300m to the south east of the Site. The following categories of ancient woodland were identified within 2km of the Site:

- Ancient Semi Natural Woodland;
- Restored Ancient Woodland Site;
- Plantation on Ancient Woodland Site; and
- Ancient Woodland Site of Unknown Category.

Protected and otherwise notable species

Badger

SEWBReC returned no records of badgers within 2km of the site within the last ten years.

Bats

At least 12 species of bat have been recorded within 10km of the Site. The bat roost records are summarised in **Table 4.4.** and **Table 4.5** lists the activity records.

Table 4.4 Summary of bat roost records within 10km of the Site

Species	Status	Number of records	Type of roost	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	EPS, WCA, S7, LBAP	1	Day Roost	2012	9,865 N
Brown Long-eared Bat	EPS, WCA, S7, LBAP	41	Maternity Roost / Day Roost / Hibernation	2019	1,139 N
Common Pipistrelle	EPS, WCA, S7, LBAP	83	Maternity roost / Nursery roost / Building roost / Day Roost /	2018	664 W
Daubenton's Bat	EPS, WCA, S7, LBAP	7	Hibernation / Day Roost	2019	3,284 E
Greater Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	1	Hibernacula Roost	2013	9519 SE
Lesser Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	8	Maternity roost / Nursery roost / Hibernacula roost / Building roost / Day Roost /	2017	5,982 SW
Noctule	EPS, WCA, S7, LBAP	1	Building Roost	2012	8,660 SW
Myotis Bat Species	EPS, WCA, S7, LBAP	6	Maternity Roost / Day Roost	2010	5,229 NE
Natterer's bat	EPS, WCA, S7, LBAP	4	Hibernation / Maternity Roost / Building Roost	2012	2,836 W
Pipistrellus Species	EPS, WCA, S7, LBAP	83	Maternity roost/ Day Roost / Building Roost	2014	783 W
Soprano Pipistrelle	EPS, WCA, S7, LBAP	45	Maternity roost/ Day Roost / Building Roost	2017	1,139 N
Whiskered Bat	EPS, WCA, S7, LBAP	7	Building Roost	2011	4,637 NE
Unidentified Bat Species	EPS, WCA, S7, LBAP	154	Building Roost	2017	267 W

Key to 'Status' abbreviations:
EPS = European Protected Species
WCA1 = Wildlife and Countryside Act Schedule 1
S7 = Environment Act (Wales) Section 7 Species
LBAP = Local Biodiversity Action Plan Species
HD2 = Habitats Directive Annex II

Table 4.5 Summary of bat activity records within 10km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	EPS, WCA, S7, LBAP	1	2013	8,740 SE
Brown Long-eared Bat	EPS, WCA, S7, LBAP	43	2018	3,369 S
Common Pipistrelle	EPS, WCA, S7, LBAP	599	2018	673 NW
Daubenton's Bat	EPS, WCA, S7, LBAP	11	2014	3,050 E
Greater Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	6	2017	4,470 SW
Lesser Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	8	2018	5,655 W
Noctule	EPS, WCA, S7, LBAP	127	2018	783 E
Long-eared Bat Species	EPS, WCA, S7, LBAP	1	2013	673 N
Myotis Bat Species	EPS, WCA, S7, LBAP	118	2018	3,142 E
Nathusius Pipistrelle	EPS, WCA, S7, LBAP	11	2018	3,050 W
Natterer's bat	EPS, WCA, S7, LBAP	14	2013	5,064 NW
Nyctalus Bat Species	EPS, WCA, S7, LBAP	5	2017	5,413 W
Pipistrellus Species	EPS, WCA, S7, LBAP	159	2019	2,767 W
Serotine	EPS, WCA, S7, LBAP	7	2017	4,470 SW
Soprano Pipistrelle	EPS, WCA, S7, LBAP	495	2019	931 N
Whiskered Bat	EPS, WCA, S7, LBAP	6	2015	2,927 W
Unidentified Bat Species	EPS, WCA, S7, LBAP	133	2019	783 W

Key to 'Status' abbreviations:
EPS = European Protected Species
WCA1 = Wildlife and Countryside Act Schedule 1
S7 = Environment Act (Wales) Section 7 Species
LBAP = Local Biodiversity Action Plan Species

HD2 = Habitats Directive Annex II

Birds

A summary of notable bird species recorded within 2km of the Site is provided in **Table 4.6.** The species recorded include those associated with habitats present on the Site and therefore have the potential to utilise the Site for breeding and/or foraging.

Table 4.6 Summary of notable bird species records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Bullfinch	S7, BoCC Amber	8	2018	252 E
Common Crossbill	Sch.1, BoCC Green	1	2017	1,167 E
Cuckoo	S7, BoCC Red	5	2019	291 N
Dunnock	S7, BoCC Amber	2	2016	1,469 N
Golden Plover	Annex 1, S7	2	2010	**Within site**
House Sparrow	S7, BoCC Red	3	2016	783 E
Kestrel	S7, BoCC Amber	1	2015	657 NE
Mistle Thrush	BoCC Red	3	2018	**Within site**
Peregrine	Sch. 1, BoCC Green	1	2010	203 W
Red Kite	Sch. 1, S7, BoCC Green	3	2015	203 W
Redwing	Sch. 1, BoCC Red	1	2010	203 W
Reed Bunting	S7, BoCC Amber	2	2014	523 W
Skylark	S7, BoCC Red	3	2018	**Within site**
Snipe	BoCC Amber	2	2018	1,460 SW
Song Thrush	S7, BoCC Red	3	2011	545 E
Spotted Flycatcher	S7, BoCC Red	1	2017	1,159 S
Starling	S7, BoCC Red	1	2010	545 E
Willow Tit	S7, BoCC Red	1	2015	657 NE
Wood Warbler	S7, BoCC Red	3	2016	1,088 N
Yellowhammer	S7, BoCC Red	1	2013	1,049 SE

Key to 'Status' abbreviations:
Annex 1 = EU Birds Directive (Annex 1) SpeciesS7 = Environment Act (Wales) Section 7 Species
Sch.1 = Wildlife and Countryside Act 1981 (as amended) Schedule 1
BoCC = Birds of Conservation Concern 4

Other Mammals

The desk study identified records of the European Protected Species (EPS) otter, as well as the notable species, hedgehog. Details provided in **Table 4.7**.

Table 4.7 Summary of other mammal records from within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Hedgehog	S7, LBAP	5	2017	990 N
Otter	EPS, WCA5, S7, LBAP	5	2019	974 N

Key to 'Status' abbreviations:
EPS = European Protected Species
S7 = Environment Act (Wales) Section 7 Species
WCA5 = Wildlife and Countryside Act Schedule 5 Species
LBAP = Local Biodiversity Action Plan Species

Amphibians

The desk study identified five records of amphibians within 2km of the Site. **Table 4.8** summarises the records received from SEWBReC. No records of GCN were identified during the desk study.

Table 4.8 Summary of amphibian records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Common Frog	WCA5, LBAP	1	2015	1,696 E
Common Toad	WCA5, S7, LBAP	2	2015	1,446 E
Palmate Newt	WCA5, LBAP	2	2016	1,024 N

Key to 'Status' abbreviations:
WCA5 = Wildlife and Countryside Act Schedule 5 Species
LBAP = Local Biodiversity Action Plan Species

Reptiles

The desk study returned two records of native reptile species, occurring on and within 2km of the Site, these are shown in **Table 4.9**.

Table 4.9 Summary of reptile records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Viviparous lizard	WCA5, S7, LBAP	5	2016	939 N
Grass Snake	WCA5, S7, LBAP	2	2018	647 W
Key to 'Status' abbreviations: **S7 = Environment Act (Wales) Section 7 Species** **WCA5 = Wildlife and Countryside Act Schedule 5 Species** **LBAP = Local Biodiversity Action Plan Species**				

Other species

A number of notable plant and invertebrate species records were provided from within 2km of the Site, these are detailed in **Table 4.10** and **Table 4.11**.

Table 4.10 Summary of notable invertebrate records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Moths				
Cinnabar	S7, LBAP	3	2016	835 N
Butterflies				
Marsh Fritillary	LBAP	32	2015	523 W
Small Heath	S7, RD1, LBAP	7	2010	**Within site**
Small Pearl-bordered Fritillary	S7, RD1, LBAP	7	2012	**Within site**
Key to 'Status' abbreviations: **RD1 (Wales) = Welsh Red Data Book listing based on IUCN guidelines** **S7 = Environment Act (Wales) Section 7 Species** **WCA5 = Wildlife and Countryside Act Schedule 5 Species** **LBAP = Local Biodiversity Action Plan Species**				

Table 4.11 Summary of notable plant records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Bee Orchid	LBAP	1	2011	186 S
Bluebell	WCA8, LBAP	14	2018	203 W
Bog Asphodel	LI	11	2011	523 W
Bog Pimpernel	LI	13	2018	576 SE
Devil's-bit-Scabious	LI	78	2018	434 SW
Early Dog-Violet	LI	2	2018	**Within site**
Heath Spotted Orchid	LBAP	7	2018	602 SW
Marsh Violet	LI	37	2018	506 E
Key to 'Status' abbreviations: **WCA8 = Wildlife and Countryside Act Schedule 8 Species** **LBAP = Local Biodiversity Action Plan Species** **LI = Locally Important Species**				

Legally controlled species

The desk study returned records of a number of non-native, invasive plant species within 2km of the Site, detailed in **Table 4.12.**

Table 4.12 Legally controlled Species within 2km of the site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Himalayan Balsam	WCA9	**22**	2018	203 W
Japanese Knotweed	WCA9	**15**	2019	555 N
Montbretia	WCA9	**3**	2018	1,414 SW
Rhododendron ponticum	WCA9	**2**	2018	555 N
Wall Cotoneaster	WCA9	**1**	2018	291 N
Key to 'Status' abbreviations: **Wildlife and Countryside Act, Schedule 9 - WCA9;**				

Waterbodies

Three waterbodies were identified within 500m of the Site, and Pond 4 was identified during the extended Phase 1 habitat survey. Details of the waterbodies are provided in **Table 4.13** and shown on **Figure 4.4 (Appendix A)**.

Table 4.13 Waterbodies within 500m of the Site

Waterbody No./Name	Description	Distance (m) and direction from the Site boundary
1	Waterbody within sheep grazed field	**Within Site**
2	Waterbody within sheep grazed field	**Within Site**
3	Waterbody within dense continuous bracken	90 N
4	Waterbody within sheep grazed field.	117 S

4.2 Extended Phase 1 habitat survey

Habitats

Overview

The Site is formed by a large hill which supports a range of habitats with a heavily sheep grazed plateau dominated by semi-improved acid grassland and poor semi-improved grassland present at the base. These areas are frequently intersected by dry-stone walls and fencing for livestock control, with wet and dry heath/acid grassland, continuous bracken and blanket bog also identified. There is a small block of hazel coppice in the southeast, dense/continuous scrub present in the south of the site, a small area of willow scrub on the northeast boundary and a mature treeline in the southeast. The Site is bordered by plantation coniferous woodland to the northeast, but the majority of the wider landscape is semi-improved acid grassland and poor semi-improved grassland. A summary of the key habitats recorded on-Site is shown in **Table 4.14** and off-Site habitats to 250m are shown in **Table 4.15** and shown in **Figure 4.5** and **Figure 4.6 (Appendix A)**. The target notes (**TN**) are provided in **Appendix D**.

Table 4.14 Summary of on-Site habitats

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6, Appendix A)
Semi-improved grassland – acid	Yes	The dominant habitat type found on the steep-sided plateau, and throughout the survey area, was semi-improved acid grassland, These areas were generally heavily sheep-grazed with species present including sheep's fescue, common bent, sweet vernal, purple moor-grass, mat-grass, sheep's sorrel and dog violet. Scattered bracken and rush sp. were also recorded frequently in this habitat. The areas in the northwest, southwest and south east of the site are heavily grazed,

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6, Appendix A)
		while northeast and centrally there is abundant rush and purple moor-grass present.
Poor semi-improved grassland	No	Poor semi-improved grassland was recorded within fields in the southwest of the Site, heavily grazed by sheep. As a result of the intense grazing the sward of the grassland is generally short with species recorded including perennial rye, sheep's fescue, Yorkshire fog, ribwort plantain, white clover, creeping buttercup, creeping thistle, daisy, and scattered rush species.
Wet heath/acid grassland	Yes	Wet heath/acid grassland was recorded in the northeast of the Site, bordering the shallow watercourse and extending south into the centre of the site. These areas comprised frequent ling heather and purple moor-grass with areas of scattered bracken and rush. Wetter areas hosted sphagnum moss, reindeer moss and other moss sp. with marsh thistle and bird's foot trefoil.
Dry heath/acid grassland	Yes	The desk study returned records of potential dry heath/acid grassland from NRW's remote sensed phase 1 layer in the northwest of the site (**TN1)**. This was confirmed in the extended phase 1 survey with mat-grass, sheep's fescue, purple moor-grass, sheep's sorrel and soft rush with scattered ling heather were identified, with some marshier patches in the southeast corner of the field.
Blanket bog	Yes	An area of blanket bog is present in the centre of the Site below the plateau that is fenced off from livestock and public access for protection as it is one of the designated features of the Mynydd y Glyn SINC. There is also an area present in the northeast of the Site. This habitat was boggy underfoot and dominated by purple-moor grass, scattered rush sp., mat grass, bell heather and cotton grass with scattered sphagnum moss, cuckoo flower, marsh thistle.
Unimproved grassland – acid	Yes	The SEWBReC data search returned possible records of unimproved acid grassland from NRW's remote sensed phase 1 layer within the Site shown as **TN2** on **Figure 4.5 & 4.6**. This habitat was not recorded at the time of survey, these areas were identified as semi-improved acid grassland.
Continuous bracken	No	Bracken is found scattered throughout the semi-improved acid grasslands on-Site and there is also a stand of continuous bracken in the east of the Site. This is located on a slope that borders semi-improved acid grassland and wet heath.
Dense and scattered scrub	No	Only small areas of scrub are present within the Site boundary. A small fenced area is present in the south with dominant willow scrub with some scattered hazel, sycamore, silver birch and scot's pine saplings. The understorey is dominated by rush and bracken with bramble and some small areas resemble an attempt at mixed plantation woodland. There is also a small block of willow scrub at the northeast boundary of the Site, with scattered conifer saplings and silver birch.
Mature trees	No	The only mature trees present within the Site boundary line the dry, slate riverbed in the southeast of the Site (**TN3**). Species recorded include oak, cherry, ash and silver birch.
Waterbodies	Yes	The waterbodies described in **Table 4.13** were visited during the extend Phase 1 habitat survey. Ponds 1 and 2 were within the Site boundary and only 1 held water at the time of survey, and was present within a heavily grazed grassland, frequently used by livestock with evidence of poaching at the margins. Waterbodies are shown in **Figure 4.4.**
Watercourses	Yes	There are wet ditches present in the east of the Site, and a narrow, slow flowing ditch with some standing vegetation recorded in the southwest within semi-improved acid grassland.

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6, Appendix A)
Hardstanding (including tracks)	No	A hardstanding track is present in the southwest use for access the site by vehicle.
Bare ground	No	Bare ground recorded during the walkover was associated with areas heavily used by off-road vehicles, either for forestry access or recreational use. This was recorded in the north east of the Site.

Table 4.15 Summary of off-Site habitats to 250m

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6)
Coniferous woodland - plantation	No	Immediately adjacent to the northeast boundary of the Site there are large is a large area of larch dominant, conifer plantation managed for forestry and recreation.
Broad-leaved woodland – semi-natural	No	In the south of the Site there is a small block of semi-natural woodland that follows the watercourse. This comprises dominant coppice hazel, with occasional hawthorn with a sparse understorey of scattered rush, poor-semi improved grassland species and bracken.
Watercourses	Yes	There is a watercourse that is immediately adjacent to the northern boundary of the Site, slow flowing with some pooling. There is also a watercourse present southwest of the Site boundary within the broad-leaved semi-natural woodland. which is shallow, slow flowing and ~0.5m which is heavily shaded.

Protected and otherwise notable species

Badgers

The habitats present within the Site and wider landscape are dominated by heavily grazed semi-improved acid grassland with only small pockets plantation woodland and dense/continuous scrub in the south and northeast of the site. These areas have low potential to support badgers foraging, sett building and commuting. No evidence of badger setts or activity was recorded on-Site or within 250m of its boundary during the extended Phase 1 habitat survey.

Bats

The Site provides potential foraging habitat in the form of a mosaic of semi-improved acid grassland, dry and wet heath and blanket bog, with plantation woodland bordering the northwest and scrub in the south and southeast of the Site. The network of drystone walls also has the potential to support commuting bats.

There are no buildings present within the Site boundary. There is potential for trees within the area of hazel coppice in the southeast and the mature trees that line the dry riverbed (**TN3**) in the east of the Site to support roosting bats.

Dormouse

The habitats present within and adjacent to the Site are not considered to be typical of habitat that would support dormouse. There are no hedgerows present, and the continuous scrub in the south and northeast of Site is low in species diversity, has a sparse the understorey, is not large enough and with no connectivity to potential off-Site habitat that could support the species. Food species were limited on-Site with no hazel identified and very limited bramble across the Site.

Otter

The slow flowing ditches in the southwest and east of the Site have moderate potential to support otter commuting as there are other watercourses present within 250m, but low potential for foraging, and negligible potential for resting and holt creation as the ditches are shallow with no cover.

The watercourse present off-Site to the north also has moderate potential for commuting, and low potential for foraging, resting and holt creation. The watercourse southeast of the site that runs within the hazel coppice woodland, has high commuting potential as it holds connectivity to a number of watercourses in the wider landscape and is well covered. This stream has low potential for foraging, holt creation and resting.

The waterbodies identified within 500m of the Site that have not dried out hold moderate foraging potential for otter, given the proximity to the network of ditches in the south. No evidence of otter was recorded at the time of survey.

Water vole

The banks of the open slow flowing watercourses are heavily vegetated with rush species present and the substrate could support burrows, though these are not more than ~50cm in height and water levels are unstable. There is also limited connectivity to the wider network of ditches/watercourses and very few opportunities for above ground nesting sites.

The waterbody on Site is within close proximity to the watercourse in and adjacent to the south of the Site, however these are not considered to hold potential for the species and that the waterbodies are not large enough to support individual water vole.

Great crested newts

There are limited habitats on Site for GCN with the areas of scrub in the south and northwest and the fenced area of blanket bog and heath are the only areas considered suitable to support terrestrial GCN. The intensive grazing, topography and vast open and exposed landscape make it sub-optimal for the species.

Habitat Suitability Index Assessment

The three potentially suitable GCN breeding waterbodies identified during the desk study, as well as a Pond 4 that was identified during the visits, were assessed for their habitat suitability using the HSI scoring system. At the time of survey Ponds 2 & 3 were found to be dry and therefore scoped out from further survey. The HSI scores for the remaining ponds are listed in **Table 4.16** below.

Table 4.16 HSI scores for ponds within 500m of the Site

Pond ID	HSI score	Pond suitability
1	0.59	Below average
2	n/a	Pond dry on 29 April 2020
3	n/a	Pond dry on 29 April 2020

Pond ID	HSI score	Pond suitability
4	0.68	Average

Presence/likely absence surveys

All waterbodies assessed using the HSI assessment were then subject to an eDNA survey to confirm GCN presence/likely absence. The eDNA results for the remaining ponds are listed in **Table 4.17** below.

Table 4.17 eDNA survey results

Pond ID	Date surveyed	eDNA survey result
P1	29 April 2020	Negative
P3	1 May 2020	Negative

Reptiles

There is suitable habitat to support widespread British reptile species foraging, refuging and commuting in the heath, blanket bog, continuous bracken and less intensely grazed semi-improved acid grassland. The network of dry-stone walls and scattered stone (**TN4**) and scrub on-Site provides suitable habitat for refuge and hibernation. Common lizard has been observed basking on a stone wall on the 3 April, and1 & 2 June 2020, and flushed in the vegetation on the 2 June 2020 (**TN5**).

Breeding birds

The Site comprises areas of semi-improved acid and poor semi-improved grassland, and a mosaic of other habitats; including scrub, wet and dry heath and blanket bog, all of which are suitable for nesting birds.

Initial surveys have identified that the areas of semi-improved and improved grassland on the Site have the potential to support notable species such as dunnock, reed bunting and skylark. In areas of scrub notable species including linnet, mistle thrush, song thrush, cuckoo and spotted flycatcher have all been recorded and have potential to breed on the Site, all of which are Species of Principle Importance (SPI) and Birds of Conservation Concern (BoCC) Red-list species.

Five species listed on Schedule 1 of the *Wildlife and Countryside Act 1981* (as amended) have been recorded on the Site; common crossbill, goshawk, merlin, peregrine and red kite. The woodland plantation adjoining the Site provides suitable habitat for breeding common crossbill and goshawk.

Wintering birds

The habitats within and adjacent to the Site have the potential to support migratory/wintering raptors waders, wildfowl and other non-breeding bird species.

Initial survey results and desk-based review has identified records of notable species including merlin, goshawk, lapwing, golden plover and snipe, all of which have the potential to use the Site during non-breeding periods. Further surveys will be carried out during the non-breeding season to understand number and species present.

Other species

Other notable species highlighted by the desk study may occur on the Site. The only potentially suitable habitat for hedgehog is the scrub in the south and northeast of the Site, however the species is scarcely found in uplands and are commonly associated with a mosaic of hedgerows woodland and grassland opposed to the vast open grassland habitat on-Site. The waterbody on Site holds the potential to support common toad breeding, and the adjacent scrub and less heavily grazed areas could provide terrestrial habitat.

Habitats on the Site, including the grassland, continuous stands of bracken and blanket bog provides suitable habitat to support generalist moth and butterfly species. Notable invertebrates identified within 2km of the Site during the desk study includes small pearl-bordered fritillary and small heath butterflies and cinnabar moth. The areas of continuous bracken habitat identified, particularly in the centre of the Site resembles suitable habitat for these species, with habitat occurring on south facing sunny slopes. The desk study returned 32 records of marsh fritillary within 2km of the site, the closest being 523m to the east. The majority of the site is heavily grazed with short sward acid grassland unsuitable to support marsh fritillary, a species commonly associated with calcareous grassland. The damper habitats within the Site, including the blanket bog and wet heath could provide sub-optimal habitat for this species, however no devil's bit scabious or field scabious was identified during the survey, which are the main food plants or the species.

Of the notable plant species identified in the desk study, only dog violet was identified extended Phase 1 habitat survey.

Legally controlled species

No legally controlled plant species were identified on-Site during the extended Phase 1 walkover survey.

5. Summary and Conclusions

The desk study and extended Phase 1 habitat survey of the Site have highlighted the presence of two SACs within 10km of the Site, two SSSIs and 26 SINCs within a 2km radius. The closest SAC is Blackmill Woodlands and is approximately 9.5km from the Site and designated for its old sessile oak woods, a habitat that is not found on or directly adjacent to the Site. Cardiff Beech Woods SAC is approximately 9.3km north of the Site and is designated as one of the largest concentrations of Asperulo-Fagetum beech forest in Wales. This habitat occurs on calcareous soils and not found on or directly adjacent to the Site.

Nant Gelliwion Woodland SSSI is approximately 1.2km north of the Site and is designated for its mixed deciduous woodland and stands of sessile oak. This habitat type does not occur within or adjacent to the Site. Rhos Tonyrefail SSSI is approximately 0.5km from the Site and is designated for its marshy grassland, acid flush, species-rich neutral grassland, acid grassland, wet heath and blanket mire, as well as it's population of marsh fritillary butterflies. Similar habitats have been identified on-Site, and there is potential for marsh fritillary to be supported, though no field scabious or devil's bit scabious was identified during the visit.

There are six SINCs within 2km of the site; with one, Mynydd y Glyn and Mynydd Gelliwion and Gellwion Slopes, lying within the Site boundary. Mynydd y Glyn is designated as an area of upland peat bog, as identified during the extended Phase 1 walkover survey. Mynydd Gelliwion and Gellwion Slopes is designated as a bog mosaic with forestry plantation, ffridd marshy and acid grassland. The remaining sites are designated for their grassland and/or woodland habitats.

A number of HoPIs were identified in the desk study within a 2km radius of the Site. The following habitats within the Site boundary may contain HoPIs: dry acid heath; unimproved acid grassland; semi-improved acid grassland; standing water; wet heath/acid grassland mosaic; wet heath, blanket bog.

The desk study and field survey identified the potential for a number of legally protected and notable species to utilise the habitats within the Site. These are:

- Badger – potentially foraging and commuting on-Site;
- Bats – potentially roosting, foraging and commuting on-Site;
- Otter – potentially commuting, resting and holt building within 250m of the Site;
- Birds – including Schedule 1 and notable species, potentially nesting and foraging on-Site;
- Reptiles – potentially foraging, commuting, refuging and hibernating on-Site; and
- Terrestrial invertebrates – potentially undergoing their full life cycle on -Site; and
- Other notable species –hedgehog and toad – potentially foraging, commuting and occupying habitats on-Site.

5.1 Species scoped out

Dormouse

The desk study returned no records of dormouse within 2km of the Site and the field survey did not identify suitable habitat within and adjacent to the Site that would support dormouse. There are no hedgerows present, and the limited scrub that is present on site is not large enough or well connected to support a viable population of dormouse. Therefore, no further survey work is recommended in relation to dormice.

Water vole

No records of water vole were returned during the desk study, and the watercourses identified on Site are unsuitable for water vole given the shallow banks, lack of vegetation, depth and lack of burrowing oportunities. Therefore, no further survey work is recommended in relation to water vole.

Great crested newt

No records of great crested newt were returned during the desk study, and all of the waterbodies that underwent eDNA survey tested negative for GCN. Therefore, no further survey work is recommended in relation to this species.

5.2 Recommendations for further work

This PEA informs the biodiversity baseline associated with the Proposed Development. Elements including biodiversity survey scope and methodology, sensitive scheme design and environmental measures to be incorporated into the Proposed Development will be detailed and agreed as part of the wider EIA process.

Appendix A
Figures

302000
303000
304000
305000
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189000

Key

Site Boundary

0 150 300 450 600 m

Scale at A3: 1:10,000

Pennant Walters
Mynydd y Glyn Wind Farm
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Figure 1.1 Site Boundary

March 2021

wood.

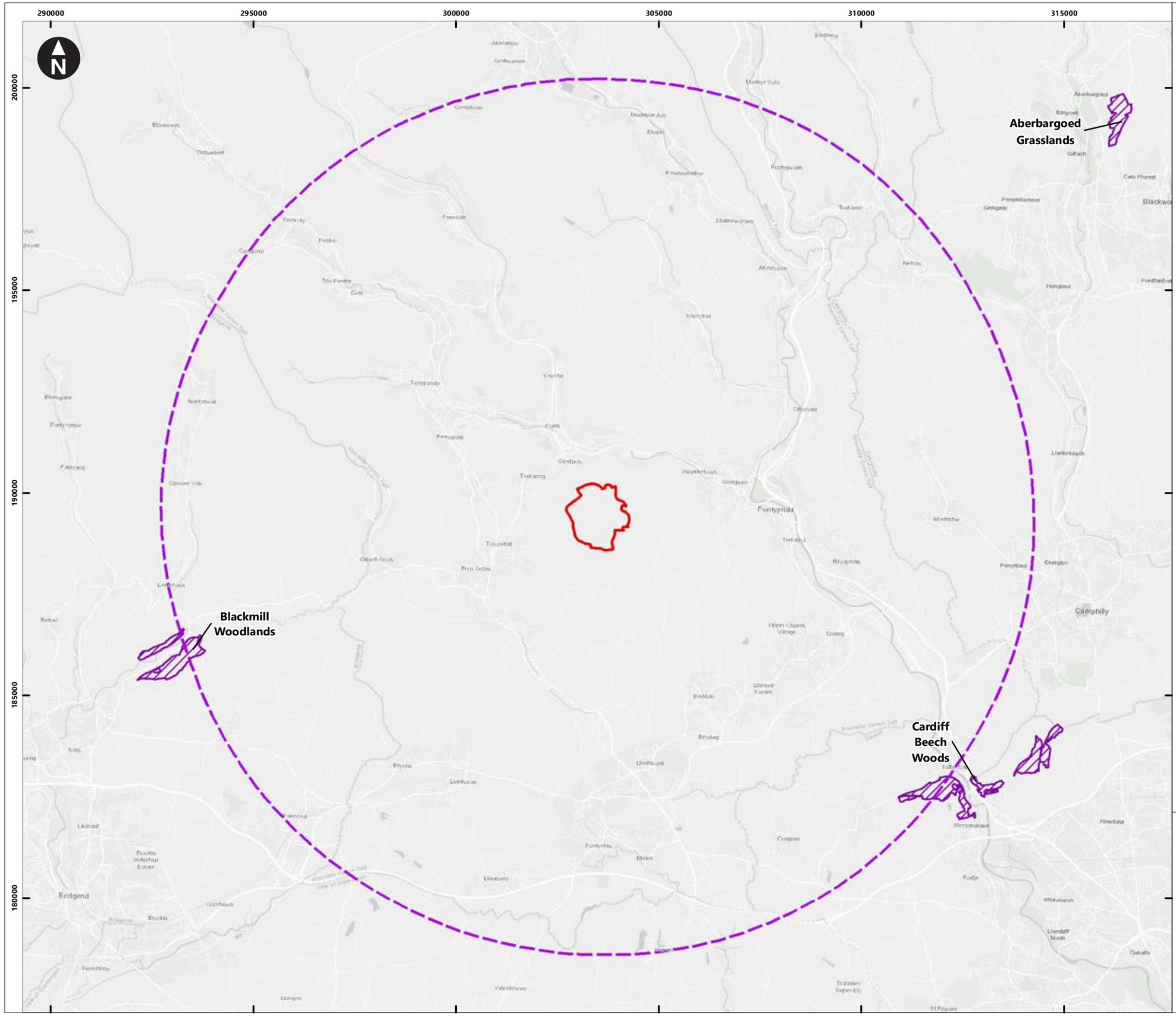

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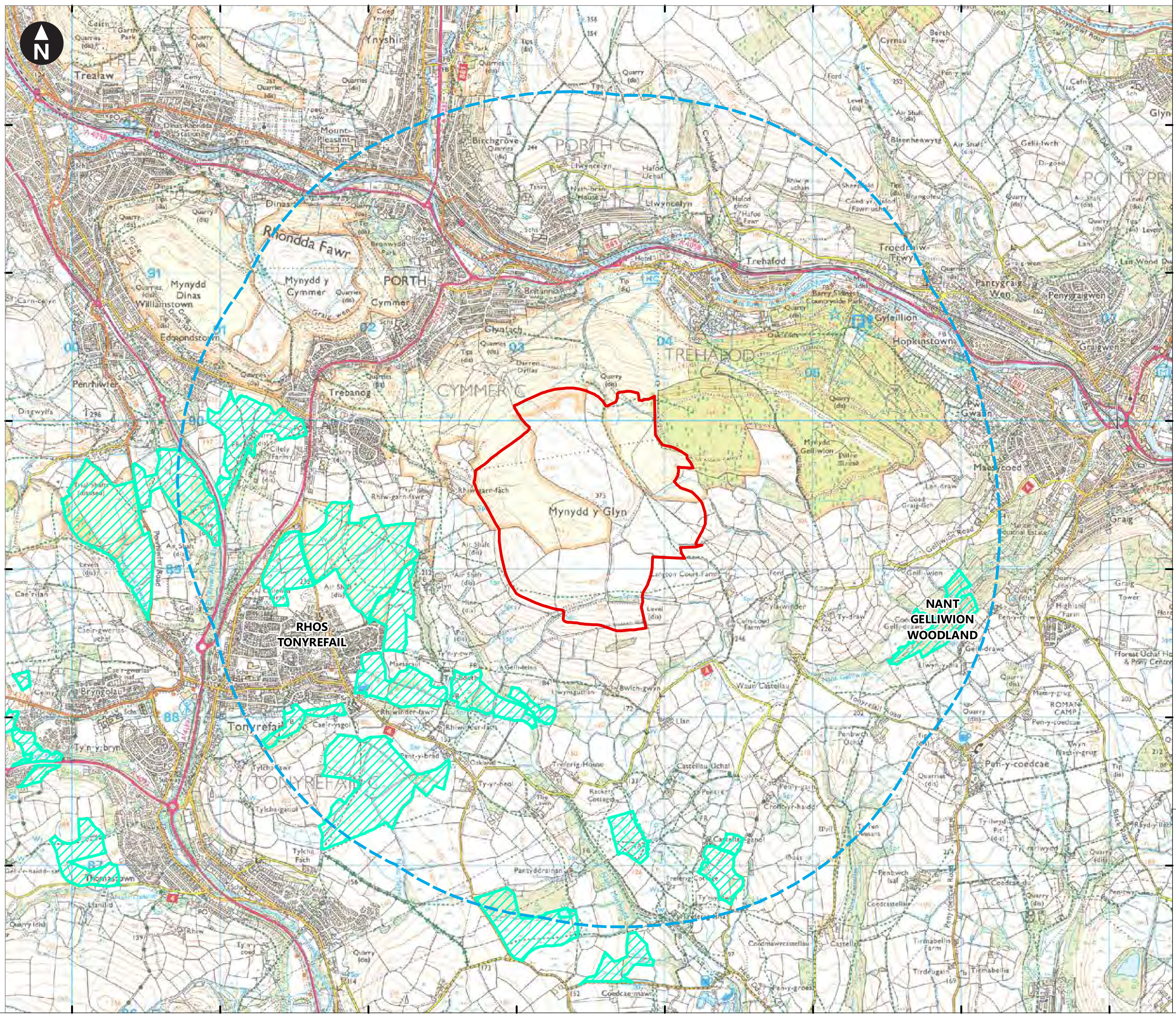
Figure 4.1 Statutory designated biodiversity Sites of international importance within 10km of the Site

March 2021

wood.



Key

Site Boundary

2km buffer

SSSI

0 500 1,000 1,500 m

Scale at A3: 1:25,000

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Figure 4.2 Sites with national statutory designation for biodiversity conservation

March 2021

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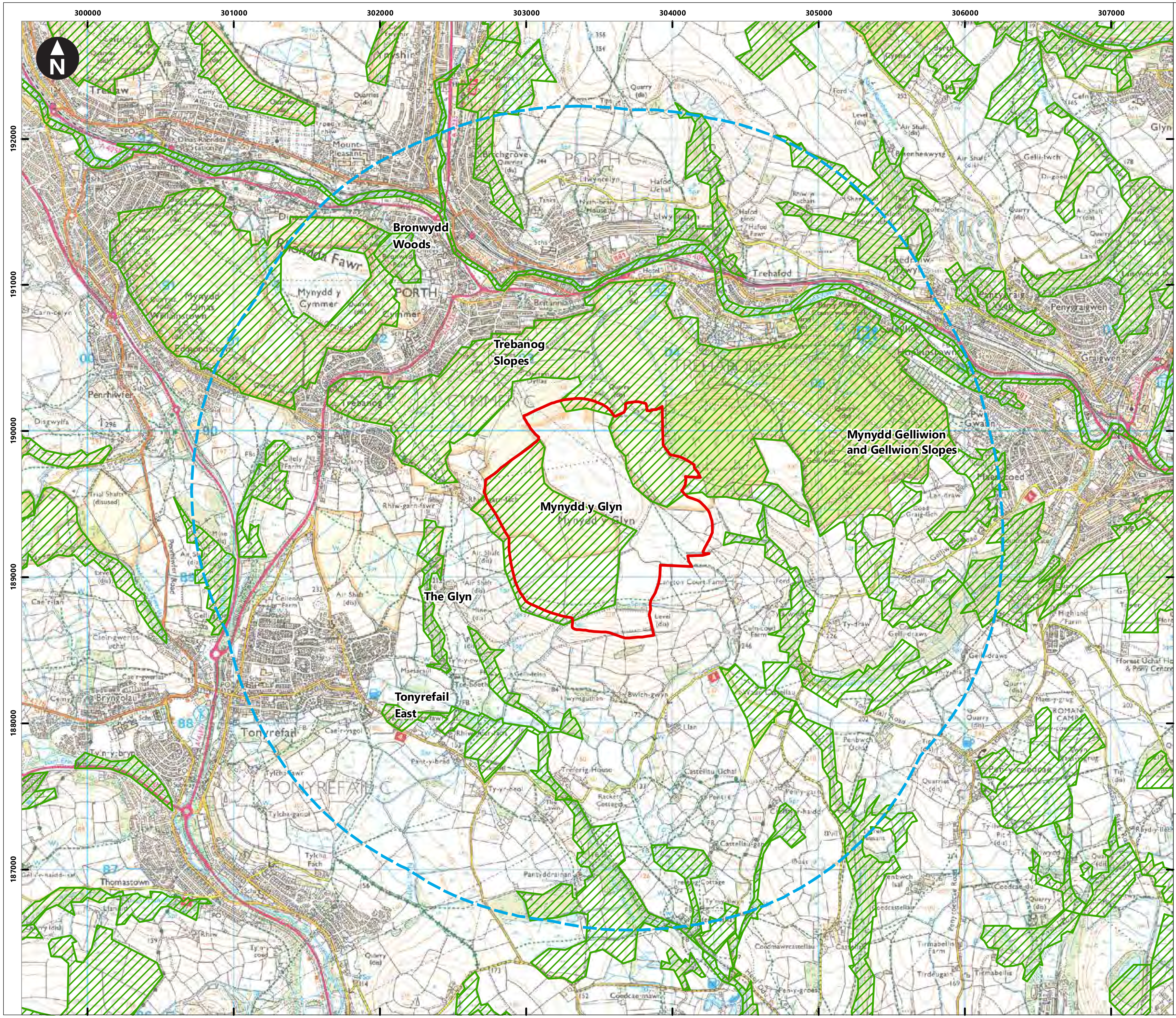

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Key

Site Boundary

2km buffer

SINC

0 500 1,000 1,500 m

Scale at A3: 1:25,000

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Figure 4.3 Non-statutory designated biodiversity Sites areas within 2km of the Site

March 2021

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191000 190000 189000 188000

Key

- Site Boundary
- 500m buffer
- Waterbodies
- Dry Ponds

0 200 400 600 800 m

Scale at A3: 1:15,000

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Figure 4.4 Waterbodies identified within 500m of the Site

March 2021

wood.

302000 302500 303000 303500 304000 304500 305000

190500 190000 189500 189000 188500

Site Boundary
250m study area boundary
Target Note
A3.1: Parkland and scattered trees- broad-leaved
G2: Running water
J2.1.1: Intact hedge native species-rich
J2.5: Wall
J2.6: Dry ditch
A1.1.1: Broadleaved woodland - semi-natural
A1.1.2: Broadleaved woodland - plantation
A1.2.2: Coniferous woodland - plantation
A2.1: Scrub- Dense/Continous
A2.2: Scrub- Scattered
B1.2: Acid grassland - semi-improved
B2.2: Neutral grassland - semi-improved
B4: Improved grassland
B6: Poor semi-improved grassland
C1.1: Continous Bracken
C1.2: Scattered Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid orassland
E1.6.1: Blanket bog
G1: Standing water
J3.6: Buildings
J4: Bare ground
Hardstanding

0 0.1 0.2 0.3 0.4 0.5 0.6 km
Scale at A3: 1:10,000

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Figure 4.5 Extended Phase 1 Habitat Plan

April 2021

wood.

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0.3 km
Scale at A3: 1:5,000
Site
250m study area
Target Note
G2: Running water
J2.5: Wall
A2.1: Scrub- Dense/Continous
B1.2: Acid grassland - semi-
B2.2: Neutral grassland - semi-
C1.1: Continous Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
J4: Bare ground
Hardstanding

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report
Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
wood.
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Site
250m study area
Target Note
A3.1: Parkland and scattered trees- broad-leaved
G2: Running water
J2.5: Wall
A1.2.2: Coniferous woodland - plantation
A2.1: Scrub- Dense/Continous
B1.2: Acid grassland - semi-improved
B2.2: Neutral grassland - semi-improved
C1.1: Continous Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
J4: Bare ground
Hardstanding
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0.3 km
Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
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Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
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Site
250m study area
Target Note
A3.1: Parkland and scattered
G2: Running water
J2.1.1: Intact hedge native
J2.5: Wall
J2.6: Dry ditch
A1.1.1: Broadleaved woodland -
A1.1.2: Broadleaved woodland -
A1.2.2: Coniferous woodland -
A2.1: Scrub- Dense/Continous
A2.2: Scrub- Scattered
B1.2: Acid grassland - semi-
B2.2: Neutral grassland - semi-
B4: Improved grassland
B6: Poor semi-improved
C1.1: Continous Bracken
C1.2: Scattered Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
G1: Standing water
J3.6: Buildings
J4: Bare ground
Hardstanding
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Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
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Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
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Site
250m study area
Target Note
G2: Running water
J2.5: Wall
A2.1: Scrub- Dense/Continous
B1.2: Acid grassland - semi-improved
B6: Poor semi-improved grassland
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
G1: Standing water
Hardstanding
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0.3 km
Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report
Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
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42864-WOOD-XX-XX-FG-OE-0008_S0_P01.2
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Site

250m study area

Target Note

A3.1: Parkland and scattered trees- broad-leaved

G2: Running water

J2.1.1: Intact hedge native species-rich

J2.5: Wall

J2.6: Dry ditch

A1.1.1: Broadleaved woodland - semi-natural

A1.1.2: Broadleaved woodland - plantation

A2.1: Scrub- Dense/Continous

A2.2: Scrub- Scattered

B1.2: Acid grassland - semi-improved

B2.2: Neutral grassland - semi-improved

B4: Improved grassland

B6: Poor semi-improved grassland

C1.1: Continous Bracken

C1.2: Scattered Bracken

D5: Dry heath/acid grassland

D6: Wet heath/acid grassland

E1.6.1: Blanket bog

G1: Standing water

J3.6: Buildings

Hardstanding

0 0.1 0.2 0.3 km

Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report

Figure 4.6 Extended Phase 1 Habitat Plan - Detailed

April 2021

wood.

Appendix B
Legislation

All wild mammals (including rabbits and foxes)

Under the *Wild Mammals (Protection) Act 1996* it is an offence intentionally to cause unnecessary suffering to any wild mammal.

Badger

The Protection of Badgers Act 1992 makes it an offence to:

- wilfully kill, injure or take a badger;
- attempt to kill, injure or take a badger; or
- cruelly ill-treat a badger.

It is also an offence to interfere with a badger set by:

- damaging a badger sett or any part of it;
- destroying a badger sett, obstructing access to or any entrance of a badger sett, disturbing a badger when it is occupying a badger sett; or
- intending to do any of those things or being reckless as to whether his actions would have any of those consequences.

Bats

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill a bat;
- deliberately disturb a bat (this applies anywhere, not just at its roost), in particular in such a way as to be likely to:
  - impair their ability to survive, breed or reproduce, or rear or nurture their young; and
  - impair their ability to hibernate or migrate.
- affect significantly the local distribution or abundance of that bat species;
- damage or destroy a breeding site or resting place of any bat;
- intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection (this is taken to mean all bat roosts whether bats are present or not).

Dormouse

Dormouse is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. This species is afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill any such animal;
- deliberately disturb any such animal, in particular in such a way as to be likely to:
  - impair their ability to survive, breed or reproduce, or rear or nurture their young;
  - impair their ability to hibernate or migrate; and
  - affect significantly the local distribution or abundance of that species.
- damage or destroy a breeding site or resting place of any such animal;
- intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

Great crested newt

The great crested newt is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. It is afforded protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill any such newt;
- deliberately disturb any such newt, in particular in such a way as to be likely to:
  - impair their ability to survive, breed or reproduce, or rear or nurture their young;
  - impair their ability to hibernate or migrate; and
  - affect significantly the local distribution or abundance of that species.
- deliberately take or destroy the eggs of such a newt;
- damage or destroy a breeding site or resting place of any such newt;
- intentionally or recklessly disturb any such newt while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that any such newt uses for shelter or protection.

This relates to both the aquatic and terrestrial habitat they occupy. The legislation applies to all life stages of this species.

Reptiles

The four widespread[16] species of reptile that are native to Britain, namely common or viviparous lizard (Zootoca (*Lacerta) vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake (*Natrix natrix (Naturix helvetica*)), are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

- intentionally kill or injure any of these species.

Birds

With certain exceptions[17], all wild birds, their nests and eggs are protected by section 1 of the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, *inter alia*, to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 of the Act subject to various controls.

Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- intentionally or recklessly disturb the dependent young of any such bird.

For golden eagle, white-tailed eagle and osprey, it is also an offence to:

- take, damage or destroy the nest of these species (this applies at any time, not only when the nest is in use or being built).

[16] The other native species of British reptile (sand lizard and smooth snake) receive a higher level of protection in England and Wales under the *Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. However, the distribution of these species is restricted to only a very few sites. All marine turtles (*Cheloniidae and Dermochelyidae*) are also protected.

[17] Some species, such as game birds, are exempt in certain circumstances.

Appendix C
Species Scientific Names

Table B.1 Species Scientific Names

Species	*Scientific Name*
Adder	*Vipera berus*
Alder	*Frangula alnus*
Ash	*Fraxinus sp.*
Badger	*Meles meles*
Bee Orchid	*Ophrys apifera*
Beech	*Fagus sylvatica*
Bell heather	*Erica cinerea*
Birch	*Betula sp.*
Bird's foot trefoil	*Lotus corniculatus*
Bluebell	*Hyacinthoides non-scripta*
Bog Asphodel	*Narthecium ossifragum*
Bog Pimpernel	*Potamogeton polygonifolius*
Bracken	*Pteridium*
Bramble	*Rubus sp.*
Brandt's Bat	*Myotis brandti*
Brown long-eared bat	*Plecotus auritus*
Bullfinch	*Pyrrhula pyrrhula*
Cherry Laurel	*Prunus laurocerasus*
Cinnabar	*Tyria jacobaeae*
Cock's-foot	*Dactylis glomerata*
Common Bent	*Agrostis capillaris*
Common Crossbill	*Loxia curvirostra*
Common Frog	*Rana temporaria*
Common Nettle	*Urtica dioica*
Common Pipistrelle	*Pistrellus pipistrellus*
Common Toad	*Bufo bufo*

Species	*Scientific Name*
Conifer	*Pinophyta sp.*
Creeping Bent	*Agrostis stolonifera*
Creeping Buttercup	*Ranunculus repens*
Creeping Thistle	*Cirsium arvense*
Cuckoo	*Cuculus canorus*
Cuckoo Flower	*Cardamine pratensis*
Daisy	*Bellis perennis*
Dandelion	*Taraxacum sp.*
Daubenton's Bat	*Myotis daubentonii*
Devil's-bit-Scabious	*Succisa pratensis*
Dog Violet	*Viola canina*
Dormouse	*Muscardinus avellanarius*
Dunnock	*Prunella modularis*
Early Hair Grass	*Aira praecox*
Giant Hogweed	*Heracleum mantegazzianum*
Goat Willow	*Salix caprea*
Golden Plover	*Pluvialis apricaria*
Gorse	*Ulex sp.*
Goshawk	*Accipiter gentilis*
Grass Snake	*Natrix natrix*
Great Crested Newt	*Triturus cristatus*
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*
Greater Willowherb	*Epilobium hirsutum*
Hare	*Lepus europaeus*
Hawthorn	*Crataegus sp.*
Hazel	*Corylus sp.*
Heath Spotted Orchid	*Dactylorhiza maculata*
Heath Rush	*Juncus squarrosus*

Species	*Scientific Name*
Heather	*Calluna sp.*
Hedgehog	*Erinaceus europaeus*
Himalayan Balsam	*Impatiens glandulifera*
Himalayan Cotoneaster	*Cotoneaster simonsii*
Himalayan Honeysuckle	*Leycesteria formosa*
Honeysuckle	*Lonicera fragrantissim*
Japanese knotweed	*Reynoutria japonica*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo atthis*
Knot Grass	*Polygonum sp.*
Lapwing	*Vanellus vanellus*
Lesser Horseshoe Bat	*Rhinolophus hipposideros*
Linnet	*Linaria cannabina*
Ling heather	*Calluna vulgaris*
Marsh Fritillary	*Euphydryas aurinia*
Marsh Thistle	*Cirsium palustre*
Marsh Violet	*Viola palustris*
Mat-Grass	*Nardus stricta*
Merlin	*Falco columbarius*
Mistle Thrush	*Turdus viscivorus*
Montbretia	*Crocosmia*
Natterer's bat	*Myotis nattereri*
Noctule	*Nyctalus noctula*
Oak	*Quercus sp.*
Otter	*Lutra lutra*
Palmate Newt	*Lissotriton helveticus*
Pearl-bordered Fritillary	*Boloria euphrosyne*

Species	*Scientific Name*
Peregrine	*Falco peregrinus*
Perennial Rye	*Lolium perenne*
Purple Moor Grass	*Molinia caerulea*
Red Fescue	*Festuca rubra*
Red Kite	*Milvus milvus*
Redwing	*Turdus iliacus*
Reed Bunting	*Emberiza schoeniclus*
Reindeer moss	*Cladonia Stellaris*
Rhododendron ponticum	*Rhododendron ponticum*
Ribwort Plantain	*Plantago lanceolata*
Rowan	*Sorbus sp.*
Rush	*Juncaceae sp.*
Sallow	*Cirrhia icteritia*
Scots Pine	*Pinus sylvestris*
Sedge sp.	*Cyperaceae sp.*
September Thorn	*Ennomos erosaria*
Serotine	*Eptesicus serotinus*
Shaded Broad-bar	*Scotopteryx chenopodiata*
Sheep's Fescue	*Festuca ovina*
Sheep's' Sorrel	*Rumex acetosella*
Silver Birch	*Betula pendula*
Skylark	*Alauda arvensis*
Slow worm	*Anguis fragilis*
Small Heath	*Coenonympha pamphilus*
Small Pearl-bordered Fritillary	*Boloria selene*
Snipe	*Gallinago gallinago*
Soft rush	*Juncus effusus*

Species	*Scientific Name*
Song Thrush	*Turdus philomelos*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Sphagnum Moss	*Sphagnum*
Spotted Flycatcher	*Muscicapa striata*
Starling	*Sturnus vulgaris*
Sweet Vernal	*Anthoxanthum odoratum*
Sycamore	*Acer pseudoplatanus*
Viviparous Lizard	*Zootoca vivipara*
Wall Cotoneaster	*Cotoneaster horizontalis*
Water Vole	*Arvicola amphibius*
Wavy Hair Grass	*Deschampsia flexuosa*
Whiskered Bat	*Myotis mystacinus*
White Clover	*Trifolium repens*
Willow	*Salix sp.*
Willow Tit	*Poecile montana*
Wood Warbler	*Phylloscopus sibilatrix*
Yarrow	*Achillea millefolium*
Yellowhammer	*Emberiza citrinella*
Yew	*Taxus baccata*
Yorkshire fog	*Holcus lanatus*

Appendix D
Target Notes

Table C.1 Target Notes

Reference (Figure 4.5 & 4.6)	Description
1	Areas of dry heath/acid grassland identified during the desk study from NRWs remote sensing layer and confirmed on site during extended Phase 1 habitat survey.
2	Grasslands identified in the desk study as being unimproved acid grassland
3	Dry slate riverbed
4	Scattered stone amongst bracken
5	Common Lizard

Appendix 7.2
Interim Bat Survey Report

Pennant Walters

Mynydd y Glyn Wind Farm

Interim Bat Survey Report

Wood Group UK Limited – May 2021

Report for

Pennant Walters

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Document revisions

No.	Details	Date
1	42864-WOOD-XX-XX-RP-OE-0001_S0_P02	April 2021

Contents

1. Introduction

1.1 Background

1.1.1 Pennant Walters are seeking planning permission for a seven-turbine wind farm on land at Mynydd y Glyn, Pontypridd ('the Site'). The Site lies within the Rhondda Cynon Taf County Borough Council administrative area and is located approximately 3km west of Pontypridd (National Grid Reference (NGR) ST 03605 89504). The Site comprises a plateau of grazing pasture with areas of conifer plantation woodland and blanket bog and measures 168.53 hectares (ha), (see **Figure 1.1, Appendix A)**.

1.1.2 Wood Group UK Ltd (Wood) was commissioned by Pennant Walters to undertake a suite of bat surveys of the Site to support the Proposed Development.

1.2 This report

1.2.1 This report presents the methods and findings of the baseline bat surveys. The structure of the report is as follows:

Section 2 – Methods.

Section 3 – Results.

Section 4 – Summary.

Section 5 – Collision Risk Assessment.

Section 6 – Further Survey.

1.2.2 This interim report summarises the methods adopted for, and results of, the bat survey undertaken between April 2020 and February 2021. These results will be used to inform the evolution of the project design and specification of environmental measures. The results of these ecological studies will also inform the Environmental Impact Assessment (EIA).

1.2.3 It should be noted that survey work is on-going, and this document is an interim summary of the survey work undertaken to date. It is not intended to be a complete assessment of the status of population on the Site.

1.3 Survey area

1.3.1 Bat surveys conducted during 2020 were carried out in advance of the scheme design being finalised including the Site boundary and proposed turbine size and layout. Between the time of commencing surveys and the time of writing the Site boundary and proposed turbine layout has evolved. The bat survey area comprises the Site boundary and an additional 266m buffer area (200m plus a maximum potential rotor radius (66m) from the Site boundary). The Site boundary has recently been updated, the current site boundary and associated 266m buffer which comprises the bat survey area is shown on **Figure 1.2, Appendix A**.

1.4 Legislative and policy context

1.4.1 All British bat species are protected under UK and European legislation (see **Appendix B** of this report), such that it is a criminal offence to disturb, injure or kill any bat, or damage or destroy a bat roost (even when no bats are present).

1.4.2 In addition, the following national and local planning policies require the consideration of biodiversity/nature conservation and provide guidance/considerations for developments affecting designated sites and habitats, along with protected priority habitats and species:

- Future Wales; National Development Framework 2021.
- Planning Policy Wales – Chapter 6 Distinctive and Natural Places (11th Ed.; 2021).
- Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009).
- Rhondda Cynon Taf Local Development Plan (LDP) up to 2021 (adopted 2011).
- The Rhondda Cynon Taf Supplementary Planning Guidance (SPG) Nature Conservation 2011.
- Rhondda Cynon Taf Biodiversity Action Plan (Action for Nature) 2000 (updated 2008).

1.4.3 In order to ensure compliance with the relevant legislation and policy, it is necessary to understand how bats use features within the Site so that the effects of the proposed development on bat populations can be appropriately assessed and mitigated for.

2. Methodology

2.1 Overview

2.1.1 A variety of methods have been used, to date, to assess the use of the Site by bats, in line with best practice guidelines. Bats and onshore wind turbines [1] and the Bat Conservation Trust (BCT) third edition of Good Practice Guidelines[2] were the main source of guidance. The Bat Mitigation Guidelines[3], Bat Workers' Manual[4], Bat Tree Habitat Key[5] and British Standard 8596:2015[6] provide further guidance that has been taken into account when designing the survey methodology and programme of survey work. The guidance provided has been interpreted using professional experience with the detailed survey design, while guided by these documents, adapted to ensure relevance to the current bat survey area and take account of emerging survey data.

2.1.2 The remainder of this section describes the following survey methods that have been applied in 2020.

- Desk study.
- Field survey: roost identification.
  - Preliminary appraisal of potential bat roost features.
  - Built structures (external inspection).
  - Trees (ground level roost assessment, potential roost feature [PRF] inspection).
- Field survey: bat activity.
  - Preliminary appraisal of habitats for bats.
  - Manual transects.
  - Automated monitoring.

2.1.3 This section then goes on to describe:

- The methods used throughout field survey work to aid with species identification.
- How environmental conditions were considered in survey design and recorded during field survey work.
- What limitations affected the field surveys.
- The personnel responsible for applying survey methods.

[1] SNH, NE, NRW, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter and BCT *et al.* (2019) *Bats and onshore wind turbines: survey, assessment and mitigation.*
[2] J. Collins (ed.). Bat surveys for professional ecologists: Good practice guidelines. 3rd Edition. London: Bat Conservation Trust, 2016.
[3] A.J. Mitchell-Jones. Bat Mitigation Guidelines. Peterborough: Natural England, 2004.
[4] A.J. Mitchell-Jones A.P. McLeish, A.P. Bat Workers' Manual. 3rd Edition. Peterborough: JNCC, 2004.
[5] H. Andrews. Bat roosts in trees: a guide to identification and assessment for tree-care and ecology professionals. Exeter: Pelagic Publishing, 2018.
[6] British Standards Institution. BS 8596:2015: Surveying for bats in trees and woodland. London: BSI. 2015.

2.2 Desk study

2.2.1 A desk study was carried out in 2020 to feed into the design of field surveys. The following data sources were consulted as part of the desk study:

- Multi Agency Geographical Information for the Countryside (MAGIC) – Used to identify internationally and nationally important sites designated for bats within 10km of the Site and European Protected Species Mitigation Licences (EPSMLs) within 5km of the Site.
- South East Wales Biodiversity Records Centre (SEWBReC) – Records of bats within a 10km radius of the Site boundary.

2.3 Field survey: roost identification

Preliminary appraisal of potential bat roost features

2.3.1 A walkover survey of the bat survey area (**Figure 1.2, Appendix A**) was undertaken on the 29 April and 1 May 2020. During this survey all trees and built structures[7] were assessed for their potential to support roosting bats. This included a visual inspection of the exterior of built structures to consider the presence of potential roost features (PRFs) such as roof voids or weatherboarding.

2.3.2 This was a high-level scoping exercise and did not involve assessing every individual tree, but where groups of trees occur together (e.g. woodland) a general assessment was made of the tree group and its potential to support bat roosts; similarly, not every building was inspected in detail, but was subject to a more general assessment.

Built structures

Overview

2.3.3 **Table 2.1** below lists the built structures assessed in 2020, and the dates the detailed external inspections were undertaken, built structures locations are shown in **Figure 3.2, Appendix A**.

[7] Built structures is used to refer to all natural and constructed features surveyed with the bat survey area such as buildings, ice houses, caves, rock excavations; but excludes trees.

Table 2.1 Built structures external inspection dates

Building reference (Figure 3.2)	External inspection
B1	29.06.2020
B2	29.06.2020
B3	30.07.2020
B4	30.07.2020
B5	30.07.2020
B6	30.07.2020

External inspection

2.3.4 To build upon the preliminary bat appraisal, a more detailed visual inspection of the exterior of built structures within the bat survey area, where accessible, was carried out in July 2020 to assess their level of potential suitability to support roosting bats. A general description of the structure was made, along with consideration of the following factors.

- The presence of PRFs such as roof voids and soffit boxes with access gaps and gaps under bargeboards, roof tiles, hanging tiles and weatherboarding.
- Expected levels of artificial lighting around potential roost entrances.
- Expected levels of disturbance to any potential roost.
- Quality of adjoining or connecting habitat for roosting bats at the site of the structure, and the potential for bat foraging and commuting routes in the surrounding area.

2.3.5 With these factors taken into account, the assessed structures were categorised in accordance with their level of potential suitability to support roosting bats, as set out in in **Table 2.2**.

Table 2.2 Criteria used for categorising the level of potential for built structures to support roosting bats

Potential Roost Suitability	Requirements
Negligible	Structures with negligible features likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

2.3.6 In addition, the exteriors of buildings near potential roost entrances (e.g. gaps under soffits and hanging tiles) were examined using binoculars and a powerful torch to look for signs of bats.

2.3.7 Built structures were categorised by their highest potential to support any type of roost. For example, if a structure had high potential to support a maternity roost of bats in the summer, but only low potential to support hibernating bats in the winter, the structure was categorised as having high potential to support roosting bats overall.

Trees

Overview

2.3.8 **Table D1 (Appendix D)** lists the trees assessed in 2020 and 2021 and indicates which methods have been applied at each tree and the date on which the surveys were carried out. The methods adopted at each tree were selected based on those that were deemed most appropriate, considering initial survey results and the suitability and type of PRFs present. Tree locations are shown in **Figure 3.3, (Appendix A).**

Ground level roost assessment

2.3.9 To build upon the preliminary bat appraisal, a more detailed visual inspection of trees within the bat survey area was carried out to assess their level of potential suitability to support roosting bats. The trees were inspected from ground level between June 2020, using close focussing binoculars and a powerful light source, and assessed with consideration of the following.

- The presence of PRFs such as rot holes; knot holes; tear outs; flush cuts; hazard beams; wounds; cankers; and other cavities, splits or lifting bark (which are arboricultural terms for such features).
- Expected levels of artificial lighting around potential roost entrances.
- Expected levels of disturbance to any potential roost.
- Quality of adjoining or connecting habitat for roosting bats at the site of the structure, and the potential for bat foraging and commuting routes in the surrounding area.

2.3.10 The assessed trees were categorised in accordance with their level of potential suitability to support roosting bats, as set out in **Table 2.3**.

Table 2.3 Criteria used for categorising the level of potential for trees to support roosting bats

Potential Roost Suitability	Requirements
Negligible	Trees with no visible features likely to be used by roosting bats.
Low	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A tree with one or more PRFs that are suitable for use by large numbers of bats on a regular basis, and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat

Potential Roost Suitability	Requirements
Confirmed roosts	Where it was possible to determine that the tree supports a PRF that is used or has been used by bats. Any tree confirmed to support roosting bats during subsequent survey works was also moved into this category

2.3.11 For all trees categorised as having high or moderate potential to support roosting bats, a unique reference number was assigned, a photograph was taken, and the following details were recorded:

- Grid reference.
- Tree species.
- Tree diameter at breast height (DBH).
- Tree height (measured using a clinometer).
- Number and type of PRF(s).
- Approximate height of PRF(s), and whether they were on the stem or a limb.
- Aspect that the PRF(s) were facing.

2.3.12 Full details of low and negligible potential trees were not recorded, and these trees were not considered for further assessment.

PRF/ hibernation inspection

2.3.13 Trees categorised as providing a high level of bat roost potential during the ground level roost assessment were taken forward for PRF inspection. The decision to take forward high potential trees only was based on the Bats and Onshore Wind Turbines guidance[8] which outlines that key features that could support maternity roosts and significant hibernation or swarming sites (both of which may attract bats from numerous colonies from a large catchment) should be taken forward, it was considered that only the high potential trees had the potential roost suitability to meet these criteria.

2.3.14 PRFs occurring up to 2m from ground level were inspected either from ground level or using a ladder. PRFs above this height were accessed using rope and harness climbing techniques, where safe to do so. All PRF inspections were undertaken using an endoscope and torch, once during the winter period (January- February) in 2021. PRF inspections updated the ground level roost assessments, allowed for a hibernation inspection and recorded additional characteristics of each feature, including approximate internal cavity dimensions and the type of bat roost the feature had potential to support. These were defined as:

- Maternity roosts supported by larger cavities and utilised between May and August by female bats and their young.
- Hibernation roosts supported by a range of cavity sizes but providing constant humidity and temperatures for bats between the months of October and March.

[8] SNH, NE, NRW, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter and BCT *et al.* (2019) *Bats and onshore wind turbines: survey, assessment and mitigation.*

- Day roosts supported by a range of cavity sizes, but usually smaller, supporting individual or small groups of bats between the months of March and November.

2.3.15 Any bats, or evidence of bat occupation (including staining, smoothing of bark and droppings) was recorded, and a photograph of each PRF was taken for reference and to aid future identification of individual features if such were required.

2.3.16 While in the canopy it is often possible to identify features that are not visible from ground level. Therefore, any additional PRFs observed, that had not been identified from the ground-based assessment were recorded and inspected and then included in further survey work, as appropriate. Trees were 'scoped out' from requiring further survey during this exercise, where close inspection revealed them to provide moderate, low or negligible potential to support roosting bats.

PRF/ hibernation inspection

2.3.17 A sample of bat droppings, if found during the built structure inspections and PRF inspection work, would be collected, and submitted for DNA analysis to confirm the identification of bat species. Samples would only be collected where these were accessible, identification of the species occupying the roost was not obvious, and where it was possible to do so without causing undue stress to any bat(s) present. Whilst this was a survey intention no suitable bat droppings were recorded during survey work.

2.4 Field survey: bat activity

Preliminary appraisal of habitats for bats

2.4.1 During the initial walkover survey of the bat survey area in April and May 2020, the habitats were considered for their potential to support bats. This particularly focussed on assessing factors that might affect the quality of the habitat for foraging and commuting bats, with an overall category assigned, taking into account the features summarised in **Table 2.4**.

Table 2.4 Factors considered when assessing the potential suitability of the bat survey area for bats

Potential Roost Suitability	Requirements
Negligible	Negligible habitat features on the Site that are likely to be used by foraging or commuting bats. Habitat may be brightly lit by artificial lighting.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated and not well connected to the surrounding landscape by other habitat. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or patch of scrub. Site may be well-lit by artificial lighting in some areas.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water. Habitat may be lit my artificial lighting, but this is low-level and/or only affects parts of the site.
High	Continuous, high quality habitat that is well connected to the wider landscape and likely to be regularly used by commuting bats. Such as river valleys, vegetated streams, intact hedgerows and woodland edge. High quality habitat that is well connected to the wider landscape and likely to be rich in invertebrate prey. Such as broadleaved woodland, tree-lined watercourses, water bodies and grazed parkland. Habitat is typically unlit by artificial lighting.

Manual transects

2.4.2 The main areas of potential bat foraging habitat on the Site were divided into three transects, each approximately 4km in length, designed to incorporate potential bat flight lines and sample the range of habitat types present. **Table 2.5** presents the dates and weather conditions on which manual transect survey visits were carried out and **Figure 2.1 (Appendix A)** shows transect routes.

Table 2.5 Walked Transect Surveys – Dates, Times and Weather Conditions

Date	Start/End Time of Transect	Time of Sunset or Sunrise	Weather Conditions
20th May 2020	21:07/11:44*	00:07	Temperature: 12-10°C, Average Wind: 0.9-2.7m/s, Rain: None, Cloud Cover: 65%
9th June 2020	21:27/00:27	21:27	Temperature: 8.9-8.5°C, Average Wind: 5 -3.6m/s, Rain: None, Cloud Cover: 50%
30th July 2020	21:05/00:05	21:05	Temperature: 17-15°C, Average Wind: 4-2.7m/s, Rain: None, Cloud Cover: 30%
10th September 2020	19:40/22:40	19:40	Temperature: 13-10°C, Average Wind: 2.7-0m/s, Rain: None, Cloud Cover: 60%
16th September 2020	19:24/21:54*	19:24	Temperature: 14-9°C, Average Wind: 3-8m/s, Rain: None, Cloud Cover: 0%
12th October 2020	18:36/21:36	18:36	Temperature: 9°C, Average Wind: 3.7-2.2m/s, Rain: None, Cloud Cover: 20%

*Survey cut short due to very strong winds

2.4.3 During each survey visit the surveyor walked at least two circuits of the transect from sunset until approximately three hours after sunset; recording the number of bat passes of each species, and the type of activity heard (e.g. foraging, social calls). While walking along the transect route, surveyors watched for bat activity (light levels permitting) and monitored and recorded bat calls using Elekon BatLogger M detectors. Calls were subsequently analysed using BatExplorer software to aid species identification (see **Section 2.5**). For the purpose of this assessment, a "pass" is defined as the sequence of calls[9] a bat makes as it flies past, typically getting louder then softer as the distance between bat and surveyor changes.

2.4.4 Each of the transects was visited at dusk by an ecologist monthly between May and October inclusive, with the exception of August (please see **Section 2.7**). Within each month, all transects were surveyed simultaneously. The starting point of the transect was varied between visits to enable sampling of different parts of the transects at differing periods of time after sunset.

Automated monitoring

2.4.5 In order to monitor bat activity throughout the night at proposed turbine locations, an automated detector was allocated to each of the six proposed turbine locations[10]. Monitored locations were selected with the aim of being positioned as close to the proposed turbine locations as possible, taking into account the need to secure the detector in a safe position, with the Site being open access and heavily used by the public. Due to the evolution of scheme design some turbine locations also changed after the completion of the 2020 monitoring period resulting in some

[9] Bat "calls" are the individual clicks made by bats as they echolocate.
[10] The Proposed Development comprised six turbines during 2020 surveys, a seven turbine scheme was developed in 2021

turbine locations being added, removed or moved. The monitoring locations are shown in reference to the current proposed turbine positions in **Figure 2.2** (**Appendix A**).

2.4.6 At each location a full spectrum automated bat detector (Elekon BatLogger A+) was deployed to record bat calls continuously from 30 minutes before sunset to 30 minutes after sunrise for a minimum of ten nights per season spring (May), summer (July) and autumn (September). Posts were used to elevate the microphone to a height 2m above ground. The exception to this was at monitoring location 6 in the north east of the Site; as the position of this turbine was changed after the survey window (please see **Section 2.7**).

2.4.7 As far as possible, at least ten consecutive nights of data per month from each recording location was analysed using BatExplorer software to identify bats to species level, or to genus or species group where the characteristics of the call were common to more than one species (**Section 2.5**). Automated detector units were left to record over more than ten nights, and the dates for analysis were chosen as the ten consecutive nights with the best weather conditions. By selecting the dates for analysis in this way it is assumed that nights with the best possible conditions for bat activity during the recording period were being chosen.

2.4.8 Prior to deployment and at intervals of every five days during recording periods all automated bat detectors, cables and microphones were checked, and the microphones tested and calibrated to ensure operation at the same level of sensitivity. Full automated monitoring survey details are provided in **Table C1 (Appendix C)**.

Ecobat analysis

2.4.9 Analysis of the data collected during the automated monitoring included use of Ecobat[11] to aid in quantifying bat activity levels in the context of bat activity levels recorded elsewhere in the region. Ecobat is an online tool that compares data collected by automated bat detectors at any given site with data collected by the same means at the same time of year within a defined search radius. The reference range data set were stratified to include:

- Only records from within 30 days of the survey dates.
- Records within a 100km radius of the survey location.
- Records using any make/ model of bat detector.

2.4.10 Through generating a percentile rank for each night of bat activity, the Ecobat tool can identify the number of nights in which species data collected by a static detector could be considered to represent 'high', 'moderate/ high', 'moderate', 'low/moderate', or 'low' levels of activity, as shown in **Table 2.6**.

Table 2.6 Percentile score and categorised level of bat activity

Percentile score	Bat activity level
81 - 100	High
61 - 80	Moderate - High
41 - 60	Moderate
21 - 40	Low - Moderate

[11] http://www.mammal.org.uk/science-research/ecostat/

Percentile score	Bat activity level
0 - 20	Low

Extracted from *Bats and onshore wind turbines* (2019)[1]

2.4.11 The analysis was run at both the local (detector) scale, and at the site scale to allow assessment of bat activity across the proposed development.

2.5 Species identification

2.5.1 Analysis of bat recordings was carried out with reference to published guidance to aid species identification[12,13]. Where records from the bat detector surveys (manual transects and automated monitoring) were not identified to species level during the sound analysis process due to the overlapping call parameters of some species, records were identified to genus/species group, with the following groups used:

- CP/SP (common pipistrelle or soprano pipistrelle).
- NP/CP (Nathusius' pipistrelle or common pipistrelle).
- NSL (noctule, Leisler's bat or serotine).
- *Nyctalus* sp. (noctule or Leisler's bat).
- *Myotis* sp. (bat species in the genus *Myotis*).
- LE (brown or grey long-eared bat).
- Bat sp. (calls that could not be ascribed to a species group).

2.5.2 The majority of recordings of bats in the genus Myotis were grouped together, as these species in particular have widely overlapping call parameters. Similarly, it is very difficult to distinguish between the two British species of long-eared bats through flight observations and sound recordings alone, therefore recordings were grouped as 'LE' rather than identified to species.

2.6 Environmental conditions

2.6.1 Manual transects and automated monitoring were undertaken as far as practically possible when there was little or no rain, maximum ground wind speed of 5m/s and the temperature was 10°C and above as, in these weather conditions, bats are unlikely to be deterred from flying. Temperature, humidity, cloud cover and rainfall levels were recorded by the surveyors during each manual survey session. Any other environmental conditions that may affect bat activity, such as high noise or artificial light levels, were also noted.

2.6.2 During automated monitoring, weather recordings were taken directly after each recording night from https://www.wunderground.com. Full details of weather conditions experienced during automated monitoring are provided in **Table C2 (Appendix C).**

[12] J. Russ, J. British Bat Calls a Guide to Species Identification. Exeter: Pelagic Publishing, 2012
[13] N. Middleton, A. Froud and K. French. Social calls of the bats of Britain and Ireland. Exeter: Pelagic Publishing, 2014.

2.7 Field survey limitations

Roost identification surveys

2.7.1 Access could not be gained for internal inspections in the built structures identified within the bat survey area due to access restrictions predominately associated with the Covid-19 pandemic.

Bat activity surveys

2.7.2 The Site is open access and subject to high levels of public use (potentially increased during the Covid-19 national lockdown). The automated detectors were small and could be concealed to a degree. However, it was considered weather station/s would be difficult to safely deployed on the Site. As such detailed weather data was taken the day directly after each automated recording night from https://www.wunderground.com.

2.7.3 Best efforts were made to achieve 10 nights automated recording for each recording period in optimal weather conditions that were consecutive, covering the correct seasonal window and covering the same dates for all automated recorders on Site. Recording periods were selected based on long term weather forecasts to select the best weather window, recorders were also left recording for a minimum of an additional week to allow for selection of the best data set. Notwithstanding some nights recording were still outside optimum weather conditions as set out in **Section 2.6.** In most of these instances the weather was only marginally outside the optimal range (e.g 0.5 – 3.8m/s over the optimum wind or 3ºC below the correct temperature). The Site is a Welsh upland site, situated in a highly exposed and elevated position and as such is subject to weather extremes and fluctuations. Given the nature and location of the Site and the data collation approach, it is considered the data provided within this report was collected in the best available weather conditions, accurately reflects bat activity at this geographic location, and is suitable to inform an assessment of the bat populations on Site.

2.7.4 Due to the evolution of scheme design some proposed turbine locations changed after the completion of the 2020 monitoring period additionally a seventh turbine location was added in 2021. Automated monitoring data was not collected at the proposed turbine location in the far east of the Site; as the position of this turbine was moved. The 2020 monitoring locations are shown in reference to the current proposed turbine positions in **Figure 2.2** (**Appendix A**). All automated monitoring locations are in proximity to proposed turbine locations with the exception of automated detector location 6 which is no longer close to any proposed turbine locations after the design change. Additional automated monitoring surveys are being undertaken in 2021 to account for design changes as detailed in **Section 6**.

2.7.5 The walked transect surveys were planned to be undertaken once each month from May to October inclusive. However, the August transect could not be completed due to access restrictions. To ensure a good spread of data collection through the season, an additional transect was undertaken in September.

2.8 Personnel

2.8.1 All survey work was led and organised by Chris Hill MCIEEM. Chris is registered under Natural England (NE) Class Licence 2 (registration no. 2015-15031-CLS-CLS) and has over 12 years' experience in ecological consultancy. Tree and building inspections were led and undertaken by Kelly Jones. Kelly is registered under Natural Resources Wales (NRW) (registration no. S088838/1) and has over 10 years' experience in ecological consultancy. The survey leads were assisted by suitably qualified and experienced Wood ecologists; details of whom are provided in (**Table C3, Appendix C**).

3. Results

3.1 Desk study

Designated sites

3.1.1 There are no internationally or nationally important sites that are designated for bat conservation within 10km of the Site.

SEWBReC records

3.1.2 SEWBReC holds records of at least 12 species of bat, recorded within the last 15 years within 10km of the Site. The bat roost records are summarised in **Table 3.1** and shown on **Figure 3.1, Appendix A** while **Table 3.2** lists the activity records.

Table 3.1 Summary of bat roost records within 10km of the Site

Species	Number of records	Type of roost	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	1	Day Roost	2012	9,865 N
Brown Long-eared Bat	41	Maternity Roost / Day Roost / Hibernation	2019	1,139 N
Common Pipistrelle	83	Maternity roost / Nursery roost / Building roost / Day Roost /	2018	664 W
Daubenton's Bat	7	Hibernation / Day Roost	2019	3,284 E
Greater Horseshoe Bat	1	Hibernacula Roost	2013	9519 SE
Lesser Horseshoe Bat	8	Maternity roost / Nursery roost / Hibernacula roost / Building roost / Day Roost /	2017	5,982 SW
Noctule	1	Building Roost	2012	8,660 SW
Myotis Bat Species	6	Maternity Roost / Day Roost	2010	5,229 NE
Natterer's bat	4	Hibernation / Maternity Roost / Building Roost	2012	2,836 W
Pipistrellus Species	83	Maternity roost/ Day Roost / Building Roost	2014	783 W
Soprano Pipistrelle	45	Maternity roost/ Day Roost / Building Roost	2017	1,139 N
Whiskered Bat	7	Building Roost	2011	4,637 NE
Unidentified Bat Species	154	Building Roost	2017	267 W

Table 3.2 Summary of bat activity records within 10km of the Site

Species	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	1	2013	8,740 SE
Brown Long-eared Bat	43	2018	3,369 S
Common Pipistrelle	599	2018	673 NW
Daubenton's Bat	11	2014	3,050 E
Greater Horseshoe Bat	6	2017	4,470 SW
Lesser Horseshoe Bat	8	2018	5,655 W
Noctule	127	2018	783 E
Long-eared Bat Species	1	2013	673 N
Myotis Bat Species	118	2018	3,142 E
Nathusius Pipistrelle	11	2018	3,050 W
Natterer's bat	14	2013	5,064 NW
Nyctalus Bat Species	5	2017	5,413 W
Pipistrellus Species	159	2019	2,767 W
Serotine	7	2017	4,470 SW
Soprano Pipistrelle	495	2019	931 N
Whiskered Bat	6	2015	2,927 W
Unidentified Bat Species	133	2019	783 W

3.2 Field survey: roost identification

Preliminary appraisal of potential bat roost features

3.2.1 During the preliminary bat appraisal six built structures were recorded within the bat survey area that were later subject to focussed survey work. This survey provided a starting point for the follow-on survey work, such that where further survey effort has built on the appraisal, those results supersede the preliminary task and, as such, are detailed in the relevant sections of this document.

3.2.2 The current status of built structures within the bat survey area, based on all survey effort undertaken to date, is shown in **Table 3.4** and presented on **Figure 3.2** (**Appendix A**).

3.2.3 The preliminary bat appraisal identified trees within the bat survey area that were later subject to focussed survey work assessing each tree individually. The follow-on survey results supersede the preliminary walkover task and, as such, are detailed in the relevant sections of this document. The location and status of trees following all survey work are shown in **Figure 3.3 (Appendix A**) and results of the focussed follow-on survey work are provided in **Table D1** (**Appendix D**).

Built structures

External inspection

3.2.4 The results of the external inspection to establish the level of potential suitability to support roosting bats in built structures is summarised in **Table 3.3.** The built structures comprise a mix of agricultural buildings, residential dwellings and a wall. Some level of roosting potential for bats is provided by four structures; after the external inspections two structures are classed as having 'low' roosting potential, one as having 'moderate' potential and one offering 'high' potential. The location of each structure is shown in **Figure 3.2** (**Appendix A)** along with the current potential roost status category.

Table 3.3 Built structures external inspection results

Built structure ID	General description	PRFs and potential access points recorded	Hibernation potential	Level of roost potential
B1	Small open cattle shed constructed of cinderblock with corrugated metal roofing. Structurally generally sound with wooden support beams. Does not appear to be in current use. Low habitat quality: structure is surround by short grazed agricultural grassland. Lack of feature nearby for commuting to connect to wider landscape.	Low potential for roosting bats around roof beams where corrugated metal meets wall, however exposure to the elements means it is not suitable for more than occasional summer use by individual bats	No	Low
B2	Crumbling stone wall running along dry riverbed. High habitat quality: structure lies within shaded dry river bed underneath tree cover. Good foraging and commuting opportunities directly outside roost.	Large cavity in wall extends into bank >30cm. Provides opportunities for crevice roosting bats. Easy access by rodents reduces suitability as only 1m above ground level.	No	Moderate
B3	House in current use. Looks like it has been recently built with roof tiles, soffit boxes, chimney and barge boards all in good condition. Moderate habitat quality: cattle sheds nearby which may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.	No PRFs recorded or potential access points recorded	No	Negligible
B4	Cattle shed. Constructed of timber beams with corrugated metal	Many access points however no suitable PRFs recorded.	No	Negligible

Built structure ID	General description	PRFs and potential access points recorded	Hibernation potential	Level of roost potential
	sheeting. Exposed to elements with lots of movement of metal sheeting in the wind Moderate habitat quality: cattle shed may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.			
B5	Farmhouse currently in use. Brick construction walls with pitched tiled roof. Wooden bargeboard on eastern aspect, bargeboard missing on western aspect. Stone structure attached to side of house with pitched roof and wooden beams. Moderate habitat quality: cattle sheds nearby which may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.	Easy access to loft space on wester aspect due to missing barge board. Loft space is likely to provide many roosting and hibernating opportunities for crevice roosting and void dwelling bats. Easy access to stone structure adjacent to property which is sheltered and has wooden beams to provide roosting opportunities. Likely to also contain many opportunities for crevice roosting bats but was not inspected internally. Multiple opportunities for crevice roosting bats in stone wall at entrance to structure.	Yes	High
B6	Cattle shed with exposed wooden beams and corrugated metal roof. Plastic fascia runs along western and eastern aspect. Moderate habitat quality: cattle shed may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.	Exposure to element within main structure and lack of roosting opportunities means it is unlikely to support roosting bats. May be limited opportunities behind fascia for individual crevice roosting bats.	No	Low

Hibernation monitoring

3.2.5 Following the external inspections, one building (B5) was assessed as having the potential to support hibernating bats and was highlighted for further survey. However, due to access restrictions no internal survey could be undertaken (see **Section 2.7**).

Built Structure Summary

3.2.6 The results of the survey work undertaken to date to identify roosting bats within built structures are summarised in **Table 3.4** with the current potential roost status category of each structure shown in **Figure 3.2** (**Appendix A**). It should be noted that these categories are based on the current understanding of the structures and may be revised in response to future survey work.

3.2.7 Following the external inspections and hibernation surveys, two structures were classed as 'low' roosting potential, one structure was categorised as 'moderate' and one offered 'high' potential.

Table 3.4 Summary of bat roosting potential categories assigned to built structures on and up to a 266m radius around the Site

Level of roost potential	Built structure reference	Total number in category
High	B5	1
Moderate	B2	1
Low	B1, B6	2
Negligible	B3, B4	2

Trees

3.2.8 Results from the ground level roost assessments and PRF inspections are provided in **Table D1 (Appendix D**) and summarised in **Table 3.5**. The potential roost status category of each tree following all survey work to date is shown in **Figure 3.3 (Appendix A**). It should be noted that the results and roosting potential categories are based on the current understanding of the trees and may be revised in response to future survey work.

Ground level roost assessment

3.2.9 Most of the trees identified were found in the dry riverbed in the east of the Site and along the southern perimeter of the bat survey area. In total 17 trees were identified as providing high or moderate suitability for roosting bats during the ground level roost assessment. Six trees supported features with high potential suitability to support roosting bats and 11 trees were identified as having moderate potential. Due to the small number of trees, all high and moderate potential trees were scoped-in for further survey

PRF/ hibernation inspection

3.2.10 Of the 17 trees which required a visual inspection of PRFs, all were able to be fully inspected using rope and harness or from ground level using the endoscope. In addition, two further trees were surveyed (one with high and one with moderate potential roost suitability), where PRFs had been identified after the initial scoping exercise. Overall:

- Only one tree (Tree Reference [TR] 9) remained as high suitability.

- One tree (TR8) was upgraded to high suitability.
- Seven trees remained as moderate suitability.
- Four trees were downgraded to moderate suitability.
- Five trees were downgraded to low suitability.
- One tree (TR17) was downgraded to negligible suitability.

3.2.11 No bats or signs of bats (such as droppings) were recorded.

Table 3.5 Summary of bat roosting potential categories assigned to trees on the Site

Roost potential	Tree references	Total number in category
Confirmed	-	-
High	TR8, TR9	2
Moderate	TR1, TR2, TR3, TR4, TR6, TR7, TR13, TR14, TR15, TR16, TR18	11
Low	TR5, TR10, TR11, TR12, TR19	5
Negligible	TR17	1

3.3 Field survey: bat activity

Preliminary appraisal of habitats for bats

3.3.1 A preliminary appraisal of the habitats and their value to foraging and commuting bats for the Site and up to a 266m radius has been undertaken. There are very limited sources of artificial lighting on and around the Site. There are no buildings present within the Site boundary. Overall, the Site is assessed as being of moderate suitability for foraging and commuting bats.

Habitat features of low suitability

3.3.2 There are large swathes of continuous bracken across the Site and there are some large areas of bare ground in the north east of the Site, both habitat types offering negligible opportunities for foraging and commuting bats. The Site is located on a heavily grazed plateau and is generally open and exposed.

Habitat features of moderate suitability

3.3.3 The heavily grazed plateau is dominated by semi-improved acid grassland and poor semi-improved grassland. Due to the close-cropped nature of the grasslands, the sward is short and lacks botanical diversity. This reduces the abundance and diversity of associated invertebrate species which in turn reduces its foraging value for bat species.

3.3.4 There is a small block of hazel coppice in the southeast, dense/continuous scrub is present in the south of the site and a small area of willow scrub on the northeast boundary. There is a network of drystone walls across parts of the Site which have the potential to provide a linear landscape feature for commuting bats.

Habitat features of high suitability

3.3.5 A small number of mature trees are present lining the dry riverbed in the southeast of the Site.

3.3.6 Wet and dry heath/acid grassland mosaics and areas of blanket bog present across the site are well linked and likely support a good diversity of invertebrate species providing a foraging resource for bats. In addition, there are two ponds and several wet ditches present within the Site which provide good foraging and commuting opportunities for bats.

Manual transects

3.3.7 At least four species were confirmed to be using the survey area during manual transect survey work:

- Common pipistrelle.
- Soprano pipistrelle.
- Long-eared bats.
- *Myotis* sp.

3.3.8 Additional species may also have been recorded, where some ambiguous calls were allocated to *Myotis* species and to the categories Nathusius' pipistrelle/common pipistrelle, noctule/Leisler's bat/ serotine rather than to species level.

3.3.9 **Table 3.6** summarises the results of the manual transect survey work in terms of the number of bat passes by each species recorded on each transect. In order to provide a means of comparison, an average number of passes per hour of each species has been calculated. It should be noted that these figures are intended to give an indication of relative levels of bat activity on each transect and do not represent actual numbers of bats. A single bat may pass the surveyor several times, with each pass counted separately. Equally, the same bat may pass over more than one transect in a single evening, therefore being recorded by more than one surveyor on the same date. **Figures 3.4 to 3.8 (Appendix A)** present the relative distribution of species across the transects.

Table 3.6 Manual transect survey results

Survey month	Number of Passes	Transect Number	Species												Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
May	**Per Species**	1	13.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	15.00
	Average Per Hour Per Species		4.33	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	5.00
	Per Species	2	8.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	11.00
	Average Per Hour Per Species		2.67	0.00	0.33	0.33	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	3.67
June	**Per Species**	1	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00
	Average Per Hour Per Species		1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	Per Species	2	7.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
	Average Per Hour		2.33	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.67

Survey month	Number of Passes	Transect Number	Species												Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
	Per Species														
July	**Per Species**	1	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	8.00
	Average Per Hour Per Species		2.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	2.67
	Per Species	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
September 1st Visit	**Per Species**	1	22.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	25.00
	Average Per Hour Per Species		7.33	0.00	0.00	0.33	0.33	0.00	0.00	0.33	0.00	0.00	0.00	0.00	8.33
	Per Species	2	46.00	2.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.00
	Average Per Hour Per Species		15.33	0.67	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.00

Survey month	Number of Passes	Transect Number	Species												Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
September 2nd Visit	**Per Species**	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Per Species	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
October	**Per Species**	1	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	Average Per Hour Per Species		0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33
	Per Species	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Result Type															

Survey month	Number of Passes	Transect Number	Species											Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
Total Number of Passes Per Species for All Months Combined			107	3	1	7	1	0	0	1	3	0	0	0	122
Average Passes Per Hour Per Species for All Months Combined			5.94	0.17	0.06	0.39	0.06	0.00	0.00	0.06	0.17	0.00	0.00	0.00	6.78

Table notes: CP = common pipistrelle; SP = soprano pipistrelle; CP/SP = common or soprano pipistrelle; NP/CP = Nathusius' pipistrelle or common pipistrelle; NSL = noctule/serotine/Leisler's bat; N = noctule; LE = long-eared bats; GH = greater horseshoe; LH = lesser horseshoe.

3.3.10 Overall, there was a relatively low level of bat activity across all transects. Overall, there was an average of 6.78 bat passes per hour recorded across the Site, for all species across all months. There is no strong temporal pattern reflected in the data.

- Common pipistrelle made up the greatest proportion of recordings, representing approximately 88% of all bat passes (5.94 passes per hour on average).
- The next most frequently recorded group was the category of 'Nathusius' pipistrelle or common pipistrelle' which made up 5.7% of all bat passes across the Site (0.39 passes per hour on average).
- When considering all potential noctule, Leisler's bat and serotine calls as a group, these make up 0.8% of recordings on the Site (0.06 passes per hour on average).
- When considering the quieter species that are typically underrepresented in acoustic surveys, it is notable that very little activity was recorded on the Site, with only two pass assigned to the Myotis genera throughout the entire survey period. One brown long-eared pass was recorded, but this was out-with the site boundary, within the bat survey area.

3.3.11 A summary of the geographical and temporal distribution of recordings by species as follows.

Common pipistrelle

3.3.12 Common pipistrelle recordings are distributed relatively evenly across the entire survey area, having been recorded at nearly every point along each of the transect routes. The recordings peaked in September. Only one pass was recorded that could not be differentiated between common pipistrelle and soprano pipistrelle (on transect 1 in May).

Soprano pipstrelle

3.3.13 Soprano pipistrelle were only recorded twice in September and once October with activity limited to the southern part of the Site. Only one pass was recorded that could not be differentiated between common pipistrelle and soprano pipistrelle (on transect 1 in May).

Common or Nathusius' pipistrelle

3.3.14 Only seven passes were recorded of species which could not be differentiated between common pipistrelle or Nathusius' pipistrelle. Passes were recorded in May, June and September; three on transect 1 and four passes on transect 2, all in the south of the Site.

Myotis species

3.3.15 *Myotis* species were recorded twice on transect 1 (May and June) and once on transect 2 (May), all in the northern section of the Site.

Long-eared bats

3.3.16 Long-eared bat recordings were made on a single occasion on transect 1, in September. The recording was made within the 266m buffer area.

Noctule, serotine and Leisler's bats

3.3.17 Only one pass was recorded of species which could not be differentiated between Noctule/serotine/Leisler's bats in September in the south of the Site, adjacent to a drystone wall.

3.4 Automated monitoring

3.4.1 At least seven species of bat were confirmed to be using the bat survey area during the automated detector work:

- Common pipistrelle.
- Soprano pipistrelle.
- Noctule.
- Long-eared bat.;.
- *Myotis* sp.
- Greater horseshoe bat.
- Lesser horseshoe bat.

3.4.2 Additional species may also have been recorded, where some ambiguous calls were allocated to groupings such as *Myotis* sp, common/ Nathusius' pipistrelle or noctule/serotine/Leisler's bat rather than species level.

3.4.3 **Table 3.7** summarises the results of the automated monitoring in terms of the total number of bat contacts recorded by each species at each location. In order to provide a means of comparison, an average number of contacts per night of each species has been calculated. It should be noted that these figures are intended to give an indication of relative levels of bat activity at each location and do not represent actual numbers of bats. **Table D2, (Appendix D)** summarises the results of the automated monitoring by location and season (spring, summer, autumn).

Table 3.7 Summary of automated monitoring results

		Total Passes (average passes per night)												
Automated detector	**Number of nights recording**	**CP**	**SP**	**CP/SP**	**NP/CP**	**NSL**	**Nyct sp.**	**N**	**LE**	**M**	**Bat sp.**	**GH**	**LH**	**Total**
1	30	412 (13.73)	21 (0.70)	48 (1.60)	30 (1.00)	4 (0.13)	4 (0.13)	38 (1.27)	9 (0.30)	9 (0.30)	15 (0.50)	0 (0)	0 (0)	590 (19.67)
2	30	454 (15.13)	42 (1.40)	62 (2.07)	53 (1.77)	10 (0.33)	4 (0.13)	11 (0.37)	4 (0.13)	6 (0.20)	22 (0.73)	1 (0.03)	0 (0)	669 (22.3)
3	30	962 (32.07)	64 (2.13)	165 (5.50)	94 (3.13)	4 (0.13)	3 (0.10)	16 (0.53)	18 (0.60)	67 (2.23)	18 (0.60)	0 (0)	2 (0.07)	1413 (47.1)
4	30	1145 (38.17)	83 (2.77)	83 (2.77)	75 (2.5)	0 (0)	12 (0.4)	19 (0.63)	26 (0.87)	71 (2.37)	41 (1.37)	1 (0.03)	7 (0.23)	1563 (52.1)
5	30	91 (3.03)	8 (0.27)	21 (0.7)	10 (0.33)	6 (0.20)	14 (0.47)	34 (1.13)	8 (0.27)	3 (0.10)	4 (0.13)	10 (0.33)	0 (0)	209 (6.97)
6	30	315 (10.5)	24 (0.8)	75 (2.5)	37 (1.23)	4 (0.13)	6 (0.20)	29 (0.97)	14 (0.47)	19 (0.63)	8 (0.27)	0 (0)	34 (1.13)	565 (18.83)
Total contacts	180	**3379**	**242**	**454**	**299**	**28**	**43**	**147**	**79**	**175**	**108**	**12**	**43**	**5009**
Average contacts per night		18.77	1.34	2.52	1.66	0.16	0.24	0.82	0.44	0.97	0.60	0.07	0.24	27.83

Species codes: **CP** = common pipistrelle; **SP** = soprano pipistrelle; **CP/SP** = common/soprano pipistrelle (*Pipistrellus* species); **CP/NP** = common/ Nathusius' pipistrelle (*Pipistrellus* species); **NSL** = Noctule/Serotine/Leiser bat (Nyctaloid species); **Nyct sp.** = Noctule/leiser bat (Nyctalus species); **N** = Noctule; **LE** = long-eared bat; **M** = *Myotis* bat species; **Bat sp.** = Bat call unable to clearly identify down to species level; **GH** = greater horseshoe and **LH** = lesser horseshoe

3.4.4 Overall, there was an average of 27.83 bat recordings per night for all species, across all locations and all months. Common pipistrelle recordings make up 67.5% of all recordings across all locations and all months (an average of 18.77 recordings per night). Contacts which could not be assigned to species-level between common or soprano pipistrelle accounted for 9.06% of all contacts. Contacts which could not be assigned to species-level between common or Nathusius' pipistrelle accounted for 5.97% of all contacts. Soprano pipistrelle being the fourth most frequently recorded species which make up 4.83% of all recordings (an average of 1.34 recordings per night).

3.4.5 All the other species or groups of species were each recorded in much lower numbers with average number of contacts per night being 0.97 (Myotis species), 0.82 (noctule), 0.44 (long-eared bat), 0.24 (noctule or Leisler's bat), 0.13 (noctule, serotine or Leisler's bat), 0.24 (lesser horseshoe) and 0.07 passes per night (greater horseshoe).

3.4.6 Activity levels were notably different between the monitoring locations, in order of activity level when considering all species combined:

- Location 4: average of 52.1 recordings per night.
- Location 3: average of 47.1 recordings per night.
- Location 2: average of 22.3 recordings per night.
- Location 1: average of 19.67 recordings per night.
- Location 6: average of 18.83 recordings per night.
- Location 5: average of 6.97 recordings per night.

Ecobat analysis

3.4.7 In order to interpret the results of the automated detector surveys the data was processed through Ecobat.

Site level

3.4.8 Summary data relating to bat activity levels recorded across the Site is provided in **Table 3.8** below and shown in **Chart 1**. For detailed Ecobat outputs relating to site-wide activity levels, please refer to **Appendix E.**

Table 3.8 Summary table showing key metrics for each species recorded for all automated recording locations across the Site.

Species/Species Group	Median Percentile	Median Ecobat Activity Category	95% Confidence Intervals	Max Percentile	Nights Recorded
M	46	Moderate	60.5 - 78.5	85	45
Nyctaloid	16	Low	52.5 - 52.5	59	14
Nyctalus	31	Low - Moderate	31 - 31	67	7
N	46	Moderate	60 - 60	88	23
Pipistrellus	54	Moderate	60 - 81	96	64
CP	64	Moderate - High	62 - 88	99	97
SP	31	Low - Moderate	45.5 - 71	86	53
LE	31	Low - Moderate	42.5 - 42.5	70	37
GH	0	Low	31 - 31	54	7
LH	0	Low	31 - 57.5	84	13

Species codes: **M** = *Myotis* bat species; **Nyctaloid** = Noctule/Serotine/Leiser bat; **Nyctalus** = Noctule/leiser bat; **N** = Noctule; **Pipistrellus** = common/soprano/Nathusius pipistrelle; **CP** = common pipistrelle; **SP** = soprano pipistrelle; **LE** = long-eared bat; **GH** = greater horseshoe and **LH** = lesser horseshoe

Chart 1. The activity level (percentile) of bats recorded across each night of the bat survey for all automated recording locations across the Site. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity)

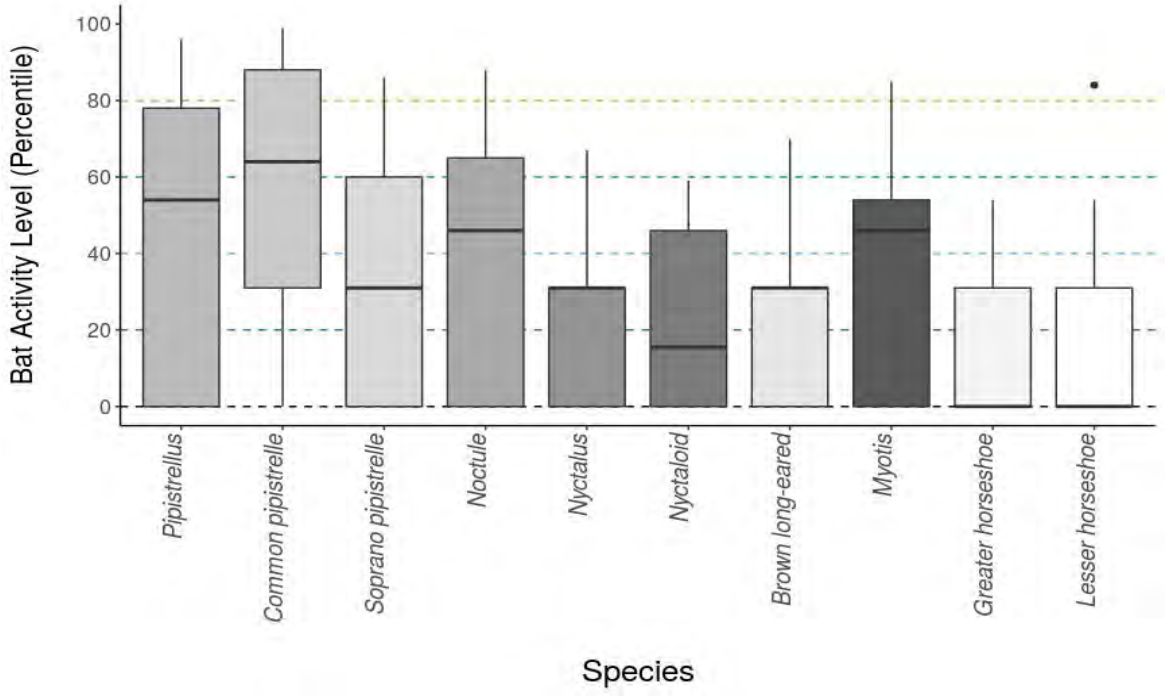


Table 3.9 Ecobat summary table showing the number of nights recorded bat activity fell into each activity band for each species for 180 nights recording.

Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
M	1	10	12	7	15
Nyctaloid	0	0	5	2	7
Nyctalus	0	1	0	3	3
N	3	3	6	2	9
Pipistrellus	13	12	16	5	18
CP	33	17	15	21	11
SP	3	9	9	10	22
LE	0	2	7	10	18
GH	0	0	1	2	4
LH	1	0	2	2	8

Species codes: **M** = *Myotis* bat species; **Nyctaloid** = Noctule/Serotine/Leiser bat; **Nyctalus** = Noctule/leiser bat; **N** = Noctule; **Pipistrellus** = common/soprano/Nathusius pipistrelle; **CP** = common pipistrelle; **SP** = soprano pipistrelle; **LE** = long-eared bat; **GH** = greater horseshoe and **LH** = lesser horseshoe

From the data displayed in **Table 3.8, Table 3.9** and **Chart 1**, the following observations can be made[14]:

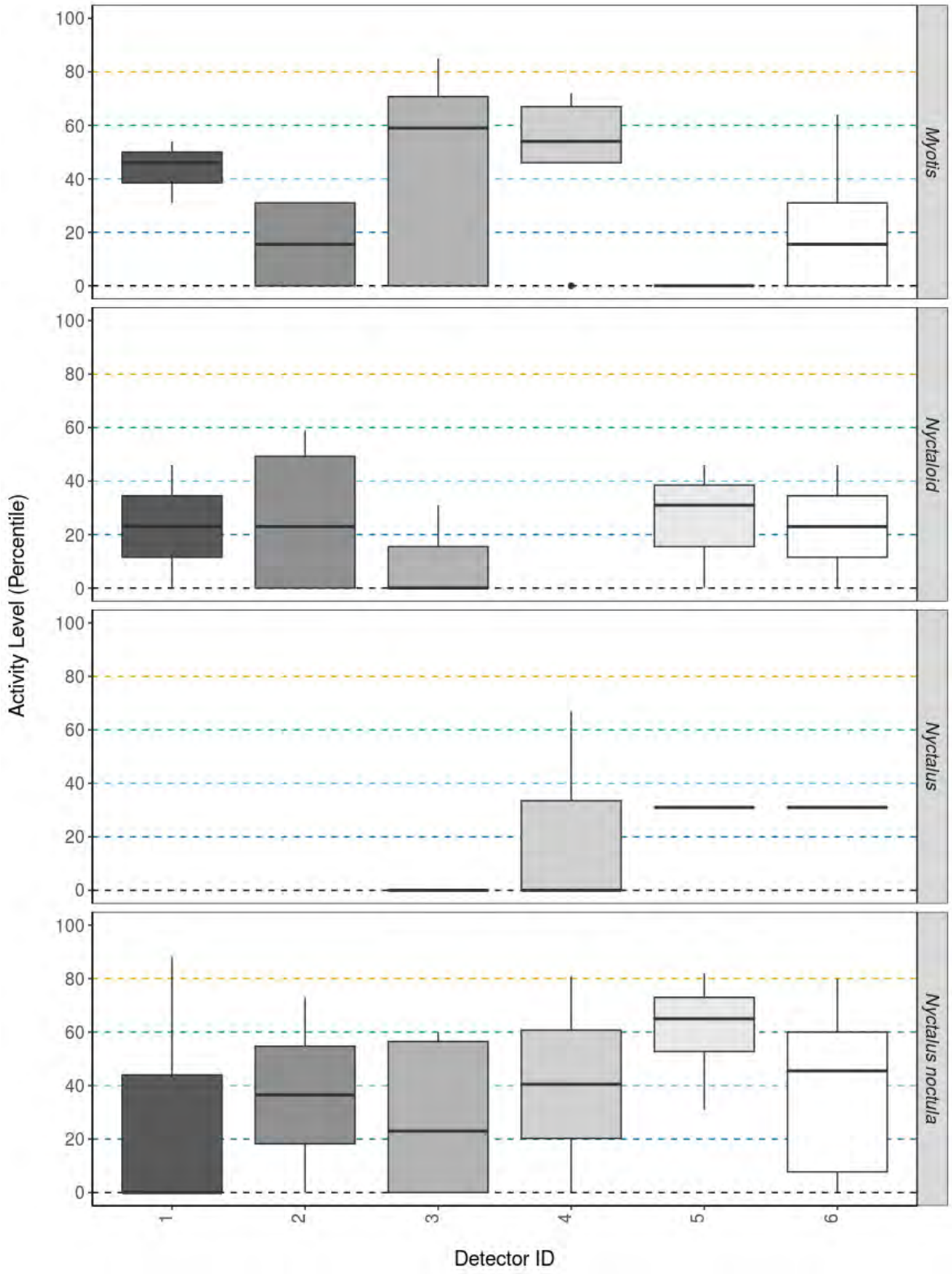
- *Myotis* – data suggests an overall Moderate level of activity across the Site (median percentile of 46) based on 45 nights where this species group was recorded.
- Nyctaloid – This group comprises bats which could not be separated between noctule/serotine/Leisler's bat due to overlapping call parameters data suggests an overall Low level of activity across the Site (median percentile of 16), based on 14 nights of activity recorded.
- *Nyctalus* – This group comprises bats which could not be separated between noctule/Leisler's bat due to overlapping call parameters. Data suggests an overall Low - Moderate level of activity across the Site (median percentile of 31), based on 7 nights of activity recorded.
- Noctule – data suggests an overall Moderate level of activity across the Site (median percentile of 46), based on 23 nights of activity recorded.
- Common pipistrelle – data suggests an overall Moderate - High level of activity across the Site (median percentile of 64), based on 97 nights of activity recorded.
- Soprano pipistrelle – data indicates an overall Low-Moderate level of activity across the Site (median percentile of 31), based on 53 nights of activity recorded.
- Long-eared bats –data suggests an overall Low - Moderate' level of activity across the Site (median percentile of 31), based on 37 nights activity.
- Greater horseshoe bats – data suggests an overall Low level of activity across the Site (median percentile of 0), based on 7 nights activity.
- Lesser horseshoe bats – data suggests an overall Low level of activity across the Site (median percentile of 0), based on 13 nights activity.

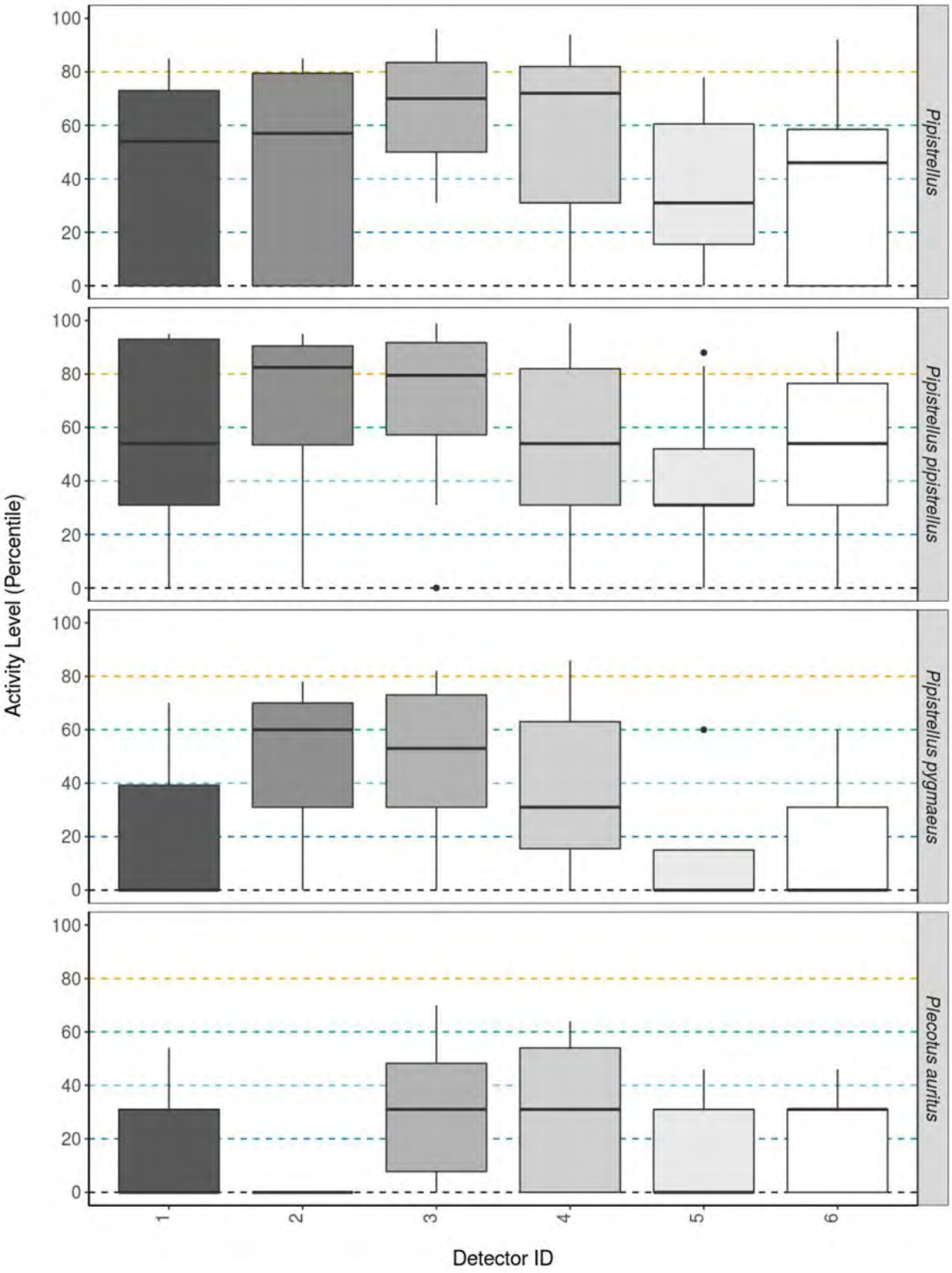
Automated detector level

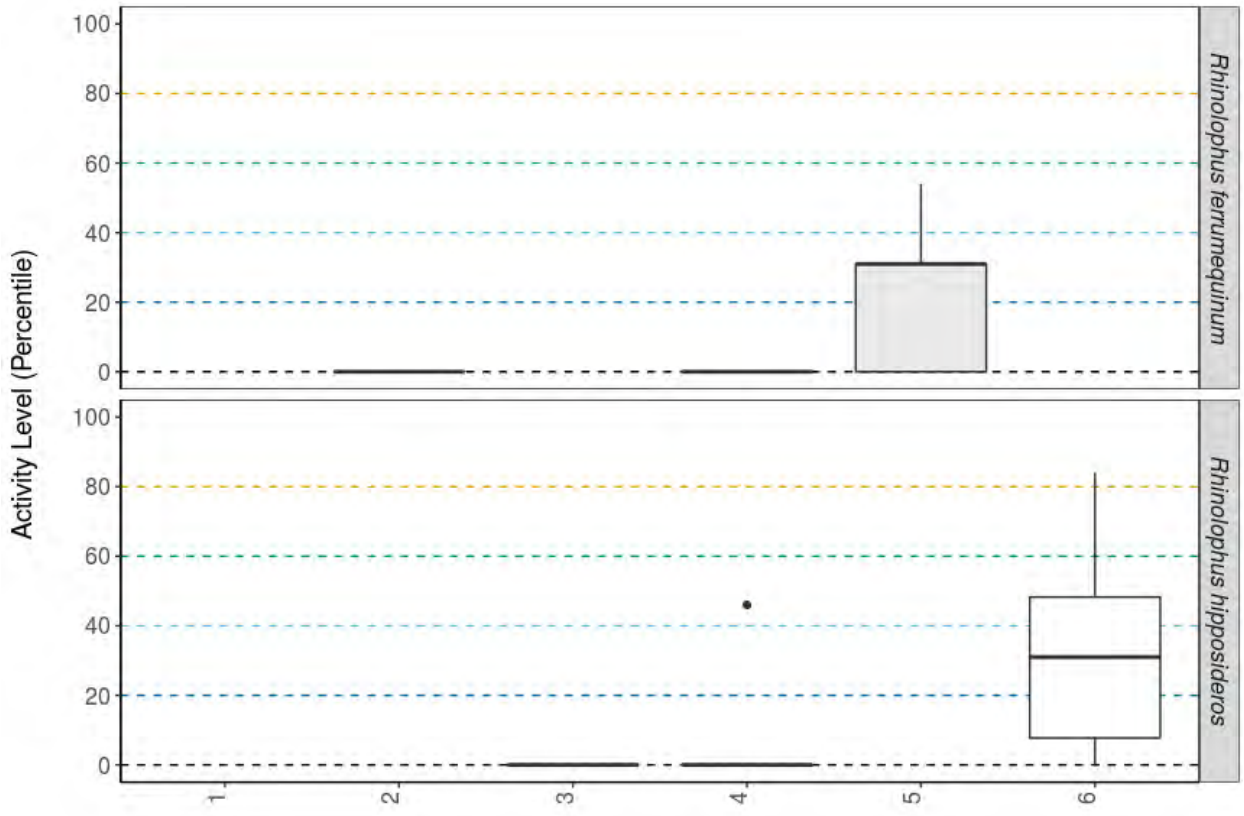
3.4.9 **Chart 2** shows the detailed results relating to activity levels for each species of bat recorded at each automated detector location. For detailed Ecobat outputs relating to each automated detector location, please refer to **Appendix E.**

Chart 2. Differences in bat activity between the six automated detector locations. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity)

[14] At the time of analysing data, Ecobat had a built-in programming error in the way it counts *Pipistrellus* records as such this grouping is not discussed as results may be misleading. It is considered that the recordings identified to common and soprano pipistrelle are accurate and of greater importance for inform the assessment.







3.4.10 From the data displayed in **Chart 2**, the following observations can be made:

- *Myotis* – Moderate levels of activity were recorded detectors 1, 3 and 4 with Low levels at detector 2, 5 and 6.
- Nyctaloid – This group comprises bats which could not be separated between noctule, serotine and Leisler's bat due to overlapping call parameters. Low – Moderate levels were recorded at locations 1,2,5 and 6 and Low at location 3.
- *Nyctalus* – This group comprises bats which could not be separated between noctule and Leisler's bat due to overlapping call parameters. Low – Moderate levels were recorded at locations 5 and 6 and Low at locations 3 and 4.
- Noctule – Moderate to High levels were recorded at location 5, Moderate levels were recorded at locations 4 and 6, Low – Moderate levels were recorded at locations 2 and 3 and low at location 1.
- Common pipistrelle – High levels of activity were recorded at location 2, Moderate -High levels were recorded at location 3, Moderate levels at locations 1,4 and 6 and Low – Moderate at location 5.
- Soprano pipistrelle – Moderate levels of activity were recorded at location 2 and 3, Low – Moderate at location 4 and Low at 1, 5 and 6.
- Long-eared bats – Low - Moderate levels of activity were recorded at locations 3, 4 and 6, and low at locations 1,2 and 5.

- Greater horseshoe bats – Low - Moderate levels of activity were recorded at location 5, Low levels of activity were recorded at locations 2 and 4, no passes were recorded at other locations.
- Lesser horseshoe bats – Low - Moderate levels of activity were recorded at location 6, Low levels of activity were recorded at locations 3 and 4, no passes were recorded at other locations.

4. Summary

4.1 Overview

In total, at least seven species of bat were confirmed to use the Site during the current survey period:

- Common pipistrelle.
- Soprano pipistrelle.
- Noctule.
- Long-eared bat (almost certainly brown long-eared bat).
- *Myotis* sp. (potentially including whiskered bat, Brandt's bat, Daubenton's bat and/or Natterer's bat).
- Greater horseshoe bat.
- Lesser horseshoe bat.

4.1.1 It is possible that Leisler's bat, serotine and/or Nathusius' pipistrelle were also recorded on the Site, with these species known to occur in south Wales. No definitive recordings of these species have been made in the survey area so far. However, noctule and common pipistrelle have been widely recorded across the Site as such it is considered likely the activity in the noctule/serotine/Leisler's bat group were from ambiguous noctule calls with the activity from the common pipistrelle/ Nathusius' pipistrelle group likely from ambiguous common pipistrelle calls.

4.1.2 Myotis recordings could be from whiskered bat, Brandt's bat, Daubenton's bat or Natterer's bat which were all recorded in the desk study. From the desk study results, habitat requirements and known species distribution across Wales it is not considered that passes were from Bechstein's bat or Alcathoe bat.

4.1.3 While long-eared bat recordings cannot typically be assigned to species level based on acoustic files alone, the known distribution of the grey long eared bat is very restricted in the UK with no confirmed records of this species occurring in this region of Wales. It is, therefore, unlikely that this very rare species occurs in the bat survey area, and it is assumed all long-eared bat records collected during the survey work relate to brown long-eared bats.

4.2 Roost identification

4.2.1 The bat survey area provides 13 trees with moderate or high roosting potential and four built structures with some potential to support roosting bats.

4.2.2 To date no roosts have been identified within the bat survey area.

4.3 Bat activity

4.3.1 The Site as a whole provides moderate suitability for foraging and commuting bats. Common pipistrelle was widely recorded across the Site and make up 67.5% of all automated detector recordings across all locations and all months. Contacts which could not be assigned to species-level between common or soprano pipistrelle accounted for 9.06%, while those which could not be assigned to species-level between common or Nathusius' pipistrelle accounted for 5.97%. Soprano pipistrelle was the fourth most frequently recorded species which make up 4.83% of all recordings (an average of 1.34 recordings per night). All other recorded species or groups of species had an average of less than one contact per night.

4.3.2 The greatest levels of bat activity were recorded on the areas of the Site that were closest to linear features, such as dry stone walls in the south western of the Site, where automated detectors 3 and 4 were located, and along the southern extent of both transects.

5. Collision risk assessment

5.1 Methods

5.1.1 A collision risk assessment for bats has been carried out within this report following the steps outlined in the Bats and onshore wind turbines (2019)[7]. Estimating the vulnerability of bat populations to windfarms is based on the following factors:

- Relative abundance and collision risk of bat species.
- The project size and habitat suitability within the Site.
- Bat activity recorded at the Site.

5.1.2 **Table 5.1** outlines the relative abundance and level of potential vulnerability from wind farms of populations of Welsh bat species which has been used to inform the assessment.

Table 5.1 Level of potential vulnerability of Welsh bat populations to wind farms.

Wales	**Collision Risk**			
		Low collision risk	**Medium collision risk**	**High collision risk**
Relative abundance	**Common species**			Common pipistrelle Soprano pipistrelle
	Rarer species	Brown long eared bat Daubenton's bat Natterer's bat Lesser horseshoe		
	Rarest species	Alcathoe bat Bechstein's bat Brandt's bat Greater horseshoe Grey long eared bat Whiskered bat	Barbastelle Serotine	Nathusius' pipistrelle Noctule bat Leisler's Bat

Extracted from *Bats and onshore wind turbines* (2019)[7]. Yellow = low population vulnerability, Orange = medium population vulnerability, Red = high population vulnerability.

5.1.3 The level of potential vulnerability identified in **Table 5.1** has then been considered alongside scheme details and bat activity recorded at the Site. This requires a two-stage process, **Table 5.2** provides an indication of the potential site risk based on evaluation of habitat and the size of the development (Stage 1) and an overall assessment of risk can then be made by considering the results of the initial site risk assessment in relation to bat activity output from Ecobat (Stage 2), which considers the relative vulnerability of each species of bat present, at the population level (**Table 5.3**). Full details on how the habitat risk and project size was determined are presented in **Table F1, Appendix F**.

Table 5.2 Stage 1 - Initial site risk assessment

Site risk level (1-5)		Project size		
		Small	Medium	Large
Habitat risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Extracted from *Bats and onshore wind turbines* (2019)[7]
Green (1 – 2) – lowest/ low site risk; Yellow (3) – medium site risk; Red (4 – 5) – highest/ high site risk

Table 5.3 Stage 2 - Overall risk assessment

Site risk level (from Table 5.2)	Ecobat activity category (or equivalent justified categorisation)					
	Nil (0)	Low (1)	Low – moderate (2)	Moderate (3)	Moderate – high (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	16	18
Highest (5)	0	5	10	15	20	25

Overall assessment: Low (green) – 0-4; Medium (yellow) 5 -12; High (red) – 15 - 25

5.1.4 The scores in the table are a product of multiplying site risk level and the Ecobat activity category. The activity categories equate to those given in Table 5.1 for high collision risk species.

5.2 Results

5.2.1 As detailed in **Table 5.1,** the following high collision risk species were recorded on Site during all survey work.

- Common pipistrelle.
- Soprano pipistrelle.
- Noctule.

5.2.2 As discussed in **Section 4.1**, it is possible that Leisler's bat and Nathusius' pipistrelle (high collision risk) or serotine (medium collision risk) were also recorded on the Site. No definitive recordings of these species have been made in the bat survey area during all survey work and these species are classed within the rarest category in Wales (**Table 5.1**) and as such are not considered common and widespread; noctule and common pipistrelle however were widely recorded across the Site

during survey work. It is considered likely the activity in the noctule/serotine/Leisler's bat group were from ambiguous noctule calls and the activity from the common pipistrelle/ Nathusius' pipistrelle group can likely be attributed to ambiguous common pipistrelle calls. Whilst it is possible some of recorded activity in these groupings may have been from Leisler's bat, serotine or Nathusius' pipistrelle, it is considered unlikely based on current results; additionally, there is no way to determine how many (if any) passes within the broader species groupings were from these species and as such there is no way to accurately determine their level of activity in Ecobat. Nathusius' pipistrelle, serotine and Leisler's bat are therefore not being taken forward for further consideration within the collision risk assessment.

5.2.3 All other bat species recorded on Site, which were confirmed to species level, were classed as low collision risk and as such are not considered further within the collision risk assessment process.

Stage 1 - Initial site risk assessment

5.2.4 Based on the results of the habitat suitability assessment detailed in **Section 3.3** and following the criteria set out in **Table F1, Appendix F** the Site is considered to **provide Moderate potential habitat risk**. There are areas of high-quality habitat and moderate-high potential roost availability on and adjacent to the Site including many mature trees in treelines and scattered throughout the Site, with bordering broadleaved plantation woodland, alongside a number of scattered ponds. The majority the Site however is dominated by heavily grazed semi-improved acid and neutral grassland with limited botanical diversity alongside large swathes of continuous bracken and small blocks of coniferous woodland plantation with bare understorey. The Site is situated on top of a large hill and is generally open and exposed. The Site is connected to the wider landscape by linear features including dry stone walls, woodland and streams, but the wider survey area is bound by busy A roads and residential areas which reduces connectivity.

5.2.5 Following the criteria set out in **Table F1, Appendix F** the project size is considered to be Medium. There will be less than 10 turbines, which falls within the Small project size category, however the turbines are proposed to be over 100m in height which falls within the Large project size category. The Large category is allocated for the largest developments (>40 turbines), due to the low number of turbines[15] it is considered that the Medium project size best reflects scheme proposals.

5.2.6 Based on evaluation of habitats and the size of the development (Stage 1 of the assessment) the Site is considered to have a **site risk level of 3 (medium site risk)**

Stage 2 - Overall risk assessment

5.2.7 The overall assessment of collision risk has been undertaken for each high-risk species. In order to understand collision risk at average levels of bat activity and at unusually high levels of bat activity both the highest Ecobat activity category and the most frequent activity category (median) is shown in **Table 5.4**. All calculations reference the method in **Table 5.3.**

[15] At time of writing a six-turbine scheme is being taken forward

Table 5.4 Stage 2 - Overall collision risk assessment

Species	Highest Ecobat category (number of nights activity recorded at that category)	Overall risk category	Median Ecobat category	Overall risk category
Common pipistrelle	High (33)	15	Moderate - High	12
Soprano pipistrelle	High (3)	15	Low - Moderate	9
Noctule	High (3)	15	Moderate	6

Overall assessment: Low (green) – 0-4; Medium (yellow) 5 -12; High (red) – 15 – 25

5.2.8 The highest Ecobat activity category for common pipistrelle was High based which was recorded on 33 nights, 64 nights activity were recorded across all other category levels therefore it is considered the Median risk level of Moderate- High is a fair reflection of the risk level for this species on Site.

5.2.9 High levels of acivity were recorded on only 3 nights for soprano pipistrelle and 3 nights for noctule, as such it is considered that the assessment at the median Ecobat activity category best reflects the levels of bat activity recorded on Site for these species.

5.2.10 At the Site level the collision risk for common pipistrelle, soprano pipistrelle and noctule is assessed as Medium.

5.2.11 An overall collision risk assessment has also been undertaken for each automated detector location as presented in **Table 5.5.**

Table 5.5 Stage 2 - Overall collision risk assessment (by detector)

Automated detector	Common pipistrelle		Soprano pipistrelle		Noctule	
	Ecobat Median Category	Overall Collision risk category	Ecobat Median Category	Overall Collision risk category	Ecobat Median Category	Overall Collision risk category
1	Moderate	9	Low	3	Low	3
2	High	15	Moderate	9	Low – Moderate	6
3	Moderate -High	12	Moderate	9	Low – Moderate	6
4	Moderate	9	Low – Moderate	6	Moderate	9
5	Low	3	Low	3	Moderate -High	12
6	Moderate	9	Low	3	Moderate	9

Overall assessment: Low (green) – 0-4; Medium (yellow) 5 -12; High (red) – 15 - 25

5.2.12 Collision risk for common pipistrelle is classed as High at automated detector location 2, Medium at locations 1,3,4 and 6 and Low at location 3.

5.2.13 Collision risk for soprano pipistrelle is classed as Medium at automated detector locations 2,3 and 4 and Low at 1,5 and 6.

5.2.14 Collision risk for noctule is classed as Medium at locations 2,3,4,5 and 6 and Low at location 1.

5.3 Conclusion

5.3.1 A collision risk assessment has been undertaken for each species recorded on Site, considered high risk for collision with turbines (common pipistrelle, soprano pipistrelle and noctule). The overall collision risk category for the Proposed Development is Medium for common pipistrelle, soprano pipistrelle and noctule. At the detector level Medium collision risk was recorded at all locations with the exception of location 2 (High collision risk) and location 5 (Low collision risk).

6. Survey programme 2021

6.1 Roost surveys

6.1.1 As summarised in **Section 4**, no bat roosts were identified within the bat survey area, 13 trees were found to have moderate or high roosting potential and four built structures were identified with low, moderate or high roosting potential.

6.1.2 Where access allows, trees will be subject to an additional PRF inspection (using the same methods set out in **Section 2.3**) using an endoscope and torch, once during the summer period (May-September) in 2021. PRF inspection is being taken forward as the most effective method to survey trees for roosting bats. It is the only survey method where field signs, (such as droppings) can be identified and is a more reliable technique to detect the presence and absence of bats. It is also a more efficient and practical approach given the high number of trees to be surveyed.

6.1.3 There are no built structures with roosting potential within the Site, the four built structures identified with roosting potential were within the wider bat survey area outside the Site boundary. Access restrictions did not allow for internal or further roost surveys to these buildings in 2020.

6.1.4 In line with *Bats and Onshore Wind Turbines* (2019)[1] those structures which have the potential to support maternity roosts will be taken forward for further survey, these comprise built structures B2 (a stone wall with cavity) and B5 (a farmhouse). The two built structures not taken forward for survey are open cattle sheds with low roosting potential, built structure B1 is approximately 450m from the nearest proposed turbine location and built structure B6 is approximately 600m from the nearest proposed turbine location.

6.1.5 In 2021, where access allows, built structures B2 and B5 will be subject to internal or endoscope inspections and dusk emergence survey visits between May and September 2021 following the Bat Conservation Trust (BCT) third edition of Good Practice Guidelines[2]. Due to the very remote and elevated nature of the site dawn surveys will not be conducted on the basis of health and safety and safe access to survey locations prior to dawn.

6.2 Bat activity surveys

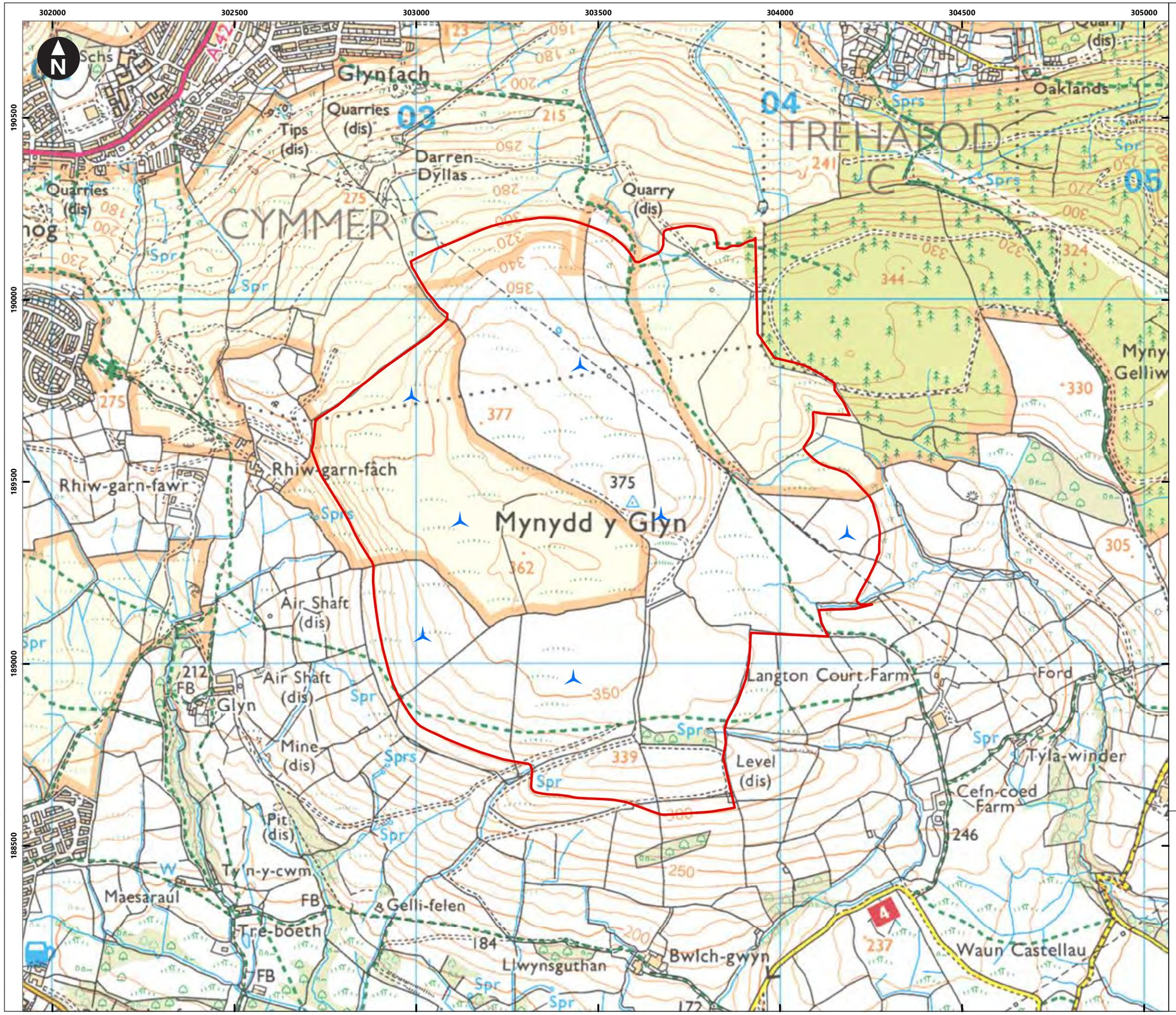
6.2.1 Additional automated detector surveys are being undertaken at proposed turbine locations between April and June 2021, completing 10 days monitoring in each month following the same methods set out in **Section 2.4**. The main aims of the additional survey are to:

- Confirm bat activity level's where proposed turbine locations have either moved or been added since the completion of 2020 monitoring.
- Confirm the collision risk assessment for the Proposed Development based on a larger data set.
- Where possible, seek to securely erect a weather station on the Site to take detailed weather readings for the duration of the 2021 survey period and compare bat activity levels to detailed weather data.

6.2.2 Automated monitoring undertaken in 2020 has met the minimum survey requirement as set out *Bats and Onshore Wind Turbines* (2019)[1] and allowed for a comparison in seasonal activity. As such

it is not considered another full year of data (i.e., an additional autumn survey period) is required to inform the assessment. Surveys in 2020 indicate the Proposed Development has a Medium collision risk for common pipistrelle, soprano pipistrelle and noctule, the additional survey will seek to understand correlations between weather data and bat activity on the Site to input into sensitive mitigation design.

Appendix A
Figures



PROJ_Mynydd_Y_Glyn_Tur...

Site boundary

0 0.1 0.2 0.3 0.4 0.5 0.6 km

Scale at A3: 1:10,000

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 1.1
Site boundary

June 2021

wood.

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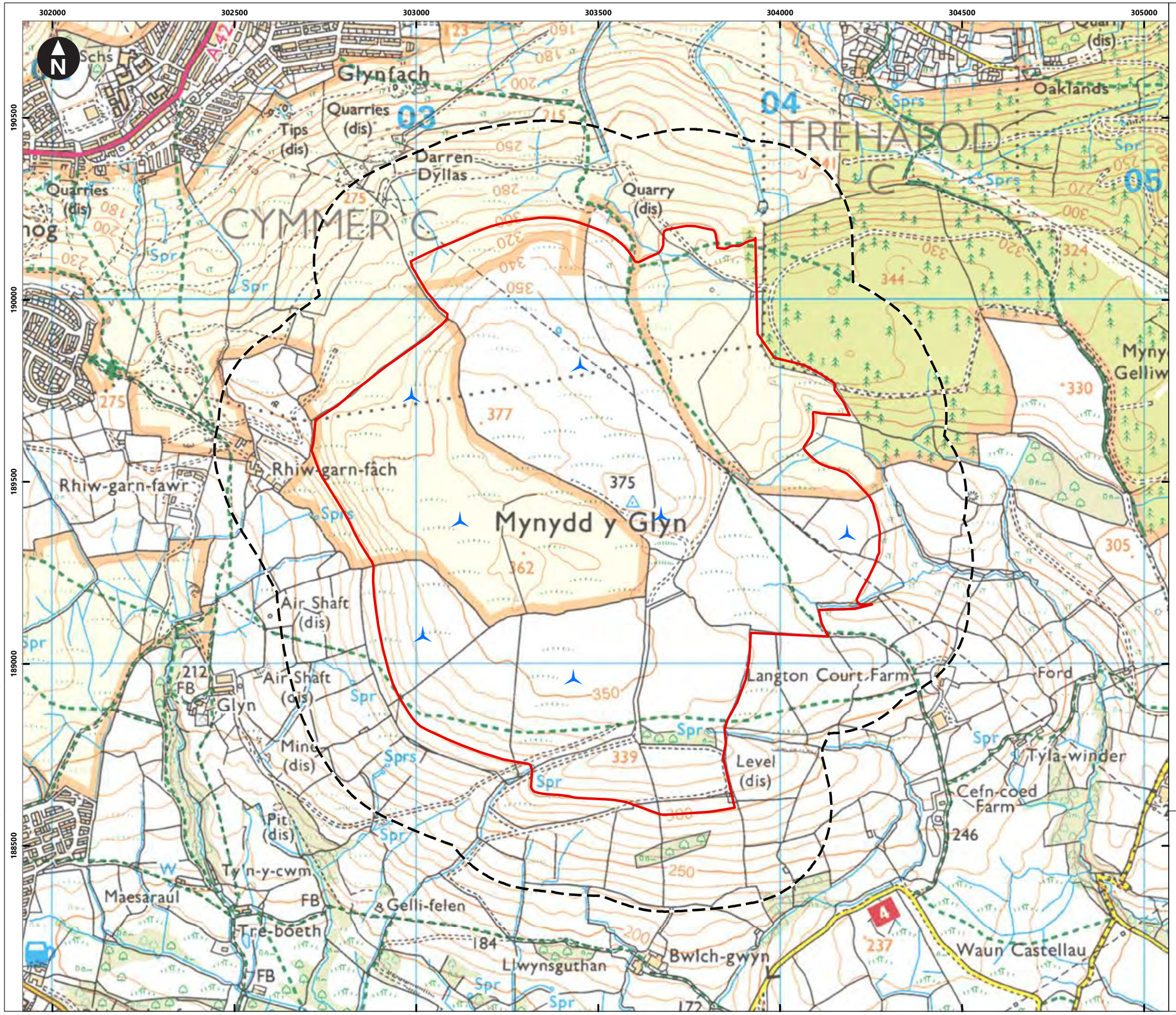


Proposed Turbine layout

Site boundary

Bat survey area (266m buffer)

0 0.1 0.2 0.3 0.4 0.5 0.6 km

Scale at A3: 1:10,000

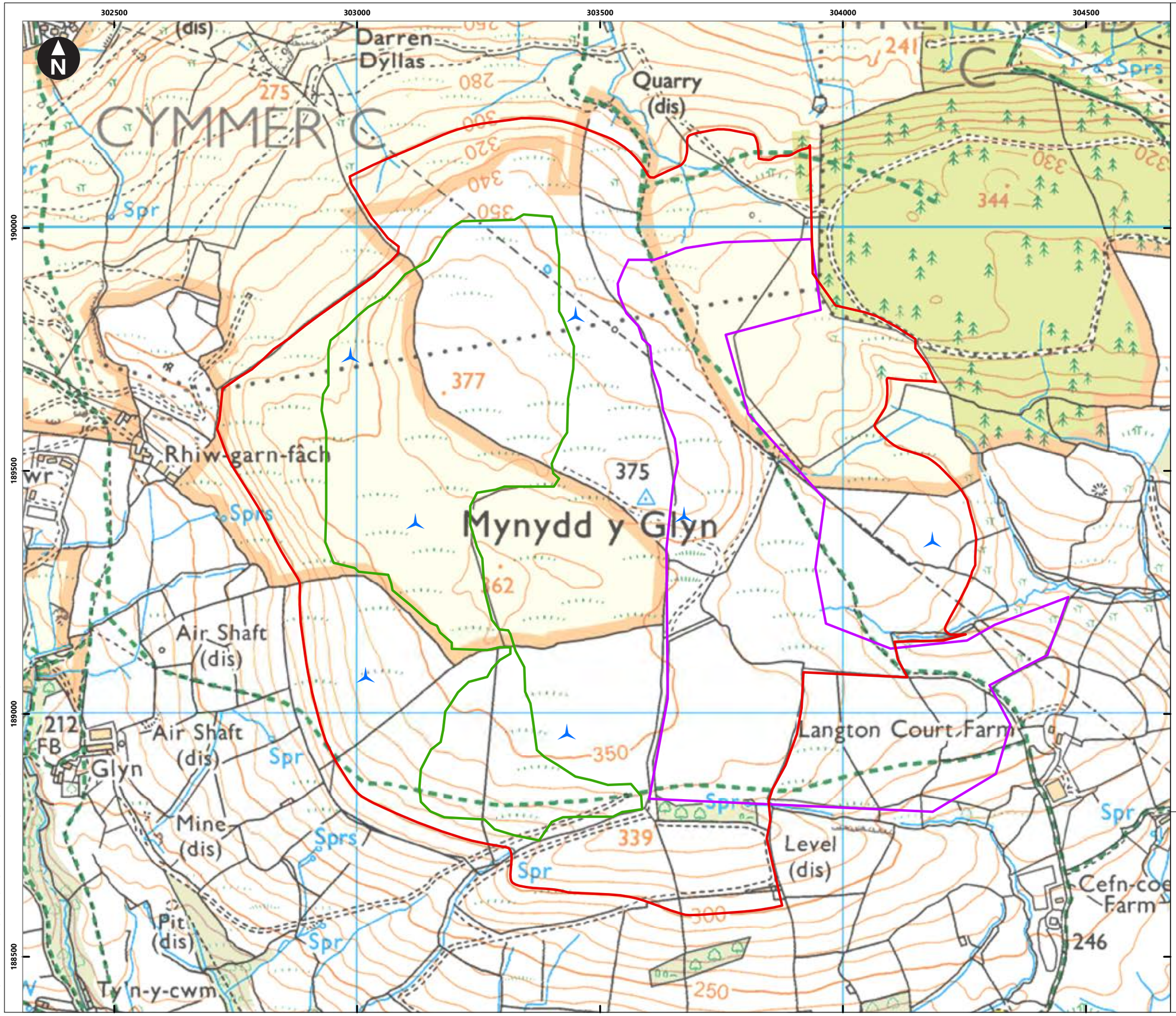
Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 1.2
Survey area

June 2021

wood.

H:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0035_S0_P01.2.mxd Originator: tom.suter



Site boundary

Manual bat activity transect routes

Transect 1

Transect 2

Proposed Turbine layout

0 0.1 0.2 0.3 0.4 km

Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 2.1
Manual transect surveys

June 2021

wood.

42864-WOOD-XX-XX-FG-OE-0036_S0_P01.2

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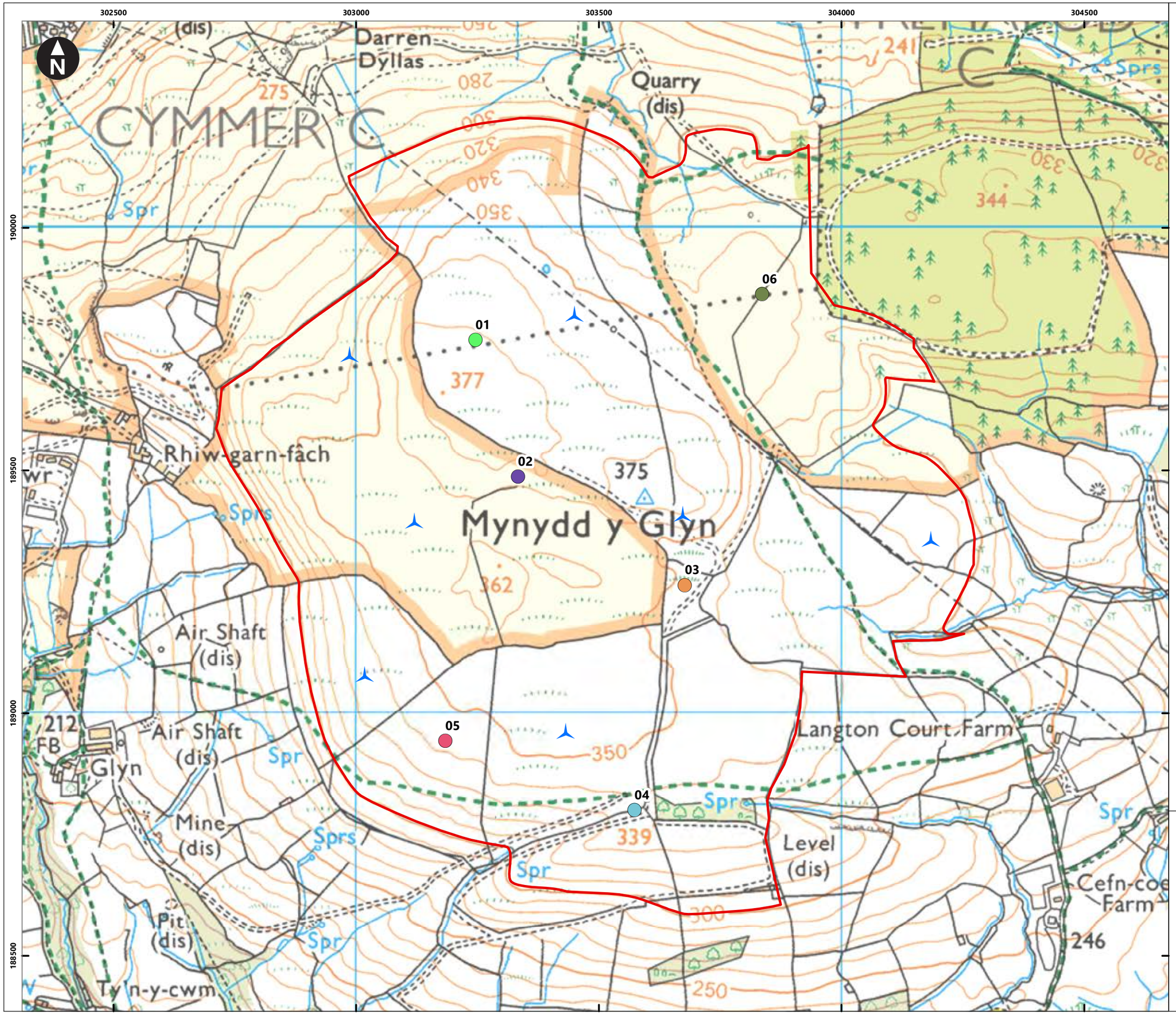

Proposed Turbine layout

Site boundary

Automated bat activity monitoring locations

- 01
- 02
- 03
- 04
- 05
- 06

0 0.1 0.2 0.3 0.4 km

Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 2.2
Automated monitoring

June 2021

wood.

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290000 295000 300000 305000 310000 315000

200000 195000 190000 185000 180000

Key

Site boundary

10km buffer

Bat roost

- Brandt''s Bat
- Brown Long-eared Bat
- Common Pipistrelle
- Daubenton''s Bat
- Greater Horseshoe Bat
- Lesser Horseshoe Bat
- Long-eared Bat Species
- Myotis Bat Species
- Natterer''s Bat
- Noctule Bat
- Pipistrelle agg.
- Pipistrellus Bat Species
- Soprano Pipistrelle
- Unknown Bat
- Whiskered Bat

0 1,000 2,000 3,000 4,000 5,000 m

Scale at A3: 1:90,000

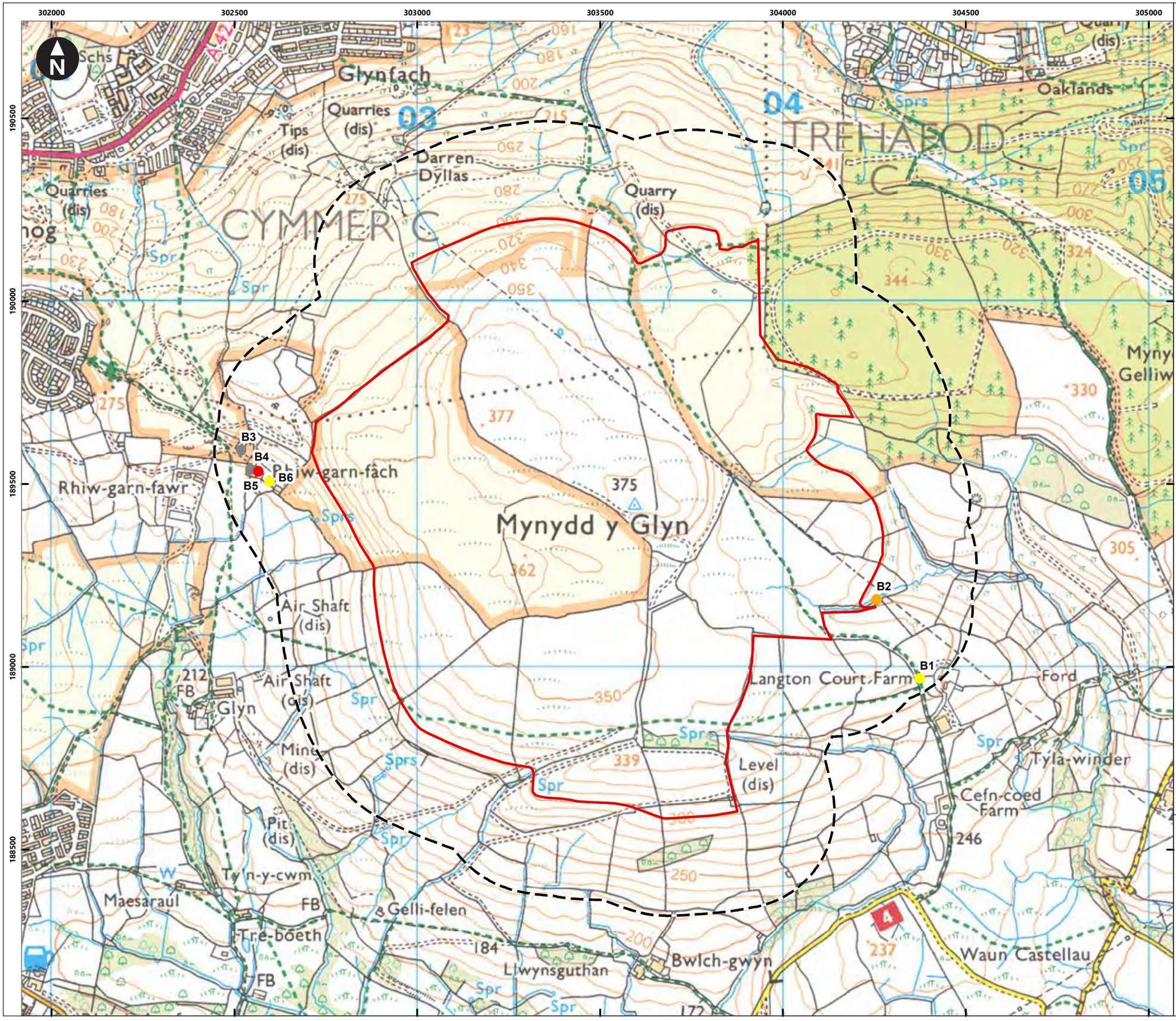
Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.1
Bat roosts and Statutory designated biodiversity Sites of international importance for bats within 10km of the Site

March 2021

wood.

P:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0038_S0_P01.1.mxd Originator: jon.squire

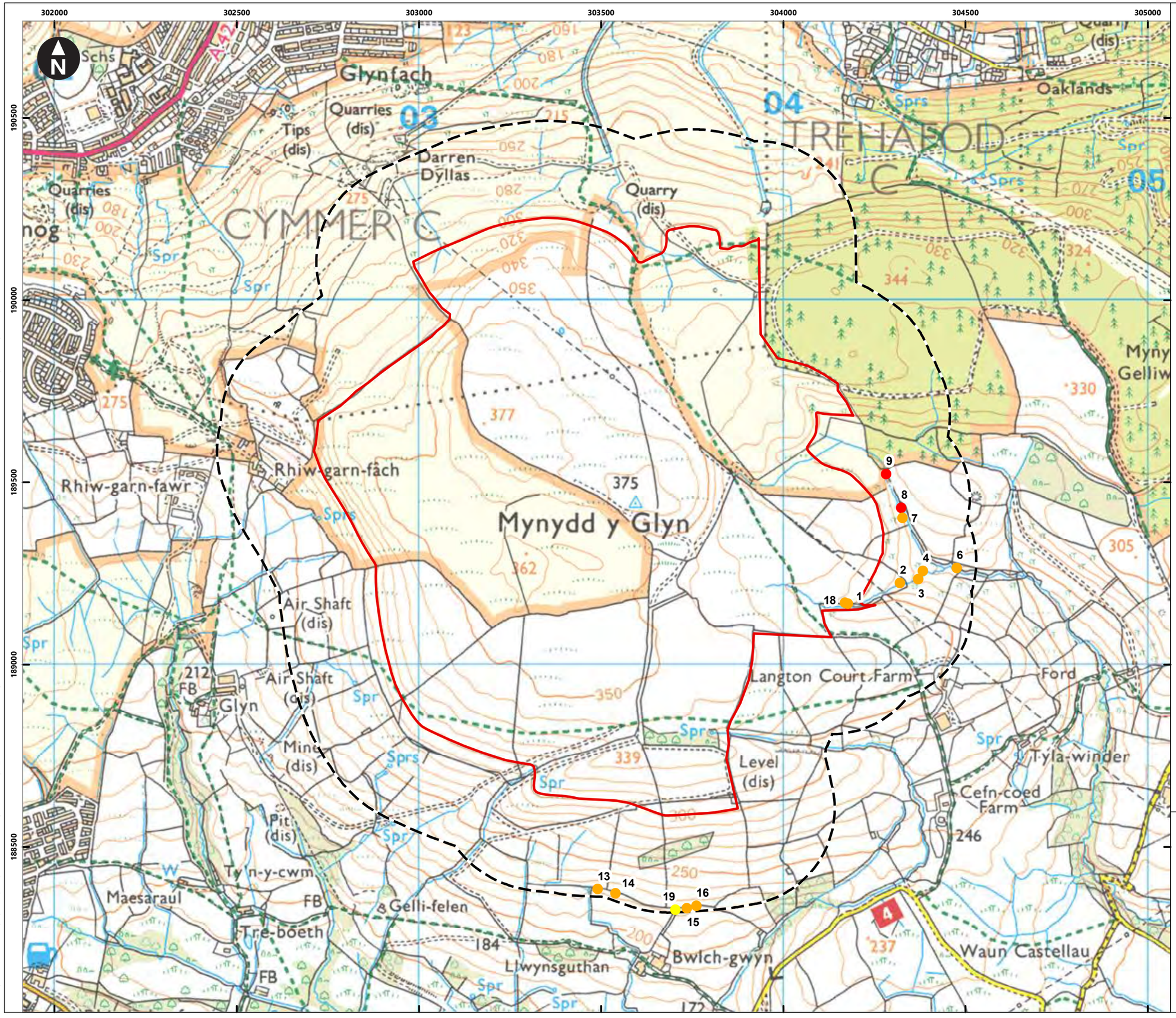


Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.2
Level of roosting potential assigned to built structures

April 2021

wood.



Site boundary

Bat survey area (266m buffer)

Bat surveys

- High
- Moderate
- Low

0 0.1 0.2 0.3 0.4 0.5 0.6 km

Scale at A3: 1:10,000

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.3
Level of roosting potential assigned to trees

April 2021

wood.

302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Common pipistrelle
Soprano pipistrelle
Pipistrellus sp
Myotis sp
NSL
Plecotus auritus

Bat density

0.3 - 0.5
0.5 - 1.5
1.5 - 2.5
2.5 - 4.5
4.5 - 6.5
6.50- 9.5

0 0.1 0.2 0.3 0.4 km

Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.4
Indicative distribution of species records during the manual transect survey

April 2021

wood.

42864-WOOD-XX-XX-FG-OE-0027_S0_P01.1

P:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0027_S0_P01.1.mxd Originator: jon.squire

302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Common pipistrelle

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.5
Manual bat transect activity for Common Pipistrelle

April 2021

wood.

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302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Soprano pipistrelle

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.6
Manual bat transect activity for Soprano Pipistrelle

April 2021

wood.

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302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Pipistrellus sp

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.7
Manual bat transect activity for Pipistrellus sp.

April 2021

wood.

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302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Myotis sp
NSL
Plecotus auritis

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.8
Manual bat transect Recorded bat activity for Nyctaloid sp., Long-eared. and Myotis sp.

April 2021

wood.

Q:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0031_S0_P01.1.mxd Originator: jonathan.collini

Appendix B
Legislation

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. They are afforded full protection under Section 9(4) of the Act and Regulation 43 of the Regulations. These make it an offence, *inter alia*, to:

- Deliberately capture, injure or kill a bat.
- Deliberately disturb a bat (this applies anywhere, not just at its roost), in particular in such a way as to be likely to:
  - Impair their ability to survive, breed or reproduce, or rear or nurture their young.
  - Impair their ability to hibernate or migrate.
- Affect significantly the local distribution or abundance of that bat species.
- Damage or destroy a breeding Site or resting place of any bat.
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.
- Intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection (this is taken to mean all bat roosts whether bats are present or not).

Appendix C
Tables relating to survey methods

Table C1 Automated monitoring survey details

Automated Detector ID	British National Grid Reference	Spring	Summer	Autumn	Phase 1 Habitat classification of static location	Linear features within 50m detector.
1	ST 03246 89768	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	No
2	ST 03327 89397	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Dry heath/acid grassland	Yes, fence line and crumbling stone wall
3	ST 03677 89263	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	Yes, fence line
4	ST 03553 88821	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	Yes, intact stone wall
5	ST 03183 88942	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	No
6	ST 03744 89877	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Bare ground	Yes, fence line with scattered young trees

Table C2 Indicative weather conditions during automated bat survey work

Season	Date	Sunrise	Sunset	Temperature (Min°C)	Temperature (Max°C)	Temperature (Average°C)	Average Wind Speed (m/s)	Rainfall	Average Humidity (%)
Spring	20/05/2020	05:14:00	21:06:00	11	19	14	3.3	Some light rain showers	82
	21/05/2020	05:12:00	21:08:00	13	18	15	5.5	Some light rain showers	76
	22/05/2020	05:11:00	21:09:00	12	13	12	8.8	None	77
	23/05/2020	05:10:00	21:11:00	12	13	12	8.1	None	86
	24/05/2020	05:09:00	21:12:00	7	12	9	2.7	None	96
	25/05/2020	05:08:00	21:13:00	9	15	11	2.5	None	86
	26/05/2020	05:07:00	21:14:00	12	17	13	3.1	None	91
	27/05/2020	05:06:00	21:16:00	14	21	17	4.4	None	63
	28/05/2020	05:05:00	21:17:00	12	21	15	4.7	None	53
	29/05/2020	05:04:00	21:18:00	12	21	15	3.6	None	55
Summer	03/07/2020	05:02:00	21:33:00	15	16	16	5.8	Some light rain showers	98

Season	Date	Sunrise	Sunset	Temperature (Min°C)	Temperature (Max°C)	Temperature (Average°C)	Average Wind Speed (m/s)	Rainfall	Average Humidity (%)
	04/07/2020	05:03:00	21:32:00	14	17	15	8.6	Some light rain showers	94
	05/07/2020	05:03:00	21:32:00	12	14	13	8.8	None	77
	06/07/2020	05:04:00	21:31:00	13	15	14	4.1	None	86
	07/07/2020	05:05:00	21:30:00	14	15	15	7.2	Heavy rain showers	99
	08/07/2020	05:06:00	21:30:00	15	16	15	5.3	Some light rain showers	97
	09/07/2020	05:07:00	21:29:00	11	17	13	4.1	None	80
	10/07/2020	05:08:00	21:28:00	9	15	11	3.3	None	80
	11/07/2020	05:09:00	21:27:00	10	16	12	3.1	None	80
	12/07/2020	05:10:00	21:26:00	14	18	15	3.1	None	82
Autumn	08/09/2020	06:37:00	19:43:00	15	16	15	5.5	Some light rain showers	96
	09/09/2020	06:39:00	19:40:00	9	13	11	2.5	None	84
	10/09/2020	06:40:00	19:38:00	11	14	13	3.1	None	80

Season	Date	Sunrise	Sunset	Temperature (Min°C)	Temperature (Max°C)	Temperature (Average°C)	Average Wind Speed (m/s)	Rainfall	Average Humidity (%)
	11/09/2020	06:42:00	19:36:00	14	16	15	5.5	None	86
	12/09/2020	06:44:00	19:33:00	14	16	15	4.1	None	86
	13/09/2020	06:45:00	19:31:00	12	16	14	2.7	None	96
	14/09/2020	06:47:00	19:29:00	17	22	19	2.7	None	67
	15/09/2020	06:48:00	19:27:00	15	16	16	3.8	None	100
	16/09/2020	06:50:00	19:24:00	13	19	16	7.5	None	84
	17/09/2020	06:52:00	19:22:00	11	17	13	6.6	None	77

*Weather data obtained from https://www.wunderground.com/ at time of data collection

Table C3 Personnel involved in bat survey work

Surveyor name	Position	Qualifications and experience
Chris Hill	Associate Director	BSc (hons), MRes. MCIEEM. Over 11 years' experience working in ecological consultancy. Natural England bat survey licence holder Class 2 licence registration no. 2015-15031-CLS-CLS
Kelly Jones	Principal Consultant	BSc (hons), MSc. GradCIEEM. 9 years working in ecological consultancy. Natural Resources Wales bat survey licence holder for 4 years. Class 4 licence registration no. S088838/1 and Natural England licence number 2017-30482-CLS-CLS. Certified in tree climbing and aerial rescue.
Gary Lindsay	Consultant	BSc (hons), MSc. 4 years working in ecological consultancy providing ecological support on a range of projects including large infrastructure developments, installation and refurbishment of power lines and residential developments.
Jonathan D'Arcy	Consultant	BSc (hons), 7 years working in ecological consultancy. Natural England and Natural Resources Wales class licence holder for 7 years. Natural Resources Wales licence number S085065/1 and Natural England Class 2 licence registration no. 2018-37285-CLS-CLS. Certified in tree climbing and aerial rescue.
Sara Rodriquez-Pecino	Senior Consultant	BSc (hons), MSc. GradCIEEM. 7 years working in ecological consultancy. Natural England bat survey licence holder Class 2 licence registration no. 2019-41070-CLS-CLS. Certified in tree climbing and aerial rescue.
Sam Barnes	Senior Consultant	BSc (hons), MSc. 8 years working in ecological consultancy. Natural England bat survey licence holder Class 1 licence registration no. 2016-23778.
Claire Neale	Senior Consultant	BSc (hons), MSc. 7 years working in ecological consultancy involved with numerous projects within the power sector, specialising in supporting the delivery of environmental support
Katie Watkins	Assistant Consultant	BSc (hons), MSc. 2 years working in ecological consultancy providing ecological support on a range of projects including large infrastructure developments, installation and refurbishment of power lines and residential developments.

Appendix D
Tables relating to survey results

Table D1 Tree survey dates, methods and results

Tree ID	Tree species	PRA survey date	Initial suitability	PRF inspection date	Access method	Final suitability
1	Cherry	29/06/2020	Moderate	16/02/2021	Ground level	Moderate
2	Oak	29/06/2020	Moderate	16/02/2021	Ladder	Moderate
3	Oak	29/06/2020	High	16/02/2021	Ladder	Moderate
4	Oak	29/06/2020	Moderate	16/02/2021	Rope/harness	Moderate
5	Oak	29/06/2020	High	16/02/2021	Rope/harness	Low
6	Oak	29/06/2020	High	16/02/2021	Ground level	Moderate
7	Oak	29/06/2020	High	16/02/2021	Ground level	Moderate
8	Oak	29/06/2020	Moderate	16/02/2021	Rope/harness	High
9	Oak	29/06/2020	High	16/02/2021	Rope/harness	High
10	Oak	29/06/2020	Moderate	16/02/2021	Ground level	Low
11	Willow	29/06/2020	Moderate	17/02/2021	Ground level	Low
12	Oak	29/06/2020	Moderate	17/02/2021	Rope/harness	Low
13	Ash	29/06/2020	Moderate	17/02/2021	Ladder	Moderate
14	Cherry	29/06/2020	Moderate	17/02/2021	Ground level	Moderate
15	Ash	29/06/2020	High	17/02/2021	Ground level	Moderate
16	Birch	29/06/2020	Moderate	17/02/2021	Ground level	Moderate
17	Birch	29/06/2020	Moderate	17/02/2021	Ground level	Negligible
18	Cherry	n/a	Moderate	16/02/2021	Ground level	Moderate
19	Ash	n/a	High	17/02/2021	Ground level	Low

Table D2 Summary of automated detector monitoring results by season

			Total Passes (average passes per night)												Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
Spring	1	10	54	3	6	8	0	0	0	0	2	2	0	0	75
			5.4	0.3	0.6	0.8	0	0	0	0	0.2	0.2	0	0	7.5
	2	10	211	10	8	34	0	0	0	0	1	7	0	0	271
			21.1	1	0.8	3.4	0	0	0	0	0.1	0.7	0	0	27.1
	3	10	336	26	34	38	0	1	6	0	2	3	0	1	447
			33.6	2.6	3.4	3.8	0	0.1	0.6	0	0.2	0.3	0	0.1	44.7
	4	10	56	8	8	7	0	0	1	2	23	0	0	2	107
			5.6	0.8	0.8	0.7	0	0	0.1	0.2	2.3	0	0	0.2	10.7
	5	10	21	2	2	2	0	0	0	0	1	0	0	0	28
			2.1	0.2	0.2	0.2	0	0	0	0	0.1	0	0	0	2.8
	6	10	59	5	19	9	0	0	6	0	4	0	0	2	104
			5.9	0.5	1.9	0.9	0	0	0.6	0	0.4	0	0	0.2	10.4

			Total Passes (average passes per night)												Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
Summer	1	10	2	0	2	0	0	0	1	0	0	0	0	0	5
			0.2	0	0.2	0	0	0	0.1	0	0	0	0	0	0.5
	2	10	4	1	1	0	0	0	1	0	2	1	0	0	10
			0.4	0.1	0.1	0	0	0	0.1	0	0.2	0.1	0	0	1
	3	10	14	0	0	0	1	0	1	1	59	2	0	0	78
			1.4	0	0	0	0.1	0	0.1	0.1	5.9	0.2	0	0	7.8
	4	10	7	3	0	0	0	0	0	1	10	1	0	0	22
			0.7	0.3	0	0	0	0	0	0.1	1	0.1	0	0	2.2
	5	10	4	0	0	0	0	0	0	0	0	2	0	0	6
			0.4	0	0	0	0	0	0	0	0	0.2	0	0	0.6
	6	10	8	1	1	0	1	3	2	0	3	0	0	0	19
			0.8	0.1	0.1	0	0.1	0.3	0.2	0	0.3	0	0	0	1.9
Autumn	1	10	356	18	40	22	4	4	37	9	7	13	0	0	510

			Total Passes (average passes per night)												Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
			35.6	1.8	4	2.2	0.4	0.4	3.7	0.9	0.7	1.3	0	0	51
	2	10	239	31	53	19	10	4	10	4	3	14	1	0	388
			23.9	3.1	5.3	1.9	1	0.4	1	0.4	0.3	1.4	0.1	0	38.8
	3	10	612	38	131	56	3	2	9	17	6	13	0	1	888
			61.2	3.8	13.1	5.6	0.3	0.2	0.9	1.7	0.6	1.3	0	0.1	88.8
	4	10	1082	72	75	68	0	12	18	23	38	40	1	5	1434
			108.2	7.2	7.5	6.8	0	1.2	1.8	2.3	3.8	4	0.1	0.5	143.4
	5	10	66	6	19	8	6	14	34	8	2	2	10	0	175
			6.6	0.6	1.9	0.8	0.6	1.4	3.4	0.8	0.2	0.2	1	0	17.5
	6	10	248	18	55	28	3	3	21	14	12	8	0	32	442
			24.8	1.8	5.5	2.8	0.3	0.3	2.1	1.4	1.2	0.8	0	3.2	44.2
Total		180	3379	242	454	299	28	43	147	79	175	108	12	43	5009

			Total Passes (average passes per night)											Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
Proportion			67.46%	4.83%	9.06%	5.97%	0.56%	0.86%	2.93%	1.58%	3.49%	2.16%	0.24%	0.86%	

Species codes: **CP** = common pipistrelle; **SP** = soprano pipistrelle; **CP/SP** = common/soprano pipistrelle (*Pipistrellus* species); **CP/NP** = common/ Nathusius' pipistrelle (*Pipistrellus* species); **NSL** = Noctule/Serotine/Leiser bat (Nyctaloid species); **Nyct sp.** = Noctule/leiser bat (Nyctalus species); **N** = Noctule; **LE** = long-eared bat; **M** = *Myotis* bat species; **Bat sp.** = Bat call unable to clearly identify down to species level; **GH** = greater horseshoe and **LH** = lesser horseshoe.

Appendix E
Ecobat analysis

Table E1 Ecobat summary table showing the number of nights recorded bat activity fell into each activity band for each species[IJ1].

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
1	*Myotis*	0	0	2	1	**0**
1	*Nyctaloid*	0	0	1	0	**1**
1	*Nyctalus noctula*	1	0	0	0	**2**
1	*Pipistrellus*	2	2	2	0	**5**
1	*Pipistrellus pipistrellus*	5	1	3	3	**1**
1	*Pipistrellus pygmaeus*	0	2	0	1	**5**
1	*Plecotus auritus*	0	0	1	1	**3**
2	*Myotis*	0	0	0	2	**2**
2	*Nyctaloid*	0	0	2	0	**2**
2	*Nyctalus noctula*	0	1	0	0	**1**
2	*Pipistrellus*	3	2	3	0	**4**
2	*Pipistrellus pipistrellus*	7	3	1	2	**1**

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
2	*Pipistrellus pygmaeus*	0	3	1	2	**1**
2	*Plecotus auritus*	0	0	0	0	**4**
2	*Rhinolophus ferrumequinum*	0	0	0	0	**1**
3	*Myotis*	1	4	1	0	**4**
3	*Nyctaloid*	0	0	0	1	**2**
3	*Nyctalus*	0	0	0	0	**1**
3	*Nyctalus noctula*	0	0	3	0	**3**
3	*Pipistrellus*	4	2	4	1	**0**
3	*Pipistrellus pipistrellus*	9	4	2	2	**1**
3	*Pipistrellus pygmaeus*	1	3	2	2	**2**
3	*Plecotus auritus*	0	1	1	2	**2**
3	*Rhinolophus hipposideros*	0	0	0	0	**2**
4	*Myotis*	0	5	9	0	**1**
4	*Nyctalus*	0	1	0	0	**2**
4	*Nyctalus noctula*	1	0	0	0	**1**

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
4	*Pipistrellus*	3	2	0	2	**2**
4	*Pipistrellus pipistrellus*	7	2	4	2	**4**
4	*Pipistrellus pygmaeus*	2	1	2	3	**3**
4	*Plecotus auritus*	0	1	3	2	**3**
4	*Rhinolophus ferrumequinum*	0	0	0	0	**1**
4	*Rhinolophus hipposideros*	0	0	1	0	**4**
5	*Myotis*	0	0	0	0	**3**
5	*Nyctaloid*	0	0	1	1	**1**
5	*Nyctalus*	0	0	0	2	**0**
5	*Nyctalus noctula*	1	1	1	1	**0**
5	*Pipistrellus*	0	2	1	2	**2**
5	*Pipistrellus pipistrellus*	2	1	2	6	**3**
5	*Pipistrellus pygmaeus*	0	0	1	0	**3**
5	*Plecotus auritus*	0	0	1	1	**3**
5	*Rhinolophus ferrumequinum*	0	0	1	2	**2**

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
6	*Myotis*	0	1	0	4	**5**
6	*Nyctaloid*	0	0	1	0	**1**
6	*Nyctalus*	0	0	0	1	**0**
6	*Nyctalus noctula*	0	1	2	1	**2**
6	*Pipistrellus*	1	2	6	0	**5**
6	*Pipistrellus pipistrellus*	3	6	3	6	**1**
6	*Pipistrellus pygmaeus*	0	0	3	2	**8**
6	*Plecotus auritus*	0	0	1	4	**3**
6	***Rhinolophus hipposideros***	**1**	**0**	**1**	**2**	**2**

Table E2 Ecobat summary table showing key metrics for each species recorded. The reference range is the number of nights for each species that your data were compared to. Reference Range of 200+ required to be confident in the relative activity level[IJ2].

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
1	*Myotis*	46	31 - 54	54	3	2002
1	*Nyctaloid*	23	23 - 23	46	2	NA
1	*Nyctalus noctula*	0	0 - 0	88	3	1779
1	*Pipistrellus*	54	60 - 81	85	11	3943
1	*Pipistrellus pipistrellus*	54	42.5 - 90.5	95	13	3601
1	*Pipistrellus pygmaeus*	0	31 - 70	70	8	2471
1	*Plecotus auritus*	0	42.5 - 42.5	54	5	1010
2	*Myotis*	16	15.5 - 15.5	31	4	2002
2	*Nyctaloid*	23	52.5 - 52.5	59	4	NA
2	*Nyctalus noctula*	37	36.5 - 36.5	73	2	1779
2	*Pipistrellus*	57	54 - 83	85	12	3943
2	*Pipistrellus pipistrellus*	83	60 - 90	95	14	3601
2	*Pipistrellus pygmaeus*	60	45.5 - 71	78	7	2471
2	*Plecotus auritus*	0	0 - 0	0	4	1010
2	*Rhinolophus ferrumequinum*	0	0	0	1	471

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
3	*Myotis*	59	60.5 - 78.5	85	10	2002
3	*Nyctaloid*	0	0 - 0	31	3	NA
3	*Nyctalus*	0	0	0	1	1722
3	*Nyctalus noctula*	23	60 - 60	60	6	1779
3	*Pipistrellus*	70	50.5 - 83	96	11	3943
3	*Pipistrellus pipistrellus*	80	62 - 88	99	18	3601
3	*Pipistrellus pygmaeus*	53	38.5 - 76	82	10	2471
3	*Plecotus auritus*	31	31 - 54	70	6	1010
3	*Rhinolophus hipposideros*	0	0 - 0	0	2	368
4	*Myotis*	54	50 - 62	72	15	2002
4	*Nyctalus*	0	0 - 0	67	3	1722
4	*Nyctalus noctula*	41	40.5 - 40.5	81	2	1779
4	*Pipistrellus*	72	51.5 - 86.5	94	9	3943
4	*Pipistrellus pipistrellus*	54	55 - 82	99	19	3601
4	*Pipistrellus pygmaeus*	31	31 - 72	86	11	2471
4	*Plecotus auritus*	31	31 - 60	64	9	1010

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
4	*Rhinolophus ferrumequinum*	0	0	0	1	471
4	*Rhinolophus hipposideros*	0	0 - 0	46	5	368
5	*Myotis*	0	0 - 0	0	3	2002
5	*Nyctaloid*	31	38.5 - 38.5	46	3	NA
5	*Nyctalus*	31	31 - 31	31	2	1722
5	*Nyctalus noctula*	65	31 - 82	82	4	1779
5	*Pipistrellus*	31	31 - 67	78	7	3943
5	*Pipistrellus pipistrellus*	31	31 - 59.5	88	14	3601
5	*Pipistrellus pygmaeus*	0	0 - 0	60	4	2471
5	*Plecotus auritus*	0	38.5 - 38.5	46	5	1010
5	*Rhinolophus ferrumequinum*	31	31 - 31	54	5	471
6	*Myotis*	16	31 - 31	64	10	2002
6	*Nyctaloid*	23	23 - 23	46	2	NA
6	*Nyctalus*	31	0	31	1	1722
6	*Nyctalus noctula*	46	45.5 - 70	80	6	1779
6	*Pipistrellus*	46	46 - 74	92	14	3943

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
6	*Pipistrellus pipistrellus*	54	47.5 - 72	96	19	3601
6	*Pipistrellus pygmaeus*	0	31 - 54	60	13	2471
6	*Plecotus auritus*	31	31 - 31	46	8	1010
6	*Rhinolophus hipposideros*	31	31 - 57.5	84	6	368

Appendix F
Collision risk assessment method

Table F1 Full details relating to Stage 1 – Initial site risk assessment

Site risk level (1-5)	**Project size**			
Habitat risk		**Small**	**Medium**	**Large**
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Habitat risk	**Description**
Low	• Small number of potential roost features, of low quality. • Low quality foraging habitat that could be used by small numbers of foraging bats. • Isolated site not connected to the wider landscape by prominent linear features.
Moderate	• Buildings, trees or other structures with moderate – high potential as roost sites on or near the site. • Habitat could be used extensively for foraging bats. • Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	• Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/ or confirmed roosts present close to or on the site. • Extensive and diverse habitat mosaic of high quality foraging for bats. • Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. • At/ near edge of range and/ or an important flyway. • Close to key roost and/ or swarming site.

Project size	**Description**
Small	• Small scale development (≤ 10 turbines). No other wind energy developments within 10km. • Comprising turbines <50m in height.

Medium	• Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. • Comprising turbines 50 – 100m in height.
Large	• Largest developments (>40 turbines) with other wind energy developments within 5km. • Comprising turbines >100m in height.

Appendix Contents

Appendix 5.1
LVIA Methodology and Glossary

1.1 Introduction

1.1.1 The Landscape and Visual Impact Assessment (LVIA) and cumulative landscape and visual impact assessment (CLVIA) identifies, predicts, and evaluates the likely significant landscape and visual effects that may result from the Proposed Development. This assessment assesses the effects of the Proposed Development described in **Chapter 2: The proposed development** of the EIA Scoping Report.

1.1.2 Essentially, the landscape and visual effect (and whether it is significant) is assessed by considering the landscape or visual sensitivity to the Proposed Development, with reference to the susceptibility and value of the receptor, against the magnitude of change in order to identify a level of effect that would be brought about by the Proposed Development, were it to be implemented. The level of effect is also described in terms of its scale, geographical extent and duration, and subsequently whether the effect would be significant.

1.1.3 The type of effect is also considered and may be direct or indirect; temporary or permanent (reversible); cumulative; and beneficial, neutral or adverse. The assessment has also considered the cumulative effects resulting from the Proposed Development in combination with other existing and consented wind farms, and wind farms at the planning application stage.

1.1.4 The time period for the assessment covers phases of development related to the construction of the Proposed Development and associated infrastructure and its operation for a period of 30 years.

1.1.5 Landscape and visual assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion has been sought through consultation, internal peer review, and the adoption of a systematic, impartial, and professional approach.

1.1.6 **Appendix 5.1** has been structured as follows:

- General Methodology;
- Landscape Assessment;
- Visual Assessment;
- Cumulative Landscape and Visual Assessment (CLVIA);
- Evaluation of Cumulative Landscape and Visual Effects;
- Visual Assessment of Views from Residential Properties;
- Night-time assessment;
- Production of ZTVs and Visualisations; and
- Abbreviations and Glossary.

1.2 General Methodology

1.2.1 The methodology for the LVIA and CLVIA has been undertaken in accordance with best practice guidance including, but not limited to, the following:

- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, Landscape Institute and IEMA, May 2013;

- Siting and Designing Windfarms in the Landscape, Version 3a, SNH, August 2017;
- Wind Farm Design Guidance in Wales – Designing Wind Farms in Wales, Design Council for Wales, 2012;
- LANDMAP Guidance Note 46: Using LANDMAP in Landscape and Visual Impact Assessments GN46. Natural Resources Wales, June 2021.
- Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments, SNH, 2012;
- Residential Visual Amenity Assessment (RVAA). Technical Guidance Note 02/19. Landscape Institute, March 2019
- Visual Representation of Windfarms, Version 2.2, SNH, February 2017; and
- Visual Representation of Development Proposals. Technical Guidance Note 06/19. Landscape Institute, September 2019.

1.2.2 The landscape and visual effects of wind turbines can be directly experienced through the observation of existing wind farms within this area whose location is shown on **Figure 5.4**. Noticeably, wind farm development can co-exist with other features of the landscape, rather than replacing or removing them, as in the case of more conventional built development, although they can alter the landscape character of an area. Wind farm development is also visually permeable and although views may be interrupted, they are not blocked or prevented. Generally, wind farms have a 'small' development footprint that preserves much of the physical elements of the landscape, but entails the addition of tall structures, which are unavoidably visible over longer distances, leading to greater visual effects. A further, important difference is the reversibility of almost all of the landscape and visual effects as a result of the decommissioning stage.

1.2.3 Wind farms give rise to a wide range of opinions, from strongly negative to strongly positive. However, LVIA is not an assessment of public opinion, although a precautionary approach has been taken, which assumes that the nature of the effects would be adverse or neutral unless otherwise stated.

Defining the LVIA Study Area

1.2.4 Current NRW guidance[1] advises that the LVIA Study Area for wind turbines of this height should be based on a specified search area that is 23 km distant from each of the proposed turbine locations as illustrated in **Figure 5.1**. This is termed the defined LVIA study area. It is important to note that the boundary of the defined LVIA study area is not the limit of potential visibility. Furthermore, NRW Guidance allied with conclusions and observations made in undertaking numerous LVIAs for wind farms developments in South Wales and across other regions in Wales concludes that significant landscape and visual effects are highly likely to be restricted to an area up to 10 km from each of the proposed turbine locations. This is termed the detailed LVIA study area and is also shown in **Figure 5.1**.

1.3 Landscape Assessment

1.3.1 Landscape Effects are defined by the Landscape Institute in GLVIA 3, paragraphs 5.1 and 5.2 as follows:

[1] *LANDMAP Guidance Note 46: Using LANDMAP in Landscape and Visual Impact Assessment GN46*. Natural Resources Wales, June 2021

"An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern ... is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. ... The area of landscape that should be covered in assessing landscape effects should include the site itself and the full extent of the wider landscape around it which the development may influence in a significant manner."

1.3.2 The potential landscape effects, occurring during the construction, operation and decommissioning period may therefore include, but are not restricted to the following:

- Changes to landscape elements: the addition of new elements (wind turbines, met mast(s) and ground level infrastructure elements) or the potential removal of existing elements such as trees, vegetation and buildings and other characteristic elements of the host LANDMAP aspect areas;
- Changes to landscape qualities: degradation or erosion of landscape elements and patterns and perceptual characteristics, particularly those that form key characteristic elements of host LANDMAP aspect areas or contribute to the landscape value of adjacent local landscape designations;
- Changes to landscape character: landscape character may be affected through the incremental effect on characteristic elements, landscape patterns and qualities (including perceptual characteristics) and the addition of new features, the magnitude of which is sufficient to alter the overall landscape character within LANDMAP aspect areas and/or landscape designations; and
- Cumulative landscape effects: where more than one wind farm may lead to a potential landscape effect.

1.3.3 Development may have a direct (physical) effect on the landscape as well as an indirect effect which would be perceived from the wider landscape, or other areas of landscape, outside the host LANDMAP aspect areas. This is usually, but not always exclusively, via a visual effect pathway.

Evaluating Landscape Sensitivity to Change

1.3.4 The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value. The overall sensitivity is described as High, Medium, Low, or Negligible. Landscape sensitivity often varies in response to both the type of development proposed and the particular site location, such that landscape sensitivity needs to be considered on a case by case basis. This should not be confused with 'inherent sensitivity' where areas of the landscape may be referred to as inherently of 'high' or 'low' sensitivity. For example, a National Park may be described as inherently of high sensitivity on account of its designation, although it may prove to be less sensitive to particular development and/or of variable sensitivity across the geographical area of the National Park. Alternatively, an undesignated landscape may be of high sensitivity to a particular development regardless of the lack of local or national designation.

1.3.5 The main factors considered are discussed as follows:

Landscape Susceptibility

1.3.6 Landscape susceptibility according to GLVIA3 means "*the ability of the landscape to accommodate the development without undue consequences for maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*". In the case of wind farm development there may be local or regional spatial strategies and/or landscape studies that can assist in broad

scale judgements about the overall landscape capacity or sensitivity to wind farm development[2]. Attention, however, must be paid to the purpose, scope and methodology of these documents, as whilst providing assistance for strategic planning, they are not usually suitable for the assessment of specific wind farm proposals and should not be directly applied to individual applications. Rather, they provide broad information that should be considered as part of the more detailed landscape assessment.

1.3.7 Judgements on landscape susceptibility include references to both the physical and aesthetic landscape characteristics, and the potential scope for mitigation. Landscape susceptibility varies according to different areas of landscape character and whilst accepting that wind farm development is likely to lead to high levels of landscape change in most circumstances, factors that commonly indicate lower landscape susceptibility to wind farm development include landscape characteristics of larger scale, uniformity of land cover, simple landform and skylines with limited landscape features. Generally speaking, lower landscape susceptibility together with lower landscape value tends to indicate lower landscape sensitivity to development. Conversely, higher landscape susceptibility and value tend to indicate higher landscape sensitivity to development.

1.3.8 Common indicators of landscape susceptibility[3] to wind farm development are as follows:

- Landscape Scale:

  A large-scale landscape is generally considered to be less susceptible to wind farm development in comparison to a small-scale landscape.

- Landform and Topography:

  A simple landform with smooth, regular, rolling, undulating, or flowing landforms that might include plains, undulating or rolling lowlands, and plateaus that are generally considered to be less susceptible to wind farm development in comparison to more complex landforms which might include narrow glens, valleys, dramatic rugged and/or distinct landform features or pronounced undulations.

- Openness and Enclosure:

  Open landscapes are generally considered to be less susceptible to wind farm development, but could entail wider visibility, conversely enclosed landscapes could offer more screening potential, limiting visibility to a smaller area, but are also likely to be of smaller scale.

- Land Cover Pattern:

  Simple, regular landscapes with extensive areas of uniform ground cover (moorland / grassland, unenclosed land, forestry, large regular field patterns, parliamentary enclosures) are generally considered to be less susceptible to wind farm development in comparison to landscapes with more complex or irregular land cover (smaller fields, medieval enclosures, smaller scale 'patchwork' landscapes of mixed fields with small woodland copses).

- Presence of Development:

  Areas where there are existing large-scale developments (industry, mineral extraction, masts pylons, other turbines, urban fringe / large settlement, major transport routes) are generally considered to be less susceptible to wind farm development in comparison to areas

[2] A good example is *Heads of the Valleys Smaller Scale Wind Turbine Development Landscape and Sensitivity Study Final Report* (April 2015) prepared by Gillespies, although as noted in the main text the proposed Mynydd-y-Glyn Wind Farm's capacity exceeds the largest capacity category utilised in the Study.
[3] Scottish Natural Heritage, A Guide to Commissioning a Landscape Capacity Study, 2015.

characterised by smaller scale development (smaller, generally historic villages with dense settlement patterns and smaller scale associated buildings such as churches).

- Landmarks:

  Landscapes that contain large scale landmarks which may include other wind farms and infrastructure and large-scale developments are generally less susceptible to wind farm development although development needs to be carefully sited to manage landscape foci and avoid 'visual clutter' or cumulative impacts. Historic landmarks such as important views to distinctive church spires and towers, particular 'landmark' landforms (prominent hills or peaks) or 'land art' generally increase susceptibility.

- Settlement:

  Landscapes which are un-settled or with lower levels of population are generally considered to be less susceptible to wind farm development in comparison to more densely populated areas.

- Skyline:

  Prominent and distinctive skylines, horizons (including indented ridges / peaks, key views and or vistas) or skylines with important landmark features that are identified in LANDMAP commentaries and responses, are generally considered to be more susceptible to wind farm development in comparison to broad, simple skylines which lack landmark features or contain other turbines / tall infrastructure features.

- Windiness and Rational:

  Areas that appear to be windy / windswept which may also be elevated or exposed are generally considered to be less susceptible to wind farm development in comparison to more sheltered areas.

- Change and Movement:

  Landscapes which contain movement (traffic, wind turbines, other moving infrastructure and waves / tides) or are subject to high levels of change (large scale forestry operations, mineral extraction, man-made change and development) are generally considered to be less susceptible to wind farm development in comparison to landscapes that are still or appear to be unchanging and/or notably historic with notable 'time depth'.

- Remoteness, Naturalness, Wildness / Tranquillity:

  Notably wild or tranquil landscapes are generally considered to be more susceptible to wind farm development in comparison to cultivated or farmed / developed landscapes where perceptions of 'wildness' and tranquillity are less tangible. Landscapes which are either remote or natural may vary in their susceptibility to wind farm development.

- Landscape Context and Adjacent Landscapes:

  The location and visual connection to adjacent landscapes may also have a bearing on the overall susceptibility of the landscape to wind farm development. This consideration is pertinent to the ridgeline and valley topography that characterises the parts of south Wales including the defined study area.

Landscape Value

1.3.9 This includes the consideration of a range of features which may include the presence or absence of landscape designation, special landscape qualities, rarity / representativeness, conservation interests, recreational value, perceptual qualities such as tranquillity and historical or cultural

associations, as set out in GLVIA 3, page 84, Box 5.1. The importance attached to a landscape, often as a basis for designation or recognition, which expresses national or local consensus, because of its quality including cultural associations, scenic or aesthetic qualities. Landscape value may be indicated by the presence or absence of a landscape planning designation such as an Area of Outstanding Natural Beauty (AONB) or Special Landscape Area (SLA) (higher value) indicating a landscape of national or local value accordingly or an undesignated landscape (lower value).

1.3.10 The absence of a landscape planning designation should not assume an area of 'low' landscape value and undesignated areas of landscape are often of some local value. Indications of this are likely to be present in the form of documented, locally valued, cultural / natural heritage and scenic or aesthetic qualities such as 'wildness' or the presence of viewing platforms or benches. It should be noted that a landscape of high value may not always equate to areas of high landscape quality and that areas of low landscape value may contain areas of higher landscape quality. The state of repair or condition of the elements of a particular landscape, its integrity and intactness and the extent to which its distinctive character is apparent are also relevant. The quality of a landscape element or characteristic may also be influenced by the degree to which it may contribute to the overall landscape character type/area, its rarity, fragility, and potential for replacement or mitigation. Landscapes of lower quality tend to include those under intensive agriculture, forestry or urban fringe situations where the landscape elements and patterns have been eroded, landscapes with man-made development such as infrastructure or other wind farms and areas of derelict or vacant land, areas of mineral extraction and / or land fill.

Evaluating the Magnitude of Landscape Change

1.3.11 The 'magnitude' or 'degree of change' resulting from a particular development is described as High, Medium, Low, Negligible or None. This is assessed by considering the scale, geographical extent and duration of the proposed change, which may include the loss or addition of particular features (primarily wind turbines), changes to landscape quality and changes to landscape character. As such this needs to be considered on a case by case basis. It may be possible for some mitigation measures to reduce the magnitude of change and consequently the residual landscape effects, and for these reasons the landscape design of the wind farm should form an iterative part of the assessment process. The main factors to be considered are discussed as follows.

- Loss, Alteration, or Addition to Landscape Elements:

  Development may result in the loss, alteration, or addition of landscape elements such as trees, hedgerows, or development components such as wind turbines anemometry masts and new access tracks. These can be quantified objectively;

- Loss, Alteration, or Addition to Landscape Characteristics / Quality:

  Development may result in the loss, alteration, or addition of physical landscape characteristics, such as wooded areas, landscape patterns, or development components such as wind turbines, which can be quantified objectively. Perceptual characteristics and effects on scenic quality or wildness also need to be considered, albeit subjectively, with reference made to objective and documented opinion; and

- Change to Landscape Character (As represented by LANDMAP Aspect Areas):

  All landscapes change over time and much of that change is managed or planned. Often landscapes will have management objectives for 'protection' or 'accommodation', meaning that they may accommodate wind farm development and 'change' whereby the landscape character could be altered to create new landscapes for the accommodation of wind farm development and / or forestry or to provide areas or development resulting in townscape or peri-urban

development. The scale of change may be localised, or occurring over parts of an area, or more widespread affecting whole landscape character areas and their overall integrity.

1.3.12 In addition to the scale or magnitude of the effect, GLVIA3 advises that consideration should also be given to the following aspects of a landscape effect:

Geographical Extent

1.3.13 Landscape effects should be described in terms of the geographical extent or physical area that would be affected (described as a linear or area measurement e.g. spatial extent of the hub height and/or blade tip ZTVs). This should not be confused with the scale of the proposed development or its physical footprint. Landscape effects occurring over a larger geographical extent and over a higher proportion of a landscape designation or LANDMAP aspect area are more likely to be regarded as significant.

Duration and Reversibility

1.3.14 Landscape effects should also be described in terms of the duration of the effect and whether this would be permanent, temporary or reversible. Duration can be considered as ranging between temporary (short to long term and time limited) or permanent. Although 'long term' some development such as housing should be regarded as permanent, whilst mineral extraction works usually entail several phases of development, followed by restoration to a 'new' landscape character. Wind farm development usually operates for a long term, time limited operational period, in the case of the proposed Mynydd-y-Glyn Wind Farm 25 years followed by a decommissioning period that would allow the landscape effects to be reversed. Reversibility is only assessed as part of the decommissioning stage and cannot factor into the assessment of the time limited operational effects.

1.3.15 Further guidance on the evaluation of landscape sensitivity and magnitude are provided in **Table A5.1**.

1.3.16 The level of landscape effect is evaluated through the combination of landscape sensitivity and magnitude of change, a process assisted by the matrix in **Table A5.3**, which is used to guide the assessment. In those instances where there would be no change to the landscape, the magnitude has been recorded as 'Zero' and the level of effect as 'None'.

1.3.17 Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' as required by the relevant EIA Regulations. Further information is also provided about the nature of the effects (whether these would be direct / indirect, temporary / permanent / reversible, cumulative, or beneficial, neutral or adverse).

1.3.18 In describing the level of landscape effect the assessment text clearly and transparently sets out the professional judgements that have been made in determining sensitivity and how the value and susceptibility of the landscape receptor has been assessed; and in determining magnitude and how the size and scale, geographical extent and duration of the effect has been taken into account.

Table A5.1 Landscape Sensitivity and Magnitude

Examples of Landscape Sensitivity	
High	Landscape character, characteristics, and elements with no or limited landscape capacity or scope for landscape change and higher landscape value and susceptibility to the proposed development. Often includes landscapes which are nationally, internationally or regionally designated and have a high landscape value. In relation to landscape designations, the documented Special Landscape Qualities qualities[4] are such that there would be no or limited landscape capacity or scope for landscape change of the type posed by the proposed development.
Medium	Landscape character, characteristics, and elements with some landscape capacity or some scope for landscape change. Often includes landscapes of medium landscape value and quality as assessed in the relevant VSAA LANDMAP responses which may be locally designated or undesignated and have a medium landscape value. In relation to landscape designations, the documented Special Landscape Qualities and wild land qualities are such that there would be some landscape capacity or scope for change or accommodation.
Low	Landscape character, characteristics and elements which display greater landscape capacity or scope for landscape change to accommodate the proposed development as part of spatial strategy for example. Usually applies to landscapes which are undesignated with indicators of lower landscape susceptibility to development. May also apply to landscapes that may have been subject to intensive agriculture, blanket forestry or other man-made development and have a low landscape value.
Negligible	Landscape character, characteristics and elements where there is a high landscape capacity or a planned desire for landscape change of the type proposed as part of spatial strategy for example. Usually applies to landscapes with a lower landscape susceptibility to development. May also apply to derelict landscapes, or vacant land, areas of mineral extraction and / or land fill for example.
Examples of Landscape Magnitude	
High	A total or large-scale change and / or extent that may include the loss of key landscape characteristics / special qualities or the addition of new uncharacteristic features or elements, that would become the dominant characteristics of the landscape, and change the overall landscape quality, and character over a large area.
Medium	A medium-scale change of limited scale and extent including the loss of some key landscape characteristics / special qualities or elements, or the addition of some new uncharacteristic features or elements that would potentially change the landscape quality and character of a localised area or part of a landscape character type/area.
Low	A low-scale change affecting small areas of landscape character / special qualities, including the loss of lower value landscape elements, or the addition of new features or elements of limited characterising influence.
Negligible	A negligible change affecting smaller areas of landscape character and quality, including the loss of some landscape elements or the addition of features or elements, which are either of low value or hardly noticeable in terms of their contribution to the landscape character.
None	There would be no change to the receptor.

1.4 Visual Assessment

1.4.1 Visual Effects are concerned wholly with the effect of the development on views, and the general visual amenity and are defined by the Landscape Institute in GLVIA 3, paragraphs 6.1 as follows:

"An assessment of visual effects deals with the effects of change and development on views available to people and their visual amenity. The concern ... is with assessing how the surroundings of

[4] As set out in a National Park Management Plan or the several Special Landscape Area reviews that have been commissioned by individual or consortia of local authorities in south Wales.

individuals or groups of people may be specifically affected by changes in the context and character of views."

1.4.2 Visual effects are identified for different receptors (people) who will experience the view(s) at their places of residence, during recreational activities, at work, or when travelling through the area. The visual effects may include the following:

- Visual effect: a change to an existing static view, sequential views, or wider visual amenity as a result of development or the loss of particular landscape elements or features already present in the view(s); and
- Cumulative visual effects: the cumulative or incremental visibility of similar types of development may combine to have a cumulative visual effect.

1.4.1 The level of visual effect (and whether this is significant) is determined through consideration of the 'sensitivity' of each visual receptor (or range of sensitivities for receptor groups) and the 'magnitude of change' that would be brought about by the construction and operation proposed development. Visual assessment unavoidably involves a combination of both quantitative and subjective assessment and wherever possible a consensus of professional opinion is sought through consultation and internal peer review.

Zone of Theoretical Visibility (ZTV)

1.4.3 Plans mapping the Zone of Theoretical Visibility (ZTV) are used to analyse the extent of theoretical visibility of development or part of a development, across the defined and detailed LVIA Study Areas and to assist with viewpoint selection. For proposed wind farm developments ZTVs are calculated for the turbines' hub heights and their blade tips. The ZTVs does not take account of the screening effects of buildings, localised landform and vegetation, unless specifically noted (see individual figures). As a result, there may be roads, tracks and footpaths within the LVIA study areas which, although shown as falling within the ZTV, are screened or filtered by built form and vegetation, which would otherwise preclude visibility.

1.4.4 The ZTVs provide a starting point in the assessment process and accordingly tend towards giving a 'worst case' or greatest calculation of the theoretical visibility.

Viewpoint Analysis

1.4.5 Viewpoint analysis is used to assist the assessment and is conducted from selected viewpoints identified and agreed upon with consultees within the LVIA Study Area. The purpose of this is to assess both the level of visual impact for particular receptors and to help guide the design process and focus the LVIA. A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer geographical limit, beyond which there would be no further significant visual effects.

1.4.6 The assessment involves visiting the viewpoint location and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with good visibility and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

1.4.7 The assessors have also viewed the electronic photomontages in animated form as part of the office-based software used for their production so the effects of blade rotation can be assessed. The turbines are always viewed as though facing towards the viewer to provide maximum potential visibility, although during operation, the turbines would face into the wind. The prevailing wind direction, likely to occur during the operational period is therefore also informative to the

assessment, particularly if this tends to be variable or directional. In south Wales the prevailing wind direction is from the south-west.

Evaluating Visual Sensitivity to Change

1.4.8 In accordance with paragraphs 6.31-6.37 of *GLVIA 3* the sensitivity of visual receptors takes account of the susceptibility of the receptor to visual change and the value of the baseline view available to them.. Sensitivity is assessed as High, Medium, Low, or Negligible, although in practice 'negligible' sensitivity is not used.

Visual Assessment: Susceptibility

1.4.9 The main factors to consider are the activity or occupation of the receptor at the viewpoint or receptor location and the extent to which their attention or interest may be focused on the view and visual amenity of the surrounding landscape. Whilst it is accepted that people will undertake a range of different activities, their visual experience of a development will change according to where they are, and what they are doing, and susceptibility is assessed as follows:

- People at nationally recognised viewpoints, people at views/vistas attached to heritage features (such as Gardens and Designed Landscapes) or other locations recognised nationally in art or literature, are assessed as of high susceptibility. People in their communities including those engaged in out-door recreation (e.g. users of public open spaces), where the focus of the activity is on enjoyment of the landscape and there is a high frequency of use, are also considered to be of high susceptibility;
- People on local footpaths routed through undesignated, landscapes that may be of lower scenic quality, and people engaged in sport, or travelling / commuting, especially on motorways, trunk roads and other 'A' roads are considered as to be of less susceptibility (medium); and
- People at their place of work where views are not an important contributor to the quality of working life possess the least (low) susceptibility.

Visual Assessment: Value

1.4.10 In relation to value, consideration is given to the value of the view(s) through reference to local or national scenic landscape designation. Other factors to consider include the importance or popularity of the view(s) and/or the likely numbers of viewers and the location and context of the viewpoint (in terms of the main primary or secondary views from a receptor location). The visual experience from a tourist destination, for example, could involve either the key views to, or from the main attraction, or those from the car-park / service area, and this context will affect the sensitivity and value of the views. Whilst views from car-parks / service areas may still be experienced by receptors of inherently higher sensitivity, these types of views should not be considered of higher value or sensitivity.

1.4.11 Landmarks / tourist attractions and national trails visited and used by large numbers of people are likely to be of higher value and more sensitive than those which are less visited. Occasionally there may be exceptions such as motorways where, although there are higher numbers of receptors these are generally considered to be of lower value. Conversely some less well visited footpaths within remote areas, may be of higher value precisely because of the lower visitor numbers.

Evaluating the Magnitude of Change to the View

1.4.12 The magnitude of change is described as High, Medium, Low, Negligible or Zero, and is assessed by consideration of possible changes caused by the Proposed Development, which may affect the view. For visual receptors for whom the Proposed Development would not be visible and there would be no change to their view, the magnitude has been recorded as 'zero' and the level of effect as 'no view'.

1.4.13 The magnitude of visual change is described by reference to the following:

- Scale of Change:

  The scale of change in the view (including horizontal and vertical FoV[5] affected), is determined by the loss or addition of features in the view and changes in the composition and extent of view affected. This can in part be described objectively by reference to numbers of new objects visible and the horizontal / vertical extents of the FoV affected.

- Contrast:

  The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of mass, scale, colour, movement, form and texture. Proposed Developments which contrast or appear incongruous in terms of colour, scale and form are likely to be more visible and to generate a higher magnitude of change.

- Distance:

  The proximity or distance from the Proposed Development can be described objectively and often provides a strong indicator of magnitude, subject to any intervening screening by landform, vegetation, or buildings.

- Speed of Travel:

  The speed at which the Proposed Development may be viewed will affect how long the view is experienced and the likelihood of the Proposed Development being particularly noticed by people travelling in cars compared to those who may be walking and able to stop and 'take in' a view.

- Angle of View (AoV):

  The AoV from the main viewing direction may be considered in terms of whether the Proposed Development is experienced directly or at an oblique angle from the visual receptors' main viewing direction. Road users are generally more aware of the views in the direction of travel, whilst train passengers are more aware of views perpendicular to their direction of travel. Elevated views are likely to reveal more of the Proposed Development, whereas low level views are more likely to be screened by intervening built form and vegetation.

- Screening:

  The Proposed Development may be wholly or partly screened by landform, vegetation (seasonal) and or built form. Conversely open views, particularly from landscapes where LANDMAP identifies their availability as a characteristic, are likely to reveal more of a development.

[5] Field of View.

- Skyline / Background:

  Whether the Proposed Development would be viewed against the skyline or a background landscape may affect the level of contrast and magnitude, for example, skyline developments may appear more noticeable, particularly where they affect open and uninterrupted horizons. Conversely, wind turbines may also appear more noticeable when viewed against a darker background landscape, such as forestry.

- Nature of Visibility:

  The nature of visibility, whether this is subject to various phases of development change and the manner in which the development may be viewed such as intermittently or continuously, and / or seasonally, due to periodic management or leaf fall, is a further factor for consideration.

1.4.14 In addition to the scale or magnitude of the effect, GLVIA 3 advises that consideration should also be given to the following aspects of a visual effect:

Geographical Extent

1.4.15 A visual effect is also considered in terms of the geographical extent, physical area or location over which it would be experienced (described as a linear or area measurement). Visual effects affecting a large geographical area are more likely to be regarded as significant.

Duration and Reversibility

1.4.16 A visual effect is also considered in terms of the duration over which the effect would be experienced and whether this would be permanent, temporary or reversible. Duration can be considered as ranging between temporary (short to long term and time limited) or permanent. Although 'long term' some development such as housing should be regarded as permanent, whilst mineral extraction works usually entail several phases of development, followed by restoration. Wind farm development usually operates for a long term, time limited period, for the proposed Mynydd-y-Glyn Wind Farm 30 years followed by a decommissioning period that would allow the visual effects to be reversed. Reversibility is only assessed as part of the decommissioning stage and cannot factor into the assessment of the time limited operational effects. Permanent visual effects (not time limited) are more likely to be regarded as significant.

1.4.17 Further guidance on the evaluation of visual sensitivity and magnitude is provided in **Table A5.2**.

Table A5.2 Visual Receptor Sensitivity and Magnitude

Examples of Visual Sensitivity	
High	People in their communities and on long distance, strategic footpaths or popular footpaths and tourist destinations, viewing important landscape features, beauty spots and picnic areas, where the activities are focused on the landscape. Receptors include groups of high susceptibility to change such as residents, tourists / visitors, and walkers travelling through the landscape, viewing and experiencing landscapes of high value and quality.
Medium	People within outdoor sports based recreational spaces such as and golf courses, using local or less well used recreational routes of viewing landscapes of high or medium value. Receptors include groups of medium susceptibility to change receptors such as some walkers, cyclists, road users, and other recreational receptors travelling through the landscape / seascape. Viewing and experiencing landscapes of medium value and quality.
Low	People working on the land or sea, at their place of work, or taking part in activities such as team sports that do not involving an appreciation of the landscape, including vehicular receptors travelling on motorways and other busy trunk and 'A' roads. Often viewing and experiencing landscapes of medium to low value and quality.

Examples of Visual Sensitivity	
Negligible	Not used.
Examples of Visual Magnitude	
High	A major change or obstruction of a view that may be directly visible, appearing as the dominant and contrasting feature appearing in the fore or middle ground.
Medium	A prominent change or partial view of a new element within the view that may be readily noticeable, directly or obliquely visible including glimpsed, partly screened or intermittent views, appearing as a prominent feature in the middle ground or background landscape.
Low	A noticeable or small level of change, affecting a small part of the view that may be obliquely viewed or partly screened and/or appearing in the background landscape although noticeable. May include views experienced whilst travelling at speed.
Negligible	A small or intermittent change to the view that may be obliquely viewed and mostly screened and/or appearing in the distant background or viewed at high speed over short periods and capable of being missed by the casual observer.
None	There would be no change to the view.

1.4.18 The level of visual effect is evaluated through the combination of visual sensitivity and magnitude of change, a process assisted by the matrix in **Table A5.3**, which is used to guide the assessment. In those instances where there would be no change or no visibility or view of the Proposed Development, the magnitude has been recorded as 'Zero' and the level of effect as 'No View'.

1.4.19 Once the level of effect has been assessed, a judgement is then made as to whether the level of effect is 'significant' as required by the relevant EIA Regulations. Further information is also provided about the nature of the effects (whether these would be direct / indirect, temporary / permanent / reversible, cumulative, or beneficial, neutral or adverse).

1.5 Cumulative Landscape and Visual Assessment

1.5.1 The assessment of cumulative effects is essentially the same as for the assessment of the primary landscape and visual effects, in that the level of landscape and visual effect is determined by assessing the sensitivity of the landscape or visual receptor and the magnitude of change. Cumulative assessment however, considers the magnitude of change posed by multiple development.

1.5.2 A cumulative landscape or visual effect simply means that more than one type of development is present or visible within the landscape. Other forms of existing development and landuse 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 capacity for cumulative development, 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.

1.5.3 Detailed guidance on the cumulative assessment of wind farm development is provided in the SNH document '*Guidance: Assessing the Cumulative Impact of Onshore Wind Energy Developments*' (2012). This assessment distinguishes between 'additional' cumulative effects that would result from adding the Proposed Development to other cumulative wind farm development and 'combined' cumulative effects that assess the total cumulative effect of the Proposed Development

and other cumulative wind farm development. In the latter case a significant cumulative effect may result from the Proposed Development or one of more other existing, under-construction or consented wind farms, or other wind farm applications. In those cases, the main contributing wind farm(s) is identified in the assessment.

1.5.4 Types of cumulative effect are defined as follows:

- Cumulative Landscape Effects: Where more than one wind development may have an effect on a landscape designation or particular area of landscape character as define by LANDMAP Aspect Areas;
- 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:
  - 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[6];
  - 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
  - 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.

1.5.5 The SNH document '*Siting and Designing Wind farms in the Landscape' (Version 3a)* explains that the development of multiple wind farms within a particular area may create different types of cumulative effect, such as where:

"The wind farms are seen as separate isolated features within the landscape character type, too infrequent and of insufficient significance to be perceived as a characteristic of the area;

The wind farms are seen as a key characteristic of the landscape, but not of sufficient dominance to be a defining characteristic of the area; [a landscape with wind farms] and

The wind farms appear as a dominant characteristic of the area, seeming to define the character type as a 'wind farm landscape character type."

1.5.6 Wind farm development that results in the creation of a '*wind farm landscape*' as opposed to a '*landscape with wind farms'* or '*landscape with occasional wind farms*' is likely to be assessed as significant. Equally the 'additional effect' of a proposed wind farm development, adding to a scenario where there are already a number of other existing or consented wind farms, may be less than the effect of the Proposed Development either on or primary basis or in an area where there are few or no wind farms existing. This is because wind farm development has already been established as a characterising influence and the additional effect of further development may or may not alter this.

1.5.7 Whilst the CLVIA considers other wind farm development, it should not be considered as a substitute for individual LVIA assessment in respect of each of the other cumulative developments included in the CLVIA.

[6] Note: A person's field of view is variable but is approximately 90° when facing in one direction.

Defining the Cumulative Study Area

1.5.8 The cumulative search area and study area is the same as the defined LVIA Study Area as illustrated in **Figure 5.1**. Other existing, under-construction, consented and application wind energy sites included within this area are noted and considered in terms of their likely relevance to the CLVIA. Sites within the Cumulative Search Area which are considered likely to contribute to a significant cumulative effect in 'addition' or in 'combination' with the Proposed Development are included in the CLVIA.

1.5.9 Those developments at pre-planning or scoping stage are excluded in accordance with SNH guidance, unless there is a justified / exceptional circumstance for their inclusion in the assessment.

Predicting Cumulative Landscape Effects

1.5.10 The CLVIA considers the extent to which the Proposed Development, in combination with other existing, consented and proposed[7], may change landscape character through either an 'additional' or 'in combination' effect on characteristic elements, landscape characteristics and quality of the baseline landscape character as defined in LANDMAP. Identified cumulative landscape effects are described in relation to each individual scoped in LANDMAP Aspect Area and for any scoped in designated landscape areas assessed within the LVIA Study Area.

Predicting Cumulative Visual Effects

1.5.11 The assessment of cumulative visual effects involves reference to the cumulative visibility ZTV maps and the cumulative viewpoint analysis. The cumulative visibility of other existing and consented wind energy developments and applications is established in the first instance using the computer programme (Resoft Wind Farm© software) to identify areas where wind energy developments are theoretically visible. Cumulative visibility maps are analysed to identify the visual receptor locations and routes where cumulative visual effects on the landscape and people may occur as a result of the Proposed Development.

1.5.12 With potential receptor locations identified, cumulative effects on individual receptor groups are then explored through viewpoint analysis, which involves site visits informed by wireline illustrations that include other wind energy developments. The computer programme itself can also be used to 'drive' particular routes to assess the visibility of different wind energy developments and inform the assessment of sequential cumulative effects that may occur along a route or journey, and compared to actual visibility experienced along a route during the site visit.

Evaluation of Cumulative Landscape and Visual Effects

1.5.13 The evaluation of cumulative effects is assisted by the matrix in **Table A5.3**, which is used to guide the assessment.

1.5.14 The cumulative assessment has been prepared to ensure that, as well as the primary effect of the Proposed Development (LVIA) the 'additional' cumulative effects and the 'combined' cumulative effect (CLVIA) is also reported to account for two cumulative Scenarios as follows:

- Existing + Proposed Development:
  - The primary effect in the context of the current baseline of operational wind energy developments as summarised in **Table 5.1**.
- Scenario 1: Existing + Consented + the Proposed Development:

[7] Planning application submitted or at public inquiry.

- The additional and combined cumulative effects of any consented wind energy developments with the Proposed Development are assessed.

- Scenario 2: Existing + Consented + Applications + the Proposed Development:
  - The additional and combined cumulative effects of the existing and consented wind energy developments and any live applications (which would include schemes at planning appeal), with the Proposed Development are assessed. At present no live applications have been identified in the CLVIA study area.

1.5.15 In addition, the cumulative assessment takes account of the timescales, as far as practicable.

1.5.16 Due to the numbers of other wind energy developments scoped into the CLVIA, the overall cumulative effects may be greater than for the primary effect or additional effect for the Proposed Development assessed in the main LVIA. The resulting level of cumulative effect may remain at the same level of effect or increase to a higher level of effect. The point at which these effects become significant or not significant in landscape and visual terms is still a matter for professional judgement, although four scenarios or combinations of cumulative effect, taking account of other wind energy development can occur as follows:

- 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;
- 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;
- A non-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
- 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 effect is still termed 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.

1.5.17 The nature of a cumulative effect may also be described as direct / indirect, temporary / permanent, or beneficial/ adverse. The probability of a cumulative effect occurring may also be described (certain, likely or uncertain / unknown).

1.6 Evaluating Landscape and Visual Effects

1.5.18 The level of effect relating to landscape and visual effects and / or cumulative landscape and visual effects is determined by the combination of sensitivity (ranging from High to Negligible) and magnitude of change (ranging from High to Zero), which is assisted by the matrix illustrated in **Table A5.3**. In addition to the scale or magnitude of the effect, the GLVIA 3 advises that consideration should also be given to the geographical extent and duration or reversibility of the effect as described earlier.

Types of Landscape and Visual Effect

1.5.19 The relevant EIA Regulations also require that the level of effect is described in terms of its 'type' or 'nature' of effect (whether the effect is permanent / temporary, direct / indirect, beneficial/neutral/adverse and or cumulative) as well as the scale over which the effect would occur. For example, an effect may be locally significant, or significant with respect to a small number of receptors, but not significant when judged in a wider context. These terms are defined below:

- Temporary or Short Term / Long term / Permanent:

  The time period over which an effect may occur is referred to as temporary / short term, long term, or permanent. Wind farm development is considered 'in perpetuity' due to the long-term periods of operation typically occurring over 25-30 years. However, the Proposed Development is time-limited and the effects would also be reversible upon completion of the Proposed Development's decommissioning.

- Direct / Indirect effects:

  Direct effects relate to the host landscape elements and LANDMAP Aspect Areas and concern both physical and perceptual effects on these receptors. Indirect effects relate to those LANDMAP Aspect Areas, designated landscapes and visual receptors which separated by distance or remote from the Proposed Development. Such receptors can only be impacted via of visual or perceptual effects pathways. The Landscape Institute also defines indirect effects as those which are not a direct result of the Proposed Development but are often produced elsewhere or from a complex pathway e.g. localised road widening to facilitate delivery of turbines along the proscribed access route.

- Beneficial / Neutral / Adverse:

  The landscape and visual effects generated may be beneficial, neutral, or adverse. The LVIA assumes that the nature of the effects would be 'adverse' unless otherwise stated i.e. adopts a worst-case scenario and in the case of wind farm development, the most noticeable effects and changes are likely to be visual. However, GLVIA 3 cautions against the automatic assumption that all change would result in an adverse effect.

  - In Landscape Terms: a beneficial effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include changes that neither add nor detract from the quality and character of an area including development that may be reasonably accommodated within the scale and capacity of the landscape in the context of landscape management and change as defined in LANDMAP commentaries, and negligible magnitudes of change. An adverse effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction or operation that exceeds landscape capacity, leading to a reduction in landscape quality and character of a LANDMAP Aspect Area or a landscape designation;

  - In Visual Terms: beneficial or adverse effects are less easy to define or quantify and require subjective consideration of a number of aesthetic factors affecting the view, which may be beneficial, neutral, or adverse. Not all change, including high levels of change, is necessarily an adverse experience. Public opinions as to the visual effects of wind farms vary widely, however this LVIA is not an assessment of public opinion. Rather, an LVIA considers architectural and aesthetic factors such as the visual composition of the landscape in the view together with the wind farm design, which may or may not be reasonably accommodated within the scale and character of the landscape as perceived from the receptors' location. Neutral visual effects would include changes that are not dominating, overbearing, or oppressive. They include development that appears reasonably well accommodated within the scale and landscape setting or context and also includes

negligible magnitudes of change. An adverse effect may include poor visual design quality such as overlapping ('stacking') turbines, inappropriate scale of development relative to the underlying landscape, or other visual factors that may reduce scenic quality, such that the wind farm would appear dominating, overbearing, or oppressive.

Probability of Cumulative Effect

1.5.20 The probability of cumulative effects is variable. Those effects related to existing wind energy development and those under construction are considered as certain; effects related to development with planning consent are considered as likely. Wind energy development sites for which there is a submitted planning application are considered as uncertain.

Determining the Significance of Effects

1.5.21 In accordance with the relevant EIA Regulations it is important to determine whether the predicted effects, resulting from the Proposed Development, are likely to be significant. Significant landscape and visual effects are highlighted in **bold** in the text and in most cases, relate to all those effects that result in a '**Substantial**' or a '**Substantial / Moderate**' effect as indicated in **Table A5.3**. 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 in bold and explained as part of the assessment, where they occur.

1.5.22 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 A5.3 Evaluation of Landscape and Visual Effects

		Landscape and Visual Sensitivity			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change	**High**	**Substantial**	**Substantial / Moderate**	**Moderate**	Slight
	Medium	**Substantial / Moderate**	**Moderate**	Slight	Slight / Negligible
	Low	**Moderate**	Slight	Slight / Negligible	Negligible
	Negligible	Slight	Slight / Negligible	Negligible	Negligible
	Zero	None / No View			

1.6.1 In line with the emphasis placed in GLVIA 3 upon application of professional judgement, the adoption of an overly mechanistic approach through reliance upon a matrix as presented in **Table A5.3** will be avoided. This will be achieved by the provision of clear and accessible narrative explanations of the rationale underlying the assessment made for each landscape and visual receptor over and above the outline assessment provided by use of the matrix. Matrices for landscape and visual effects are provided as a summary in support of the narrative explanations. Wherever possible cross references will be made to baseline figures and/or to photomontage visualisations to support the rationale

Residential Visual Amenity Assessment

1.6.2 Residential amenity is a planning matter that involves a wide number of effects (such as noise and shadow flicker) and benefits, of which residential visual amenity is just one component. The

Residential Visual Amenity Assessment (RVAA) is limited to the consideration of visual effects on residential amenity and the methodology accords with the advice in GLVIA 3, the Landscape Institute's *Residential Visual Amenity Assessment: Technical Guidance Note*, 2019.

1.6.1 Planning law contains a widely understood principle that the outlook or view from a private property is a private interest and not therefore protected by the UK planning system. However, the planning system also recognises situations where the effects on residential visual amenity are considered as a matter of public interest. This matter has been examined at a number of public inquiries in Wales (as well as in Scotland and England) where the key determining issue was not the identification of significant effects on views, but whether the proposed turbines would have an overbearing effect and/or result in unsatisfactory living conditions, leading to a property being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live.

1.6.2 The visual assessment methodology consequently provides for a much more detailed assessment of the closest residential properties in communities. This allows the assessor. and the determining authority. to make a judgement as to whether the residents at these properties and communities would be likely to sustain unsatisfactory living conditions which it would not be in the public interest to create. Reviews of decisions demonstrate that significant visual effects or changes to the views available from residential properties and their curtilage are not the decisive consideration, rather it is the residential amenity and, with regard to an LVIA, residential *visual* amenity that is determinate.

1.6.3 The methodology for assessing the visual effects on views from residential properties is therefore slightly different from the assessment of other visual receptors and allows for two stages of assessment as follows:

- Stage 1: Undertake a visual assessment to identify any significant effects upon residents in communities; and
- Stage 2: Undertake a Residential Visual Amenity Assessment (RVAA).

1.6.4 A residential property, for the purposes of environmental impact assessment, should be one that was designed and built/converted for that purpose and currently (at the time of the assessment) remains in a habitable condition, of a safe construction, wind and water tight with appropriate vehicle access, and services (drinking water, sanitation, and power supply). Other buildings such as barns/outbuildings, garages, huts and derelict properties should generally be excluded from the RVAA, unless they form part of the curtilage of an existing residence.

1.6.5 The assessment of residential properties or groups of residential properties is limited to those which appear on the Ordnance Survey 1:25,000 scale map and any expectations such as known recent 'new-builds'. Planning permissions and conversions are not included. Whilst most of the properties can be viewed at close range from public roads and footpaths, or have otherwise been visited, some of these properties are accessed via private or gated roads and due to these access limitations, they have been assessed from the nearest public road or footpath which may be at greater distance from the property. Where this is the case, the RVAA should be regarded as a 'best estimate' of the likely visual effects.

1.6.6 Baseline conditions across many parts of the Valleys area in south Wales are such that communities are often located within the proscribed 2 km radius RVAA study area with these communities containing large numbers of residential properties. This situation is applicable to the proposed Mynydd-y-Glyn Wind Farm. Undertaking visual assessments and subsequently RVAAs at individual residential properties in these communities is neither practical nor desirable. Residential properties in communities are therefore grouped together based upon shared relevant characteristics as listed in paragraph 5.6.11 under Stage 2: Residential Visual Amenity Assessment.

Stage 1: Visual Assessment

1.6.7 A visual assessment is undertaken to identify those properties where a significant visual effect on a view from the property available to the resident(s) is likely to occur. The methodology for this is set out above and combines an assessment of the residents' 'sensitivity' with an assessment of 'magnitude'.

1.6.8 The sensitivity of individual residential receptors in the community has been assessed as 'High' due to the high susceptibility of residents in accordance with GLVIA 3, paragraph 6.33. The value of the view is also likely to be regarded as high by the residents themselves, but the views in the closest communities to the proposed Mynydd-y-Glyn Wind Farm are not nationally and only infrequently locally designated for their scenic value and generally accord a medium value in this respect.

1.6.9 Other wind energy development may be visible to residents in some communities within the 2 km radius RVAA study area. However, it is considered unlikely that it would contribute to an effect on the RVAA because as shown in **Table 5.1** and **Figure 5.4,** the wind energy developments that are the closest (within 10 km) and which are most likely to be visible from these communities are scattered individual turbines under 100m blade tip height.

Stage 2: Residential Visual Amenity Assessment

1.6.10 The second stage is to consider the residential visual amenity and whether, in terms of the wider public interest, the visual effects would result in unsatisfactory living conditions, leading to properties being regarded, objectively, as an unattractive (as opposed to a less attractive) place in which to live. Relevant information considered as part of the Stage 2 assessment may include, but is not limited to the following:

- Scale of Wind Farm:
  - Number and height of visible turbines;
  - The horizontal and vertical extent or AoVs of the visible turbine array;
  - Separation distance (closest and furthest visible turbines); and
  - Height differentials in metres Above Ordnance Datum (AOD) between the property groups in the valleys and the turbine bases on the ridgeline.
- Description of property groups, as far as this can be ascertained and as applicable to a majority of individual properties in a defined group:
  - Orientation and size of properties and whether views from the properties towards the wind farm would be direct or oblique;
  - Location of principal rooms and main living areas such as living/dining rooms, kitchens and conservatories, as opposed to upstairs rooms (bedrooms / bathrooms), working areas such as farm buildings and utility areas;
  - Location of principal garden areas which may include patios and seating areas as opposed to less well used areas within curtileges such as paddocks or garages; and
  - The effects of any screening by landform, vegetation or nearby built development.
- Location and context:
  - The aspect of the property in terms of the overall use and relationship to the garden areas and surrounding landscape;
  - The principal direction of main views and visual amenity;

- The context and nature of any intervening structures e.g. other existing wind farm development, farm buildings or forestry.

1.6.11 The RVAA will be supported by aerial and ground level photography as well as map-based data, the production of ZTV plots and visualisations such as wirelines. The RVAA will take account of the likely views from the ground floors of properties and main garden areas but excludes upper floors and other non-residential land that may be associated with the properties. These areas cannot usually be assessed from public areas, unless they have been subject to further on-site assessment with the resident's permission.

1.6.12 Other factors affecting residential amenity such as noise and shadow flicker are not considered as part of the RVAA.

1.7 Night-time Assessment

1.7.1 The night-time assessment follows the same methodology used for the assessment of landscape, visual and cumulative effects. The only difference is that it is conducted during periods of dawn to dusk and assesses the baseline night-time environment against the proposed additional, artificial lighting, in this case aviation warning lights, to be fitted to the proposed turbines.

1.7.2 The study area for the night-time assessment is also the same as the detailed LVIA Study Area.

1.7.3 As with the landscape and visual assessment, the sensitivity of the visual receptor to the Proposed Development (aviation warning lights) and the magnitude of change are combined to determine the level of effect likely to result from the aviation warning lights. The evaluation of significance and the nature of these effects is also described following the methodology used for the assessment of landscape, visual and cumulative effects.

1.7.4 Importantly, the night-time assessment is not a technical lighting impact assessment based on quantitative measurement of light levels, rather the assessment relies on professional judgement of what the human eye can reasonably perceive.

1.7.5 The night-time assessment is supported by a baseline night-time environment or darkness survey and ZTV plots, baseline photography, wirelines and photomontages from selected viewpoints. These visualisations help to assess both the level of night-time visual impact for particular visual receptors and focus the assessment.

Night-time Viewpoint Analysis

1.7.6 A range of viewpoints are examined in detail and analysed to determine whether a significant visual effect would occur. By arranging the viewpoints in order of distance it is possible to define a threshold or outer limit, beyond which there would be no further significant night-time effects.

1.7.7 The night-time viewpoint analysis involves visiting the viewpoint locations during periods of dawn or dusk and viewing wirelines and photomontages prepared for each viewpoint location. The fieldwork is conducted in periods of fine weather with clear skies and considers seasonal changes such as reduced leaf cover or hedgerow maintenance.

Baseline Night-time Environment or Darkness Survey

1.7.8 During site visits a baseline night-time environment survey or 'darkness survey' is carried out at each viewpoint location. The purpose of the darkness survey is to establish the existing light levels perceived by the landscape architects at the viewpoints and determine their sensitivity to change. The following observations are recorded:

- Areas of darkness with no artificial light;
- Direct artificial lighting (where the light source is directly visible from the viewpoint);
- Indirect artificial lighting (where the light source is not visible but the light emanating from the light source is visible as in the case of 'sky glow');
- Static lighting, for example emanating from built development or street lighting; and
- Mobile or transient lighting, for example associated with moving vehicles, trains or aircraft.

1.7.9 Baseline photographs at each of the night-time assessment viewpoints are obtained and presented.

1.8 Production of ZTVs and Visualisations

1.8.1 Zones of Theoretical Visibility (ZTVs) and visualisations (wirelines / wirelines and photomontages) are graphical images produced to assist and illustrate the LVIA and the cumulative assessment. The methodology accords with the SNH guidance *Visual Representation of Wind Farms*, Version 2.2, February 2017. Further, additional guidance is provided by the Landscape Institute Technical Guidance Note: *Visual Representation of Development Proposals*, 17 September 2019.

Methodology for Production of ZTVs

1.8.1 The ZTVs are calculated using Resoft Wind Farm© software to generate the zone of theoretical visibility of the proposed Mynydd-y-Glyn Wind Farm. This software creates a 3D computer model of the existing landscape and the development using Ordnance Survey Terrain 5. This data provides a digital record of the existing landform of Great Britain based on 5m grid squares and models representing the specified geometry and position of the proposed turbines. The computer model includes the defined and detailed LVIA Study Area and takes account of atmospheric refraction and the Earth's curvature.

1.8.2 The resulting ZTV plots are overlaid on Ordnance Survey mapping at an appropriate scale and presented as figures using desktop publishing/graphic design software.

1.8.3 Resoft Wind Farm© software is also used to calculate cumulative ZTV plots based on the intervisibility of the Proposed Development with other existing, consented and application wind farms included in the CLVIA. In addition to the methods as described above, the layouts and geometries of the surrounding existing, consented and application wind farms are loaded into the same computer programme.

Methodology for Baseline Photography

1.8.4 Once a viewpoint has been selected, it is visited, confirmed, and assessed with the aid of a wireline or similar visualisation in the field. A photographic record is taken to record the view and the details of the viewpoint location and associated data are recorded to assist in the production of visualisations and to validate their accuracy. All site photography included in the LVIA is taken in accordance with *Visual Representation of Development Proposals. Technical Guidance Note 06/19.* Landscape Institute, September 2019.

1.8.5 The following photographic information is recorded:

- Date, time, weather conditions and visual range;
- GPS recorded 12 figure grid reference accurate to ~5 m;
- GPS recorded Above Ordnance Datum (AOD) height data;

- The focal length of lens is confirmed;
- Horizontal field of view (in degrees); and
- Bearing to Target Site (Proposed Development).

1.8.6 All photographs included in this assessment were recorded with a digital SLR camera set to produce photographs equivalent to that of a manual 35 mm SLR camera with a fixed 50mm or 75mm focal length lens as required.

1.8.7 All the resulting visualisations have been prepared to show other cumulative wind energy development in order that they may assist the cumulative assessment as well as the LVIA.

1.8.8 Whilst no two-dimensional image can fully represent the real viewing experience, the visualisation aims to provide a realistic representation of the Proposed Development, based on current information and photomontage methodology.

Methodology for Production of Visualisations

1.8.9 The view from each viewpoint located within 11 km will be illustrated with a photograph, a wireline and a photomontage indicating the Proposed Development. It should be noted however, that the SNH guidance advises that beyond 20 km the visibility of turbines in the printed photomontages is difficult to see or reproduce realistically. Consequently, the view from the most distant proposed viewpoint (Craig-y-Fan Du, Brecon Beacons National Park) at ~20 km will only be produced as a wireline.

1.8.10 The wirelines and photomontages are produced using Resoft Wind Farm© software to generate a perspective view of the wind farm. This software creates a 3D computer model of the existing landscape and the development using digital terrain data and models representing the specified geometry and position of the proposed turbines. The computer model includes the entire LVIA Study Area and all visualisations take account of the effects caused by atmospheric refraction and the Earth's curvature. The computer model does not take account of the screening effects of any intervening objects and forestry, unless specified (see individual figures).

1.8.11 A wireline of the Proposed Development and the existing landform is generated for each viewpoint within the LVIA Study Area. These wirelines are used to assist the assessment on location at each viewpoint, the position of which, if required, is adjusted on site to achieve the most visible vantage-point of the Proposed Development (e.g. to avoid buildings, forestry, and general foreground clutter, potentially interfering with the view). Photographs are then taken using a digital SLR camera in combination with a panoramic head equipped tripod. Detailed information is then recorded on site to enable the accurate alignment of the photographs with the wireline model (data such as: GPS grid co-ordinates; ground level information; compass bearings; and any other known references and viewpoint information).

1.8.12 The photographs from the viewpoint are then joined to form a planar or cylindrical projection image or panorama as required by the SNH guidance, using computer software to remove 'barrel distortion' caused by the camera lens. This panorama, combined in Resoft Wind Farm© with the data recorded on site, enables the wireline to be superimposed and aligned. To produce the photomontage, the wireline turbines are rendered to appear 'life-like' taking into account the time of the photography and weather conditions occurring on the day.

1.8.13 Site infrastructure, including the site access, on-site access tracks and crane hard standing areas, the substation and possible on-site borrow pits may also be illustrated in the photomontages for viewpoints within 10 km.

1.8.14 The completed panoramas, wirelines, photomontages and accompanying data are then presented as figures using desktop publishing/graphic design software in accordance with referenced SNH and Landscape Institute guideline.

Printing of Maps and Visualisations

1.8.15 All electronic visualisations and maps should be printed out and viewed at the correct scale as noted on the document.

1.9 Glossary of Terms and Abbreviations

1.9.1 Note: Those descriptions marked with an asterisk are as per the terminology provided in the GLVIA 3 glossary.

Term/abbreviation	Definition
AOD	Above Ordnance Datum
AoV	Angle of View
Artificial light	Light produced by electrical means.
BT	Blade Tip
Candela	A unit of measure of luminous intensity, in a given direction.
CLVIA	Cumulative Landscape and Visual Impact Assessment
Constant light	Uninterrupted light source over a given time period.
Cumulative effects	Additional changes caused by a proposed development in conjunction with other similar developments or as a combined effect of a set of developments, taken together' (SNH, 2012)
Cumulative landscape effects	Effects that 'can impact on either the physical fabric or character of the landscape, or any special values attached to it' (SNH, 2012)
Cumulative visual effects: In combination In succession Sequentially	Effects that can be caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint' and/or sequential effects which 'occur when the observer has to move to another viewpoint to see different developments' (SNH 2012) • In combination: Where two or more developments are or would be within the observer's arc of vision at the same time without moving his/her head (GLVIA3, 2013 Table 7.1). • In succession: Where the observer has to turn his/her head to see the various developments – actual and visualised (GLVIA3, 2013 Table 7.1). • Sequential cumulative effect. Occurs where the observer has to move to another viewpoint to see the same or different developments. Sequential effects may be assessed for travel along regularly used routes such as major roads or popular paths (GLVIA3, 2013 Table 7.1).
Darkness survey	Visual survey the night-time environment and the identification of artificial light sources.
Development*	Any proposal that results in change to the landscape and/or visual environment.

Term/abbreviation	Definition
Degree of change	A combination of the scale, extent and duration of an effect also defined as 'magnitude'.
Designated Landscape*	Areas of landscape identified as being of importance at international, national or local levels, either defined by statue or identified in development plans or other documents.
Direct light	The artificial light source is visible. Note that light emanating from the window of a building is considered to be a 'direct' light source.
EIA	Environmental Impact Assessment
Elements*	Individual parts which make up the landscape, such as, for example, trees, hedges and buildings.
Enhancement*	Proposals that seek to improve the landscape resource of the site and its wider setting beyond its baseline condition.
Environmental fit	The relationship of a development to identified environmental opportunities and constraints in its setting.
Feature*	Particularly prominent or eye-catching elements in the landscape such as tree clumps, church towers or wooded skylines OR a particular aspect of the project proposal.
FoV	Field of View – the horizontal angle of the view illustrated in a visualisation.
Geographical Information System (GIS)	A system that captures, stores, analyses, manages and presents data linked to location. It links spatial information to a digital database.
GLVIA 3	Guidelines for Landscape and Visual Impact Assessment, Third Edition, published jointly by the Landscape Institute and Institute of Environmental Management and Assessment, 2013.
Heritage	The historic environment and especially valued assets and qualities such as historic buildings and cultural traditions.
HH	Hub Height
Historic Landscape Characterisation (HLC) and Historic Land-use Assessment (HLA)	Historic characterisation is the identification and interpretation of the historic dimension of the present-day landscape or townscape within a given area. HLC is the term used in England and Wales, HLA is the term used in Scotland.
Indirect effects*	Direct effects relate to the host landscape and concern both physical and perceptual effects on the receptor. Indirect effects relate to those landscapes and receptors which separated by distance or remote from the development and therefore are only affected in terms of visual or perceptual effects. The Landscape Institute also defines indirect effects as those which are not a direct result of the development but are often produced away from it or as a result of a complex pathway.
Indirect light	The light source is not visible but the light emanating from the source is apparent.
Infrared light	A type of light not visible to the human eye.
Iterative design process	The process by which project design is amended and improved by successive stages of refinement which respond to growing understanding of environmental issues.

Term/abbreviation	Definition
Key characteristics	Those combinations of elements which are particularly important to the current character of the landscape and help to give an area its particularly distinctive sense of place.
LANDMAP	LANDMAP is a whole landscape approach that covers all landscapes, designated and non-designated, it covers the natural, rural, peri-urban and urban areas in Wales, (excluding the Cities of Cardiff and Swansea), it includes inland waters and coastal areas to the low water mark. LANDMAP is an all-Wales GIS (Geographical Information System) based landscape resource where landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data set. In Wales, LANDMAP is the formally adopted methodology for landscape assessment and is advocated by Planning Policy Wales.
Land cover	The surface cover of the land, usually expressed in terms of vegetation cover or lack of it. Related to but not the same as land use.
Landscape and Visual Impact Assessment (LVIA)	A tool used to identify and assess the likely significance of the effects of change resulting from development both on the landscape as an environmental resource in its own right and on people's views and visual amenity.
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 landscapes distinctive. The process results in the production of a Landscape Character Assessment.
Landscape capacity	The ability of a landscape to accommodate different amounts of change or development of a specific type. Capacity reflects the landscape's sensitivity to the type of change, and the value attached to the landscape, and is therefore dependent on judgements about the desirability of retaining landscape characteristics and the acceptability of their loss. (http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-resource-library/glossary-of-terms/).
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 classification	A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape.
Landscape constraints	Components of the landscape resource such as views or mature trees recognised as constraints to development. Often associated with landscape opportunities.
Landscape effects*	Effects on the landscape as a resource in its own right. An assessment of landscape effects deals with the effects of change and development on landscape as a resource. The concern here is with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character. (GLVIA3 2013, Para 5.1).
Landscape fit	The relationship of a development to identified landscape opportunities and constraints in its setting.
Landscape patterns	Spatial distributions of landscape elements combining to form patterns, which may be distinctive, recognisable and describable e.g. hedgerows and stream patterns.

Term/abbreviation	Definition
Landscape quality (condition)*	A measure of the 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 qualities	A term used to describe the aesthetic or perceptual and intangible characteristics of the landscape such as scenic quality, tranquillity, sense of wildness or remoteness. Cultural and artistic references may also be described here.
Landscape receptors *	Defined aspects of the landscape resource that have the potential to be affected by a proposal
Landscape resource	The combination of elements that contribute to landscape context, character, and value.
Landscape sensitivity	The sensitivity of the landscape to a particular development considers the susceptibility of the landscape and its value.
Landscape strategy	The overall vision and objectives for what the landscape should be like in the future, and what is thought to be desirable for a particular landscape type or area as a whole, usually expressed in formally adopted plans and programmes or related documents.
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. The value of the Landscape Character Types or Areas that may be affected, based on review of any designations at both national and local levels, and, where there are no designations, judgements based on criteria that can be used to establish landscape value.
Level of effect	Determined through the combination of sensitivity of the receptor and the proposed magnitude of change brought about by the development.
Lux	A unit of illumination, the amount of light on a surface per unit area.
Magnitude (of effect)*	A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short term or long term in duration.
Mitigation	Measures which are proposed to prevent, reduce and where possible offset any significant adverse effects (or to avoid, reduce and if possible remedy identified effects. (GLVIA3, 2013 Para 3.37).
NRW	Natural Resources Wales
Natural light	Light supplied by the sun, directly or indirectly, the moon and stars.
Perception	Combines the sensory (that we receive through our senses) with the cognitive (our knowledge and understanding gained from many sources and experiences).
Perceptual Aspects	A landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity. (GLVIA3, 2013 Box 5.1)
Photomontage*	A visualisation which superimposes an image of the proposed development upon a photograph or series of photographs.
Beneficial or Adverse Types of Landscape Effect	The landscape effects may be beneficial, neutral, or adverse. In landscape terms – a beneficial effect would require development to add to the landscape quality and character of an area. Neutral landscape effects would include low or negligible changes that may be considered as part of the 'normal' landscape processes such as maintenance or harvesting

Term/abbreviation	Definition
	activities. A adverse effect may include the loss of landscape elements such as mature trees and hedgerows as part of construction leading to a reduction in the landscape quality and character of an area.
Beneficial or Adverse Types of Visual Effect	The visual effects may be beneficial, neutral, or adverse. In visual terms – beneficial or adverse effects are less easy to define or quantify and require a subjective consideration of a number of factors affecting the view, which may be beneficial, neutral, or adverse. Opinions as to the visual effects of wind energy developments vary widely, however it is not the assumption of this assessment that all change, including substantial levels of change is a adverse experience. Rather this assessment has considered factors such as the visual composition of the landscape in the view together with the design and composition, which may or may not be reasonably, accommodated within the scale and character of the landscape as perceived from the receptor location.
Probability of Effect	The probability of a landscape and visual effect occurring as a result of this Development should be regarded as certain, subject to the stated project design and the continuance of the existing, baseline landscape resource, including known changes such as other permitted wind farm development. The probability of cumulative effects however is variable. Whereas those effects related to existing wind energy development and those under construction are considered as certain, effects related to development with planning consent are only considered as likely. Wind energy development sites for which there is a submitted planning application are considered as uncertain and other wind energy development for which no planning application has been made are considered as uncertain / unknown, as the level of uncertainty would be greater.
Proximity activated lighting	Lighting which is turned on by the detection of moving objects, such as aircraft detected by radar.
Rarity	The presence of rare elements or features in the landscape or the presence of a rare Landscape Character Type. (GLVIA3 2013, Box 5.1)
RD	Rotor Diameter
Receptor	Physical landscape resource, special interest, or viewer group that will experience an effect.
Recreation Value*	Evidence that the landscape is valued for recreational activity where experience of the landscape is important. (GLVIA3 2013, Box 5.1)
Representativeness*	Whether the landscape contains a particular character and/or features or elements which are considered particularly important examples.
Residual effects	Likely environmental effects, remaining after mitigation.
Scale Indicators	Landscape elements and features of a known or recognisable scale such as houses, trees, and vehicles that may be compared to other objects, where the scale of height is less familiar, to indicate their true scale.
Scenic quality	Depends upon perception and reflects the particular combination and pattern of elements in the landscape, its aesthetic qualities, its more intangible sense of place or 'genius loci' and other more intangible qualities. (GLVIA3 2013, Box 5.1)
Seascape	Landscapes with views of the coast or seas, and coasts and adjacent marine environments with cultural, historical and archaeological links with each other.
Sense of Place (genius loci)	The essential character and spirit of an area: 'genius loci' literally means 'spirit of the place'.

Term/abbreviation	Definition
Sensitivity*	A term applied to specific receptors, combining judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value associated to that receptor.
Significance	A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.
Significant Effects	It is a requirement of the EIA Regulations to determine the likely significant effects of the development on the environment which should relate to the level of an effect and the type of effect. The significance of an effect gives an indication as to the degree of importance (based on the magnitude of the effect and the sensitivity of the receptor) that should be attached to the impact described. Whether or not an effect should be considered significant is not absolute and requires the application of professional judgement. Significant – 'noteworthy, of considerable amount or effect or importance, not insignificant or negligible'. The Concise Oxford Dictionary. Those levels and types of landscape and visual effect likely to have a major or important / noteworthy or special effect of which a decision maker should take particular note.
Sky glow	The brightness of the night sky in a built-up area as a result of light pollution, apparent as a diffuse artificial light in the sky above major towns and cities.
SNH	Scottish Natural Heritage
Susceptibility*	The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.
Sustainability*	The principle that the environment should be protected in such a condition and to such a degree that ensures new development meets the needs of the present without compromising the ability of future generations to meet their own needs.
Temporary or permanent effects	Effects may be considered as temporary or permanent. In the case of wind energy development the application is for a 25 year period after which the assessment assumes that decommissioning will occur and that the site will be restored. For these reasons the development is referred to as long term and reversible.
Time depth	Historical layering – the idea of landscape as a 'palimpsest', a much written-over asset of landscape.
Townscape	The character and composition of the built environment including the buildings and the relationships between them, the different types of urban open space, including green spaces, and the relationship between buildings and open spaces.
True View Visuals	A mobile 3D augmented reality (AR) tool used to aid with the assessment. The True View Visuals tool indicates visibility of the Proposed Development to assist in confirming viewpoint positions as well as indicating limited or no visibility of turbines in particular locations. Whilst the images are indicative only, the AR tool provides a comparable image to the accurate wirelines produced.
Type or Nature of effect	Whether an effect is direct or indirect, temporary or permanent, beneficial (positive), neutral or adverse (negative) solus or cumulative.
Viewpoints	Selected for illustration of the visual effects fall broadly into three groups: Representative Viewpoints: selected to represent the experience of different types of visual receptor, where larger numbers of viewpoints cannot all be included individually and where the significant effects are unlikely to differ – for example certain points may be chosen to represent the view of users of particular public footpaths and bridleways;

Term/abbreviation	Definition
	Specific Viewpoints: chosen because they are key and sometimes promoted viewpoints within the landscape, including for example specific local visitor attractions, such as landscapes with statutory landscape designations or viewpoints with particular cultural landscape associations. Illustrative Viewpoints: chosen specifically to demonstrate a particular effect or specific issues, which might, for example, be the restricted visibility at certain locations. (GLVIA3 2013, Para 6.19)
Visual amenity	The overall views and surroundings, which provide a visual setting or backdrop to the activities of people living, working, participating in recreational activities, visiting or travelling through an area.
Visual dominance	A visual effect often referred to in respect of residential properties that in relation to development would be subject to blocking of views, or reduction of light / shadowing, and high levels of visual intrusion.
Visual effect*	Effects on specific views and on the general visual amenity experienced by people.
Visual Receptors*	Individuals and/or defined groups of people who have the potential to be affected by a proposal.
Visual sensitivity	The sensitivity of visual receptors such as residents, relative to their location and context, to visual change proposed by development.
Visualisation	Computer visualisation, photomontage, or other technique to illustrate the appearance of the development from a known location.
Wireline / Wireframe	A computer-generated line drawing of the DTM (digital terrain model) and the proposed development from a known location.
Zone of Theoretical Visibility (ZTV)*	A map, usually digitally produced, showing areas of land within which, a development is theoretical visible.

Appendix 6.1
Historic Environment - Non-designated Historic Assets

Table 6.1 Non-designated historic assets within study area (GGAT HER)

HER Ref.	Name	Easting	Northing	Period	Type
GGAT01483m	Stone Axe, Tyla-Winder	305000	189000	Neolithic	Axe
GGAT01559m	Llwyncelyn	303000	191000	Post Medieval	Coin Hoard
GGAT01609m	Bwlch Gwyn	303640	188180	Post Medieval	House
GGAT01740m	Hafod, Rhiwgarn	302590	189730	Medieval	Long Hut
GGAT03815m	Trig Point, Pontypridd	305071	189901	Post Medieval	Triangulation Point
GGAT03816m	Quarry, Trehafod	304476	190435	Post Medieval	Quarry
GGAT04941m	Trebannog Deserted Industrial Village	301950	190210	Post Medieval	Village
GGAT06021m	Glyn Colliery (Phase 1), Tonyrefail	302520	188890	Post Medieval	Colliery
GGAT06097m	Cymmer Colliery, Porth	302837	190989	Post Medieval	Colliery
GGAT06136m	Glyn Colliery (Phase 2), Tonyrefail	302560	188740	Post Medieval	Colliery
GGAT06443m	Rails, Gellifelen, Tonyrefail, Rhondda	302854	188269	Unknown	Railway Transport Site
GGAT06603m	Mount Zion Baptist Church, Trebanog	301560	189661	Modern	Church
GGAT08160m	Dyllas Road Over Bridge	302870	190940	Post Medieval	Road Bridge
GGAT08161m	Clifton Row Retaining Wall, Porth	303450	190960	Post Medieval	Wall
GGAT08528m	Trig Pillar (Tp5050), Mynydd-Y-Glyn	303585	189448	Modern	Triangulation Point
GGAT08529m	Trig Pillar (Tp10087), Mynydd-Y-Glyn	303585	189449	Modern	Triangulation Point

Table 6.2 Events recorded within study area (GGAT HER)

HER Ref.	Name	Easting	Northing	Event Type
GGATE006005	Uplands Survey East Glamorgan	308570	194550	Field Survey
GGATE003757	Coach and Horses Public House, Caerwent	347105	190473	Evaluation

HER Ref.	Name	Easting	Northing	Event Type
GGATE004025	Mount Zion Baptist Church, Trebanog	301560	189661	Photographic Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	303411	190921	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	303310	190940	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302490	191320	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302495	191277	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302546	191227	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302489	191321	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302500	192970	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302480	192460	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302430	192400	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302420	191680	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302500	191290	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302862	190973	Building Survey
GGATE005328	Relief Road Porth - Lower Rhondda Fach	302445	191333	Building Survey
GGATE003465	site visit to Mynydd-y-Glyn	302618	189716	Field Visit

Appendix 7.1
Preliminary Ecological Appraisal

Pennant Walters

Mynydd y Glyn Wind Farm

Preliminary Ecological Appraisal

Wood Group UK Limited – April 2021

Report for

Pennant Walters

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Document revisions

No.	Details	Date
1	42864-WOOD-XX-XX-RP-OE-0001_S0_P01	April 2021

Contents

1. Introduction

1.1 Background

Wood Group UK Ltd (Wood) was commissioned by Pennant Walters to undertake a Preliminary Ecological Appraisal (PEA) of an area known as Mynydd y Glyn (hereafter referred to as 'the Site'). An agreement has been secured to develop a wind farm at the Site, which is located at National Grid Reference (NGR) ST 03626 89459 and measures approximately 168.53 hectares (ha) and shown in **Figure 1.1 (Appendix A).**

This PEA has been informed by the completion of a desk study and an extended Phase 1 habitat survey. The approach taken broadly follows that detailed in the *Guidelines for Preliminary Ecological Appraisal*[1], with the standard Phase 1 habitat survey[2] methodology being extended to identify the presence, or potential presence, of legally protected species, habitats and species that are of importance for biodiversity conservation, and legally controlled species as detailed in the *Guidelines for Baseline Ecological Assessment*[3].

1.2 Purpose of this report

This report has been prepared as part of an EIA relating to the Site. This report is intended to enable the early identification of potential ecological constraints; inform additional survey or mitigation requirements; and to establish the ecological baseline of the Site.

This report details the methods adopted and results of the extended Phase 1 habitat survey and makes recommendations for further work in relation to establishing the ecological baseline where required.

1.3 Proposed development

The Proposed Development is to construct and operate a wind farm of seven turbines and associated infrastructure including access tracks, transformer and a substation.

1.4 Site context

The Site is situated within the Rhondda Valley and is located approximately 3km west of Pontypridd. The Site comprises a plateau of extensive semi-improved acid grassland used for grazing livestock with steep-sloping sides. Blanket bog is present within the Site, which is designated as a Site of Importance for Nature Conservation (SINC). The site is bordered by habitats synonymous with those on-Site, as well as conifer plantation woodland in the northeast. The Site is accessed through a farmyard in Rhiwinder so the southwest of the Site, or on foot from an unnamed road southeast of the Site using a Public right of Way (PRoW). In the wider landscape surrounding land use is dominated by livestock grazing agriculture, with plantation conifer woodland managed for forestry, and small urban settlements.

[1] CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. Chartered Institute of Ecology and Environmental Management, Winchester.
[2] JNCC (2010). Phase 1 Habitat Survey – a Technique for Environmental Audit. JNCC, Peterborough.
[3] *IEA (1995) Guidelines for Baseline Ecological Assessment.* E & F Spon, London.

2. Legislative and policy context

A number of sites, habitats and species are protected through either statute or national or local policy: details of these are provided in Boxes 1 and 2 below. Policies relevant to biodiversity conservation are listed in **Table 2.1**, along with an outline of the issues included in these policies that need to be considered when undertaking an ecological appraisal.

Box 1 Designated Wildlife Sites, and Priority Habitats and Species

Statutory nature conservation sites

Internationally important sites: Special Areas of Conservation (SACs) and candidate SACs, Special Protection Areas (SPAs) and proposed SPAs, Sites of Community Importance, Ramsar sites and European offshore marine sites.

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not subject to international designations and National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as nature conservation. Their level of importance is defined by their other statutory or any non-statutory designation (e.g. if an LNR is also an SSSI but is not an internationally important site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory nature conservation sites

Non-statutory biodiversity Sites in South East Wales are designated as Sites of Importance for Nature Conservation (SINCs).

Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, Habitats of Principal Importance (HoPI) for the conservation of biodiversity in Wales (under Section 7 of the 'The Environment (Wales) Act 2016) are identified as of national species/habitat importance reflecting the fact that these species/habitats have been defined at a national level. The level of importance therefore pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued, other than for waterfowl, for which thresholds have been defined for national/international 'population importance'.

- International importance: populations of species or areas of habitat for which European sites are designated;
- International importance: populations of birds meeting the threshold for European importance (1% of the relevant international population);
- National importance: Section 7 of the 'The Environment (Wales) Act 2016' introduces a list of living organisms and types of habitat in Wales, known as Habitats and Species of Principal Importance, which in Wales are considered of key significance to sustain and improve biodiversity. These are listed on: https://www.biodiversitywales.org.uk/Environment-Wales-Act.
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern[4] Red List.
- National importance: Nationally Scarce species, which are species recorded from 16-100 10x10km squares of the national grid;
- National importance: Populations of birds comprising at least 1% of the relevant British breeding/wintering population (where data are available);
- National importance: Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600);
- County importance: Species and habitats listed in Local Biodiversity Action Plan for Rhonda Cynon Taf.

[4] Eaton, M.A., Aebischer, N.J., Brown, A.F., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A. and Gregory, R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds*, 108:708–746.

Box 2 Legally Protected and Controlled Species

Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding:
  - species that are only protected in relation to their sale (see Section 9[5] and 13[2]), reflecting the fact that the proposed development does not include any proposals relating to the sale of species; and
  - species that are listed on Schedule 1 but that are not likely to breed on or near the Site, given that this schedule is only applicable whilst birds are breeding;
- Species included on Schedules 2 and 5 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*
- Badgers, which are protected under the *Protection of Badgers Act 1992*.

A summary of the legislation pertaining to faunal species that may occur on the Site is provided in **Appendix B**

Legal control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

Table 2.1 Policy Issues Considered

Policy Reference	Policy Issue
Future Wales; National Development Framework 2021	The Welsh national development framework sets the direction for development in Wales to 2040 and includes a Habitats Regulations Assessment. Policy 9 – Resilient Ecological Networks and Green Infrastructure outlines measures to ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure.
Planning Policy Wales – Chapter 6 Distinctive and Natural Places (11th Ed.; 2021)	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government's objectives for Distinctive and Natural Places theme of planning policy topics covers historic environment, landscape, biodiversity and habitats, coastal characteristics, air quality, soundscape, water services, flooding and other environmental (surface and sub-surface) risks. In particular, the Biodiversity and Resilience of Ecosystems section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by Natural Resources Wales.
Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009)	Welsh Governments (WG) policy on positive planning for nature conservation and developments affecting designated sites and habitats, along with protected priority habitats and species.
Rhondda Cynon Taf Local Development Plan (LDP) up to 2021 (Adopted 2011)	The LDP identifies where allocations for new developments such as housing, employment, community facilities, and roads have been made. It provides a framework for local decision making and brings together both development and conservation interests to ensure that any changes in the use of land are coherent and provides maximum benefits to the community.
Rhondda Cynon Taf Supplementary Planning	The Rhondda Cynon Taf Supplementary Planning Guidance (SPG) on Nature Conservation was produced in 2011 and provides additional guidance to support the Local Development Plan (LDP)

Guidance (SPG) Nature Conservation 2011	policies. The purpose of the SPG is to assist those submitting and determining planning applications in Rhondda Cynon Taf to ensure that nature conservation is protected and conserved when development is proposed.
Rhondda Cynon Taf Biodiversity Action Plan (Action for Nature) 2000 (updated 2008)	The national strategy for biodiversity is delivered at local level via Local Biodiversity Action Plans (LBAP). Rhondda Cynon Taf LBAP (Action for Nature) is the driver to protect, enhance and manage the biodiversity resource, by setting out objectives, targets and actions for the conservation of biodiversity within Rhondda Cynon Taf

3. Methodology

3.1 Desk study

A data-gathering exercise was undertaken to obtain information relating to statutory and non-statutory nature conservation sites, habitats of principle importance and species, and legally protected and controlled species (see Boxes 1 and 2). The data were obtained from South East Wales Biodiversity Records Centre (SEWBReC), from the MAGIC website, from aerial photographs and from Ordnance Survey mapping. Data for the last ten years were gathered for:

- statutory designated biodiversity sites of international importance within 10km of the Site;
- statutory designated biodiversity sites of national/ local importance within 2km of the Site;
- non-statutory designated biodiversity sites areas within 2km of the Site;
- records of legally protected/important species within 2km of the Site, and bat roosts within 10km of the Site;
- European Protected Species Mitigation Licences (EPSMLs) within 5km of the Site;
- waterbodies within 500m of the Site; and
- Habitats of Principal Importance for the conservation of biodiversity in Wales and the Habitats of Principal Importance for Rhondda Cynon Taf within 2km of the Site.

Waterbodies were identified by reference to 1:25,000 scale Ordnance Survey mapping and online aerial photography[5]. In the absence of significant barriers to movement, 500m is the maximum distance that great crested newts (GCNs) generally move from their breeding ponds to occupy surrounding areas of suitable terrestrial habitats. Natural England (NE) therefore recommends that, where a proposed development is located within 500m of a water body, consideration be given to the potential for the water body to support breeding GCNs.

3.2 Field survey

An extended Phase 1 habitat survey of the Site, including a 250m buffer from the boundary, was undertaken by an ecologist from Wood[6] on the 29 April and 1 May 2020. An additional survey was undertaken on the 30 July 2020 to gather detail on species throughout the growing season, recording plants that are more visible at different times and support broad habitat classifications.

During the survey, distinct habitats were identified, and any features of interest subjected to a more detailed description were target noted (TN)[7]. As the standard phase 1 habitat survey methodology is mainly concerned with vegetation communities, the survey was extended[8] to allow for the provision of information on other ecological features, including identification of the presence or potential presence of legally protected and otherwise notable species.

It should be noted that while every effort has been made to provide a comprehensive description of the Site, this survey is intended to identify habitat types and does not constitute a full botanical survey.

[5] https://www.google.co.uk/intl/en_uk/earth/
[6] Claire Neale Senior Consultant Ecologist MSc MCIEEM
[7] Joint Nature Conservation Committee (2007). *Handbook for Phase 1 habitat survey - a technique for environmental audit*. JNCC, Peterborough.
[8] Institute of Environmental Assessment (1995). *Guidelines for Baseline Ecological Assessment*. E&FN Spon, London.

Protected and otherwise notable species

The methodologies used to establish the presence or potential presence of specific species and/ or species groups are summarised below. These relate to those species or biological taxa that the desk study and habitat types present indicated could occur on the Site.

The survey methods that were employed during the extended Phase 1 habitat survey to identify presence of legally protected/priority species are detailed below. **Appendix B** summarises relevant legislation relating to these species. Species are referred to by common name in the main text of the report, with scientific names provided in **Appendix C**.

Where possible, the survey area included the entirety of the Site and adjoining areas of land up to 250m from the Site boundary, albeit noted access had not been agreed for all land adjacent to the Site, therefore these areas were viewed from the Site boundary and from public rights of way (PRoW).

Badger

During the survey the habitats on the Site were assessed for their potential to provide suitable areas for sett excavation and badger foraging. Any evidence of badger activity was also recorded, such as:

- Setts - comprising either single holes or a series of holes likely to be connected underground;
- Hairs - usually with a white root, black band, white tip (often caught in sett entrances/ fences/ vegetation);
- Footprints – located in soft mud, often in sett entrances;
- Evidence of foraging – usually in the form of 'snuffle holes' (small scrapes created by badgers searching for insects and earthworms);
- Latrines - badgers usually deposit faeces in holes or scrapes in the ground; and
- Paths - particularly around setts or leading to feeding areas.

Mammal paths and snuffle holes were assumed to be created by badgers if the character of the path (in terms of size) was appropriate, and if other field signs were in close vicinity.

Bats

A general assessment of the suitability of the habitats on the Site to support roosting, foraging and commuting bats was made. During the survey, an initial assessment of the trees and buildings on and bordering the Site was undertaken to determine if further, more detailed preliminary roost assessments would be required to identify features with the potential to support roosting bats.

Dormouse

Hedgerows, scrub and woodland habitats within or bordering the Site were assessed for their suitability to support populations of dormice. This included an assessment of the suitability of the Site for foraging by dormice, e.g. availability of hazel and honeysuckle, and the connectivity between habitats on the Site and other suitable habitat in the wider landscape.

Otter

The Site was assessed for its potential to provide habitats that would support otter. Such habitats may include the presence of any drainage ditches, streams, rivers, water bodies and other foraging habitat. Water

of a significant depth and the presence of fish are important for foraging; however, otters will use sub-optimal habitat to commute through

Water vole

Water courses on and bordering the Site were assessed for their suitability and potential to support water voles. Water voles generally prefer wide swathes of riparian vegetation both growing from the bank and in the water in which to forage and shelter. Earth banks are generally required for burrows and the species prefers slow-flowing water more than 1m deep[9].

Great crested newt

The Site was assessed for its potential to provide suitable aquatic and terrestrial habitat that could support a population of GCN. This involved considering the provision of potential breeding and foraging habitats, as well as the provision of potential refugia e.g. log piles, hedgerows, grassland, ruderal and scrub habitat etc.

Habitat Suitability Index Assessment

Where accessible the water bodies identified within 500m of the Site, a habitat-based assessment was used to categorise the suitability of water bodies to support GCN using the Habitat Suitability Index (HSI) assessment. The HSI assessment process takes into account criteria developed by Oldham et al (2000)[10], which is based on ten indices relating to the suitability of a waterbody for GCN. The method calculates a score (between 0 and 1) which indicates the suitability of a waterbody to support GCN. It is a recognised tool for identifying waterbodies with greatest suitability to support this species and conversely assists in identifying unsuitable ponds or ditches that can be 'scoped-out' of further survey work.

The categorisation of HSI pond scores are as follows:

- <0.5 = Poor;
- 0.5 - 0.59 = Below Average;
- 0.6 – 0.69 = Average
- 0.7 – 0.79 = Good
- > 0.8 = Excellent

Presence/likely absence surveys

The ponds identified within the desk study and confirmed as present during the extended Phase 1 survey underwent a single Environmental DNA (eDNA)[11] to determine presence/likely absence. This method requires one daytime visit to collect the samples, between 15 April and 30 June.

The eDNA surveys involved collecting water samples from an individual pond that were then subject to analysis to detect the presence of GCN DNA, which is deemed to provide an appropriate test to establish the presence/likely absence of this species (Natural England, 2015)[12]. eDNA sampling and analysis was undertaken

[9] Strachan, R.,Moorhouse, T. and Gelling, M. (2011). *Water vole Conservation Handbook. Third edition*. Wildlife Conservation Research Unit, Oxford

[10] Oldham, R.S., Keeble, J., Swan, M.J.S., Jeffcote, M (2000), Evaluating the Suitability of Habitat for Great Crested Newt (Triturus cristatus). Herpetological Journal.

[11] This is one of the two methods accepted by Natural England for presence/likely absence surveys for GCN, the other being visits to the pond between mid-March and mid-June employing methods such as torch survey, bottle trapping, hand netting or egg searches

[12] Natural England (2015) *Guidance Great Crested Newts: Surveys and Mitigation for Development Projects*. https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects [Accessed Online].

in accordance with best practice guidance (Biggs et al., 2014)[13], with samples analysed by SureScreen Scientifics[14]. This involved taking and combining 20 sub-samples of 30ml of pond water; representatively sampling pond habitats (i.e. areas of open water suitable for courtship displays, or vegetation suitable for egg-laying), and spaced around the pond as evenly as possible. The sub-samples were mixed, before six separate 50ml aliquots[15] were taken and sent for laboratory analysis by SureScreen Scientific.

All eDNA surveys were undertaken by licenced Wood ecologists Claire Neale (NRW GCN Survey Licence Number: S087691/1) and Gary Lindsay (NRW GCN Survey Licence Number: S088151/1).

Reptiles

The Site and its surrounds were assessed for their potential to provide sheltering, foraging and breeding habitats for the four widespread reptile species: slow worm, viviparous lizard, grass snake and adder. These native reptile species generally require open areas with mixed-height vegetation, such as heathland, rough grassland, open scrub or (in the case of grass snake) water body margins. Suitable well drained and frost-free areas are needed so that they can survive the winter.

Birds

The Site was assessed for its potential to provide nesting habitat for breeding birds and/or its potential to support important assemblages of rare or notable bird species.

Other notable/priority species

An assessment was made of the potential for the Site to support any other species considered to be of value for biodiversity conservation, including those that were identified as occurring within the local area during the desk study.

Legally controlled species

The presence of any legally controlled, non-native, invasive plant species (see **Box 2**), such as Japanese knotweed, giant hogweed and Himalayan balsam was noted.

3.3 Constraints

Some of the areas were within the 250m buffer immediately outside of the Site boundary were steeply sloped and therefore could not be safely accessed. Although full access was not possible it is considered an accurate mapping of the habitat could be undertaken from adjacent land.

There is grazing access to sheep across the entire Site, and as a result of the intense grazing, and in some areas, exposure to wind, the sward of the grassland was generally short making species identification difficult.

[13] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014). *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.
[14] https://www.surescreenscientifics.com/forensic-ecology/
[15] A representative liquid sample taken from a larger amount of liquid.

4. Results

4.1 Desk Study

Statutory designated sites

Two statutory designated biodiversity sites of international importance were identified within 10km of the Site boundary, and two statutory designated biodiversity sites of national importance were identified within 2km. These sites are detailed in **Table 4.1** & **Table 4.2** and the locations of these sites are shown in **Figure 4.1** & **Figure 4.2 (Appendix A).**

Table 4.1 Sites with international statutory designation for biodiversity conservation sites within 10km.

Site	Type of designation	Approximate area (ha)	Ecological interest	OS Grid Reference	Approximate distance (m) and direction from the Site
Blackmill Woodlands	SAC	70.05	Designated as an example of old sessile oak woods at the southern extreme of the habitat's range in Wales and contributes to representation of the habitat in Wales and in south-west England.	SS929859	9,500 SW
Cardiff Beech Woods	SAC	114.45	Designated as one of the largest concentrations of Asperulo-Fagetum beech forest in Wales. The site also supports TilioAcerion forests of slopes, scress and ravines.	ST118824	9,300 SE

Table 4.2 Sites with national statutory designation for biodiversity conservation sites within 2km.

Site and Map Reference Number	Type of designation	Approximate area (ha)	Ecological interest	OS Grid Reference	Approximate distance (m) and direction from the Site
Nant Gelliwion Woodland	SSSI	11.67	The Nant Gelliwion Woodland SSSI (Coed Gelli Draws) occupies a small tributary valley of the Rhondda which flows over Pennant Sandstone and superficial deposits of boulder clay. The mixed deciduous woodland is dominated by stands of sessile oak which occur with a scattering of beech on the free-drainage valley slopes. Alder dominates areas of wetter ground while birch, ash, hazel, hawthorn, sallow and rowan are locally abundant.	ST 059887	1,248 SE

Rhos Tonyrefail	SSSI	244.71	Rhos Tonyrefail is a large lowland site of special interest for its marshy grassland, acid flush, species-rich neutral grassland, acid grassland, wet heath and blanket mire. These habitats are associated with areas of woodland. The site is also of special interest for its population of marsh fritillary butterfly.	ST005895, ST020875 and ST020890	448 SW

Non-statutory designated sites

SEWBReC returned records of six SINCs within 2km of the Site. These are detailed in **Table 4.3** below and the location of these sites is shown in **Figure 4.3 (Appendix A)**.

Table 4.3 Sites with non-statutory designation for biodiversity conservation within 2 km of the Site.

Site	Type of designation	Approximate area (ha)	Ecological interest	OS Grid Reference	Approximate distance (m) and direction from the Site
Mynydd y Glyn	SINC	74.34	Area of upland peat bog. The core of which is good condition peat bog, with surrounds that have been variously semi improved.	ST 031894	**Within site**
Bronwydd Woods	SINC	7.19	Ancient woodland with associated hillside ffridd.	ST 021912	1,005 N
Trebanog Slopes	SINC	153.3	Very large hillside mosaic site with ffridd, marshy grassland, acid grassland and heath and colliery spoil.	ST 028904	158 N
The Glyn	SINC	9.701	A valley SINC of woodland and marshy grassland.	ST023888	632 SW
Tonyrefail East	SINC	26.85	A wooded valley with marshy grassland and neutral grasslands.	ST021880	1,017 SW
Mynydd Gelliwion and Gellwion Slopes	SINC	261.1	Bog mosaic SINC of forestry plantation, ffridd marshy and acid grassland , woodlands, ponds and colliery spoil.	ST052898	**Within site**

Habitats of Principal Importance

SWBReC provided a list of habitats that may contain HoPI within 2km of the Site, listed below:

- Dry acid-heath;

- Unimproved acid grassland;
- Semi-natural broadleaved woodland;
- Intact hedge;
- Semi-improved acid grassland;
- Acid/neutral flush;
- Semi-improved neutral grassland;
- Standing water;
- Marshy grassland;
- Wet heath/acid grassland mosaic;
- Basic dry heath/calcareous grassland mosaic;
- Wet heath;
- Blanket bog;
- Fen;
- Modified valley mire;
- Valley mire; and
- Acid/neutral inland cliff.

Ancient woodland

There is no ancient woodland recorded within the Site, the closest area is ancient semi natural woodland 300m to the south east of the Site. The following categories of ancient woodland were identified within 2km of the Site:

- Ancient Semi Natural Woodland;
- Restored Ancient Woodland Site;
- Plantation on Ancient Woodland Site; and
- Ancient Woodland Site of Unknown Category.

Protected and otherwise notable species

Badger

SEWBReC returned no records of badgers within 2km of the site within the last ten years.

Bats

At least 12 species of bat have been recorded within 10km of the Site. The bat roost records are summarised in **Table 4.4.** and **Table 4.5** lists the activity records.

Table 4.4 Summary of bat roost records within 10km of the Site

Species	Status	Number of records	Type of roost	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	EPS, WCA, S7, LBAP	1	Day Roost	2012	9,865 N
Brown Long-eared Bat	EPS, WCA, S7, LBAP	41	Maternity Roost / Day Roost / Hibernation	2019	1,139 N
Common Pipistrelle	EPS, WCA, S7, LBAP	83	Maternity roost / Nursery roost / Building roost / Day Roost /	2018	664 W
Daubenton's Bat	EPS, WCA, S7, LBAP	7	Hibernation / Day Roost	2019	3,284 E
Greater Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	1	Hibernacula Roost	2013	9519 SE
Lesser Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	8	Maternity roost / Nursery roost / Hibernacula roost / Building roost / Day Roost /	2017	5,982 SW
Noctule	EPS, WCA, S7, LBAP	1	Building Roost	2012	8,660 SW
Myotis Bat Species	EPS, WCA, S7, LBAP	6	Maternity Roost / Day Roost	2010	5,229 NE
Natterer's bat	EPS, WCA, S7, LBAP	4	Hibernation / Maternity Roost / Building Roost	2012	2,836 W
Pipistrellus Species	EPS, WCA, S7, LBAP	83	Maternity roost/ Day Roost / Building Roost	2014	783 W
Soprano Pipistrelle	EPS, WCA, S7, LBAP	45	Maternity roost/ Day Roost / Building Roost	2017	1,139 N
Whiskered Bat	EPS, WCA, S7, LBAP	7	Building Roost	2011	4,637 NE
Unidentified Bat Species	EPS, WCA, S7, LBAP	154	Building Roost	2017	267 W

Key to 'Status' abbreviations:
EPS = European Protected Species
WCA1 = Wildlife and Countryside Act Schedule 1
S7 = Environment Act (Wales) Section 7 Species
LBAP = Local Biodiversity Action Plan Species
HD2 = Habitats Directive Annex II

Table 4.5 Summary of bat activity records within 10km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	EPS, WCA, S7, LBAP	1	2013	8,740 SE
Brown Long-eared Bat	EPS, WCA, S7, LBAP	43	2018	3,369 S
Common Pipistrelle	EPS, WCA, S7, LBAP	599	2018	673 NW
Daubenton's Bat	EPS, WCA, S7, LBAP	11	2014	3,050 E
Greater Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	6	2017	4,470 SW
Lesser Horseshoe Bat	EPS, WCA, S7, LBAP, HD2	8	2018	5,655 W
Noctule	EPS, WCA, S7, LBAP	127	2018	783 E
Long-eared Bat Species	EPS, WCA, S7, LBAP	1	2013	673 N
Myotis Bat Species	EPS, WCA, S7, LBAP	118	2018	3,142 E
Nathusius Pipistrelle	EPS, WCA, S7, LBAP	11	2018	3,050 W
Natterer's bat	EPS, WCA, S7, LBAP	14	2013	5,064 NW
Nyctalus Bat Species	EPS, WCA, S7, LBAP	5	2017	5,413 W
Pipistrellus Species	EPS, WCA, S7, LBAP	159	2019	2,767 W
Serotine	EPS, WCA, S7, LBAP	7	2017	4,470 SW
Soprano Pipistrelle	EPS, WCA, S7, LBAP	495	2019	931 N
Whiskered Bat	EPS, WCA, S7, LBAP	6	2015	2,927 W
Unidentified Bat Species	EPS, WCA, S7, LBAP	133	2019	783 W

Key to 'Status' abbreviations:
EPS = European Protected Species
WCA1 = Wildlife and Countryside Act Schedule 1
S7 = Environment Act (Wales) Section 7 Species
LBAP = Local Biodiversity Action Plan Species

HD2 = Habitats Directive Annex II

Birds

A summary of notable bird species recorded within 2km of the Site is provided in **Table 4.6.** The species recorded include those associated with habitats present on the Site and therefore have the potential to utilise the Site for breeding and/or foraging.

Table 4.6 Summary of notable bird species records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Bullfinch	S7, BoCC Amber	8	2018	252 E
Common Crossbill	Sch.1, BoCC Green	1	2017	1,167 E
Cuckoo	S7, BoCC Red	5	2019	291 N
Dunnock	S7, BoCC Amber	2	2016	1,469 N
Golden Plover	Annex 1, S7	2	2010	**Within site**
House Sparrow	S7, BoCC Red	3	2016	783 E
Kestrel	S7, BoCC Amber	1	2015	657 NE
Mistle Thrush	BoCC Red	3	2018	**Within site**
Peregrine	Sch. 1, BoCC Green	1	2010	203 W
Red Kite	Sch. 1, S7, BoCC Green	3	2015	203 W
Redwing	Sch. 1, BoCC Red	1	2010	203 W
Reed Bunting	S7, BoCC Amber	2	2014	523 W
Skylark	S7, BoCC Red	3	2018	**Within site**
Snipe	BoCC Amber	2	2018	1,460 SW
Song Thrush	S7, BoCC Red	3	2011	545 E
Spotted Flycatcher	S7, BoCC Red	1	2017	1,159 S
Starling	S7, BoCC Red	1	2010	545 E
Willow Tit	S7, BoCC Red	1	2015	657 NE
Wood Warbler	S7, BoCC Red	3	2016	1,088 N
Yellowhammer	S7, BoCC Red	1	2013	1,049 SE

Key to 'Status' abbreviations:
Annex 1 = EU Birds Directive (Annex 1) SpeciesS7 = Environment Act (Wales) Section 7 Species
Sch.1 = Wildlife and Countryside Act 1981 (as amended) Schedule 1
BoCC = Birds of Conservation Concern 4

Other Mammals

The desk study identified records of the European Protected Species (EPS) otter, as well as the notable species, hedgehog. Details provided in **Table 4.7**.

Table 4.7 Summary of other mammal records from within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Hedgehog	S7, LBAP	5	2017	990 N
Otter	EPS, WCA5, S7, LBAP	5	2019	974 N

Key to 'Status' abbreviations:
EPS = European Protected Species
S7 = Environment Act (Wales) Section 7 Species
WCA5 = Wildlife and Countryside Act Schedule 5 Species
LBAP = Local Biodiversity Action Plan Species

Amphibians

The desk study identified five records of amphibians within 2km of the Site. **Table 4.8** summarises the records received from SEWBReC. No records of GCN were identified during the desk study.

Table 4.8 Summary of amphibian records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Common Frog	WCA5, LBAP	1	2015	1,696 E
Common Toad	WCA5, S7, LBAP	2	2015	1,446 E
Palmate Newt	WCA5, LBAP	2	2016	1,024 N

Key to 'Status' abbreviations:
WCA5 = Wildlife and Countryside Act Schedule 5 Species
LBAP = Local Biodiversity Action Plan Species

Reptiles

The desk study returned two records of native reptile species, occurring on and within 2km of the Site, these are shown in **Table 4.9**.

Table 4.9 Summary of reptile records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Viviparous lizard	WCA5, S7, LBAP	5	2016	939 N
Grass Snake	WCA5, S7, LBAP	2	2018	647 W
Key to 'Status' abbreviations: **S7 = Environment Act (Wales) Section 7 Species** **WCA5 = Wildlife and Countryside Act Schedule 5 Species** **LBAP = Local Biodiversity Action Plan Species**				

Other species

A number of notable plant and invertebrate species records were provided from within 2km of the Site, these are detailed in **Table 4.10** and **Table 4.11**.

Table 4.10 Summary of notable invertebrate records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Moths				
Cinnabar	S7, LBAP	3	2016	835 N
Butterflies				
Marsh Fritillary	LBAP	32	2015	523 W
Small Heath	S7, RD1, LBAP	7	2010	**Within site**
Small Pearl-bordered Fritillary	S7, RD1, LBAP	7	2012	**Within site**
Key to 'Status' abbreviations: **RD1 (Wales) = Welsh Red Data Book listing based on IUCN guidelines** **S7 = Environment Act (Wales) Section 7 Species** **WCA5 = Wildlife and Countryside Act Schedule 5 Species** **LBAP = Local Biodiversity Action Plan Species**				

Table 4.11 Summary of notable plant records within 2km of the Site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Bee Orchid	LBAP	1	2011	186 S
Bluebell	WCA8, LBAP	14	2018	203 W
Bog Asphodel	LI	11	2011	523 W
Bog Pimpernel	LI	13	2018	576 SE
Devil's-bit-Scabious	LI	78	2018	434 SW
Early Dog-Violet	LI	2	2018	**Within site**
Heath Spotted Orchid	LBAP	7	2018	602 SW
Marsh Violet	LI	37	2018	506 E
Key to 'Status' abbreviations: **WCA8 = Wildlife and Countryside Act Schedule 8 Species** **LBAP = Local Biodiversity Action Plan Species** **LI = Locally Important Species**				

Legally controlled species

The desk study returned records of a number of non-native, invasive plant species within 2km of the Site, detailed in **Table 4.12.**

Table 4.12 Legally controlled Species within 2km of the site

Species	Status	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Himalayan Balsam	WCA9	**22**	2018	203 W
Japanese Knotweed	WCA9	**15**	2019	555 N
Montbretia	WCA9	**3**	2018	1,414 SW
Rhododendron ponticum	WCA9	**2**	2018	555 N
Wall Cotoneaster	WCA9	**1**	2018	291 N
Key to 'Status' abbreviations: **Wildlife and Countryside Act, Schedule 9 - WCA9;**				

Waterbodies

Three waterbodies were identified within 500m of the Site, and Pond 4 was identified during the extended Phase 1 habitat survey. Details of the waterbodies are provided in **Table 4.13** and shown on **Figure 4.4 (Appendix A)**.

Table 4.13 Waterbodies within 500m of the Site

Waterbody No./Name	Description	Distance (m) and direction from the Site boundary
1	Waterbody within sheep grazed field	**Within Site**
2	Waterbody within sheep grazed field	**Within Site**
3	Waterbody within dense continuous bracken	90 N
4	Waterbody within sheep grazed field.	117 S

4.2 Extended Phase 1 habitat survey

Habitats

Overview

The Site is formed by a large hill which supports a range of habitats with a heavily sheep grazed plateau dominated by semi-improved acid grassland and poor semi-improved grassland present at the base. These areas are frequently intersected by dry-stone walls and fencing for livestock control, with wet and dry heath/acid grassland, continuous bracken and blanket bog also identified. There is a small block of hazel coppice in the southeast, dense/continuous scrub present in the south of the site, a small area of willow scrub on the northeast boundary and a mature treeline in the southeast. The Site is bordered by plantation coniferous woodland to the northeast, but the majority of the wider landscape is semi-improved acid grassland and poor semi-improved grassland. A summary of the key habitats recorded on-Site is shown in **Table 4.14** and off-Site habitats to 250m are shown in **Table 4.15** and shown in **Figure 4.5** and **Figure 4.6 (Appendix A)**. The target notes (**TN**) are provided in **Appendix D**.

Table 4.14 Summary of on-Site habitats

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6, Appendix A)
Semi-improved grassland – acid	Yes	The dominant habitat type found on the steep-sided plateau, and throughout the survey area, was semi-improved acid grassland, These areas were generally heavily sheep-grazed with species present including sheep's fescue, common bent, sweet vernal, purple moor-grass, mat-grass, sheep's sorrel and dog violet. Scattered bracken and rush sp. were also recorded frequently in this habitat. The areas in the northwest, southwest and south east of the site are heavily grazed,

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6, Appendix A)
		while northeast and centrally there is abundant rush and purple moor-grass present.
Poor semi-improved grassland	No	Poor semi-improved grassland was recorded within fields in the southwest of the Site, heavily grazed by sheep. As a result of the intense grazing the sward of the grassland is generally short with species recorded including perennial rye, sheep's fescue, Yorkshire fog, ribwort plantain, white clover, creeping buttercup, creeping thistle, daisy, and scattered rush species.
Wet heath/acid grassland	Yes	Wet heath/acid grassland was recorded in the northeast of the Site, bordering the shallow watercourse and extending south into the centre of the site. These areas comprised frequent ling heather and purple moor-grass with areas of scattered bracken and rush. Wetter areas hosted sphagnum moss, reindeer moss and other moss sp. with marsh thistle and bird's foot trefoil.
Dry heath/acid grassland	Yes	The desk study returned records of potential dry heath/acid grassland from NRW's remote sensed phase 1 layer in the northwest of the site (**TN1)**. This was confirmed in the extended phase 1 survey with mat-grass, sheep's fescue, purple moor-grass, sheep's sorrel and soft rush with scattered ling heather were identified, with some marshier patches in the southeast corner of the field.
Blanket bog	Yes	An area of blanket bog is present in the centre of the Site below the plateau that is fenced off from livestock and public access for protection as it is one of the designated features of the Mynydd y Glyn SINC. There is also an area present in the northeast of the Site. This habitat was boggy underfoot and dominated by purple-moor grass, scattered rush sp., mat grass, bell heather and cotton grass with scattered sphagnum moss, cuckoo flower, marsh thistle.
Unimproved grassland – acid	Yes	The SEWBReC data search returned possible records of unimproved acid grassland from NRW's remote sensed phase 1 layer within the Site shown as **TN2** on **Figure 4.5 & 4.6**. This habitat was not recorded at the time of survey, these areas were identified as semi-improved acid grassland.
Continuous bracken	No	Bracken is found scattered throughout the semi-improved acid grasslands on-Site and there is also a stand of continuous bracken in the east of the Site. This is located on a slope that borders semi-improved acid grassland and wet heath.
Dense and scattered scrub	No	Only small areas of scrub are present within the Site boundary. A small fenced area is present in the south with dominant willow scrub with some scattered hazel, sycamore, silver birch and scot's pine saplings. The understorey is dominated by rush and bracken with bramble and some small areas resemble an attempt at mixed plantation woodland. There is also a small block of willow scrub at the northeast boundary of the Site, with scattered conifer saplings and silver birch.
Mature trees	No	The only mature trees present within the Site boundary line the dry, slate riverbed in the southeast of the Site (**TN3**). Species recorded include oak, cherry, ash and silver birch.
Waterbodies	Yes	The waterbodies described in **Table 4.13** were visited during the extend Phase 1 habitat survey. Ponds 1 and 2 were within the Site boundary and only 1 held water at the time of survey, and was present within a heavily grazed grassland, frequently used by livestock with evidence of poaching at the margins. Waterbodies are shown in **Figure 4.4.**
Watercourses	Yes	There are wet ditches present in the east of the Site, and a narrow, slow flowing ditch with some standing vegetation recorded in the southwest within semi-improved acid grassland.

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6, Appendix A)
Hardstanding (including tracks)	No	A hardstanding track is present in the southwest use for access the site by vehicle.
Bare ground	No	Bare ground recorded during the walkover was associated with areas heavily used by off-road vehicles, either for forestry access or recreational use. This was recorded in the north east of the Site.

Table 4.15 Summary of off-Site habitats to 250m

Phase 1 habitat	Section 7 habitat/LBAP?	Discussion (see Figure 4.5 and 4.6)
Coniferous woodland - plantation	No	Immediately adjacent to the northeast boundary of the Site there are large is a large area of larch dominant, conifer plantation managed for forestry and recreation.
Broad-leaved woodland – semi-natural	No	In the south of the Site there is a small block of semi-natural woodland that follows the watercourse. This comprises dominant coppice hazel, with occasional hawthorn with a sparse understorey of scattered rush, poor-semi improved grassland species and bracken.
Watercourses	Yes	There is a watercourse that is immediately adjacent to the northern boundary of the Site, slow flowing with some pooling. There is also a watercourse present southwest of the Site boundary within the broad-leaved semi-natural woodland. which is shallow, slow flowing and ~0.5m which is heavily shaded.

Protected and otherwise notable species

Badgers

The habitats present within the Site and wider landscape are dominated by heavily grazed semi-improved acid grassland with only small pockets plantation woodland and dense/continuous scrub in the south and northeast of the site. These areas have low potential to support badgers foraging, sett building and commuting. No evidence of badger setts or activity was recorded on-Site or within 250m of its boundary during the extended Phase 1 habitat survey.

Bats

The Site provides potential foraging habitat in the form of a mosaic of semi-improved acid grassland, dry and wet heath and blanket bog, with plantation woodland bordering the northwest and scrub in the south and southeast of the Site. The network of drystone walls also has the potential to support commuting bats.

There are no buildings present within the Site boundary. There is potential for trees within the area of hazel coppice in the southeast and the mature trees that line the dry riverbed (**TN3**) in the east of the Site to support roosting bats.

Dormouse

The habitats present within and adjacent to the Site are not considered to be typical of habitat that would support dormouse. There are no hedgerows present, and the continuous scrub in the south and northeast of Site is low in species diversity, has a sparse the understorey, is not large enough and with no connectivity to potential off-Site habitat that could support the species. Food species were limited on-Site with no hazel identified and very limited bramble across the Site.

Otter

The slow flowing ditches in the southwest and east of the Site have moderate potential to support otter commuting as there are other watercourses present within 250m, but low potential for foraging, and negligible potential for resting and holt creation as the ditches are shallow with no cover.

The watercourse present off-Site to the north also has moderate potential for commuting, and low potential for foraging, resting and holt creation. The watercourse southeast of the site that runs within the hazel coppice woodland, has high commuting potential as it holds connectivity to a number of watercourses in the wider landscape and is well covered. This stream has low potential for foraging, holt creation and resting.

The waterbodies identified within 500m of the Site that have not dried out hold moderate foraging potential for otter, given the proximity to the network of ditches in the south. No evidence of otter was recorded at the time of survey.

Water vole

The banks of the open slow flowing watercourses are heavily vegetated with rush species present and the substrate could support burrows, though these are not more than ~50cm in height and water levels are unstable. There is also limited connectivity to the wider network of ditches/watercourses and very few opportunities for above ground nesting sites.

The waterbody on Site is within close proximity to the watercourse in and adjacent to the south of the Site, however these are not considered to hold potential for the species and that the waterbodies are not large enough to support individual water vole.

Great crested newts

There are limited habitats on Site for GCN with the areas of scrub in the south and northwest and the fenced area of blanket bog and heath are the only areas considered suitable to support terrestrial GCN. The intensive grazing, topography and vast open and exposed landscape make it sub-optimal for the species.

Habitat Suitability Index Assessment

The three potentially suitable GCN breeding waterbodies identified during the desk study, as well as a Pond 4 that was identified during the visits, were assessed for their habitat suitability using the HSI scoring system. At the time of survey Ponds 2 & 3 were found to be dry and therefore scoped out from further survey. The HSI scores for the remaining ponds are listed in **Table 4.16** below.

Table 4.16 HSI scores for ponds within 500m of the Site

Pond ID	HSI score	Pond suitability
1	0.59	Below average
2	n/a	Pond dry on 29 April 2020
3	n/a	Pond dry on 29 April 2020

Pond ID	HSI score	Pond suitability
4	0.68	Average

Presence/likely absence surveys

All waterbodies assessed using the HSI assessment were then subject to an eDNA survey to confirm GCN presence/likely absence. The eDNA results for the remaining ponds are listed in **Table 4.17** below.

Table 4.17 eDNA survey results

Pond ID	Date surveyed	eDNA survey result
P1	29 April 2020	Negative
P3	1 May 2020	Negative

Reptiles

There is suitable habitat to support widespread British reptile species foraging, refuging and commuting in the heath, blanket bog, continuous bracken and less intensely grazed semi-improved acid grassland. The network of dry-stone walls and scattered stone (**TN4**) and scrub on-Site provides suitable habitat for refuge and hibernation. Common lizard has been observed basking on a stone wall on the 3 April, and1 & 2 June 2020, and flushed in the vegetation on the 2 June 2020 (**TN5**).

Breeding birds

The Site comprises areas of semi-improved acid and poor semi-improved grassland, and a mosaic of other habitats; including scrub, wet and dry heath and blanket bog, all of which are suitable for nesting birds.

Initial surveys have identified that the areas of semi-improved and improved grassland on the Site have the potential to support notable species such as dunnock, reed bunting and skylark. In areas of scrub notable species including linnet, mistle thrush, song thrush, cuckoo and spotted flycatcher have all been recorded and have potential to breed on the Site, all of which are Species of Principle Importance (SPI) and Birds of Conservation Concern (BoCC) Red-list species.

Five species listed on Schedule 1 of the *Wildlife and Countryside Act 1981* (as amended) have been recorded on the Site; common crossbill, goshawk, merlin, peregrine and red kite. The woodland plantation adjoining the Site provides suitable habitat for breeding common crossbill and goshawk.

Wintering birds

The habitats within and adjacent to the Site have the potential to support migratory/wintering raptors waders, wildfowl and other non-breeding bird species.

Initial survey results and desk-based review has identified records of notable species including merlin, goshawk, lapwing, golden plover and snipe, all of which have the potential to use the Site during non-breeding periods. Further surveys will be carried out during the non-breeding season to understand number and species present.

Other species

Other notable species highlighted by the desk study may occur on the Site. The only potentially suitable habitat for hedgehog is the scrub in the south and northeast of the Site, however the species is scarcely found in uplands and are commonly associated with a mosaic of hedgerows woodland and grassland opposed to the vast open grassland habitat on-Site. The waterbody on Site holds the potential to support common toad breeding, and the adjacent scrub and less heavily grazed areas could provide terrestrial habitat.

Habitats on the Site, including the grassland, continuous stands of bracken and blanket bog provides suitable habitat to support generalist moth and butterfly species. Notable invertebrates identified within 2km of the Site during the desk study includes small pearl-bordered fritillary and small heath butterflies and cinnabar moth. The areas of continuous bracken habitat identified, particularly in the centre of the Site resembles suitable habitat for these species, with habitat occurring on south facing sunny slopes. The desk study returned 32 records of marsh fritillary within 2km of the site, the closest being 523m to the east. The majority of the site is heavily grazed with short sward acid grassland unsuitable to support marsh fritillary, a species commonly associated with calcareous grassland. The damper habitats within the Site, including the blanket bog and wet heath could provide sub-optimal habitat for this species, however no devil's bit scabious or field scabious was identified during the survey, which are the main food plants or the species.

Of the notable plant species identified in the desk study, only dog violet was identified extended Phase 1 habitat survey.

Legally controlled species

No legally controlled plant species were identified on-Site during the extended Phase 1 walkover survey.

5. Summary and Conclusions

The desk study and extended Phase 1 habitat survey of the Site have highlighted the presence of two SACs within 10km of the Site, two SSSIs and 26 SINCs within a 2km radius. The closest SAC is Blackmill Woodlands and is approximately 9.5km from the Site and designated for its old sessile oak woods, a habitat that is not found on or directly adjacent to the Site. Cardiff Beech Woods SAC is approximately 9.3km north of the Site and is designated as one of the largest concentrations of Asperulo-Fagetum beech forest in Wales. This habitat occurs on calcareous soils and not found on or directly adjacent to the Site.

Nant Gelliwion Woodland SSSI is approximately 1.2km north of the Site and is designated for its mixed deciduous woodland and stands of sessile oak. This habitat type does not occur within or adjacent to the Site. Rhos Tonyrefail SSSI is approximately 0.5km from the Site and is designated for its marshy grassland, acid flush, species-rich neutral grassland, acid grassland, wet heath and blanket mire, as well as it's population of marsh fritillary butterflies. Similar habitats have been identified on-Site, and there is potential for marsh fritillary to be supported, though no field scabious or devil's bit scabious was identified during the visit.

There are six SINCs within 2km of the site; with one, Mynydd y Glyn and Mynydd Gelliwion and Gellwion Slopes, lying within the Site boundary. Mynydd y Glyn is designated as an area of upland peat bog, as identified during the extended Phase 1 walkover survey. Mynydd Gelliwion and Gellwion Slopes is designated as a bog mosaic with forestry plantation, ffridd marshy and acid grassland. The remaining sites are designated for their grassland and/or woodland habitats.

A number of HoPIs were identified in the desk study within a 2km radius of the Site. The following habitats within the Site boundary may contain HoPIs: dry acid heath; unimproved acid grassland; semi-improved acid grassland; standing water; wet heath/acid grassland mosaic; wet heath, blanket bog.

The desk study and field survey identified the potential for a number of legally protected and notable species to utilise the habitats within the Site. These are:

- Badger – potentially foraging and commuting on-Site;
- Bats – potentially roosting, foraging and commuting on-Site;
- Otter – potentially commuting, resting and holt building within 250m of the Site;
- Birds – including Schedule 1 and notable species, potentially nesting and foraging on-Site;
- Reptiles – potentially foraging, commuting, refuging and hibernating on-Site; and
- Terrestrial invertebrates – potentially undergoing their full life cycle on -Site; and
- Other notable species –hedgehog and toad – potentially foraging, commuting and occupying habitats on-Site.

5.1 Species scoped out

Dormouse

The desk study returned no records of dormouse within 2km of the Site and the field survey did not identify suitable habitat within and adjacent to the Site that would support dormouse. There are no hedgerows present, and the limited scrub that is present on site is not large enough or well connected to support a viable population of dormouse. Therefore, no further survey work is recommended in relation to dormice.

Water vole

No records of water vole were returned during the desk study, and the watercourses identified on Site are unsuitable for water vole given the shallow banks, lack of vegetation, depth and lack of burrowing oportunities. Therefore, no further survey work is recommended in relation to water vole.

Great crested newt

No records of great crested newt were returned during the desk study, and all of the waterbodies that underwent eDNA survey tested negative for GCN. Therefore, no further survey work is recommended in relation to this species.

5.2 Recommendations for further work

This PEA informs the biodiversity baseline associated with the Proposed Development. Elements including biodiversity survey scope and methodology, sensitive scheme design and environmental measures to be incorporated into the Proposed Development will be detailed and agreed as part of the wider EIA process.

Appendix A
Figures

302000
303000
304000
305000
190000
189000

Key

Site Boundary

0 150 300 450 600 m

Scale at A3: 1:10,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report

Figure 1.1 Site Boundary

March 2021

wood.

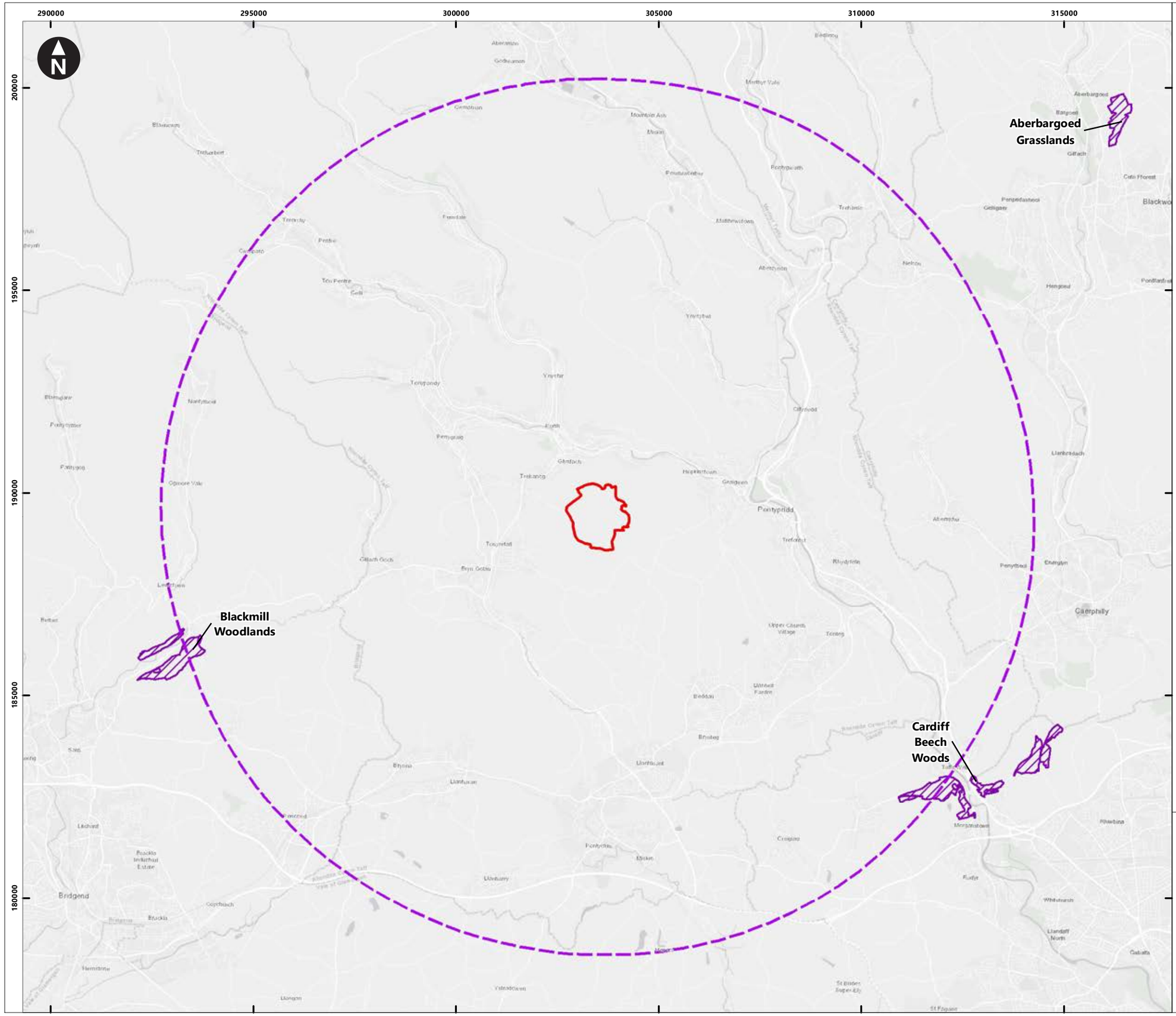

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Figure 4.1 Statutory designated biodiversity Sites of international importance within 10km of the Site

March 2021

wood.

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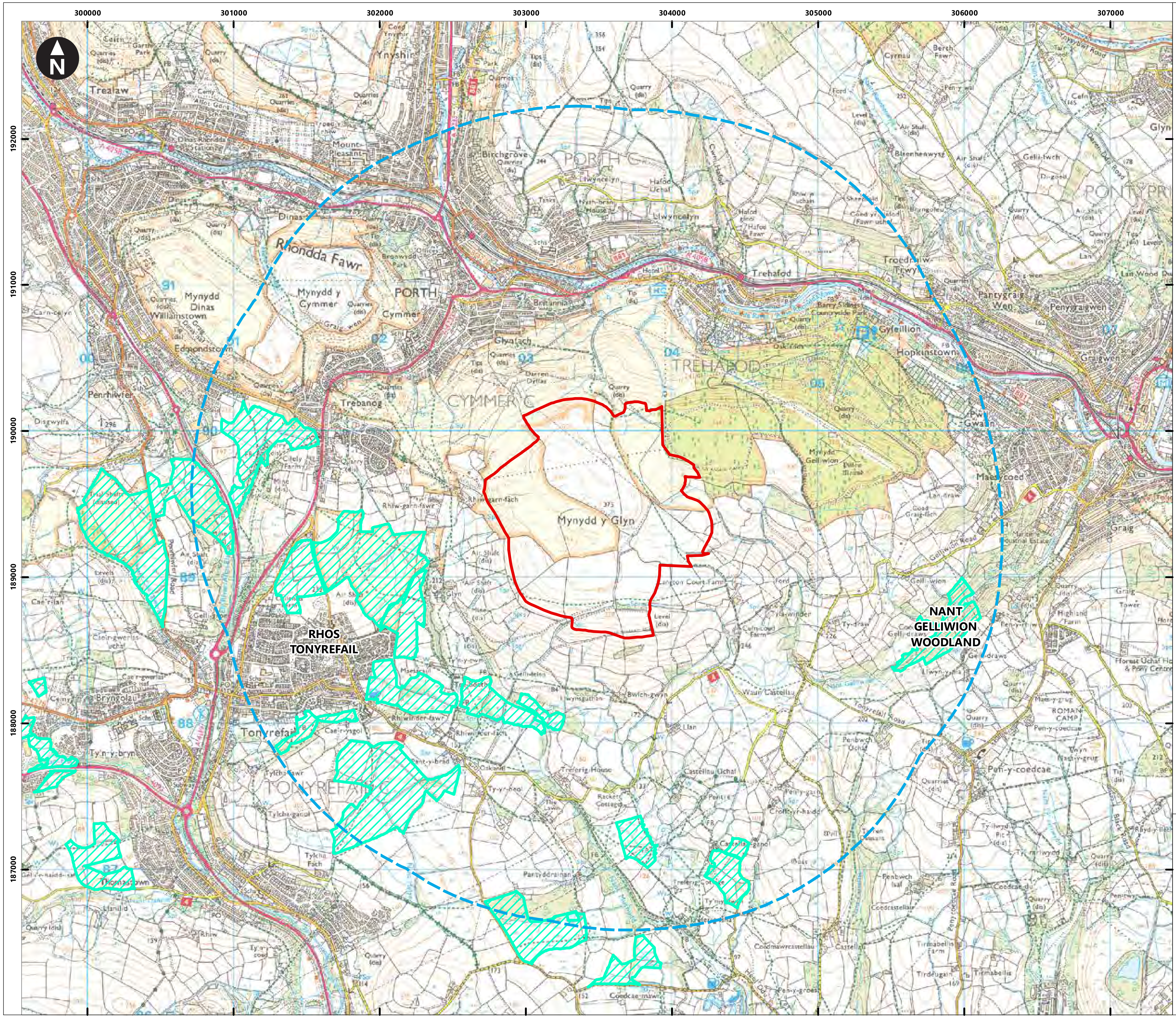


Key

Site Boundary

2km buffer

SSSI

0 500 1,000 1,500 m

Scale at A3: 1:25,000

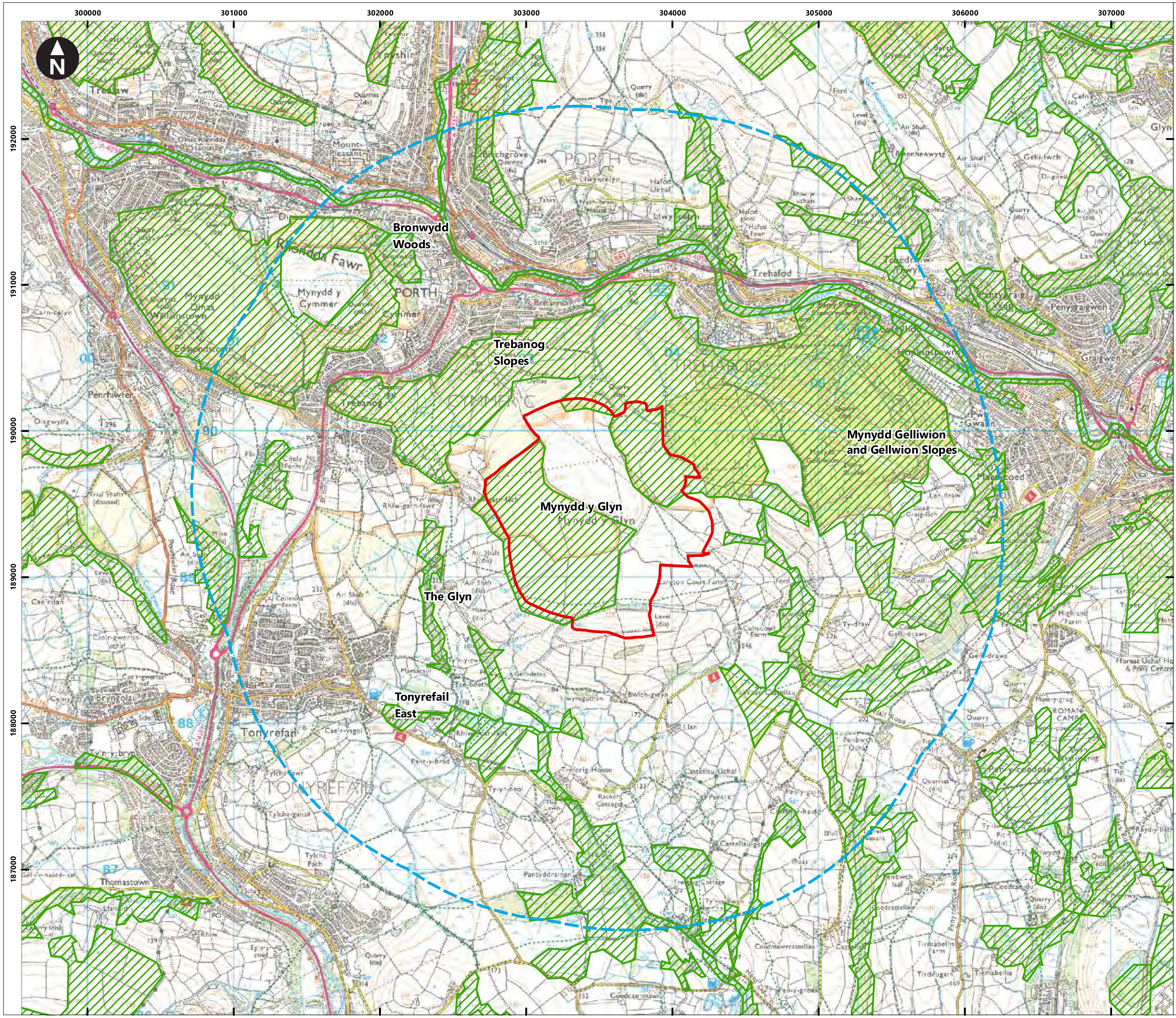
Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report

Figure 4.2 Sites with national statutory designation for biodiversity conservation

March 2021

wood.

42864-WOOD-XX-XX-FG-OE-0013_S0_P01.2



Key

Site Boundary

2km buffer

SINC

0 500 1,000 1,500 m

Scale at A3: 1:25,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report

Figure 4.3 Non-statutory designated biodiversity Sites areas within 2km of the Site

March 2021

wood.

42864-WOOD-XX-XX-FG-OE-0014_S0_P01.2

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302000 303000 304000 305000

191000 190000 189000 188000

Key

- Site Boundary
- 500m buffer
- Waterbodies
- Dry Ponds

0 200 400 600 800 m

Scale at A3: 1:15,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report

Figure 4.4 Waterbodies identified within 500m of the Site

March 2021

wood.

302000 302500 303000 303500 304000 304500 305000

190500 190000 189500 189000 188500

Site Boundary
250m study area boundary
Target Note
A3.1: Parkland and scattered trees- broad-leaved
G2: Running water
J2.1.1: Intact hedge native species-rich
J2.5: Wall
J2.6: Dry ditch
A1.1.1: Broadleaved woodland - semi-natural
A1.1.2: Broadleaved woodland - plantation
A1.2.2: Coniferous woodland - plantation
A2.1: Scrub- Dense/Continous
A2.2: Scrub- Scattered
B1.2: Acid grassland - semi-improved
B2.2: Neutral grassland - semi-improved
B4: Improved grassland
B6: Poor semi-improved grassland
C1.1: Continous Bracken
C1.2: Scattered Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid orassland
E1.6.1: Blanket bog
G1: Standing water
J3.6: Buildings
J4: Bare ground
Hardstanding

0 0.1 0.2 0.3 0.4 0.5 0.6 km
Scale at A3: 1:10,000

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Mynydd y Glyn Wind Farm
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Figure 4.5 Extended Phase 1 Habitat Plan

April 2021

wood.

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302500
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303500
190500
190000
189500
N
2
1
5
4
0
0.1
0.2
0.3 km
Scale at A3: 1:5,000
Site
250m study area
Target Note
G2: Running water
J2.5: Wall
A2.1: Scrub- Dense/Continous
B1.2: Acid grassland - semi-
B2.2: Neutral grassland - semi-
C1.1: Continous Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
J4: Bare ground
Hardstanding

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report
Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
wood.
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303500
304000
304500
190500
190000
189500
N
2
4
5
3
Site
250m study area
Target Note
A3.1: Parkland and scattered trees- broad-leaved
G2: Running water
J2.5: Wall
A1.2.2: Coniferous woodland - plantation
A2.1: Scrub- Dense/Continous
B1.2: Acid grassland - semi-improved
B2.2: Neutral grassland - semi-improved
C1.1: Continous Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
J4: Bare ground
Hardstanding
0
0.1
0.2
0.3 km
Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report
Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
wood.
42864-WOOD-XX-XX-FG-OE-0008_S0_P01.2
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303500
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188500
N
2
3
3
5
2
Site
250m study area
Target Note
A3.1: Parkland and scattered
G2: Running water
J2.1.1: Intact hedge native
J2.5: Wall
J2.6: Dry ditch
A1.1.1: Broadleaved woodland -
A1.1.2: Broadleaved woodland -
A1.2.2: Coniferous woodland -
A2.1: Scrub- Dense/Continous
A2.2: Scrub- Scattered
B1.2: Acid grassland - semi-
B2.2: Neutral grassland - semi-
B4: Improved grassland
B6: Poor semi-improved
C1.1: Continous Bracken
C1.2: Scattered Bracken
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
G1: Standing water
J3.6: Buildings
J4: Bare ground
Hardstanding
0
0.1
0.2
0.3 km
Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report
Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
wood.
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42864-WOOD-XX-XX-FG-OE-0008_S0_P01.2

302500
303000
303500
189500
189000
188500
N
2
5
Site
250m study area
Target Note
G2: Running water
J2.5: Wall
A2.1: Scrub- Dense/Continous
B1.2: Acid grassland - semi-improved
B6: Poor semi-improved grassland
D5: Dry heath/acid grassland
D6: Wet heath/acid grassland
E1.6.1: Blanket bog
G1: Standing water
Hardstanding
0
0.1
0.2
0.3 km
Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report
Figure 4.6 Extended Phase 1 Habitat Plan - Detailed
April 2021
wood.
42864-WOOD-XX-XX-FG-OE-0008_S0_P01.2
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303500

304000

304500

189000

188500

N

2

3

3

5

Site

250m study area

Target Note

A3.1: Parkland and scattered trees- broad-leaved

G2: Running water

J2.1.1: Intact hedge native species-rich

J2.5: Wall

J2.6: Dry ditch

A1.1.1: Broadleaved woodland - semi-natural

A1.1.2: Broadleaved woodland - plantation

A2.1: Scrub- Dense/Continous

A2.2: Scrub- Scattered

B1.2: Acid grassland - semi-improved

B2.2: Neutral grassland - semi-improved

B4: Improved grassland

B6: Poor semi-improved grassland

C1.1: Continous Bracken

C1.2: Scattered Bracken

D5: Dry heath/acid grassland

D6: Wet heath/acid grassland

E1.6.1: Blanket bog

G1: Standing water

J3.6: Buildings

Hardstanding

0 0.1 0.2 0.3 km

Scale at A3: 1:5,000

Pennant Walters
Mynydd y Glyn Wind Farm
Preliminary Ecological Appraisal Report

Figure 4.6 Extended Phase 1 Habitat Plan - Detailed

April 2021

wood.

Appendix B
Legislation

All wild mammals (including rabbits and foxes)

Under the *Wild Mammals (Protection) Act 1996* it is an offence intentionally to cause unnecessary suffering to any wild mammal.

Badger

The Protection of Badgers Act 1992 makes it an offence to:

- wilfully kill, injure or take a badger;
- attempt to kill, injure or take a badger; or
- cruelly ill-treat a badger.

It is also an offence to interfere with a badger set by:

- damaging a badger sett or any part of it;
- destroying a badger sett, obstructing access to or any entrance of a badger sett, disturbing a badger when it is occupying a badger sett; or
- intending to do any of those things or being reckless as to whether his actions would have any of those consequences.

Bats

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill a bat;
- deliberately disturb a bat (this applies anywhere, not just at its roost), in particular in such a way as to be likely to:
  - impair their ability to survive, breed or reproduce, or rear or nurture their young; and
  - impair their ability to hibernate or migrate.
- affect significantly the local distribution or abundance of that bat species;
- damage or destroy a breeding site or resting place of any bat;
- intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection (this is taken to mean all bat roosts whether bats are present or not).

Dormouse

Dormouse is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. This species is afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill any such animal;
- deliberately disturb any such animal, in particular in such a way as to be likely to:
  - impair their ability to survive, breed or reproduce, or rear or nurture their young;
  - impair their ability to hibernate or migrate; and
  - affect significantly the local distribution or abundance of that species.
- damage or destroy a breeding site or resting place of any such animal;
- intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

Great crested newt

The great crested newt is listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. It is afforded protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence, *inter alia*, to:

- deliberately capture, injure or kill any such newt;
- deliberately disturb any such newt, in particular in such a way as to be likely to:
  - impair their ability to survive, breed or reproduce, or rear or nurture their young;
  - impair their ability to hibernate or migrate; and
  - affect significantly the local distribution or abundance of that species.
- deliberately take or destroy the eggs of such a newt;
- damage or destroy a breeding site or resting place of any such newt;
- intentionally or recklessly disturb any such newt while it is occupying a structure or place that it uses for shelter or protection; or
- intentionally or recklessly obstruct access to any place that any such newt uses for shelter or protection.

This relates to both the aquatic and terrestrial habitat they occupy. The legislation applies to all life stages of this species.

Reptiles

The four widespread[16] species of reptile that are native to Britain, namely common or viviparous lizard (Zootoca (*Lacerta) vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake (*Natrix natrix (Naturix helvetica*)), are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

- intentionally kill or injure any of these species.

Birds

With certain exceptions[17], all wild birds, their nests and eggs are protected by section 1 of the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, *inter alia*, to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 of the Act subject to various controls.

Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- intentionally or recklessly disturb the dependent young of any such bird.

For golden eagle, white-tailed eagle and osprey, it is also an offence to:

- take, damage or destroy the nest of these species (this applies at any time, not only when the nest is in use or being built).

[16] The other native species of British reptile (sand lizard and smooth snake) receive a higher level of protection in England and Wales under the *Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. However, the distribution of these species is restricted to only a very few sites. All marine turtles (*Cheloniidae and Dermochelyidae*) are also protected.

[17] Some species, such as game birds, are exempt in certain circumstances.

Appendix C
Species Scientific Names

Table B.1 Species Scientific Names

Species	*Scientific Name*
Adder	*Vipera berus*
Alder	*Frangula alnus*
Ash	*Fraxinus sp.*
Badger	*Meles meles*
Bee Orchid	*Ophrys apifera*
Beech	*Fagus sylvatica*
Bell heather	*Erica cinerea*
Birch	*Betula sp.*
Bird's foot trefoil	*Lotus corniculatus*
Bluebell	*Hyacinthoides non-scripta*
Bog Asphodel	*Narthecium ossifragum*
Bog Pimpernel	*Potamogeton polygonifolius*
Bracken	*Pteridium*
Bramble	*Rubus sp.*
Brandt's Bat	*Myotis brandti*
Brown long-eared bat	*Plecotus auritus*
Bullfinch	*Pyrrhula pyrrhula*
Cherry Laurel	*Prunus laurocerasus*
Cinnabar	*Tyria jacobaeae*
Cock's-foot	*Dactylis glomerata*
Common Bent	*Agrostis capillaris*
Common Crossbill	*Loxia curvirostra*
Common Frog	*Rana temporaria*
Common Nettle	*Urtica dioica*
Common Pipistrelle	*Pistrellus pipistrellus*
Common Toad	*Bufo bufo*

Species	*Scientific Name*
Conifer	*Pinophyta sp.*
Creeping Bent	*Agrostis stolonifera*
Creeping Buttercup	*Ranunculus repens*
Creeping Thistle	*Cirsium arvense*
Cuckoo	*Cuculus canorus*
Cuckoo Flower	*Cardamine pratensis*
Daisy	*Bellis perennis*
Dandelion	*Taraxacum sp.*
Daubenton's Bat	*Myotis daubentonii*
Devil's-bit-Scabious	*Succisa pratensis*
Dog Violet	*Viola canina*
Dormouse	*Muscardinus avellanarius*
Dunnock	*Prunella modularis*
Early Hair Grass	*Aira praecox*
Giant Hogweed	*Heracleum mantegazzianum*
Goat Willow	*Salix caprea*
Golden Plover	*Pluvialis apricaria*
Gorse	*Ulex sp.*
Goshawk	*Accipiter gentilis*
Grass Snake	*Natrix natrix*
Great Crested Newt	*Triturus cristatus*
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*
Greater Willowherb	*Epilobium hirsutum*
Hare	*Lepus europaeus*
Hawthorn	*Crataegus sp.*
Hazel	*Corylus sp.*
Heath Spotted Orchid	*Dactylorhiza maculata*
Heath Rush	*Juncus squarrosus*

Species	*Scientific Name*
Heather	*Calluna sp.*
Hedgehog	*Erinaceus europaeus*
Himalayan Balsam	*Impatiens glandulifera*
Himalayan Cotoneaster	*Cotoneaster simonsii*
Himalayan Honeysuckle	*Leycesteria formosa*
Honeysuckle	*Lonicera fragrantissim*
Japanese knotweed	*Reynoutria japonica*
Kestrel	*Falco tinnunculus*
Kingfisher	*Alcedo atthis*
Knot Grass	*Polygonum sp.*
Lapwing	*Vanellus vanellus*
Lesser Horseshoe Bat	*Rhinolophus hipposideros*
Linnet	*Linaria cannabina*
Ling heather	*Calluna vulgaris*
Marsh Fritillary	*Euphydryas aurinia*
Marsh Thistle	*Cirsium palustre*
Marsh Violet	*Viola palustris*
Mat-Grass	*Nardus stricta*
Merlin	*Falco columbarius*
Mistle Thrush	*Turdus viscivorus*
Montbretia	*Crocosmia*
Natterer's bat	*Myotis nattereri*
Noctule	*Nyctalus noctula*
Oak	*Quercus sp.*
Otter	*Lutra lutra*
Palmate Newt	*Lissotriton helveticus*
Pearl-bordered Fritillary	*Boloria euphrosyne*

Species	*Scientific Name*
Peregrine	*Falco peregrinus*
Perennial Rye	*Lolium perenne*
Purple Moor Grass	*Molinia caerulea*
Red Fescue	*Festuca rubra*
Red Kite	*Milvus milvus*
Redwing	*Turdus iliacus*
Reed Bunting	*Emberiza schoeniclus*
Reindeer moss	*Cladonia Stellaris*
Rhododendron ponticum	*Rhododendron ponticum*
Ribwort Plantain	*Plantago lanceolata*
Rowan	*Sorbus sp.*
Rush	*Juncaceae sp.*
Sallow	*Cirrhia icteritia*
Scots Pine	*Pinus sylvestris*
Sedge sp.	*Cyperaceae sp.*
September Thorn	*Ennomos erosaria*
Serotine	*Eptesicus serotinus*
Shaded Broad-bar	*Scotopteryx chenopodiata*
Sheep's Fescue	*Festuca ovina*
Sheep's' Sorrel	*Rumex acetosella*
Silver Birch	*Betula pendula*
Skylark	*Alauda arvensis*
Slow worm	*Anguis fragilis*
Small Heath	*Coenonympha pamphilus*
Small Pearl-bordered Fritillary	*Boloria selene*
Snipe	*Gallinago gallinago*
Soft rush	*Juncus effusus*

Species	*Scientific Name*
Song Thrush	*Turdus philomelos*
Soprano pipistrelle	*Pipistrellus pygmaeus*
Sphagnum Moss	*Sphagnum*
Spotted Flycatcher	*Muscicapa striata*
Starling	*Sturnus vulgaris*
Sweet Vernal	*Anthoxanthum odoratum*
Sycamore	*Acer pseudoplatanus*
Viviparous Lizard	*Zootoca vivipara*
Wall Cotoneaster	*Cotoneaster horizontalis*
Water Vole	*Arvicola amphibius*
Wavy Hair Grass	*Deschampsia flexuosa*
Whiskered Bat	*Myotis mystacinus*
White Clover	*Trifolium repens*
Willow	*Salix sp.*
Willow Tit	*Poecile montana*
Wood Warbler	*Phylloscopus sibilatrix*
Yarrow	*Achillea millefolium*
Yellowhammer	*Emberiza citrinella*
Yew	*Taxus baccata*
Yorkshire fog	*Holcus lanatus*

Appendix D
Target Notes

Table C.1 Target Notes

Reference (Figure 4.5 & 4.6)	Description
1	Areas of dry heath/acid grassland identified during the desk study from NRWs remote sensing layer and confirmed on site during extended Phase 1 habitat survey.
2	Grasslands identified in the desk study as being unimproved acid grassland
3	Dry slate riverbed
4	Scattered stone amongst bracken
5	Common Lizard

Appendix 7.2
Interim Bat Survey Report

Pennant Walters

Mynydd y Glyn Wind Farm

Interim Bat Survey Report

Wood Group UK Limited – May 2021

Report for

Pennant Walters

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Management systems

This document has been produced by Wood Group UK Limited in full compliance with our management systems, which have been certified to ISO 9001, ISO 14001 and ISO 45001 by Lloyd's Register.

Document revisions

No.	Details	Date
1	42864-WOOD-XX-XX-RP-OE-0001_S0_P02	April 2021

Contents

1. Introduction

1.1 Background

1.1.1 Pennant Walters are seeking planning permission for a seven-turbine wind farm on land at Mynydd y Glyn, Pontypridd ('the Site'). The Site lies within the Rhondda Cynon Taf County Borough Council administrative area and is located approximately 3km west of Pontypridd (National Grid Reference (NGR) ST 03605 89504). The Site comprises a plateau of grazing pasture with areas of conifer plantation woodland and blanket bog and measures 168.53 hectares (ha), (see **Figure 1.1, Appendix A)**.

1.1.2 Wood Group UK Ltd (Wood) was commissioned by Pennant Walters to undertake a suite of bat surveys of the Site to support the Proposed Development.

1.2 This report

1.2.1 This report presents the methods and findings of the baseline bat surveys. The structure of the report is as follows:

Section 2 – Methods.

Section 3 – Results.

Section 4 – Summary.

Section 5 – Collision Risk Assessment.

Section 6 – Further Survey.

1.2.2 This interim report summarises the methods adopted for, and results of, the bat survey undertaken between April 2020 and February 2021. These results will be used to inform the evolution of the project design and specification of environmental measures. The results of these ecological studies will also inform the Environmental Impact Assessment (EIA).

1.2.3 It should be noted that survey work is on-going, and this document is an interim summary of the survey work undertaken to date. It is not intended to be a complete assessment of the status of population on the Site.

1.3 Survey area

1.3.1 Bat surveys conducted during 2020 were carried out in advance of the scheme design being finalised including the Site boundary and proposed turbine size and layout. Between the time of commencing surveys and the time of writing the Site boundary and proposed turbine layout has evolved. The bat survey area comprises the Site boundary and an additional 266m buffer area (200m plus a maximum potential rotor radius (66m) from the Site boundary). The Site boundary has recently been updated, the current site boundary and associated 266m buffer which comprises the bat survey area is shown on **Figure 1.2, Appendix A**.

1.4 Legislative and policy context

1.4.1 All British bat species are protected under UK and European legislation (see **Appendix B** of this report), such that it is a criminal offence to disturb, injure or kill any bat, or damage or destroy a bat roost (even when no bats are present).

1.4.2 In addition, the following national and local planning policies require the consideration of biodiversity/nature conservation and provide guidance/considerations for developments affecting designated sites and habitats, along with protected priority habitats and species:

- Future Wales; National Development Framework 2021.
- Planning Policy Wales – Chapter 6 Distinctive and Natural Places (11th Ed.; 2021).
- Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009).
- Rhondda Cynon Taf Local Development Plan (LDP) up to 2021 (adopted 2011).
- The Rhondda Cynon Taf Supplementary Planning Guidance (SPG) Nature Conservation 2011.
- Rhondda Cynon Taf Biodiversity Action Plan (Action for Nature) 2000 (updated 2008).

1.4.3 In order to ensure compliance with the relevant legislation and policy, it is necessary to understand how bats use features within the Site so that the effects of the proposed development on bat populations can be appropriately assessed and mitigated for.

2. Methodology

2.1 Overview

2.1.1 A variety of methods have been used, to date, to assess the use of the Site by bats, in line with best practice guidelines. Bats and onshore wind turbines [1] and the Bat Conservation Trust (BCT) third edition of Good Practice Guidelines[2] were the main source of guidance. The Bat Mitigation Guidelines[3], Bat Workers' Manual[4], Bat Tree Habitat Key[5] and British Standard 8596:2015[6] provide further guidance that has been taken into account when designing the survey methodology and programme of survey work. The guidance provided has been interpreted using professional experience with the detailed survey design, while guided by these documents, adapted to ensure relevance to the current bat survey area and take account of emerging survey data.

2.1.2 The remainder of this section describes the following survey methods that have been applied in 2020.

- Desk study.
- Field survey: roost identification.
  - Preliminary appraisal of potential bat roost features.
  - Built structures (external inspection).
  - Trees (ground level roost assessment, potential roost feature [PRF] inspection).
- Field survey: bat activity.
  - Preliminary appraisal of habitats for bats.
  - Manual transects.
  - Automated monitoring.

2.1.3 This section then goes on to describe:

- The methods used throughout field survey work to aid with species identification.
- How environmental conditions were considered in survey design and recorded during field survey work.
- What limitations affected the field surveys.
- The personnel responsible for applying survey methods.

[1] SNH, NE, NRW, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter and BCT *et al.* (2019) *Bats and onshore wind turbines: survey, assessment and mitigation.*
[2] J. Collins (ed.). Bat surveys for professional ecologists: Good practice guidelines. 3rd Edition. London: Bat Conservation Trust, 2016.
[3] A.J. Mitchell-Jones. Bat Mitigation Guidelines. Peterborough: Natural England, 2004.
[4] A.J. Mitchell-Jones A.P. McLeish, A.P. Bat Workers' Manual. 3rd Edition. Peterborough: JNCC, 2004.
[5] H. Andrews. Bat roosts in trees: a guide to identification and assessment for tree-care and ecology professionals. Exeter: Pelagic Publishing, 2018.
[6] British Standards Institution. BS 8596:2015: Surveying for bats in trees and woodland. London: BSI. 2015.

2.2 Desk study

2.2.1 A desk study was carried out in 2020 to feed into the design of field surveys. The following data sources were consulted as part of the desk study:

- Multi Agency Geographical Information for the Countryside (MAGIC) – Used to identify internationally and nationally important sites designated for bats within 10km of the Site and European Protected Species Mitigation Licences (EPSMLs) within 5km of the Site.
- South East Wales Biodiversity Records Centre (SEWBReC) – Records of bats within a 10km radius of the Site boundary.

2.3 Field survey: roost identification

Preliminary appraisal of potential bat roost features

2.3.1 A walkover survey of the bat survey area (**Figure 1.2, Appendix A**) was undertaken on the 29 April and 1 May 2020. During this survey all trees and built structures[7] were assessed for their potential to support roosting bats. This included a visual inspection of the exterior of built structures to consider the presence of potential roost features (PRFs) such as roof voids or weatherboarding.

2.3.2 This was a high-level scoping exercise and did not involve assessing every individual tree, but where groups of trees occur together (e.g. woodland) a general assessment was made of the tree group and its potential to support bat roosts; similarly, not every building was inspected in detail, but was subject to a more general assessment.

Built structures

Overview

2.3.3 **Table 2.1** below lists the built structures assessed in 2020, and the dates the detailed external inspections were undertaken, built structures locations are shown in **Figure 3.2, Appendix A**.

[7] Built structures is used to refer to all natural and constructed features surveyed with the bat survey area such as buildings, ice houses, caves, rock excavations; but excludes trees.

Table 2.1 Built structures external inspection dates

Building reference (Figure 3.2)	External inspection
B1	29.06.2020
B2	29.06.2020
B3	30.07.2020
B4	30.07.2020
B5	30.07.2020
B6	30.07.2020

External inspection

2.3.4 To build upon the preliminary bat appraisal, a more detailed visual inspection of the exterior of built structures within the bat survey area, where accessible, was carried out in July 2020 to assess their level of potential suitability to support roosting bats. A general description of the structure was made, along with consideration of the following factors.

- The presence of PRFs such as roof voids and soffit boxes with access gaps and gaps under bargeboards, roof tiles, hanging tiles and weatherboarding.
- Expected levels of artificial lighting around potential roost entrances.
- Expected levels of disturbance to any potential roost.
- Quality of adjoining or connecting habitat for roosting bats at the site of the structure, and the potential for bat foraging and commuting routes in the surrounding area.

2.3.5 With these factors taken into account, the assessed structures were categorised in accordance with their level of potential suitability to support roosting bats, as set out in in **Table 2.2**.

Table 2.2 Criteria used for categorising the level of potential for built structures to support roosting bats

Potential Roost Suitability	Requirements
Negligible	Structures with negligible features likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

2.3.6 In addition, the exteriors of buildings near potential roost entrances (e.g. gaps under soffits and hanging tiles) were examined using binoculars and a powerful torch to look for signs of bats.

2.3.7 Built structures were categorised by their highest potential to support any type of roost. For example, if a structure had high potential to support a maternity roost of bats in the summer, but only low potential to support hibernating bats in the winter, the structure was categorised as having high potential to support roosting bats overall.

Trees

Overview

2.3.8 **Table D1 (Appendix D)** lists the trees assessed in 2020 and 2021 and indicates which methods have been applied at each tree and the date on which the surveys were carried out. The methods adopted at each tree were selected based on those that were deemed most appropriate, considering initial survey results and the suitability and type of PRFs present. Tree locations are shown in **Figure 3.3, (Appendix A).**

Ground level roost assessment

2.3.9 To build upon the preliminary bat appraisal, a more detailed visual inspection of trees within the bat survey area was carried out to assess their level of potential suitability to support roosting bats. The trees were inspected from ground level between June 2020, using close focussing binoculars and a powerful light source, and assessed with consideration of the following.

- The presence of PRFs such as rot holes; knot holes; tear outs; flush cuts; hazard beams; wounds; cankers; and other cavities, splits or lifting bark (which are arboricultural terms for such features).
- Expected levels of artificial lighting around potential roost entrances.
- Expected levels of disturbance to any potential roost.
- Quality of adjoining or connecting habitat for roosting bats at the site of the structure, and the potential for bat foraging and commuting routes in the surrounding area.

2.3.10 The assessed trees were categorised in accordance with their level of potential suitability to support roosting bats, as set out in **Table 2.3**.

Table 2.3 Criteria used for categorising the level of potential for trees to support roosting bats

Potential Roost Suitability	Requirements
Negligible	Trees with no visible features likely to be used by roosting bats.
Low	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A tree with one or more PRFs that are suitable for use by large numbers of bats on a regular basis, and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat

Potential Roost Suitability	Requirements
Confirmed roosts	Where it was possible to determine that the tree supports a PRF that is used or has been used by bats. Any tree confirmed to support roosting bats during subsequent survey works was also moved into this category

2.3.11 For all trees categorised as having high or moderate potential to support roosting bats, a unique reference number was assigned, a photograph was taken, and the following details were recorded:

- Grid reference.
- Tree species.
- Tree diameter at breast height (DBH).
- Tree height (measured using a clinometer).
- Number and type of PRF(s).
- Approximate height of PRF(s), and whether they were on the stem or a limb.
- Aspect that the PRF(s) were facing.

2.3.12 Full details of low and negligible potential trees were not recorded, and these trees were not considered for further assessment.

PRF/ hibernation inspection

2.3.13 Trees categorised as providing a high level of bat roost potential during the ground level roost assessment were taken forward for PRF inspection. The decision to take forward high potential trees only was based on the Bats and Onshore Wind Turbines guidance[8] which outlines that key features that could support maternity roosts and significant hibernation or swarming sites (both of which may attract bats from numerous colonies from a large catchment) should be taken forward, it was considered that only the high potential trees had the potential roost suitability to meet these criteria.

2.3.14 PRFs occurring up to 2m from ground level were inspected either from ground level or using a ladder. PRFs above this height were accessed using rope and harness climbing techniques, where safe to do so. All PRF inspections were undertaken using an endoscope and torch, once during the winter period (January- February) in 2021. PRF inspections updated the ground level roost assessments, allowed for a hibernation inspection and recorded additional characteristics of each feature, including approximate internal cavity dimensions and the type of bat roost the feature had potential to support. These were defined as:

- Maternity roosts supported by larger cavities and utilised between May and August by female bats and their young.
- Hibernation roosts supported by a range of cavity sizes but providing constant humidity and temperatures for bats between the months of October and March.

[8] SNH, NE, NRW, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter and BCT *et al.* (2019) *Bats and onshore wind turbines: survey, assessment and mitigation.*

- Day roosts supported by a range of cavity sizes, but usually smaller, supporting individual or small groups of bats between the months of March and November.

2.3.15 Any bats, or evidence of bat occupation (including staining, smoothing of bark and droppings) was recorded, and a photograph of each PRF was taken for reference and to aid future identification of individual features if such were required.

2.3.16 While in the canopy it is often possible to identify features that are not visible from ground level. Therefore, any additional PRFs observed, that had not been identified from the ground-based assessment were recorded and inspected and then included in further survey work, as appropriate. Trees were 'scoped out' from requiring further survey during this exercise, where close inspection revealed them to provide moderate, low or negligible potential to support roosting bats.

PRF/ hibernation inspection

2.3.17 A sample of bat droppings, if found during the built structure inspections and PRF inspection work, would be collected, and submitted for DNA analysis to confirm the identification of bat species. Samples would only be collected where these were accessible, identification of the species occupying the roost was not obvious, and where it was possible to do so without causing undue stress to any bat(s) present. Whilst this was a survey intention no suitable bat droppings were recorded during survey work.

2.4 Field survey: bat activity

Preliminary appraisal of habitats for bats

2.4.1 During the initial walkover survey of the bat survey area in April and May 2020, the habitats were considered for their potential to support bats. This particularly focussed on assessing factors that might affect the quality of the habitat for foraging and commuting bats, with an overall category assigned, taking into account the features summarised in **Table 2.4**.

Table 2.4 Factors considered when assessing the potential suitability of the bat survey area for bats

Potential Roost Suitability	Requirements
Negligible	Negligible habitat features on the Site that are likely to be used by foraging or commuting bats. Habitat may be brightly lit by artificial lighting.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated and not well connected to the surrounding landscape by other habitat. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree or patch of scrub. Site may be well-lit by artificial lighting in some areas.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water. Habitat may be lit my artificial lighting, but this is low-level and/or only affects parts of the site.
High	Continuous, high quality habitat that is well connected to the wider landscape and likely to be regularly used by commuting bats. Such as river valleys, vegetated streams, intact hedgerows and woodland edge. High quality habitat that is well connected to the wider landscape and likely to be rich in invertebrate prey. Such as broadleaved woodland, tree-lined watercourses, water bodies and grazed parkland. Habitat is typically unlit by artificial lighting.

Manual transects

2.4.2 The main areas of potential bat foraging habitat on the Site were divided into three transects, each approximately 4km in length, designed to incorporate potential bat flight lines and sample the range of habitat types present. **Table 2.5** presents the dates and weather conditions on which manual transect survey visits were carried out and **Figure 2.1 (Appendix A)** shows transect routes.

Table 2.5 Walked Transect Surveys – Dates, Times and Weather Conditions

Date	Start/End Time of Transect	Time of Sunset or Sunrise	Weather Conditions
20th May 2020	21:07/11:44*	00:07	Temperature: 12-10°C, Average Wind: 0.9-2.7m/s, Rain: None, Cloud Cover: 65%
9th June 2020	21:27/00:27	21:27	Temperature: 8.9-8.5°C, Average Wind: 5 -3.6m/s, Rain: None, Cloud Cover: 50%
30th July 2020	21:05/00:05	21:05	Temperature: 17-15°C, Average Wind: 4-2.7m/s, Rain: None, Cloud Cover: 30%
10th September 2020	19:40/22:40	19:40	Temperature: 13-10°C, Average Wind: 2.7-0m/s, Rain: None, Cloud Cover: 60%
16th September 2020	19:24/21:54*	19:24	Temperature: 14-9°C, Average Wind: 3-8m/s, Rain: None, Cloud Cover: 0%
12th October 2020	18:36/21:36	18:36	Temperature: 9°C, Average Wind: 3.7-2.2m/s, Rain: None, Cloud Cover: 20%

*Survey cut short due to very strong winds

2.4.3 During each survey visit the surveyor walked at least two circuits of the transect from sunset until approximately three hours after sunset; recording the number of bat passes of each species, and the type of activity heard (e.g. foraging, social calls). While walking along the transect route, surveyors watched for bat activity (light levels permitting) and monitored and recorded bat calls using Elekon BatLogger M detectors. Calls were subsequently analysed using BatExplorer software to aid species identification (see **Section 2.5**). For the purpose of this assessment, a "pass" is defined as the sequence of calls[9] a bat makes as it flies past, typically getting louder then softer as the distance between bat and surveyor changes.

2.4.4 Each of the transects was visited at dusk by an ecologist monthly between May and October inclusive, with the exception of August (please see **Section 2.7**). Within each month, all transects were surveyed simultaneously. The starting point of the transect was varied between visits to enable sampling of different parts of the transects at differing periods of time after sunset.

Automated monitoring

2.4.5 In order to monitor bat activity throughout the night at proposed turbine locations, an automated detector was allocated to each of the six proposed turbine locations[10]. Monitored locations were selected with the aim of being positioned as close to the proposed turbine locations as possible, taking into account the need to secure the detector in a safe position, with the Site being open access and heavily used by the public. Due to the evolution of scheme design some turbine locations also changed after the completion of the 2020 monitoring period resulting in some

[9] Bat "calls" are the individual clicks made by bats as they echolocate.
[10] The Proposed Development comprised six turbines during 2020 surveys, a seven turbine scheme was developed in 2021

turbine locations being added, removed or moved. The monitoring locations are shown in reference to the current proposed turbine positions in **Figure 2.2** (**Appendix A**).

2.4.6 At each location a full spectrum automated bat detector (Elekon BatLogger A+) was deployed to record bat calls continuously from 30 minutes before sunset to 30 minutes after sunrise for a minimum of ten nights per season spring (May), summer (July) and autumn (September). Posts were used to elevate the microphone to a height 2m above ground. The exception to this was at monitoring location 6 in the north east of the Site; as the position of this turbine was changed after the survey window (please see **Section 2.7**).

2.4.7 As far as possible, at least ten consecutive nights of data per month from each recording location was analysed using BatExplorer software to identify bats to species level, or to genus or species group where the characteristics of the call were common to more than one species (**Section 2.5**). Automated detector units were left to record over more than ten nights, and the dates for analysis were chosen as the ten consecutive nights with the best weather conditions. By selecting the dates for analysis in this way it is assumed that nights with the best possible conditions for bat activity during the recording period were being chosen.

2.4.8 Prior to deployment and at intervals of every five days during recording periods all automated bat detectors, cables and microphones were checked, and the microphones tested and calibrated to ensure operation at the same level of sensitivity. Full automated monitoring survey details are provided in **Table C1 (Appendix C)**.

Ecobat analysis

2.4.9 Analysis of the data collected during the automated monitoring included use of Ecobat[11] to aid in quantifying bat activity levels in the context of bat activity levels recorded elsewhere in the region. Ecobat is an online tool that compares data collected by automated bat detectors at any given site with data collected by the same means at the same time of year within a defined search radius. The reference range data set were stratified to include:

- Only records from within 30 days of the survey dates.
- Records within a 100km radius of the survey location.
- Records using any make/ model of bat detector.

2.4.10 Through generating a percentile rank for each night of bat activity, the Ecobat tool can identify the number of nights in which species data collected by a static detector could be considered to represent 'high', 'moderate/ high', 'moderate', 'low/moderate', or 'low' levels of activity, as shown in **Table 2.6**.

Table 2.6 Percentile score and categorised level of bat activity

Percentile score	Bat activity level
81 - 100	High
61 - 80	Moderate - High
41 - 60	Moderate
21 - 40	Low - Moderate

[11] http://www.mammal.org.uk/science-research/ecostat/

Percentile score	Bat activity level
0 - 20	Low

Extracted from *Bats and onshore wind turbines* (2019)[1]

2.4.11 The analysis was run at both the local (detector) scale, and at the site scale to allow assessment of bat activity across the proposed development.

2.5 Species identification

2.5.1 Analysis of bat recordings was carried out with reference to published guidance to aid species identification[12,13]. Where records from the bat detector surveys (manual transects and automated monitoring) were not identified to species level during the sound analysis process due to the overlapping call parameters of some species, records were identified to genus/species group, with the following groups used:

- CP/SP (common pipistrelle or soprano pipistrelle).
- NP/CP (Nathusius' pipistrelle or common pipistrelle).
- NSL (noctule, Leisler's bat or serotine).
- *Nyctalus* sp. (noctule or Leisler's bat).
- *Myotis* sp. (bat species in the genus *Myotis*).
- LE (brown or grey long-eared bat).
- Bat sp. (calls that could not be ascribed to a species group).

2.5.2 The majority of recordings of bats in the genus Myotis were grouped together, as these species in particular have widely overlapping call parameters. Similarly, it is very difficult to distinguish between the two British species of long-eared bats through flight observations and sound recordings alone, therefore recordings were grouped as 'LE' rather than identified to species.

2.6 Environmental conditions

2.6.1 Manual transects and automated monitoring were undertaken as far as practically possible when there was little or no rain, maximum ground wind speed of 5m/s and the temperature was 10°C and above as, in these weather conditions, bats are unlikely to be deterred from flying. Temperature, humidity, cloud cover and rainfall levels were recorded by the surveyors during each manual survey session. Any other environmental conditions that may affect bat activity, such as high noise or artificial light levels, were also noted.

2.6.2 During automated monitoring, weather recordings were taken directly after each recording night from https://www.wunderground.com. Full details of weather conditions experienced during automated monitoring are provided in **Table C2 (Appendix C).**

[12] J. Russ, J. British Bat Calls a Guide to Species Identification. Exeter: Pelagic Publishing, 2012
[13] N. Middleton, A. Froud and K. French. Social calls of the bats of Britain and Ireland. Exeter: Pelagic Publishing, 2014.

2.7 Field survey limitations

Roost identification surveys

2.7.1 Access could not be gained for internal inspections in the built structures identified within the bat survey area due to access restrictions predominately associated with the Covid-19 pandemic.

Bat activity surveys

2.7.2 The Site is open access and subject to high levels of public use (potentially increased during the Covid-19 national lockdown). The automated detectors were small and could be concealed to a degree. However, it was considered weather station/s would be difficult to safely deployed on the Site. As such detailed weather data was taken the day directly after each automated recording night from https://www.wunderground.com.

2.7.3 Best efforts were made to achieve 10 nights automated recording for each recording period in optimal weather conditions that were consecutive, covering the correct seasonal window and covering the same dates for all automated recorders on Site. Recording periods were selected based on long term weather forecasts to select the best weather window, recorders were also left recording for a minimum of an additional week to allow for selection of the best data set. Notwithstanding some nights recording were still outside optimum weather conditions as set out in **Section 2.6.** In most of these instances the weather was only marginally outside the optimal range (e.g 0.5 – 3.8m/s over the optimum wind or 3ºC below the correct temperature). The Site is a Welsh upland site, situated in a highly exposed and elevated position and as such is subject to weather extremes and fluctuations. Given the nature and location of the Site and the data collation approach, it is considered the data provided within this report was collected in the best available weather conditions, accurately reflects bat activity at this geographic location, and is suitable to inform an assessment of the bat populations on Site.

2.7.4 Due to the evolution of scheme design some proposed turbine locations changed after the completion of the 2020 monitoring period additionally a seventh turbine location was added in 2021. Automated monitoring data was not collected at the proposed turbine location in the far east of the Site; as the position of this turbine was moved. The 2020 monitoring locations are shown in reference to the current proposed turbine positions in **Figure 2.2** (**Appendix A**). All automated monitoring locations are in proximity to proposed turbine locations with the exception of automated detector location 6 which is no longer close to any proposed turbine locations after the design change. Additional automated monitoring surveys are being undertaken in 2021 to account for design changes as detailed in **Section 6**.

2.7.5 The walked transect surveys were planned to be undertaken once each month from May to October inclusive. However, the August transect could not be completed due to access restrictions. To ensure a good spread of data collection through the season, an additional transect was undertaken in September.

2.8 Personnel

2.8.1 All survey work was led and organised by Chris Hill MCIEEM. Chris is registered under Natural England (NE) Class Licence 2 (registration no. 2015-15031-CLS-CLS) and has over 12 years' experience in ecological consultancy. Tree and building inspections were led and undertaken by Kelly Jones. Kelly is registered under Natural Resources Wales (NRW) (registration no. S088838/1) and has over 10 years' experience in ecological consultancy. The survey leads were assisted by suitably qualified and experienced Wood ecologists; details of whom are provided in (**Table C3, Appendix C**).

3. Results

3.1 Desk study

Designated sites

3.1.1 There are no internationally or nationally important sites that are designated for bat conservation within 10km of the Site.

SEWBReC records

3.1.2 SEWBReC holds records of at least 12 species of bat, recorded within the last 15 years within 10km of the Site. The bat roost records are summarised in **Table 3.1** and shown on **Figure 3.1, Appendix A** while **Table 3.2** lists the activity records.

Table 3.1 Summary of bat roost records within 10km of the Site

Species	Number of records	Type of roost	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	1	Day Roost	2012	9,865 N
Brown Long-eared Bat	41	Maternity Roost / Day Roost / Hibernation	2019	1,139 N
Common Pipistrelle	83	Maternity roost / Nursery roost / Building roost / Day Roost /	2018	664 W
Daubenton's Bat	7	Hibernation / Day Roost	2019	3,284 E
Greater Horseshoe Bat	1	Hibernacula Roost	2013	9519 SE
Lesser Horseshoe Bat	8	Maternity roost / Nursery roost / Hibernacula roost / Building roost / Day Roost /	2017	5,982 SW
Noctule	1	Building Roost	2012	8,660 SW
Myotis Bat Species	6	Maternity Roost / Day Roost	2010	5,229 NE
Natterer's bat	4	Hibernation / Maternity Roost / Building Roost	2012	2,836 W
Pipistrellus Species	83	Maternity roost/ Day Roost / Building Roost	2014	783 W
Soprano Pipistrelle	45	Maternity roost/ Day Roost / Building Roost	2017	1,139 N
Whiskered Bat	7	Building Roost	2011	4,637 NE
Unidentified Bat Species	154	Building Roost	2017	267 W

Table 3.2 Summary of bat activity records within 10km of the Site

Species	Number of records	Date of most recent record	Distance (m) and direction of nearest record from the Site
Brandt's Bat	1	2013	8,740 SE
Brown Long-eared Bat	43	2018	3,369 S
Common Pipistrelle	599	2018	673 NW
Daubenton's Bat	11	2014	3,050 E
Greater Horseshoe Bat	6	2017	4,470 SW
Lesser Horseshoe Bat	8	2018	5,655 W
Noctule	127	2018	783 E
Long-eared Bat Species	1	2013	673 N
Myotis Bat Species	118	2018	3,142 E
Nathusius Pipistrelle	11	2018	3,050 W
Natterer's bat	14	2013	5,064 NW
Nyctalus Bat Species	5	2017	5,413 W
Pipistrellus Species	159	2019	2,767 W
Serotine	7	2017	4,470 SW
Soprano Pipistrelle	495	2019	931 N
Whiskered Bat	6	2015	2,927 W
Unidentified Bat Species	133	2019	783 W

3.2 Field survey: roost identification

Preliminary appraisal of potential bat roost features

3.2.1 During the preliminary bat appraisal six built structures were recorded within the bat survey area that were later subject to focussed survey work. This survey provided a starting point for the follow-on survey work, such that where further survey effort has built on the appraisal, those results supersede the preliminary task and, as such, are detailed in the relevant sections of this document.

3.2.2 The current status of built structures within the bat survey area, based on all survey effort undertaken to date, is shown in **Table 3.4** and presented on **Figure 3.2** (**Appendix A**).

3.2.3 The preliminary bat appraisal identified trees within the bat survey area that were later subject to focussed survey work assessing each tree individually. The follow-on survey results supersede the preliminary walkover task and, as such, are detailed in the relevant sections of this document. The location and status of trees following all survey work are shown in **Figure 3.3 (Appendix A**) and results of the focussed follow-on survey work are provided in **Table D1** (**Appendix D**).

Built structures

External inspection

3.2.4 The results of the external inspection to establish the level of potential suitability to support roosting bats in built structures is summarised in **Table 3.3.** The built structures comprise a mix of agricultural buildings, residential dwellings and a wall. Some level of roosting potential for bats is provided by four structures; after the external inspections two structures are classed as having 'low' roosting potential, one as having 'moderate' potential and one offering 'high' potential. The location of each structure is shown in **Figure 3.2** (**Appendix A)** along with the current potential roost status category.

Table 3.3 Built structures external inspection results

Built structure ID	General description	PRFs and potential access points recorded	Hibernation potential	Level of roost potential
B1	Small open cattle shed constructed of cinderblock with corrugated metal roofing. Structurally generally sound with wooden support beams. Does not appear to be in current use. Low habitat quality: structure is surround by short grazed agricultural grassland. Lack of feature nearby for commuting to connect to wider landscape.	Low potential for roosting bats around roof beams where corrugated metal meets wall, however exposure to the elements means it is not suitable for more than occasional summer use by individual bats	No	Low
B2	Crumbling stone wall running along dry riverbed. High habitat quality: structure lies within shaded dry river bed underneath tree cover. Good foraging and commuting opportunities directly outside roost.	Large cavity in wall extends into bank >30cm. Provides opportunities for crevice roosting bats. Easy access by rodents reduces suitability as only 1m above ground level.	No	Moderate
B3	House in current use. Looks like it has been recently built with roof tiles, soffit boxes, chimney and barge boards all in good condition. Moderate habitat quality: cattle sheds nearby which may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.	No PRFs recorded or potential access points recorded	No	Negligible
B4	Cattle shed. Constructed of timber beams with corrugated metal	Many access points however no suitable PRFs recorded.	No	Negligible

Built structure ID	General description	PRFs and potential access points recorded	Hibernation potential	Level of roost potential
	sheeting. Exposed to elements with lots of movement of metal sheeting in the wind Moderate habitat quality: cattle shed may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.			
B5	Farmhouse currently in use. Brick construction walls with pitched tiled roof. Wooden bargeboard on eastern aspect, bargeboard missing on western aspect. Stone structure attached to side of house with pitched roof and wooden beams. Moderate habitat quality: cattle sheds nearby which may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.	Easy access to loft space on wester aspect due to missing barge board. Loft space is likely to provide many roosting and hibernating opportunities for crevice roosting and void dwelling bats. Easy access to stone structure adjacent to property which is sheltered and has wooden beams to provide roosting opportunities. Likely to also contain many opportunities for crevice roosting bats but was not inspected internally. Multiple opportunities for crevice roosting bats in stone wall at entrance to structure.	Yes	High
B6	Cattle shed with exposed wooden beams and corrugated metal roof. Plastic fascia runs along western and eastern aspect. Moderate habitat quality: cattle shed may attract invertebrates and provide foraging opportunities. Additional foraging opportunities in bracken and bog to the north and low levels of disturbance. Relatively exposed with no clear cover for commuting however low levels of lighting and disturbance means there are no significant barriers.	Exposure to element within main structure and lack of roosting opportunities means it is unlikely to support roosting bats. May be limited opportunities behind fascia for individual crevice roosting bats.	No	Low

Hibernation monitoring

3.2.5 Following the external inspections, one building (B5) was assessed as having the potential to support hibernating bats and was highlighted for further survey. However, due to access restrictions no internal survey could be undertaken (see **Section 2.7**).

Built Structure Summary

3.2.6 The results of the survey work undertaken to date to identify roosting bats within built structures are summarised in **Table 3.4** with the current potential roost status category of each structure shown in **Figure 3.2** (**Appendix A**). It should be noted that these categories are based on the current understanding of the structures and may be revised in response to future survey work.

3.2.7 Following the external inspections and hibernation surveys, two structures were classed as 'low' roosting potential, one structure was categorised as 'moderate' and one offered 'high' potential.

Table 3.4 Summary of bat roosting potential categories assigned to built structures on and up to a 266m radius around the Site

Level of roost potential	Built structure reference	Total number in category
High	B5	1
Moderate	B2	1
Low	B1, B6	2
Negligible	B3, B4	2

Trees

3.2.8 Results from the ground level roost assessments and PRF inspections are provided in **Table D1 (Appendix D**) and summarised in **Table 3.5**. The potential roost status category of each tree following all survey work to date is shown in **Figure 3.3 (Appendix A**). It should be noted that the results and roosting potential categories are based on the current understanding of the trees and may be revised in response to future survey work.

Ground level roost assessment

3.2.9 Most of the trees identified were found in the dry riverbed in the east of the Site and along the southern perimeter of the bat survey area. In total 17 trees were identified as providing high or moderate suitability for roosting bats during the ground level roost assessment. Six trees supported features with high potential suitability to support roosting bats and 11 trees were identified as having moderate potential. Due to the small number of trees, all high and moderate potential trees were scoped-in for further survey

PRF/ hibernation inspection

3.2.10 Of the 17 trees which required a visual inspection of PRFs, all were able to be fully inspected using rope and harness or from ground level using the endoscope. In addition, two further trees were surveyed (one with high and one with moderate potential roost suitability), where PRFs had been identified after the initial scoping exercise. Overall:

- Only one tree (Tree Reference [TR] 9) remained as high suitability.

- One tree (TR8) was upgraded to high suitability.
- Seven trees remained as moderate suitability.
- Four trees were downgraded to moderate suitability.
- Five trees were downgraded to low suitability.
- One tree (TR17) was downgraded to negligible suitability.

3.2.11 No bats or signs of bats (such as droppings) were recorded.

Table 3.5 Summary of bat roosting potential categories assigned to trees on the Site

Roost potential	Tree references	Total number in category
Confirmed	-	-
High	TR8, TR9	2
Moderate	TR1, TR2, TR3, TR4, TR6, TR7, TR13, TR14, TR15, TR16, TR18	11
Low	TR5, TR10, TR11, TR12, TR19	5
Negligible	TR17	1

3.3 Field survey: bat activity

Preliminary appraisal of habitats for bats

3.3.1 A preliminary appraisal of the habitats and their value to foraging and commuting bats for the Site and up to a 266m radius has been undertaken. There are very limited sources of artificial lighting on and around the Site. There are no buildings present within the Site boundary. Overall, the Site is assessed as being of moderate suitability for foraging and commuting bats.

Habitat features of low suitability

3.3.2 There are large swathes of continuous bracken across the Site and there are some large areas of bare ground in the north east of the Site, both habitat types offering negligible opportunities for foraging and commuting bats. The Site is located on a heavily grazed plateau and is generally open and exposed.

Habitat features of moderate suitability

3.3.3 The heavily grazed plateau is dominated by semi-improved acid grassland and poor semi-improved grassland. Due to the close-cropped nature of the grasslands, the sward is short and lacks botanical diversity. This reduces the abundance and diversity of associated invertebrate species which in turn reduces its foraging value for bat species.

3.3.4 There is a small block of hazel coppice in the southeast, dense/continuous scrub is present in the south of the site and a small area of willow scrub on the northeast boundary. There is a network of drystone walls across parts of the Site which have the potential to provide a linear landscape feature for commuting bats.

Habitat features of high suitability

3.3.5 A small number of mature trees are present lining the dry riverbed in the southeast of the Site.

3.3.6 Wet and dry heath/acid grassland mosaics and areas of blanket bog present across the site are well linked and likely support a good diversity of invertebrate species providing a foraging resource for bats. In addition, there are two ponds and several wet ditches present within the Site which provide good foraging and commuting opportunities for bats.

Manual transects

3.3.7 At least four species were confirmed to be using the survey area during manual transect survey work:

- Common pipistrelle.
- Soprano pipistrelle.
- Long-eared bats.
- *Myotis* sp.

3.3.8 Additional species may also have been recorded, where some ambiguous calls were allocated to *Myotis* species and to the categories Nathusius' pipistrelle/common pipistrelle, noctule/Leisler's bat/ serotine rather than to species level.

3.3.9 **Table 3.6** summarises the results of the manual transect survey work in terms of the number of bat passes by each species recorded on each transect. In order to provide a means of comparison, an average number of passes per hour of each species has been calculated. It should be noted that these figures are intended to give an indication of relative levels of bat activity on each transect and do not represent actual numbers of bats. A single bat may pass the surveyor several times, with each pass counted separately. Equally, the same bat may pass over more than one transect in a single evening, therefore being recorded by more than one surveyor on the same date. **Figures 3.4 to 3.8 (Appendix A)** present the relative distribution of species across the transects.

Table 3.6 Manual transect survey results

Survey month	Number of Passes	Transect Number	Species												Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
May	**Per Species**	1	13.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	15.00
	Average Per Hour Per Species		4.33	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	5.00
	Per Species	2	8.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	11.00
	Average Per Hour Per Species		2.67	0.00	0.33	0.33	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	3.67
June	**Per Species**	1	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00
	Average Per Hour Per Species		1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	Per Species	2	7.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00
	Average Per Hour		2.33	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.67

Survey month	Number of Passes	Transect Number	Species												Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
	Per Species														
July	**Per Species**	1	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	8.00
	Average Per Hour Per Species		2.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00	2.67
	Per Species	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
September 1st Visit	**Per Species**	1	22.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	25.00
	Average Per Hour Per Species		7.33	0.00	0.00	0.33	0.33	0.00	0.00	0.33	0.00	0.00	0.00	0.00	8.33
	Per Species	2	46.00	2.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	51.00
	Average Per Hour Per Species		15.33	0.67	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.00

Survey month	Number of Passes	Transect Number	Species												Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
September 2nd Visit	**Per Species**	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Per Species	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
October	**Per Species**	1	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
	Average Per Hour Per Species		0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33
	Per Species	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Average Per Hour Per Species		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Result Type															

Survey month	Number of Passes	Transect Number	Species											Total
			CP	SP	CP/SP	NP/CP	NSL	Nyctalus sp.	N	LE	Myotis sp.	Bat sp.	GH	LH	
Total Number of Passes Per Species for All Months Combined			107	3	1	7	1	0	0	1	3	0	0	0	122
Average Passes Per Hour Per Species for All Months Combined			5.94	0.17	0.06	0.39	0.06	0.00	0.00	0.06	0.17	0.00	0.00	0.00	6.78

Table notes: CP = common pipistrelle; SP = soprano pipistrelle; CP/SP = common or soprano pipistrelle; NP/CP = Nathusius' pipistrelle or common pipistrelle; NSL = noctule/serotine/Leisler's bat; N = noctule; LE = long-eared bats; GH = greater horseshoe; LH = lesser horseshoe.

3.3.10 Overall, there was a relatively low level of bat activity across all transects. Overall, there was an average of 6.78 bat passes per hour recorded across the Site, for all species across all months. There is no strong temporal pattern reflected in the data.

- Common pipistrelle made up the greatest proportion of recordings, representing approximately 88% of all bat passes (5.94 passes per hour on average).
- The next most frequently recorded group was the category of 'Nathusius' pipistrelle or common pipistrelle' which made up 5.7% of all bat passes across the Site (0.39 passes per hour on average).
- When considering all potential noctule, Leisler's bat and serotine calls as a group, these make up 0.8% of recordings on the Site (0.06 passes per hour on average).
- When considering the quieter species that are typically underrepresented in acoustic surveys, it is notable that very little activity was recorded on the Site, with only two pass assigned to the Myotis genera throughout the entire survey period. One brown long-eared pass was recorded, but this was out-with the site boundary, within the bat survey area.

3.3.11 A summary of the geographical and temporal distribution of recordings by species as follows.

Common pipistrelle

3.3.12 Common pipistrelle recordings are distributed relatively evenly across the entire survey area, having been recorded at nearly every point along each of the transect routes. The recordings peaked in September. Only one pass was recorded that could not be differentiated between common pipistrelle and soprano pipistrelle (on transect 1 in May).

Soprano pipstrelle

3.3.13 Soprano pipistrelle were only recorded twice in September and once October with activity limited to the southern part of the Site. Only one pass was recorded that could not be differentiated between common pipistrelle and soprano pipistrelle (on transect 1 in May).

Common or Nathusius' pipistrelle

3.3.14 Only seven passes were recorded of species which could not be differentiated between common pipistrelle or Nathusius' pipistrelle. Passes were recorded in May, June and September; three on transect 1 and four passes on transect 2, all in the south of the Site.

Myotis species

3.3.15 *Myotis* species were recorded twice on transect 1 (May and June) and once on transect 2 (May), all in the northern section of the Site.

Long-eared bats

3.3.16 Long-eared bat recordings were made on a single occasion on transect 1, in September. The recording was made within the 266m buffer area.

Noctule, serotine and Leisler's bats

3.3.17 Only one pass was recorded of species which could not be differentiated between Noctule/serotine/Leisler's bats in September in the south of the Site, adjacent to a drystone wall.

3.4 Automated monitoring

3.4.1 At least seven species of bat were confirmed to be using the bat survey area during the automated detector work:

- Common pipistrelle.
- Soprano pipistrelle.
- Noctule.
- Long-eared bat.;.
- *Myotis* sp.
- Greater horseshoe bat.
- Lesser horseshoe bat.

3.4.2 Additional species may also have been recorded, where some ambiguous calls were allocated to groupings such as *Myotis* sp, common/ Nathusius' pipistrelle or noctule/serotine/Leisler's bat rather than species level.

3.4.3 **Table 3.7** summarises the results of the automated monitoring in terms of the total number of bat contacts recorded by each species at each location. In order to provide a means of comparison, an average number of contacts per night of each species has been calculated. It should be noted that these figures are intended to give an indication of relative levels of bat activity at each location and do not represent actual numbers of bats. **Table D2, (Appendix D)** summarises the results of the automated monitoring by location and season (spring, summer, autumn).

Table 3.7 Summary of automated monitoring results

		Total Passes (average passes per night)												
Automated detector	**Number of nights recording**	**CP**	**SP**	**CP/SP**	**NP/CP**	**NSL**	**Nyct sp.**	**N**	**LE**	**M**	**Bat sp.**	**GH**	**LH**	**Total**
1	30	412 (13.73)	21 (0.70)	48 (1.60)	30 (1.00)	4 (0.13)	4 (0.13)	38 (1.27)	9 (0.30)	9 (0.30)	15 (0.50)	0 (0)	0 (0)	590 (19.67)
2	30	454 (15.13)	42 (1.40)	62 (2.07)	53 (1.77)	10 (0.33)	4 (0.13)	11 (0.37)	4 (0.13)	6 (0.20)	22 (0.73)	1 (0.03)	0 (0)	669 (22.3)
3	30	962 (32.07)	64 (2.13)	165 (5.50)	94 (3.13)	4 (0.13)	3 (0.10)	16 (0.53)	18 (0.60)	67 (2.23)	18 (0.60)	0 (0)	2 (0.07)	1413 (47.1)
4	30	1145 (38.17)	83 (2.77)	83 (2.77)	75 (2.5)	0 (0)	12 (0.4)	19 (0.63)	26 (0.87)	71 (2.37)	41 (1.37)	1 (0.03)	7 (0.23)	1563 (52.1)
5	30	91 (3.03)	8 (0.27)	21 (0.7)	10 (0.33)	6 (0.20)	14 (0.47)	34 (1.13)	8 (0.27)	3 (0.10)	4 (0.13)	10 (0.33)	0 (0)	209 (6.97)
6	30	315 (10.5)	24 (0.8)	75 (2.5)	37 (1.23)	4 (0.13)	6 (0.20)	29 (0.97)	14 (0.47)	19 (0.63)	8 (0.27)	0 (0)	34 (1.13)	565 (18.83)
Total contacts	180	**3379**	**242**	**454**	**299**	**28**	**43**	**147**	**79**	**175**	**108**	**12**	**43**	**5009**
Average contacts per night		18.77	1.34	2.52	1.66	0.16	0.24	0.82	0.44	0.97	0.60	0.07	0.24	27.83

Species codes: **CP** = common pipistrelle; **SP** = soprano pipistrelle; **CP/SP** = common/soprano pipistrelle (*Pipistrellus* species); **CP/NP** = common/ Nathusius' pipistrelle (*Pipistrellus* species); **NSL** = Noctule/Serotine/Leiser bat (Nyctaloid species); **Nyct sp.** = Noctule/leiser bat (Nyctalus species); **N** = Noctule; **LE** = long-eared bat; **M** = *Myotis* bat species; **Bat sp.** = Bat call unable to clearly identify down to species level; **GH** = greater horseshoe and **LH** = lesser horseshoe

3.4.4 Overall, there was an average of 27.83 bat recordings per night for all species, across all locations and all months. Common pipistrelle recordings make up 67.5% of all recordings across all locations and all months (an average of 18.77 recordings per night). Contacts which could not be assigned to species-level between common or soprano pipistrelle accounted for 9.06% of all contacts. Contacts which could not be assigned to species-level between common or Nathusius' pipistrelle accounted for 5.97% of all contacts. Soprano pipistrelle being the fourth most frequently recorded species which make up 4.83% of all recordings (an average of 1.34 recordings per night).

3.4.5 All the other species or groups of species were each recorded in much lower numbers with average number of contacts per night being 0.97 (Myotis species), 0.82 (noctule), 0.44 (long-eared bat), 0.24 (noctule or Leisler's bat), 0.13 (noctule, serotine or Leisler's bat), 0.24 (lesser horseshoe) and 0.07 passes per night (greater horseshoe).

3.4.6 Activity levels were notably different between the monitoring locations, in order of activity level when considering all species combined:

- Location 4: average of 52.1 recordings per night.
- Location 3: average of 47.1 recordings per night.
- Location 2: average of 22.3 recordings per night.
- Location 1: average of 19.67 recordings per night.
- Location 6: average of 18.83 recordings per night.
- Location 5: average of 6.97 recordings per night.

Ecobat analysis

3.4.7 In order to interpret the results of the automated detector surveys the data was processed through Ecobat.

Site level

3.4.8 Summary data relating to bat activity levels recorded across the Site is provided in **Table 3.8** below and shown in **Chart 1**. For detailed Ecobat outputs relating to site-wide activity levels, please refer to **Appendix E.**

Table 3.8 Summary table showing key metrics for each species recorded for all automated recording locations across the Site.

Species/Species Group	Median Percentile	Median Ecobat Activity Category	95% Confidence Intervals	Max Percentile	Nights Recorded
M	46	Moderate	60.5 - 78.5	85	45
Nyctaloid	16	Low	52.5 - 52.5	59	14
Nyctalus	31	Low - Moderate	31 - 31	67	7
N	46	Moderate	60 - 60	88	23
Pipistrellus	54	Moderate	60 - 81	96	64
CP	64	Moderate - High	62 - 88	99	97
SP	31	Low - Moderate	45.5 - 71	86	53
LE	31	Low - Moderate	42.5 - 42.5	70	37
GH	0	Low	31 - 31	54	7
LH	0	Low	31 - 57.5	84	13

Species codes: **M** = *Myotis* bat species; **Nyctaloid** = Noctule/Serotine/Leiser bat; **Nyctalus** = Noctule/leiser bat; **N** = Noctule; **Pipistrellus** = common/soprano/Nathusius pipistrelle; **CP** = common pipistrelle; **SP** = soprano pipistrelle; **LE** = long-eared bat; **GH** = greater horseshoe and **LH** = lesser horseshoe

Chart 1. The activity level (percentile) of bats recorded across each night of the bat survey for all automated recording locations across the Site. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity)

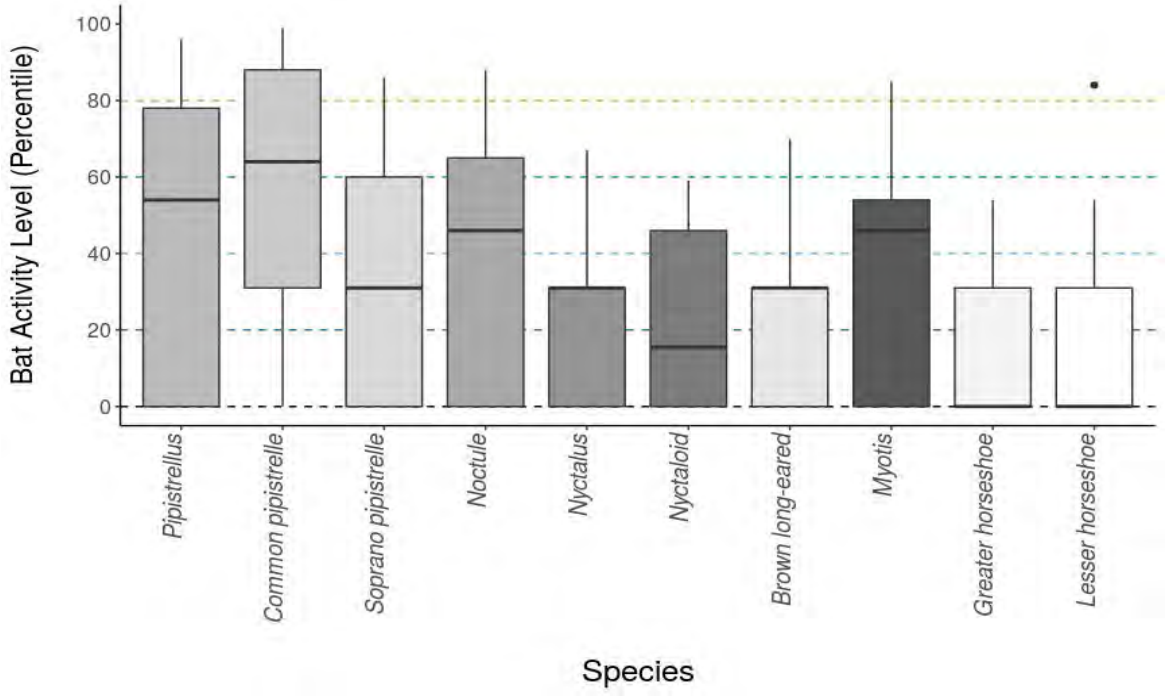


Table 3.9 Ecobat summary table showing the number of nights recorded bat activity fell into each activity band for each species for 180 nights recording.

Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
M	1	10	12	7	15
Nyctaloid	0	0	5	2	7
Nyctalus	0	1	0	3	3
N	3	3	6	2	9
Pipistrellus	13	12	16	5	18
CP	33	17	15	21	11
SP	3	9	9	10	22
LE	0	2	7	10	18
GH	0	0	1	2	4
LH	1	0	2	2	8

Species codes: **M** = *Myotis* bat species; **Nyctaloid** = Noctule/Serotine/Leiser bat; **Nyctalus** = Noctule/leiser bat; **N** = Noctule; **Pipistrellus** = common/soprano/Nathusius pipistrelle; **CP** = common pipistrelle; **SP** = soprano pipistrelle; **LE** = long-eared bat; **GH** = greater horseshoe and **LH** = lesser horseshoe

From the data displayed in **Table 3.8, Table 3.9** and **Chart 1**, the following observations can be made[14]:

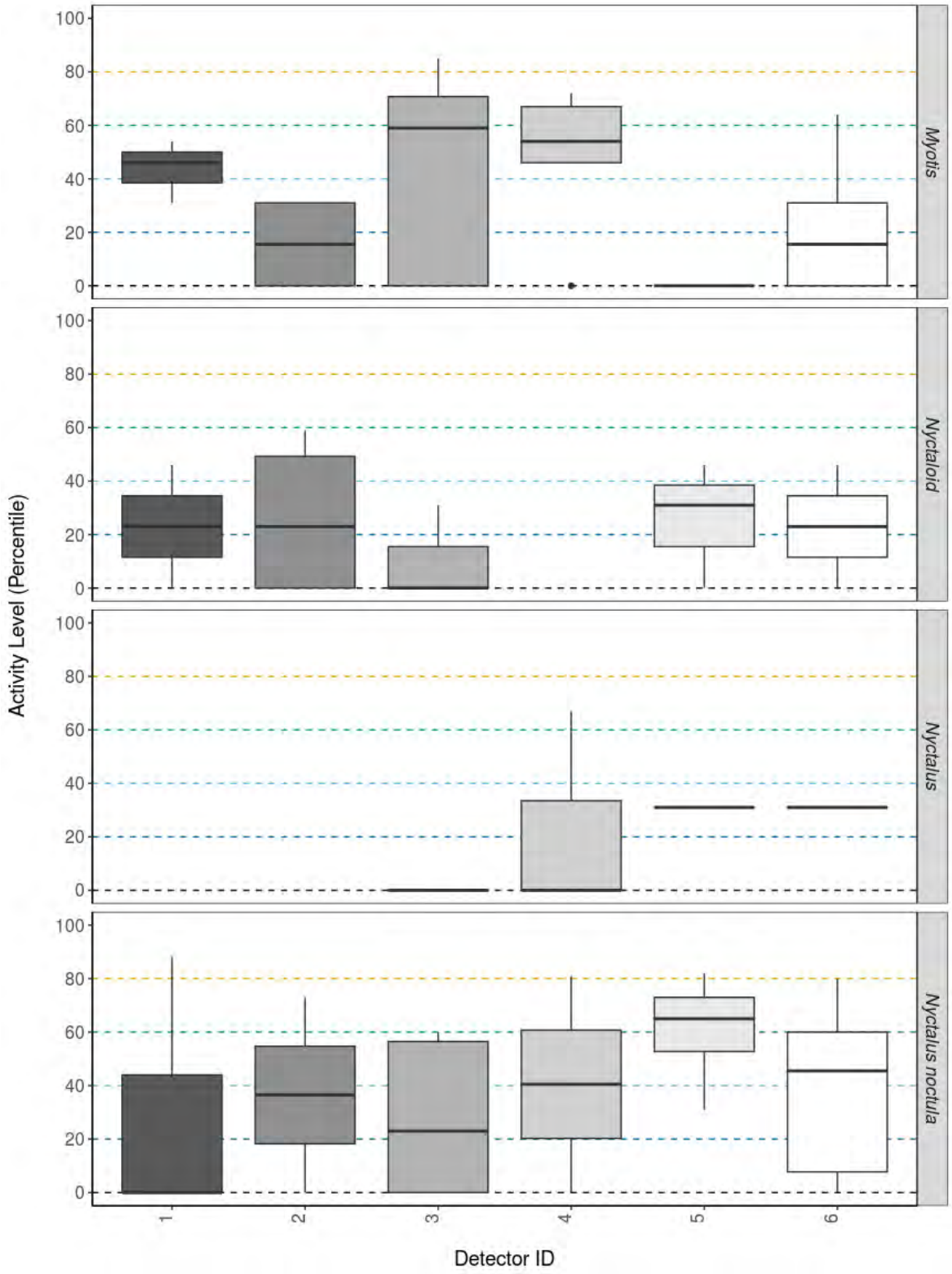
- *Myotis* – data suggests an overall Moderate level of activity across the Site (median percentile of 46) based on 45 nights where this species group was recorded.
- Nyctaloid – This group comprises bats which could not be separated between noctule/serotine/Leisler's bat due to overlapping call parameters data suggests an overall Low level of activity across the Site (median percentile of 16), based on 14 nights of activity recorded.
- *Nyctalus* – This group comprises bats which could not be separated between noctule/Leisler's bat due to overlapping call parameters. Data suggests an overall Low - Moderate level of activity across the Site (median percentile of 31), based on 7 nights of activity recorded.
- Noctule – data suggests an overall Moderate level of activity across the Site (median percentile of 46), based on 23 nights of activity recorded.
- Common pipistrelle – data suggests an overall Moderate - High level of activity across the Site (median percentile of 64), based on 97 nights of activity recorded.
- Soprano pipistrelle – data indicates an overall Low-Moderate level of activity across the Site (median percentile of 31), based on 53 nights of activity recorded.
- Long-eared bats –data suggests an overall Low - Moderate' level of activity across the Site (median percentile of 31), based on 37 nights activity.
- Greater horseshoe bats – data suggests an overall Low level of activity across the Site (median percentile of 0), based on 7 nights activity.
- Lesser horseshoe bats – data suggests an overall Low level of activity across the Site (median percentile of 0), based on 13 nights activity.

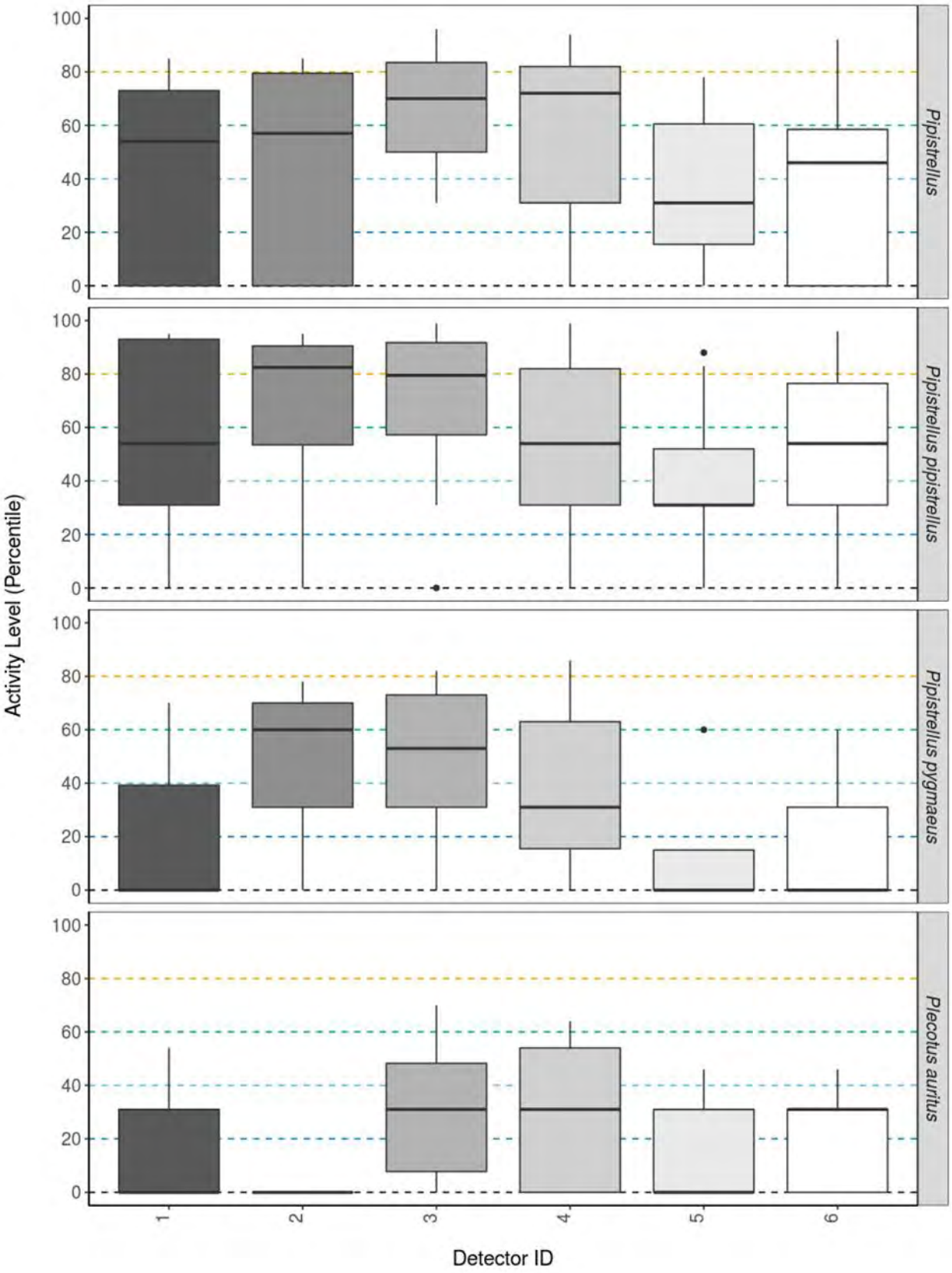
Automated detector level

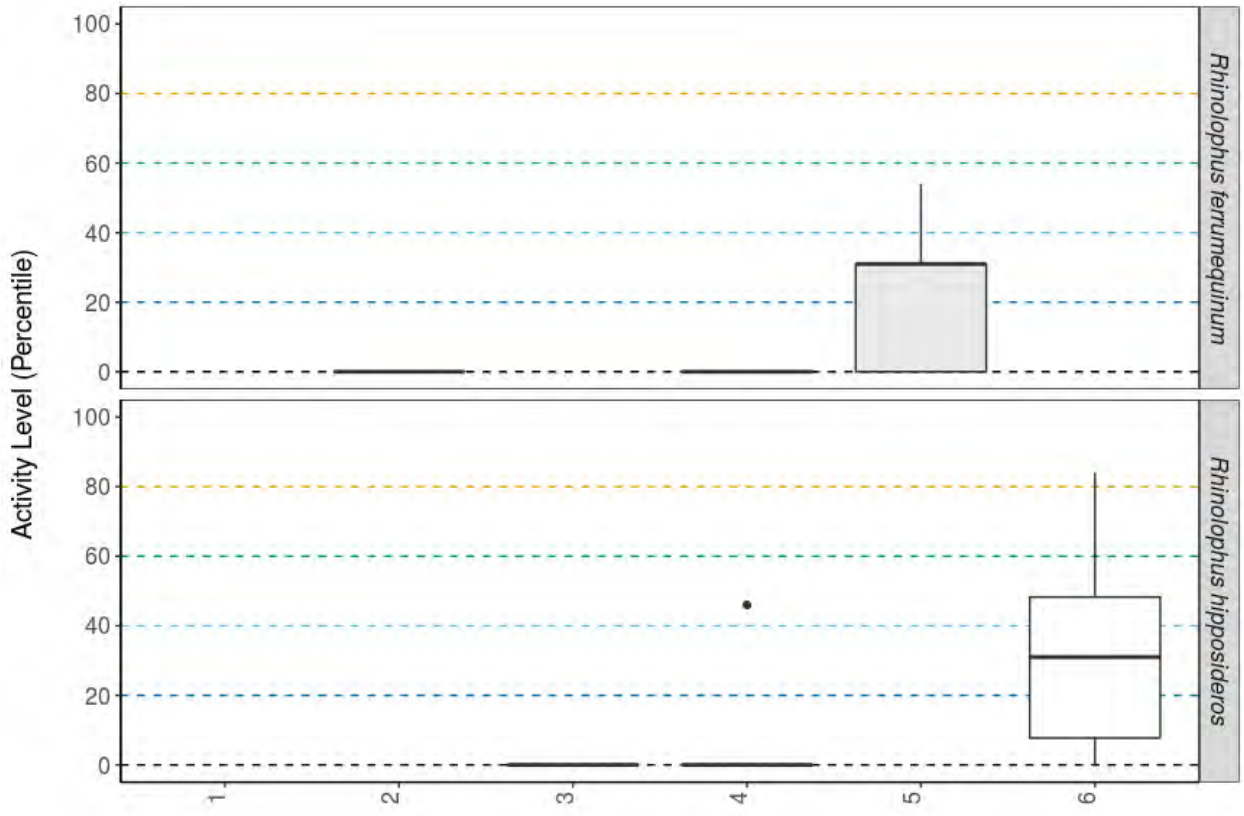
3.4.9 **Chart 2** shows the detailed results relating to activity levels for each species of bat recorded at each automated detector location. For detailed Ecobat outputs relating to each automated detector location, please refer to **Appendix E.**

Chart 2. Differences in bat activity between the six automated detector locations. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity)

[14] At the time of analysing data, Ecobat had a built-in programming error in the way it counts *Pipistrellus* records as such this grouping is not discussed as results may be misleading. It is considered that the recordings identified to common and soprano pipistrelle are accurate and of greater importance for inform the assessment.







3.4.10 From the data displayed in **Chart 2**, the following observations can be made:

- *Myotis* – Moderate levels of activity were recorded detectors 1, 3 and 4 with Low levels at detector 2, 5 and 6.
- Nyctaloid – This group comprises bats which could not be separated between noctule, serotine and Leisler's bat due to overlapping call parameters. Low – Moderate levels were recorded at locations 1,2,5 and 6 and Low at location 3.
- *Nyctalus* – This group comprises bats which could not be separated between noctule and Leisler's bat due to overlapping call parameters. Low – Moderate levels were recorded at locations 5 and 6 and Low at locations 3 and 4.
- Noctule – Moderate to High levels were recorded at location 5, Moderate levels were recorded at locations 4 and 6, Low – Moderate levels were recorded at locations 2 and 3 and low at location 1.
- Common pipistrelle – High levels of activity were recorded at location 2, Moderate -High levels were recorded at location 3, Moderate levels at locations 1,4 and 6 and Low – Moderate at location 5.
- Soprano pipistrelle – Moderate levels of activity were recorded at location 2 and 3, Low – Moderate at location 4 and Low at 1, 5 and 6.
- Long-eared bats – Low - Moderate levels of activity were recorded at locations 3, 4 and 6, and low at locations 1,2 and 5.

- Greater horseshoe bats – Low - Moderate levels of activity were recorded at location 5, Low levels of activity were recorded at locations 2 and 4, no passes were recorded at other locations.
- Lesser horseshoe bats – Low - Moderate levels of activity were recorded at location 6, Low levels of activity were recorded at locations 3 and 4, no passes were recorded at other locations.

4. Summary

4.1 Overview

In total, at least seven species of bat were confirmed to use the Site during the current survey period:

- Common pipistrelle.
- Soprano pipistrelle.
- Noctule.
- Long-eared bat (almost certainly brown long-eared bat).
- *Myotis* sp. (potentially including whiskered bat, Brandt's bat, Daubenton's bat and/or Natterer's bat).
- Greater horseshoe bat.
- Lesser horseshoe bat.

4.1.1 It is possible that Leisler's bat, serotine and/or Nathusius' pipistrelle were also recorded on the Site, with these species known to occur in south Wales. No definitive recordings of these species have been made in the survey area so far. However, noctule and common pipistrelle have been widely recorded across the Site as such it is considered likely the activity in the noctule/serotine/Leisler's bat group were from ambiguous noctule calls with the activity from the common pipistrelle/ Nathusius' pipistrelle group likely from ambiguous common pipistrelle calls.

4.1.2 Myotis recordings could be from whiskered bat, Brandt's bat, Daubenton's bat or Natterer's bat which were all recorded in the desk study. From the desk study results, habitat requirements and known species distribution across Wales it is not considered that passes were from Bechstein's bat or Alcathoe bat.

4.1.3 While long-eared bat recordings cannot typically be assigned to species level based on acoustic files alone, the known distribution of the grey long eared bat is very restricted in the UK with no confirmed records of this species occurring in this region of Wales. It is, therefore, unlikely that this very rare species occurs in the bat survey area, and it is assumed all long-eared bat records collected during the survey work relate to brown long-eared bats.

4.2 Roost identification

4.2.1 The bat survey area provides 13 trees with moderate or high roosting potential and four built structures with some potential to support roosting bats.

4.2.2 To date no roosts have been identified within the bat survey area.

4.3 Bat activity

4.3.1 The Site as a whole provides moderate suitability for foraging and commuting bats. Common pipistrelle was widely recorded across the Site and make up 67.5% of all automated detector recordings across all locations and all months. Contacts which could not be assigned to species-level between common or soprano pipistrelle accounted for 9.06%, while those which could not be assigned to species-level between common or Nathusius' pipistrelle accounted for 5.97%. Soprano pipistrelle was the fourth most frequently recorded species which make up 4.83% of all recordings (an average of 1.34 recordings per night). All other recorded species or groups of species had an average of less than one contact per night.

4.3.2 The greatest levels of bat activity were recorded on the areas of the Site that were closest to linear features, such as dry stone walls in the south western of the Site, where automated detectors 3 and 4 were located, and along the southern extent of both transects.

5. Collision risk assessment

5.1 Methods

5.1.1 A collision risk assessment for bats has been carried out within this report following the steps outlined in the Bats and onshore wind turbines (2019)[7]. Estimating the vulnerability of bat populations to windfarms is based on the following factors:

- Relative abundance and collision risk of bat species.
- The project size and habitat suitability within the Site.
- Bat activity recorded at the Site.

5.1.2 **Table 5.1** outlines the relative abundance and level of potential vulnerability from wind farms of populations of Welsh bat species which has been used to inform the assessment.

Table 5.1 Level of potential vulnerability of Welsh bat populations to wind farms.

Wales	**Collision Risk**			
		Low collision risk	**Medium collision risk**	**High collision risk**
Relative abundance	**Common species**			Common pipistrelle Soprano pipistrelle
	Rarer species	Brown long eared bat Daubenton's bat Natterer's bat Lesser horseshoe		
	Rarest species	Alcathoe bat Bechstein's bat Brandt's bat Greater horseshoe Grey long eared bat Whiskered bat	Barbastelle Serotine	Nathusius' pipistrelle Noctule bat Leisler's Bat

Extracted from *Bats and onshore wind turbines* (2019)[7]. Yellow = low population vulnerability, Orange = medium population vulnerability, Red = high population vulnerability.

5.1.3 The level of potential vulnerability identified in **Table 5.1** has then been considered alongside scheme details and bat activity recorded at the Site. This requires a two-stage process, **Table 5.2** provides an indication of the potential site risk based on evaluation of habitat and the size of the development (Stage 1) and an overall assessment of risk can then be made by considering the results of the initial site risk assessment in relation to bat activity output from Ecobat (Stage 2), which considers the relative vulnerability of each species of bat present, at the population level (**Table 5.3**). Full details on how the habitat risk and project size was determined are presented in **Table F1, Appendix F**.

Table 5.2 Stage 1 - Initial site risk assessment

Site risk level (1-5)		Project size		
		Small	Medium	Large
Habitat risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Extracted from *Bats and onshore wind turbines* (2019)[7]
Green (1 – 2) – lowest/ low site risk; Yellow (3) – medium site risk; Red (4 – 5) – highest/ high site risk

Table 5.3 Stage 2 - Overall risk assessment

Site risk level (from Table 5.2)	Ecobat activity category (or equivalent justified categorisation)					
	Nil (0)	Low (1)	Low – moderate (2)	Moderate (3)	Moderate – high (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	16	18
Highest (5)	0	5	10	15	20	25

Overall assessment: Low (green) – 0-4; Medium (yellow) 5 -12; High (red) – 15 - 25

5.1.4 The scores in the table are a product of multiplying site risk level and the Ecobat activity category. The activity categories equate to those given in Table 5.1 for high collision risk species.

5.2 Results

5.2.1 As detailed in **Table 5.1,** the following high collision risk species were recorded on Site during all survey work.

- Common pipistrelle.
- Soprano pipistrelle.
- Noctule.

5.2.2 As discussed in **Section 4.1**, it is possible that Leisler's bat and Nathusius' pipistrelle (high collision risk) or serotine (medium collision risk) were also recorded on the Site. No definitive recordings of these species have been made in the bat survey area during all survey work and these species are classed within the rarest category in Wales (**Table 5.1**) and as such are not considered common and widespread; noctule and common pipistrelle however were widely recorded across the Site

during survey work. It is considered likely the activity in the noctule/serotine/Leisler's bat group were from ambiguous noctule calls and the activity from the common pipistrelle/ Nathusius' pipistrelle group can likely be attributed to ambiguous common pipistrelle calls. Whilst it is possible some of recorded activity in these groupings may have been from Leisler's bat, serotine or Nathusius' pipistrelle, it is considered unlikely based on current results; additionally, there is no way to determine how many (if any) passes within the broader species groupings were from these species and as such there is no way to accurately determine their level of activity in Ecobat. Nathusius' pipistrelle, serotine and Leisler's bat are therefore not being taken forward for further consideration within the collision risk assessment.

5.2.3 All other bat species recorded on Site, which were confirmed to species level, were classed as low collision risk and as such are not considered further within the collision risk assessment process.

Stage 1 - Initial site risk assessment

5.2.4 Based on the results of the habitat suitability assessment detailed in **Section 3.3** and following the criteria set out in **Table F1, Appendix F** the Site is considered to **provide Moderate potential habitat risk**. There are areas of high-quality habitat and moderate-high potential roost availability on and adjacent to the Site including many mature trees in treelines and scattered throughout the Site, with bordering broadleaved plantation woodland, alongside a number of scattered ponds. The majority the Site however is dominated by heavily grazed semi-improved acid and neutral grassland with limited botanical diversity alongside large swathes of continuous bracken and small blocks of coniferous woodland plantation with bare understorey. The Site is situated on top of a large hill and is generally open and exposed. The Site is connected to the wider landscape by linear features including dry stone walls, woodland and streams, but the wider survey area is bound by busy A roads and residential areas which reduces connectivity.

5.2.5 Following the criteria set out in **Table F1, Appendix F** the project size is considered to be Medium. There will be less than 10 turbines, which falls within the Small project size category, however the turbines are proposed to be over 100m in height which falls within the Large project size category. The Large category is allocated for the largest developments (>40 turbines), due to the low number of turbines[15] it is considered that the Medium project size best reflects scheme proposals.

5.2.6 Based on evaluation of habitats and the size of the development (Stage 1 of the assessment) the Site is considered to have a **site risk level of 3 (medium site risk)**

Stage 2 - Overall risk assessment

5.2.7 The overall assessment of collision risk has been undertaken for each high-risk species. In order to understand collision risk at average levels of bat activity and at unusually high levels of bat activity both the highest Ecobat activity category and the most frequent activity category (median) is shown in **Table 5.4**. All calculations reference the method in **Table 5.3.**

[15] At time of writing a six-turbine scheme is being taken forward

Table 5.4 Stage 2 - Overall collision risk assessment

Species	Highest Ecobat category (number of nights activity recorded at that category)	Overall risk category	Median Ecobat category	Overall risk category
Common pipistrelle	High (33)	15	Moderate - High	12
Soprano pipistrelle	High (3)	15	Low - Moderate	9
Noctule	High (3)	15	Moderate	6

Overall assessment: Low (green) – 0-4; Medium (yellow) 5 -12; High (red) – 15 – 25

5.2.8 The highest Ecobat activity category for common pipistrelle was High based which was recorded on 33 nights, 64 nights activity were recorded across all other category levels therefore it is considered the Median risk level of Moderate- High is a fair reflection of the risk level for this species on Site.

5.2.9 High levels of acivity were recorded on only 3 nights for soprano pipistrelle and 3 nights for noctule, as such it is considered that the assessment at the median Ecobat activity category best reflects the levels of bat activity recorded on Site for these species.

5.2.10 At the Site level the collision risk for common pipistrelle, soprano pipistrelle and noctule is assessed as Medium.

5.2.11 An overall collision risk assessment has also been undertaken for each automated detector location as presented in **Table 5.5.**

Table 5.5 Stage 2 - Overall collision risk assessment (by detector)

Automated detector	Common pipistrelle		Soprano pipistrelle		Noctule	
	Ecobat Median Category	Overall Collision risk category	Ecobat Median Category	Overall Collision risk category	Ecobat Median Category	Overall Collision risk category
1	Moderate	9	Low	3	Low	3
2	High	15	Moderate	9	Low – Moderate	6
3	Moderate -High	12	Moderate	9	Low – Moderate	6
4	Moderate	9	Low – Moderate	6	Moderate	9
5	Low	3	Low	3	Moderate -High	12
6	Moderate	9	Low	3	Moderate	9

Overall assessment: Low (green) – 0-4; Medium (yellow) 5 -12; High (red) – 15 - 25

5.2.12 Collision risk for common pipistrelle is classed as High at automated detector location 2, Medium at locations 1,3,4 and 6 and Low at location 3.

5.2.13 Collision risk for soprano pipistrelle is classed as Medium at automated detector locations 2,3 and 4 and Low at 1,5 and 6.

5.2.14 Collision risk for noctule is classed as Medium at locations 2,3,4,5 and 6 and Low at location 1.

5.3 Conclusion

5.3.1 A collision risk assessment has been undertaken for each species recorded on Site, considered high risk for collision with turbines (common pipistrelle, soprano pipistrelle and noctule). The overall collision risk category for the Proposed Development is Medium for common pipistrelle, soprano pipistrelle and noctule. At the detector level Medium collision risk was recorded at all locations with the exception of location 2 (High collision risk) and location 5 (Low collision risk).

6. Survey programme 2021

6.1 Roost surveys

6.1.1 As summarised in **Section 4**, no bat roosts were identified within the bat survey area, 13 trees were found to have moderate or high roosting potential and four built structures were identified with low, moderate or high roosting potential.

6.1.2 Where access allows, trees will be subject to an additional PRF inspection (using the same methods set out in **Section 2.3**) using an endoscope and torch, once during the summer period (May-September) in 2021. PRF inspection is being taken forward as the most effective method to survey trees for roosting bats. It is the only survey method where field signs, (such as droppings) can be identified and is a more reliable technique to detect the presence and absence of bats. It is also a more efficient and practical approach given the high number of trees to be surveyed.

6.1.3 There are no built structures with roosting potential within the Site, the four built structures identified with roosting potential were within the wider bat survey area outside the Site boundary. Access restrictions did not allow for internal or further roost surveys to these buildings in 2020.

6.1.4 In line with *Bats and Onshore Wind Turbines* (2019)[1] those structures which have the potential to support maternity roosts will be taken forward for further survey, these comprise built structures B2 (a stone wall with cavity) and B5 (a farmhouse). The two built structures not taken forward for survey are open cattle sheds with low roosting potential, built structure B1 is approximately 450m from the nearest proposed turbine location and built structure B6 is approximately 600m from the nearest proposed turbine location.

6.1.5 In 2021, where access allows, built structures B2 and B5 will be subject to internal or endoscope inspections and dusk emergence survey visits between May and September 2021 following the Bat Conservation Trust (BCT) third edition of Good Practice Guidelines[2]. Due to the very remote and elevated nature of the site dawn surveys will not be conducted on the basis of health and safety and safe access to survey locations prior to dawn.

6.2 Bat activity surveys

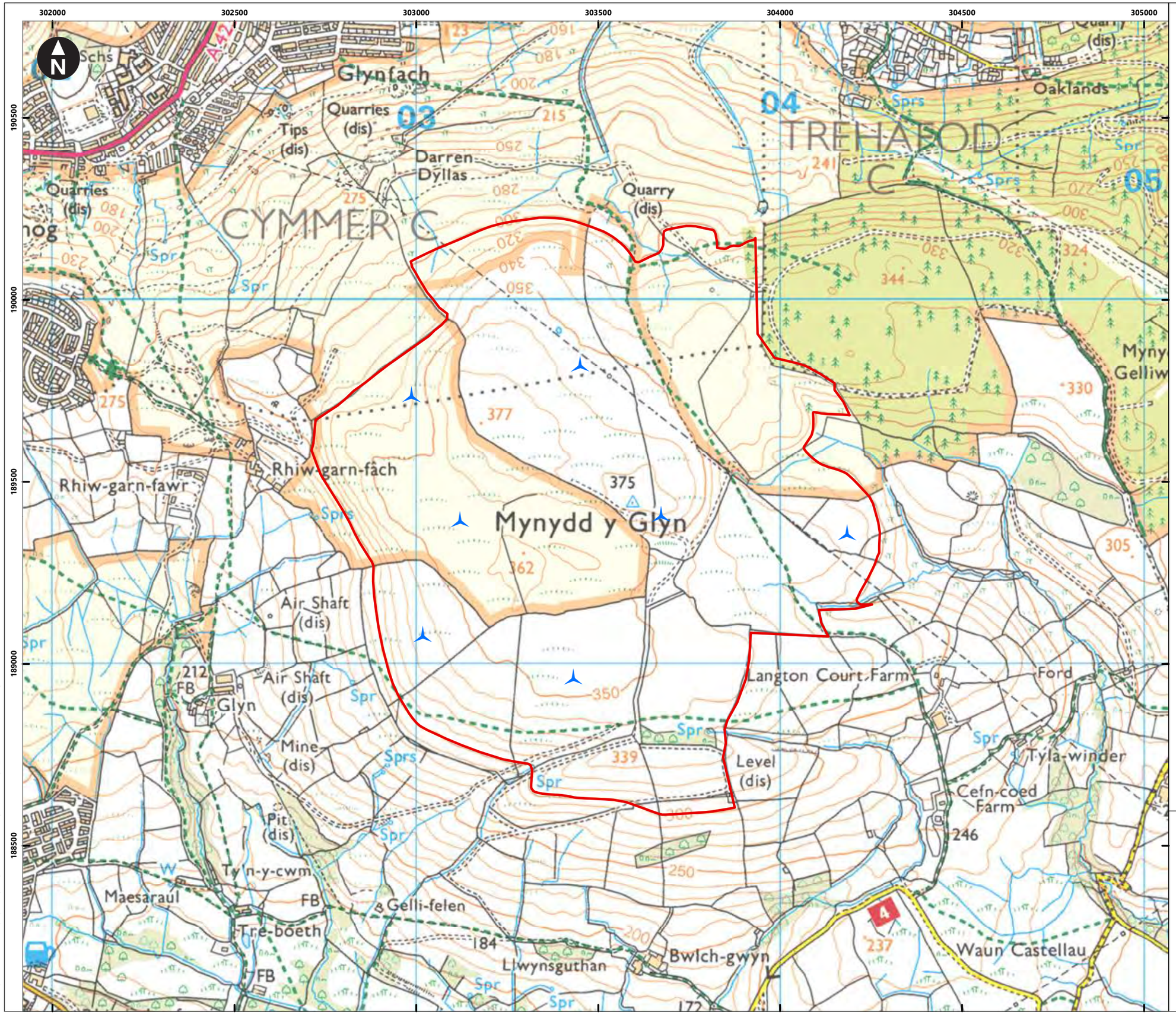
6.2.1 Additional automated detector surveys are being undertaken at proposed turbine locations between April and June 2021, completing 10 days monitoring in each month following the same methods set out in **Section 2.4**. The main aims of the additional survey are to:

- Confirm bat activity level's where proposed turbine locations have either moved or been added since the completion of 2020 monitoring.
- Confirm the collision risk assessment for the Proposed Development based on a larger data set.
- Where possible, seek to securely erect a weather station on the Site to take detailed weather readings for the duration of the 2021 survey period and compare bat activity levels to detailed weather data.

6.2.2 Automated monitoring undertaken in 2020 has met the minimum survey requirement as set out *Bats and Onshore Wind Turbines* (2019)[1] and allowed for a comparison in seasonal activity. As such

it is not considered another full year of data (i.e., an additional autumn survey period) is required to inform the assessment. Surveys in 2020 indicate the Proposed Development has a Medium collision risk for common pipistrelle, soprano pipistrelle and noctule, the additional survey will seek to understand correlations between weather data and bat activity on the Site to input into sensitive mitigation design.

Appendix A
Figures



PROJ_Mynydd_Y_Glyn_Tur...

Site boundary

0 0.1 0.2 0.3 0.4 0.5 0.6 km

Scale at A3: 1:10,000

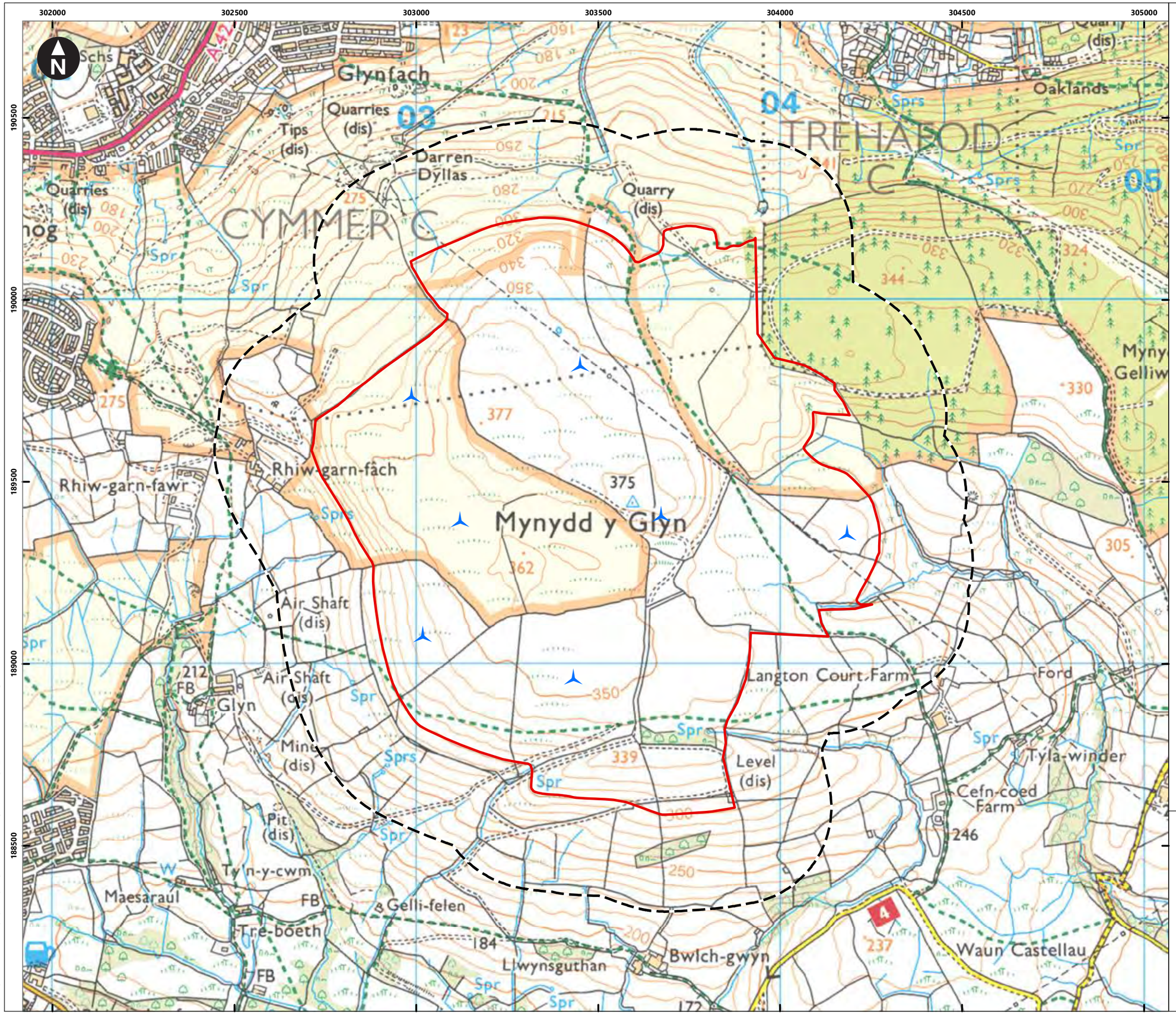
Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 1.1
Site boundary

June 2021

wood.

H:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0034_S0_P01.2.mxd Originator: tom.suter



Proposed Turbine layout

Site boundary

Bat survey area (266m buffer)

0 0.1 0.2 0.3 0.4 0.5 0.6 km

Scale at A3: 1:10,000

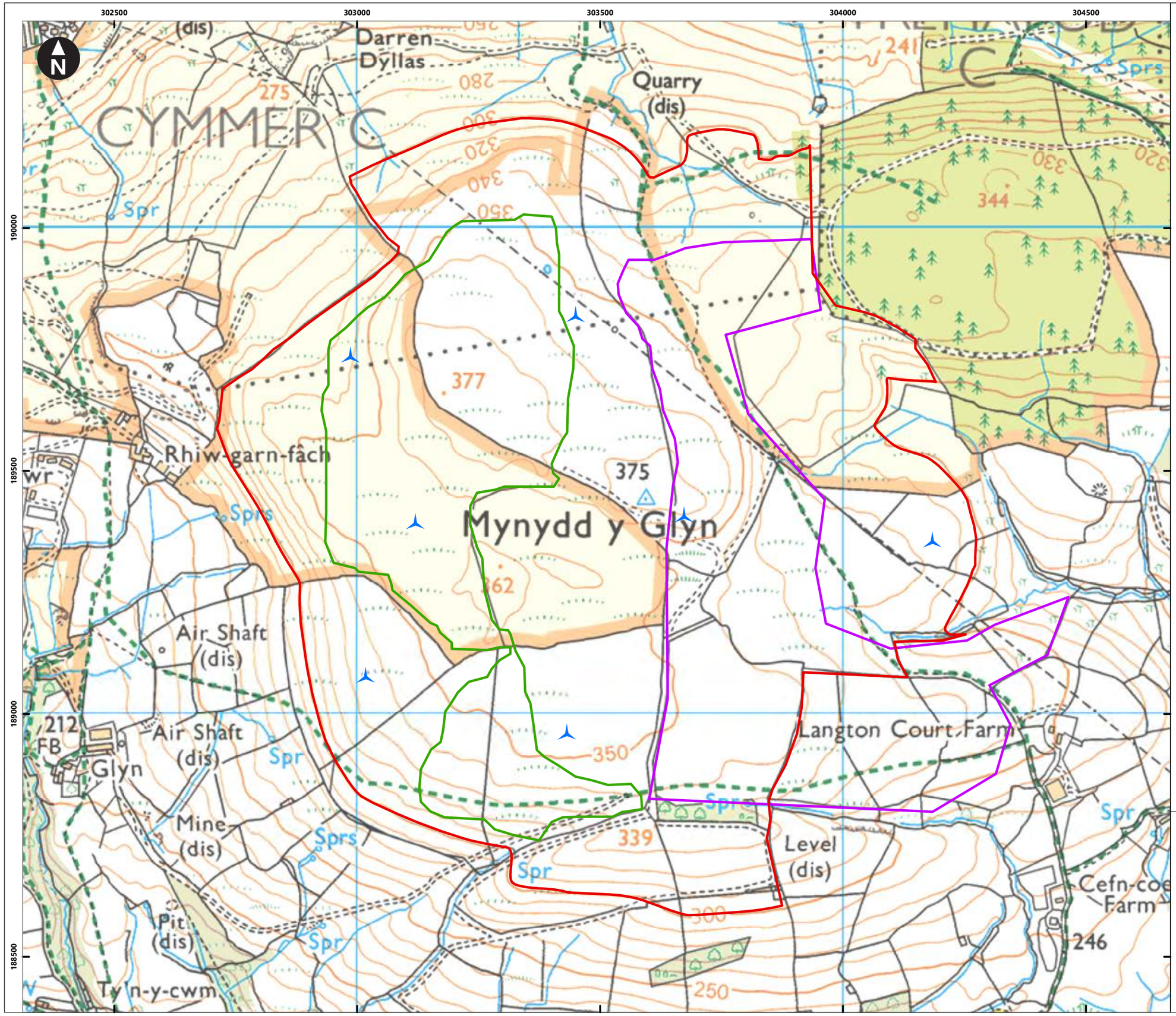
Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 1.2
Survey area

June 2021

wood.

H:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0035_S0_P01.2.mxd Originator: tom.suter



Site boundary

Manual bat activity transect routes

Transect 1

Transect 2

Proposed Turbine layout

0 0.1 0.2 0.3 0.4 km

Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

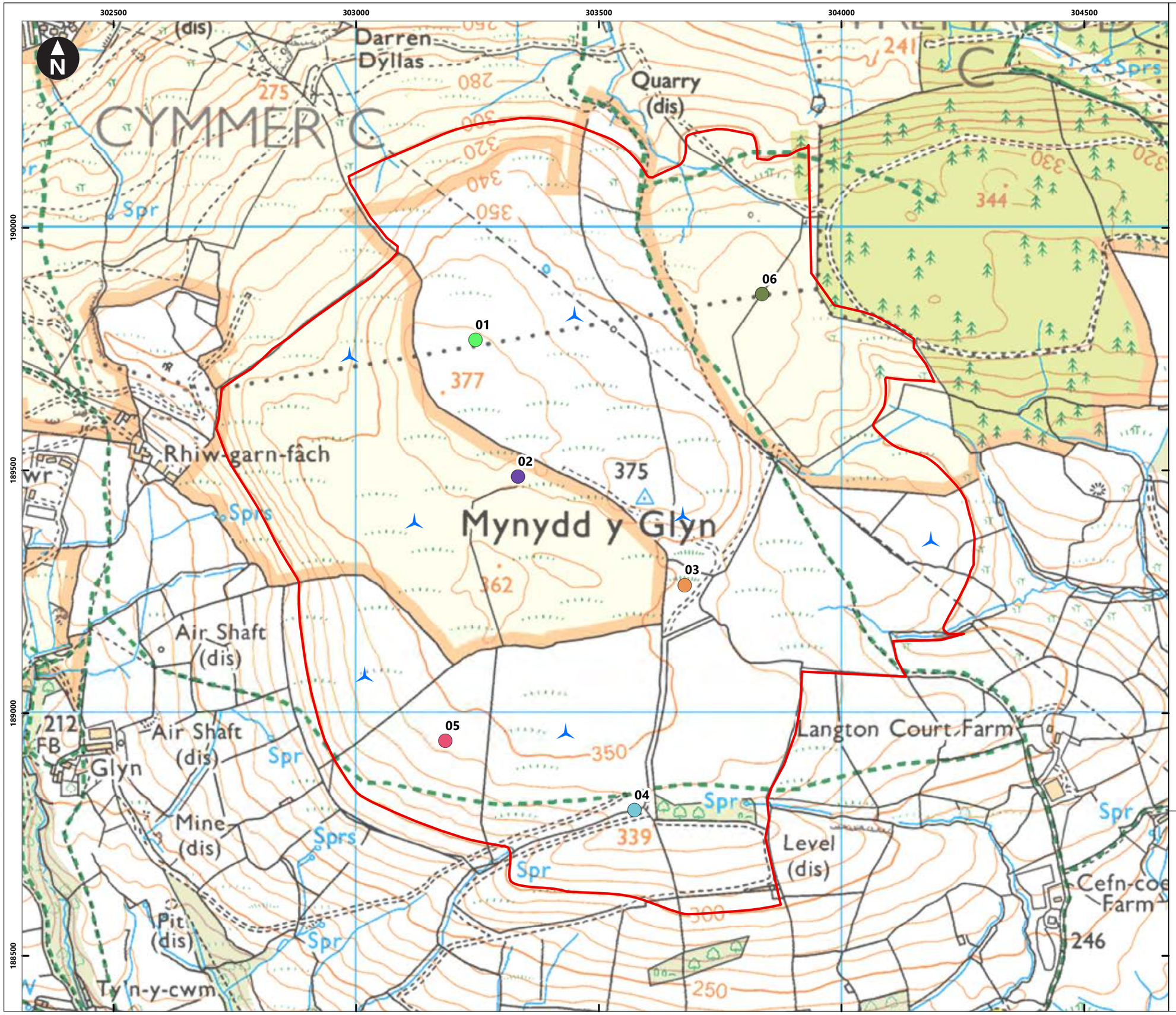
Figure 2.1
Manual transect surveys

June 2021

wood.

42864-WOOD-XX-XX-FG-OE-0036_S0_P01.2

H:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0036_S0_P01.2.mxd Originator: tom.suter



Proposed Turbine layout

Site boundary

Automated bat activity monitoring locations

- 01
- 02
- 03
- 04
- 05
- 06

0 0.1 0.2 0.3 0.4 km

Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 2.2
Automated monitoring

June 2021

wood.

H:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0037_S0_P01.2.mxd Originator: tom.suter

290000 295000 300000 305000 310000 315000

200000 195000 190000 185000 180000

Key

Site boundary

10km buffer

Bat roost

- Brandt''s Bat
- Brown Long-eared Bat
- Common Pipistrelle
- Daubenton''s Bat
- Greater Horseshoe Bat
- Lesser Horseshoe Bat
- Long-eared Bat Species
- Myotis Bat Species
- Natterer''s Bat
- Noctule Bat
- Pipistrelle agg.
- Pipistrellus Bat Species
- Soprano Pipistrelle
- Unknown Bat
- Whiskered Bat

0 1,000 2,000 3,000 4,000 5,000 m

Scale at A3: 1:90,000

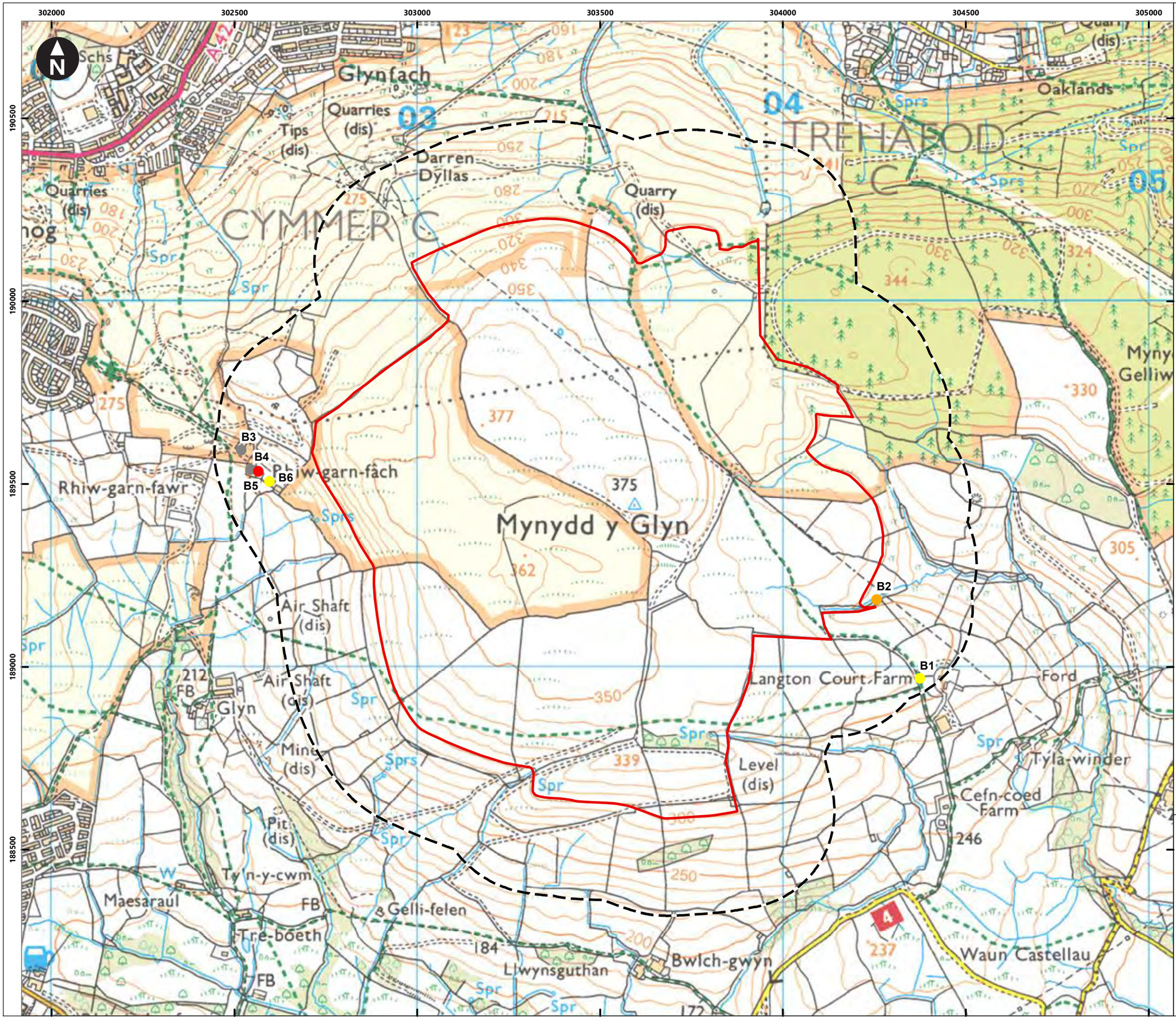
Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.1
Bat roosts and Statutory designated biodiversity Sites of international importance for bats within 10km of the Site

March 2021

wood.

P:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0038_S0_P01.1.mxd Originator: jon.squire

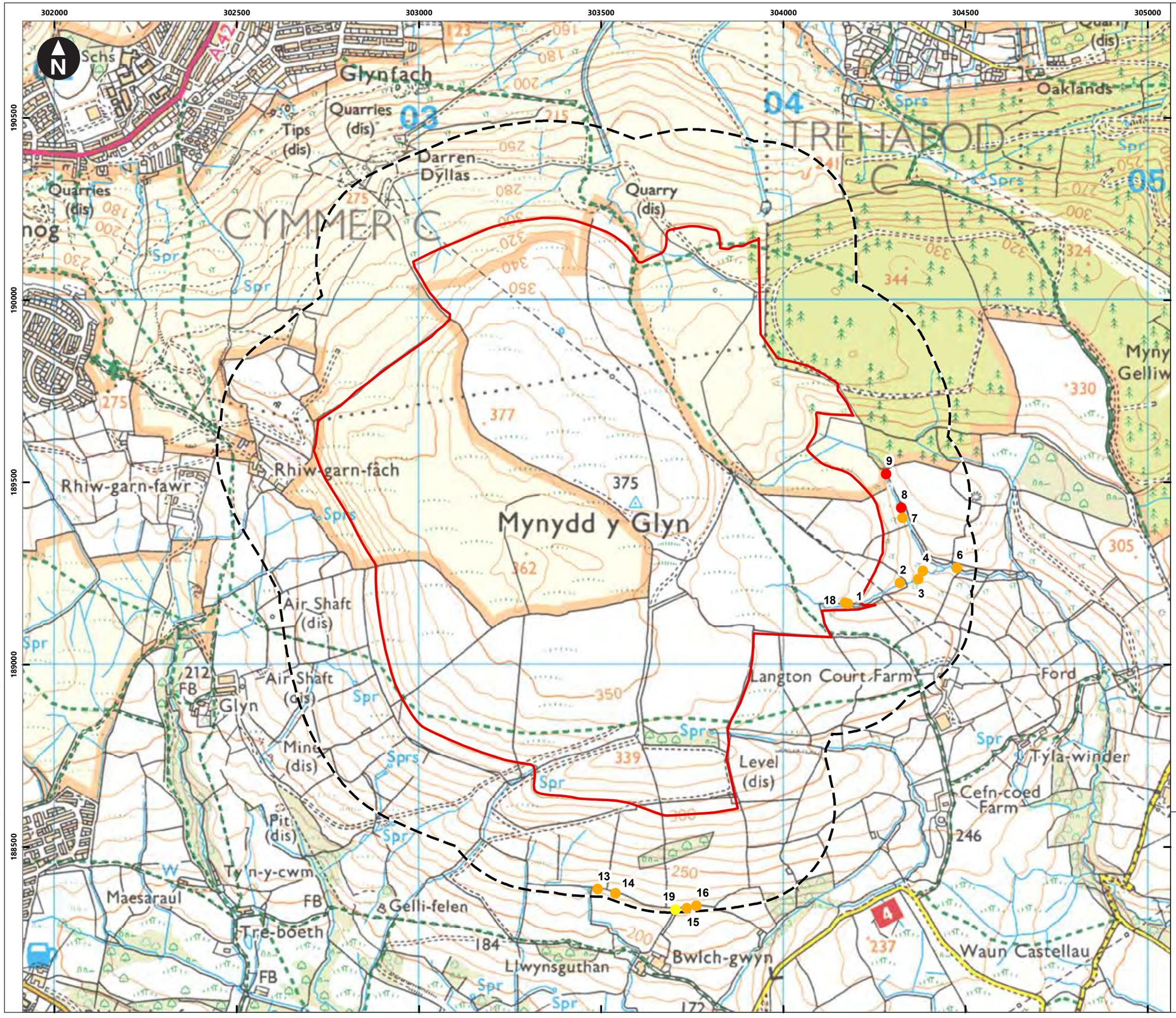


Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.2
Level of roosting potential assigned to built structures

April 2021

wood.



Site boundary

Bat survey area (266m buffer)

Bat surveys

- High
- Moderate
- Low

0 0.1 0.2 0.3 0.4 0.5 0.6 km

Scale at A3: 1:10,000

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.3
Level of roosting potential assigned to trees

April 2021

wood.

302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Common pipistrelle
Soprano pipistrelle
Pipistrellus sp
Myotis sp
NSL
Plecotus auritus

Bat density

0.3 - 0.5
0.5 - 1.5
1.5 - 2.5
2.5 - 4.5
4.5 - 6.5
6.50- 9.5

0 0.1 0.2 0.3 0.4 km

Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.4
Indicative distribution of species records during the manual transect survey

April 2021

wood.

42864-WOOD-XX-XX-FG-OE-0027_S0_P01.1

P:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0027_S0_P01.1.mxd Originator: jon.squire

302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Common pipistrelle

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.5
Manual bat transect activity for Common Pipistrelle

April 2021

wood.

P:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0028_S0_P01.1.mxd Originator: jon.squire

302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Soprano pipistrelle

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.6
Manual bat transect activity for Soprano Pipistrelle

April 2021

wood.

P:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0029_S0_P01.1.mxd Originator: jon.squire

302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Pipistrellus sp

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.7
Manual bat transect activity for Pipistrellus sp.

April 2021

wood.

P:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0030_S0_P01.1.mxd Originator: jon.squire

302500
303000
303500
304000
304500
190000
189500
189000
188500
N

Site boundary
Myotis sp
NSL
Plecotus auritis

0 0.1 0.2 0.3 0.4 km
Scale at A3: 1:7,500

Pennant Walters
Mynydd y Glyn Wind Farm
Interim Bat Report

Figure 3.8
Manual bat transect Recorded bat activity for Nyctaloid sp., Long-eared. and Myotis sp.

April 2021

wood.

Q:\Projects\42864 Mynydd y Glyn\Deliver Stage\D Design_Technical\Drawings\GIS\Workspaces\42864-WOOD-XX-XX-FG-OE-0031_S0_P01.1.mxd Originator: jonathan.collini

Appendix B
Legislation

All British bat species are listed in Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and Schedule 2 of the *The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019*. They are afforded full protection under Section 9(4) of the Act and Regulation 43 of the Regulations. These make it an offence, *inter alia*, to:

- Deliberately capture, injure or kill a bat.
- Deliberately disturb a bat (this applies anywhere, not just at its roost), in particular in such a way as to be likely to:
  - Impair their ability to survive, breed or reproduce, or rear or nurture their young.
  - Impair their ability to hibernate or migrate.
- Affect significantly the local distribution or abundance of that bat species.
- Damage or destroy a breeding Site or resting place of any bat.
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.
- Intentionally or recklessly obstruct access to any place that a bat uses for shelter or protection (this is taken to mean all bat roosts whether bats are present or not).

Appendix C
Tables relating to survey methods

Table C1 Automated monitoring survey details

Automated Detector ID	British National Grid Reference	Spring	Summer	Autumn	Phase 1 Habitat classification of static location	Linear features within 50m detector.
1	ST 03246 89768	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	No
2	ST 03327 89397	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Dry heath/acid grassland	Yes, fence line and crumbling stone wall
3	ST 03677 89263	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	Yes, fence line
4	ST 03553 88821	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	Yes, intact stone wall
5	ST 03183 88942	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Acid grassland - semi-improved	No
6	ST 03744 89877	20/05/2020 to 29/05/2020	03/07/2020 to 12/07/2020	08/09/2020 to 17/09/2020	Bare ground	Yes, fence line with scattered young trees

Table C2 Indicative weather conditions during automated bat survey work

Season	Date	Sunrise	Sunset	Temperature (Min°C)	Temperature (Max°C)	Temperature (Average°C)	Average Wind Speed (m/s)	Rainfall	Average Humidity (%)
Spring	20/05/2020	05:14:00	21:06:00	11	19	14	3.3	Some light rain showers	82
	21/05/2020	05:12:00	21:08:00	13	18	15	5.5	Some light rain showers	76
	22/05/2020	05:11:00	21:09:00	12	13	12	8.8	None	77
	23/05/2020	05:10:00	21:11:00	12	13	12	8.1	None	86
	24/05/2020	05:09:00	21:12:00	7	12	9	2.7	None	96
	25/05/2020	05:08:00	21:13:00	9	15	11	2.5	None	86
	26/05/2020	05:07:00	21:14:00	12	17	13	3.1	None	91
	27/05/2020	05:06:00	21:16:00	14	21	17	4.4	None	63
	28/05/2020	05:05:00	21:17:00	12	21	15	4.7	None	53
	29/05/2020	05:04:00	21:18:00	12	21	15	3.6	None	55
Summer	03/07/2020	05:02:00	21:33:00	15	16	16	5.8	Some light rain showers	98

Season	Date	Sunrise	Sunset	Temperature (Min°C)	Temperature (Max°C)	Temperature (Average°C)	Average Wind Speed (m/s)	Rainfall	Average Humidity (%)
	04/07/2020	05:03:00	21:32:00	14	17	15	8.6	Some light rain showers	94
	05/07/2020	05:03:00	21:32:00	12	14	13	8.8	None	77
	06/07/2020	05:04:00	21:31:00	13	15	14	4.1	None	86
	07/07/2020	05:05:00	21:30:00	14	15	15	7.2	Heavy rain showers	99
	08/07/2020	05:06:00	21:30:00	15	16	15	5.3	Some light rain showers	97
	09/07/2020	05:07:00	21:29:00	11	17	13	4.1	None	80
	10/07/2020	05:08:00	21:28:00	9	15	11	3.3	None	80
	11/07/2020	05:09:00	21:27:00	10	16	12	3.1	None	80
	12/07/2020	05:10:00	21:26:00	14	18	15	3.1	None	82
Autumn	08/09/2020	06:37:00	19:43:00	15	16	15	5.5	Some light rain showers	96
	09/09/2020	06:39:00	19:40:00	9	13	11	2.5	None	84
	10/09/2020	06:40:00	19:38:00	11	14	13	3.1	None	80

Season	Date	Sunrise	Sunset	Temperature (Min°C)	Temperature (Max°C)	Temperature (Average°C)	Average Wind Speed (m/s)	Rainfall	Average Humidity (%)
	11/09/2020	06:42:00	19:36:00	14	16	15	5.5	None	86
	12/09/2020	06:44:00	19:33:00	14	16	15	4.1	None	86
	13/09/2020	06:45:00	19:31:00	12	16	14	2.7	None	96
	14/09/2020	06:47:00	19:29:00	17	22	19	2.7	None	67
	15/09/2020	06:48:00	19:27:00	15	16	16	3.8	None	100
	16/09/2020	06:50:00	19:24:00	13	19	16	7.5	None	84
	17/09/2020	06:52:00	19:22:00	11	17	13	6.6	None	77

*Weather data obtained from https://www.wunderground.com/ at time of data collection

Table C3 Personnel involved in bat survey work

Surveyor name	Position	Qualifications and experience
Chris Hill	Associate Director	BSc (hons), MRes. MCIEEM. Over 11 years' experience working in ecological consultancy. Natural England bat survey licence holder Class 2 licence registration no. 2015-15031-CLS-CLS
Kelly Jones	Principal Consultant	BSc (hons), MSc. GradCIEEM. 9 years working in ecological consultancy. Natural Resources Wales bat survey licence holder for 4 years. Class 4 licence registration no. S088838/1 and Natural England licence number 2017-30482-CLS-CLS. Certified in tree climbing and aerial rescue.
Gary Lindsay	Consultant	BSc (hons), MSc. 4 years working in ecological consultancy providing ecological support on a range of projects including large infrastructure developments, installation and refurbishment of power lines and residential developments.
Jonathan D'Arcy	Consultant	BSc (hons), 7 years working in ecological consultancy. Natural England and Natural Resources Wales class licence holder for 7 years. Natural Resources Wales licence number S085065/1 and Natural England Class 2 licence registration no. 2018-37285-CLS-CLS. Certified in tree climbing and aerial rescue.
Sara Rodriquez-Pecino	Senior Consultant	BSc (hons), MSc. GradCIEEM. 7 years working in ecological consultancy. Natural England bat survey licence holder Class 2 licence registration no. 2019-41070-CLS-CLS. Certified in tree climbing and aerial rescue.
Sam Barnes	Senior Consultant	BSc (hons), MSc. 8 years working in ecological consultancy. Natural England bat survey licence holder Class 1 licence registration no. 2016-23778.
Claire Neale	Senior Consultant	BSc (hons), MSc. 7 years working in ecological consultancy involved with numerous projects within the power sector, specialising in supporting the delivery of environmental support
Katie Watkins	Assistant Consultant	BSc (hons), MSc. 2 years working in ecological consultancy providing ecological support on a range of projects including large infrastructure developments, installation and refurbishment of power lines and residential developments.

Appendix D
Tables relating to survey results

Table D1 Tree survey dates, methods and results

Tree ID	Tree species	PRA survey date	Initial suitability	PRF inspection date	Access method	Final suitability
1	Cherry	29/06/2020	Moderate	16/02/2021	Ground level	Moderate
2	Oak	29/06/2020	Moderate	16/02/2021	Ladder	Moderate
3	Oak	29/06/2020	High	16/02/2021	Ladder	Moderate
4	Oak	29/06/2020	Moderate	16/02/2021	Rope/harness	Moderate
5	Oak	29/06/2020	High	16/02/2021	Rope/harness	Low
6	Oak	29/06/2020	High	16/02/2021	Ground level	Moderate
7	Oak	29/06/2020	High	16/02/2021	Ground level	Moderate
8	Oak	29/06/2020	Moderate	16/02/2021	Rope/harness	High
9	Oak	29/06/2020	High	16/02/2021	Rope/harness	High
10	Oak	29/06/2020	Moderate	16/02/2021	Ground level	Low
11	Willow	29/06/2020	Moderate	17/02/2021	Ground level	Low
12	Oak	29/06/2020	Moderate	17/02/2021	Rope/harness	Low
13	Ash	29/06/2020	Moderate	17/02/2021	Ladder	Moderate
14	Cherry	29/06/2020	Moderate	17/02/2021	Ground level	Moderate
15	Ash	29/06/2020	High	17/02/2021	Ground level	Moderate
16	Birch	29/06/2020	Moderate	17/02/2021	Ground level	Moderate
17	Birch	29/06/2020	Moderate	17/02/2021	Ground level	Negligible
18	Cherry	n/a	Moderate	16/02/2021	Ground level	Moderate
19	Ash	n/a	High	17/02/2021	Ground level	Low

Table D2 Summary of automated detector monitoring results by season

			Total Passes (average passes per night)												Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
Spring	1	10	54	3	6	8	0	0	0	0	2	2	0	0	75
			5.4	0.3	0.6	0.8	0	0	0	0	0.2	0.2	0	0	7.5
	2	10	211	10	8	34	0	0	0	0	1	7	0	0	271
			21.1	1	0.8	3.4	0	0	0	0	0.1	0.7	0	0	27.1
	3	10	336	26	34	38	0	1	6	0	2	3	0	1	447
			33.6	2.6	3.4	3.8	0	0.1	0.6	0	0.2	0.3	0	0.1	44.7
	4	10	56	8	8	7	0	0	1	2	23	0	0	2	107
			5.6	0.8	0.8	0.7	0	0	0.1	0.2	2.3	0	0	0.2	10.7
	5	10	21	2	2	2	0	0	0	0	1	0	0	0	28
			2.1	0.2	0.2	0.2	0	0	0	0	0.1	0	0	0	2.8
	6	10	59	5	19	9	0	0	6	0	4	0	0	2	104
			5.9	0.5	1.9	0.9	0	0	0.6	0	0.4	0	0	0.2	10.4

			Total Passes (average passes per night)												Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
Summer	1	10	2	0	2	0	0	0	1	0	0	0	0	0	5
			0.2	0	0.2	0	0	0	0.1	0	0	0	0	0	0.5
	2	10	4	1	1	0	0	0	1	0	2	1	0	0	10
			0.4	0.1	0.1	0	0	0	0.1	0	0.2	0.1	0	0	1
	3	10	14	0	0	0	1	0	1	1	59	2	0	0	78
			1.4	0	0	0	0.1	0	0.1	0.1	5.9	0.2	0	0	7.8
	4	10	7	3	0	0	0	0	0	1	10	1	0	0	22
			0.7	0.3	0	0	0	0	0	0.1	1	0.1	0	0	2.2
	5	10	4	0	0	0	0	0	0	0	0	2	0	0	6
			0.4	0	0	0	0	0	0	0	0	0.2	0	0	0.6
	6	10	8	1	1	0	1	3	2	0	3	0	0	0	19
			0.8	0.1	0.1	0	0.1	0.3	0.2	0	0.3	0	0	0	1.9
Autumn	1	10	356	18	40	22	4	4	37	9	7	13	0	0	510

			Total Passes (average passes per night)												Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
			35.6	1.8	4	2.2	0.4	0.4	3.7	0.9	0.7	1.3	0	0	51
	2	10	239	31	53	19	10	4	10	4	3	14	1	0	388
			23.9	3.1	5.3	1.9	1	0.4	1	0.4	0.3	1.4	0.1	0	38.8
	3	10	612	38	131	56	3	2	9	17	6	13	0	1	888
			61.2	3.8	13.1	5.6	0.3	0.2	0.9	1.7	0.6	1.3	0	0.1	88.8
	4	10	1082	72	75	68	0	12	18	23	38	40	1	5	1434
			108.2	7.2	7.5	6.8	0	1.2	1.8	2.3	3.8	4	0.1	0.5	143.4
	5	10	66	6	19	8	6	14	34	8	2	2	10	0	175
			6.6	0.6	1.9	0.8	0.6	1.4	3.4	0.8	0.2	0.2	1	0	17.5
	6	10	248	18	55	28	3	3	21	14	12	8	0	32	442
			24.8	1.8	5.5	2.8	0.3	0.3	2.1	1.4	1.2	0.8	0	3.2	44.2
Total		180	3379	242	454	299	28	43	147	79	175	108	12	43	5009

			Total Passes (average passes per night)											Total
Season	Automated detector	Number of nights recording	CP	SP	CP/SP	NP/CP	NSL	Nyct sp.	N	LE	M	Bat sp.	GH	LH	
Proportion			67.46%	4.83%	9.06%	5.97%	0.56%	0.86%	2.93%	1.58%	3.49%	2.16%	0.24%	0.86%	

Species codes: **CP** = common pipistrelle; **SP** = soprano pipistrelle; **CP/SP** = common/soprano pipistrelle (*Pipistrellus* species); **CP/NP** = common/ Nathusius' pipistrelle (*Pipistrellus* species); **NSL** = Noctule/Serotine/Leiser bat (Nyctaloid species); **Nyct sp.** = Noctule/leiser bat (Nyctalus species); **N** = Noctule; **LE** = long-eared bat; **M** = *Myotis* bat species; **Bat sp.** = Bat call unable to clearly identify down to species level; **GH** = greater horseshoe and **LH** = lesser horseshoe.

Appendix E
Ecobat analysis

Table E1 Ecobat summary table showing the number of nights recorded bat activity fell into each activity band for each species[IJ1].

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
1	*Myotis*	0	0	2	1	**0**
1	*Nyctaloid*	0	0	1	0	**1**
1	*Nyctalus noctula*	1	0	0	0	**2**
1	*Pipistrellus*	2	2	2	0	**5**
1	*Pipistrellus pipistrellus*	5	1	3	3	**1**
1	*Pipistrellus pygmaeus*	0	2	0	1	**5**
1	*Plecotus auritus*	0	0	1	1	**3**
2	*Myotis*	0	0	0	2	**2**
2	*Nyctaloid*	0	0	2	0	**2**
2	*Nyctalus noctula*	0	1	0	0	**1**
2	*Pipistrellus*	3	2	3	0	**4**
2	*Pipistrellus pipistrellus*	7	3	1	2	**1**

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
2	*Pipistrellus pygmaeus*	0	3	1	2	**1**
2	*Plecotus auritus*	0	0	0	0	**4**
2	*Rhinolophus ferrumequinum*	0	0	0	0	**1**
3	*Myotis*	1	4	1	0	**4**
3	*Nyctaloid*	0	0	0	1	**2**
3	*Nyctalus*	0	0	0	0	**1**
3	*Nyctalus noctula*	0	0	3	0	**3**
3	*Pipistrellus*	4	2	4	1	**0**
3	*Pipistrellus pipistrellus*	9	4	2	2	**1**
3	*Pipistrellus pygmaeus*	1	3	2	2	**2**
3	*Plecotus auritus*	0	1	1	2	**2**
3	*Rhinolophus hipposideros*	0	0	0	0	**2**
4	*Myotis*	0	5	9	0	**1**
4	*Nyctalus*	0	1	0	0	**2**
4	*Nyctalus noctula*	1	0	0	0	**1**

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
4	*Pipistrellus*	3	2	0	2	**2**
4	*Pipistrellus pipistrellus*	7	2	4	2	**4**
4	*Pipistrellus pygmaeus*	2	1	2	3	**3**
4	*Plecotus auritus*	0	1	3	2	**3**
4	*Rhinolophus ferrumequinum*	0	0	0	0	**1**
4	*Rhinolophus hipposideros*	0	0	1	0	**4**
5	*Myotis*	0	0	0	0	**3**
5	*Nyctaloid*	0	0	1	1	**1**
5	*Nyctalus*	0	0	0	2	**0**
5	*Nyctalus noctula*	1	1	1	1	**0**
5	*Pipistrellus*	0	2	1	2	**2**
5	*Pipistrellus pipistrellus*	2	1	2	6	**3**
5	*Pipistrellus pygmaeus*	0	0	1	0	**3**
5	*Plecotus auritus*	0	0	1	1	**3**
5	*Rhinolophus ferrumequinum*	0	0	1	2	**2**

Detector ID	Species/Species Group	Nights of High Activity	Nights of Moderate/ High Activity	Nights of Moderate Activity	Nights of Low/ Moderate Activity	Nights of Low Activity
6	*Myotis*	0	1	0	4	**5**
6	*Nyctaloid*	0	0	1	0	**1**
6	*Nyctalus*	0	0	0	1	**0**
6	*Nyctalus noctula*	0	1	2	1	**2**
6	*Pipistrellus*	1	2	6	0	**5**
6	*Pipistrellus pipistrellus*	3	6	3	6	**1**
6	*Pipistrellus pygmaeus*	0	0	3	2	**8**
6	*Plecotus auritus*	0	0	1	4	**3**
6	***Rhinolophus hipposideros***	**1**	**0**	**1**	**2**	**2**

Table E2 Ecobat summary table showing key metrics for each species recorded. The reference range is the number of nights for each species that your data were compared to. Reference Range of 200+ required to be confident in the relative activity level[IJ2].

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
1	*Myotis*	46	31 - 54	54	3	2002
1	*Nyctaloid*	23	23 - 23	46	2	NA
1	*Nyctalus noctula*	0	0 - 0	88	3	1779
1	*Pipistrellus*	54	60 - 81	85	11	3943
1	*Pipistrellus pipistrellus*	54	42.5 - 90.5	95	13	3601
1	*Pipistrellus pygmaeus*	0	31 - 70	70	8	2471
1	*Plecotus auritus*	0	42.5 - 42.5	54	5	1010
2	*Myotis*	16	15.5 - 15.5	31	4	2002
2	*Nyctaloid*	23	52.5 - 52.5	59	4	NA
2	*Nyctalus noctula*	37	36.5 - 36.5	73	2	1779
2	*Pipistrellus*	57	54 - 83	85	12	3943
2	*Pipistrellus pipistrellus*	83	60 - 90	95	14	3601
2	*Pipistrellus pygmaeus*	60	45.5 - 71	78	7	2471
2	*Plecotus auritus*	0	0 - 0	0	4	1010
2	*Rhinolophus ferrumequinum*	0	0	0	1	471

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
3	*Myotis*	59	60.5 - 78.5	85	10	2002
3	*Nyctaloid*	0	0 - 0	31	3	NA
3	*Nyctalus*	0	0	0	1	1722
3	*Nyctalus noctula*	23	60 - 60	60	6	1779
3	*Pipistrellus*	70	50.5 - 83	96	11	3943
3	*Pipistrellus pipistrellus*	80	62 - 88	99	18	3601
3	*Pipistrellus pygmaeus*	53	38.5 - 76	82	10	2471
3	*Plecotus auritus*	31	31 - 54	70	6	1010
3	*Rhinolophus hipposideros*	0	0 - 0	0	2	368
4	*Myotis*	54	50 - 62	72	15	2002
4	*Nyctalus*	0	0 - 0	67	3	1722
4	*Nyctalus noctula*	41	40.5 - 40.5	81	2	1779
4	*Pipistrellus*	72	51.5 - 86.5	94	9	3943
4	*Pipistrellus pipistrellus*	54	55 - 82	99	19	3601
4	*Pipistrellus pygmaeus*	31	31 - 72	86	11	2471
4	*Plecotus auritus*	31	31 - 60	64	9	1010

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
4	*Rhinolophus ferrumequinum*	0	0	0	1	471
4	*Rhinolophus hipposideros*	0	0 - 0	46	5	368
5	*Myotis*	0	0 - 0	0	3	2002
5	*Nyctaloid*	31	38.5 - 38.5	46	3	NA
5	*Nyctalus*	31	31 - 31	31	2	1722
5	*Nyctalus noctula*	65	31 - 82	82	4	1779
5	*Pipistrellus*	31	31 - 67	78	7	3943
5	*Pipistrellus pipistrellus*	31	31 - 59.5	88	14	3601
5	*Pipistrellus pygmaeus*	0	0 - 0	60	4	2471
5	*Plecotus auritus*	0	38.5 - 38.5	46	5	1010
5	*Rhinolophus ferrumequinum*	31	31 - 31	54	5	471
6	*Myotis*	16	31 - 31	64	10	2002
6	*Nyctaloid*	23	23 - 23	46	2	NA
6	*Nyctalus*	31	0	31	1	1722
6	*Nyctalus noctula*	46	45.5 - 70	80	6	1779
6	*Pipistrellus*	46	46 - 74	92	14	3943

Detector ID	Species/Species Group	Median Percentile	95% CIs	Max Percentile	Nights Recorded	Reference Range
6	*Pipistrellus pipistrellus*	54	47.5 - 72	96	19	3601
6	*Pipistrellus pygmaeus*	0	31 - 54	60	13	2471
6	*Plecotus auritus*	31	31 - 31	46	8	1010
6	*Rhinolophus hipposideros*	31	31 - 57.5	84	6	368

Appendix F
Collision risk assessment method

Table F1 Full details relating to Stage 1 – Initial site risk assessment

Site risk level (1-5)	**Project size**			
Habitat risk		**Small**	**Medium**	**Large**
	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Habitat risk	**Description**
Low	• Small number of potential roost features, of low quality. • Low quality foraging habitat that could be used by small numbers of foraging bats. • Isolated site not connected to the wider landscape by prominent linear features.
Moderate	• Buildings, trees or other structures with moderate – high potential as roost sites on or near the site. • Habitat could be used extensively for foraging bats. • Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	• Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/ or confirmed roosts present close to or on the site. • Extensive and diverse habitat mosaic of high quality foraging for bats. • Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. • At/ near edge of range and/ or an important flyway. • Close to key roost and/ or swarming site.

Project size	**Description**
Small	• Small scale development (≤ 10 turbines). No other wind energy developments within 10km. • Comprising turbines <50m in height.

Medium	• Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. • Comprising turbines 50 – 100m in height.
Large	• Largest developments (>40 turbines) with other wind energy developments within 5km. • Comprising turbines >100m in height.

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301000 302000 303000 304000 305000 306000 307000 308000

192000 191000 190000 189000 188000 187000

N

Key

Scoping site boundary

Proposed access route

0 500 1,000 1,500 m

Scale at A3: 1:25,000

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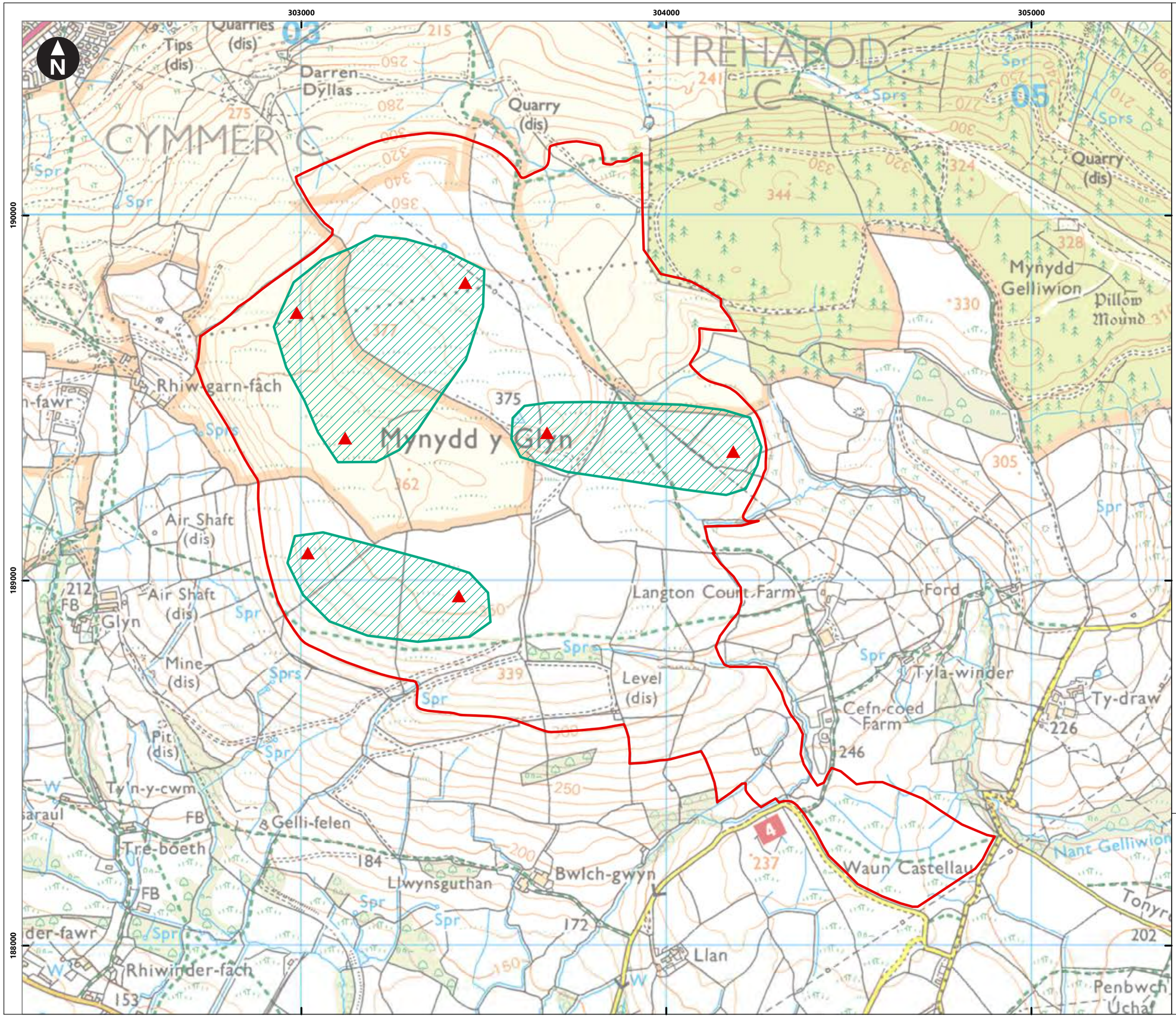
Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 1.1 - Site Location and surrounding settlements

September 2021

wood.



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Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 2.1 - Indicative Turbine Locations

September 2021

280000 290000 300000 310000 320000 330000

210000 200000 190000 180000 170000

Key

Scoping Site Boundary

LVIA study area

0 2,500 5,000 7,500 10,000 m

Scale at A3: 1:200,000

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Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 5.1
LVIA study area

August 2021

wood.

280000 290000 300000 310000 320000 330000

210000 200000 190000 180000 170000

N

Key

- Proposed turbine location
- Scoping Site Boundary
- LVIA study area

National Landscape Designations

- Brecon Beacons National Park
- Glamorgan Heritage Coast

Zones of Theoretical Visibility

- Proposed blade tip turbines may be visible
- Proposed hub heights and blade tip turbines may be visible

Long Distance Trails

- Wales Coast Path

0 2,500 5,000 7,500 10,000 m

Scale at A3: 1:200,000

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Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 5.2
Hub height and blade tip ZTVs within LVIA study area with national landscape designations and long distance trails

August 2021

wood.

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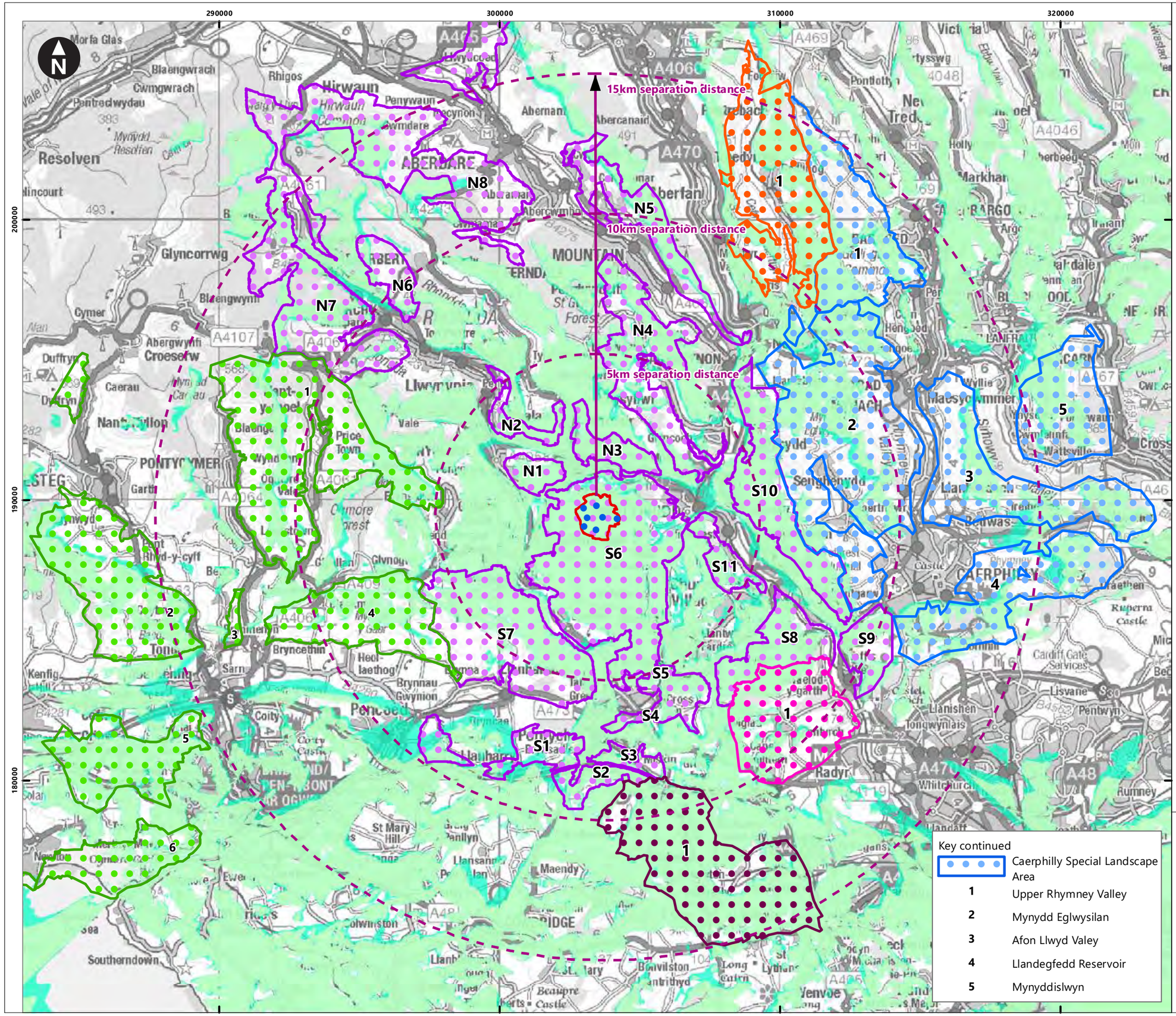

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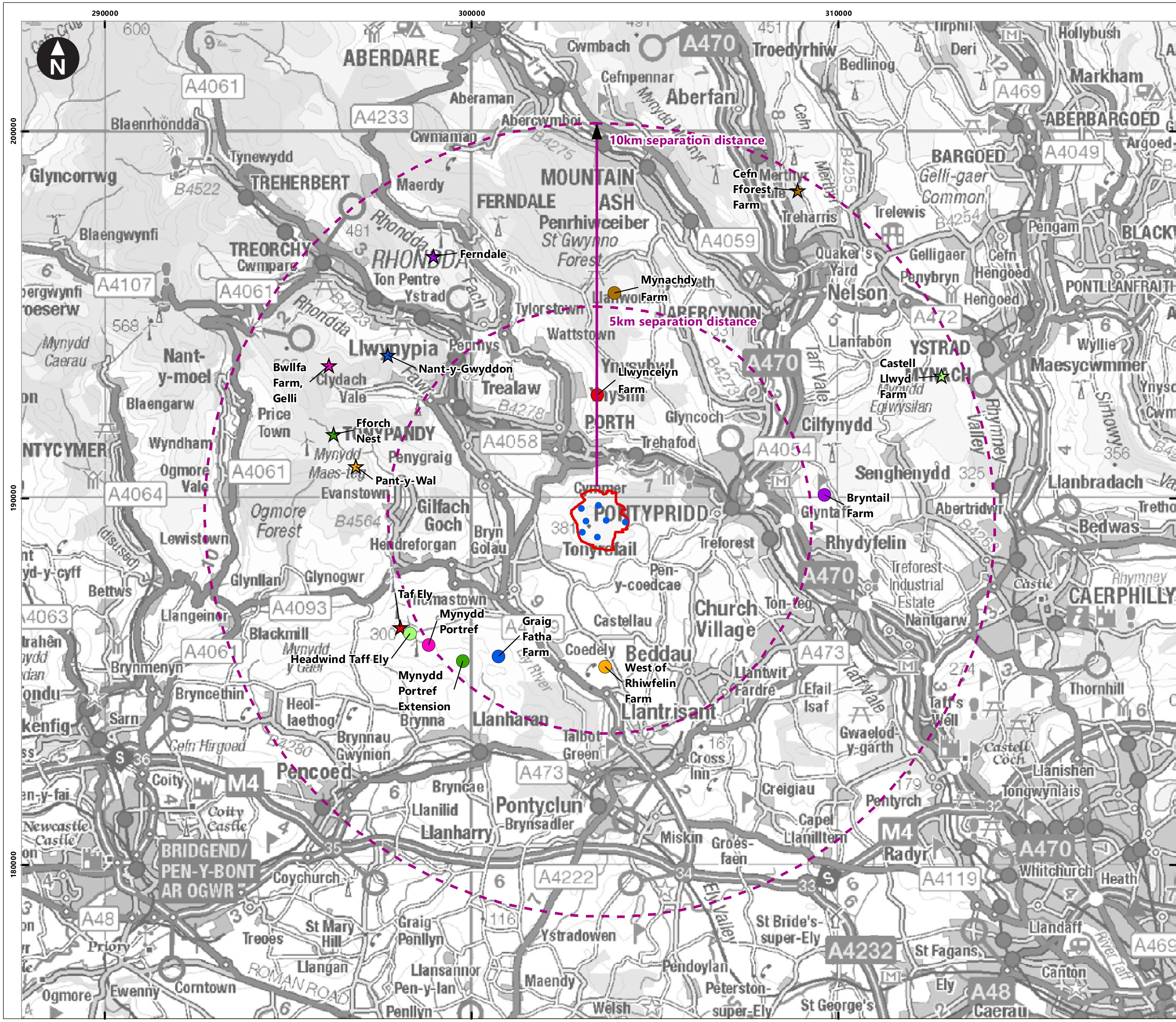
Pennant Walters
Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 5.3
Hub height and blade tip ZTVs with local landscape designations for potential inclusion in LVIA

August 2021

wood.



Key

- Scoping Site Boundary
- Separation distances at 5km intervals
- Proposed Turbine location
- Llwyncelyn Farm
- West of Rhiwfelin Farm
- Graig Fatha Farm
- Mynydd Portref Extension
- Mynydd Portref
- Bryntail Farm
- Headwind Taff Ely
- Mynachdy Farm
- Taf Ely
- Pant-y-Wal
- Nant-y-Gwyddon
- Fforch Nest
- Bwllfa Farm, Gelli
- Ferndale
- Castell Llwyd Farm
- Cefn Fforest Farm

0 1,500 3,000 4,500 6,000 m

Scale at A3: 1:100,000

Pennant Walters
Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 5.4
Wind energy developments for inclusion in the Cumulative Landscape and Visual Impact Assessment (CLVIA) within 10km of the proposal site

August 2021

wood.

42864-WOOD-XX-XX-FG-OL-0006_S0_P01.3

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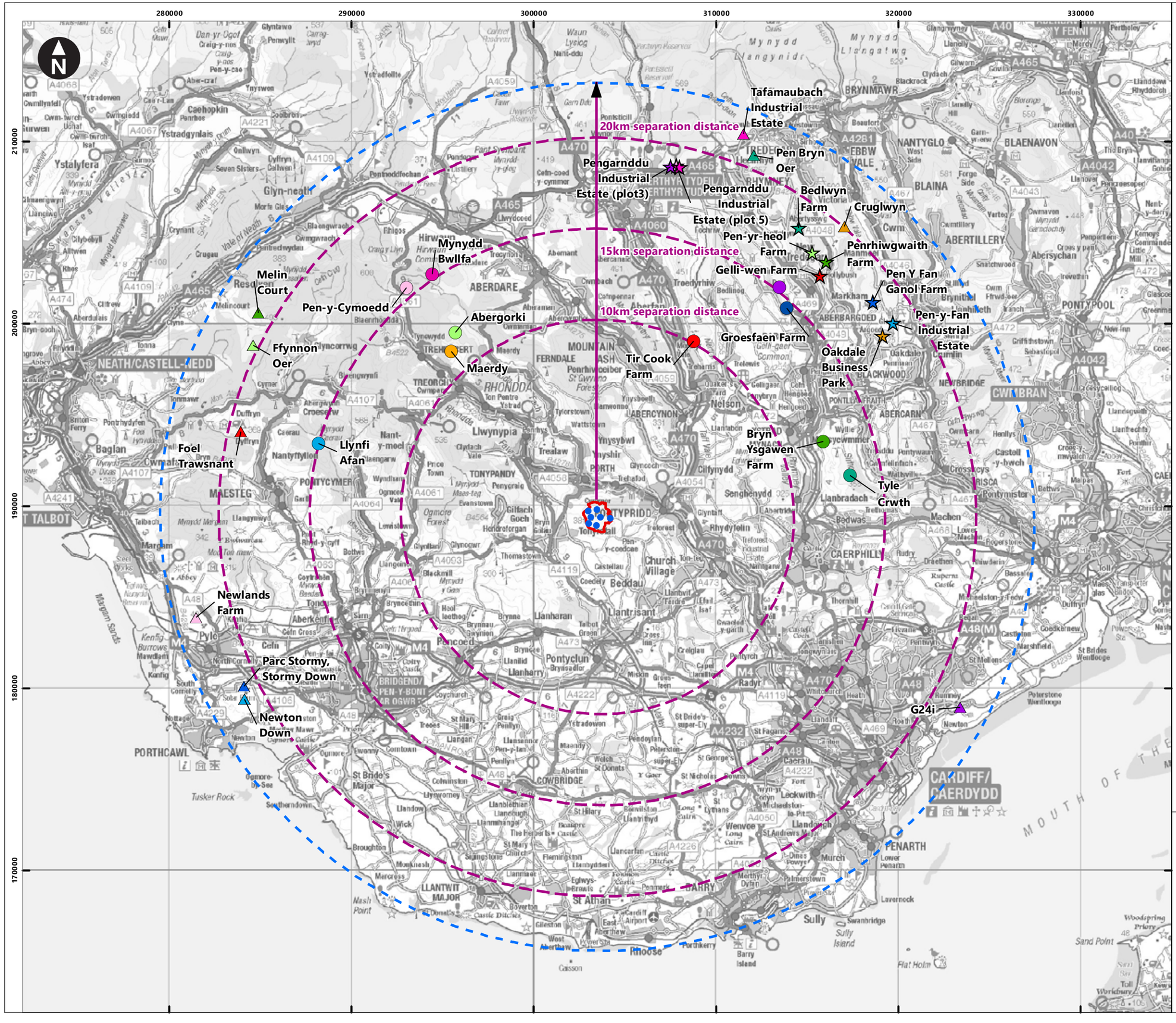

Scoping Site Boundary
CLVIA study area
Separation distances at 5km intervals
Proposed Turbine location
Tir Cook Farm
Maerdy
Abergorki
Bryn Ysgawen Farm
Tyle Crwth
Groesfaen Farm
Llynfi Afan
Cefn Bach Farm
Mynydd Bwllfa
Pen-y-Cymoedd
Gelli-wen Farm
Oakdale Business Park
Pen-yr-heol Farm
Penrhiwgwaith Farm
Bedlwyn Farm
Pen Y Fan Ganol Farm
Pen-y-Fan Industrial Estate
Pengarnddu Industrial (plot3)
Pengarnddu Industrial (St Merryn)
Pengarnddu Industrial (plot 5)
Foel Trawsnant
Cruglwyn
Ffynnon Oer
Melin Court
Pen Bryn Oer
Parc Stormy, Stormy Down
Newton Down
G24i
Tafamaubach Industrial Estate
Newlands Farm

0 2,500 5,000 7,500 10,000 m
Scale at A3: 1:200,000

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Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 5.5
Wind energy developments for inclusion in the Cumulative Landscape and Visual Impact Assessment (CLVIA) between 10km and 23km of the proposal site

August 2021

wood.

290000 300000 310000

200000 190000 180000

10km separation distance

5km separation distance

12 - OS marked viewpoint on Ferndale-Llanwonno road

11 - Carpark at Shrine of Our Lady, Penrhys

10 - Bryn Terrace, Cwm Clydach, Tonypandy.le

5 - A4233 south end of bridge over River Rhondda, Porth

4 - PRoW from Trebanog ascending Mynydd Dinas

3 - Hafod Lane, Llwyncelyn

8 - Entrance to Pontypridd Common, Pontypridd

7 - Tynybryn Road/NCR4, Tonyrefail

1 -Hafod Wen, Tonyrefail

2 - NCR4 at Rhiwinder

13 - 274 m summit on Taff Ely Ridgeway Walk, near Mynydd Meandy

6 - North-eastern edge of Pen-y-Coedcae

14 - 321 m trig point summit on Rhymney Valley Ridgeway Walk, Mynydd Mieo

15 - 307 m trig point summit of Garth Hill

9 - Northern edge of Llantrisant

16 – Valeways Heritage Millenium Trail north of Pendolyn

ABERDARE Aberaman Abercwmboi Glyncorrwg Blaengwynfi MOUNTAIN Llwyncelyn Maesycwmmer Pontypridd Price Town Bedwas CAERPHILLY Bryncethin Brynna Llanharry Pontyclun Llantrisant Llanishen Tongwynlais Whitchurch Cardiff St Mary Hill Maendy Coity Penycoed Brynmenyn Sarn

A4061 A4233 A470 A4107 A4064 A4063 A4058 A473 M4 A469

Key

- Scoping Site Boundary
- Separation distances at 5km intervals
- Proposed Turbine location

Viewpoint locations

- 1 -Hafod Wen, Tonyrefail
- 2 - NCR4 at Rhiwinder
- 3 - Hafod Lane, Llwyncelyn
- 4 - PRoW from Trebanog
- 5 - A4233 Bridge in Porth
- 6 - North-east of Pen-y-Coedcae
- 7 - Tynybryn Road/NCR4, Tonyrefail
- 8 - Pontypridd Common
- 9 - Northern edge of Llantrisant
- 10 - Bryn Terrace, Cwm Clydach
- 11 - Shrine carpark in Penrhys
- 12 - Viewpoint Llanwonno road
- 13 - Taff Ely Ridgeway Walk
- 14 - Rhymney Valley Ridgeway Walk
- 15 - Garth Hill summit
- 16 – Valeways Trail, Pendolyn
- 17 – A4059, Penderyn, BBNP

Viewpoints 16 & 17 are located beyond the extents of this figure

Zones of Theoretical Visibility

- Proposed blade tip turbines may be visible
- Proposed hub heights and blade tip turbines may be visible

0 1,500 3,000 4,500 6,000 m

Scale at A3: 1:100,000

Pennant Walters
Mynydd y Glyn Wind Farm
EIA Scoping Report

Figure 5.6
Proposed viewpoint locations

August 2021

wood.

296000 298000 300000 302000 304000 306000 308000 310000

196000 194000 192000 190000 188000 186000 184000

N

The Rhondda

Taff, Pontypridd

Troedrhiw-Trwyn

Graigwen, Pontypridd

Pontypridd Town Centre

Broadway, Treforest

Castle Square, Treforest

Old Park terrace, Treforest

Llantrisant

2279 2297 2230 3766 1487 GM3 2295 2891 613 315 3110 2266

17335 17333 17332 17331 17128 17119 17111 17121 17114 17120 17123 17112 17115 17124 17118 17122 17113 17117 17129 17110 17127

13125 18170 13127 13117 13118 18268 18269 18270 18271 13119 13120 13122 13121 24873

13515 13516 24848 24849 24889 24874 24871 24875 13497 18806 13530 24876 24846 24858 13532 13522 18805 24857 13527 13523 24855 13490 13525 13524 13504 13491 24852 24901 24862 24861 24912 24900 24863 24914 24870 24869 80670

80873 24853 80762 80764 81031

24278 24282 24283 24281 24274 24275 24273 24277 24279 24280 24276 13503 13537 13538 25541 24886 13508 13506 13507 24881 24882 13509 13510 24883

23948 23949 23953 23944

15843 15840 15838 24370 15842 15841 15837 23946

0 500 1,000 1,500 2,000 2,500 3,000 m

Scale at A3: 1:50,000

Key

- Scoping site boundary
- 1km site buffer
- 5km site buffer
- Historic landscapes
- Conservation areas
- Historic park and garden
- Scheduled monuments

Listed buildings

- Grade I
- Grade II*
- Grade II

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Figure 6.1 : Designated historic assets within 5km of site boundary

August 2021

wood.

302000 303000 304000 305000

191000 190000 189000 188000

GGAT02379m GGAT06097m GGAT01559m GGAT08161m GGAT08160m GGAT02395m GGAT02393m GGAT02394m GGAT02398m GGAT02397m GGAT03816m GGAT04941m GGAT03815m GGAT01740m GGAT06603m GGAT08528m GGAT08529m GGAT01483m GGAT06021m GGAT06136m GGAT06443m GGAT01609m

Key

Scoping site boundary

1km site buffer

HER Core

0 200 400 600 800 m

Scale at A3: 1:15,000

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Figure 6.2 : Non-designated historic assets within 1km of site boundary

August 2021

wood.

301000 302000 303000 304000 305000 306000

192000 191000 190000 189000 188000 187000

Key

- Scoping Site Boundary
- 1.5km study area
- Location of turbines
- Watercourses
- Ponds & lakes
- Springs

0 300 600 900 1,200 m

Scale at A3: 1:20,000

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Figure 9.1 Site Location Plan and Study Area

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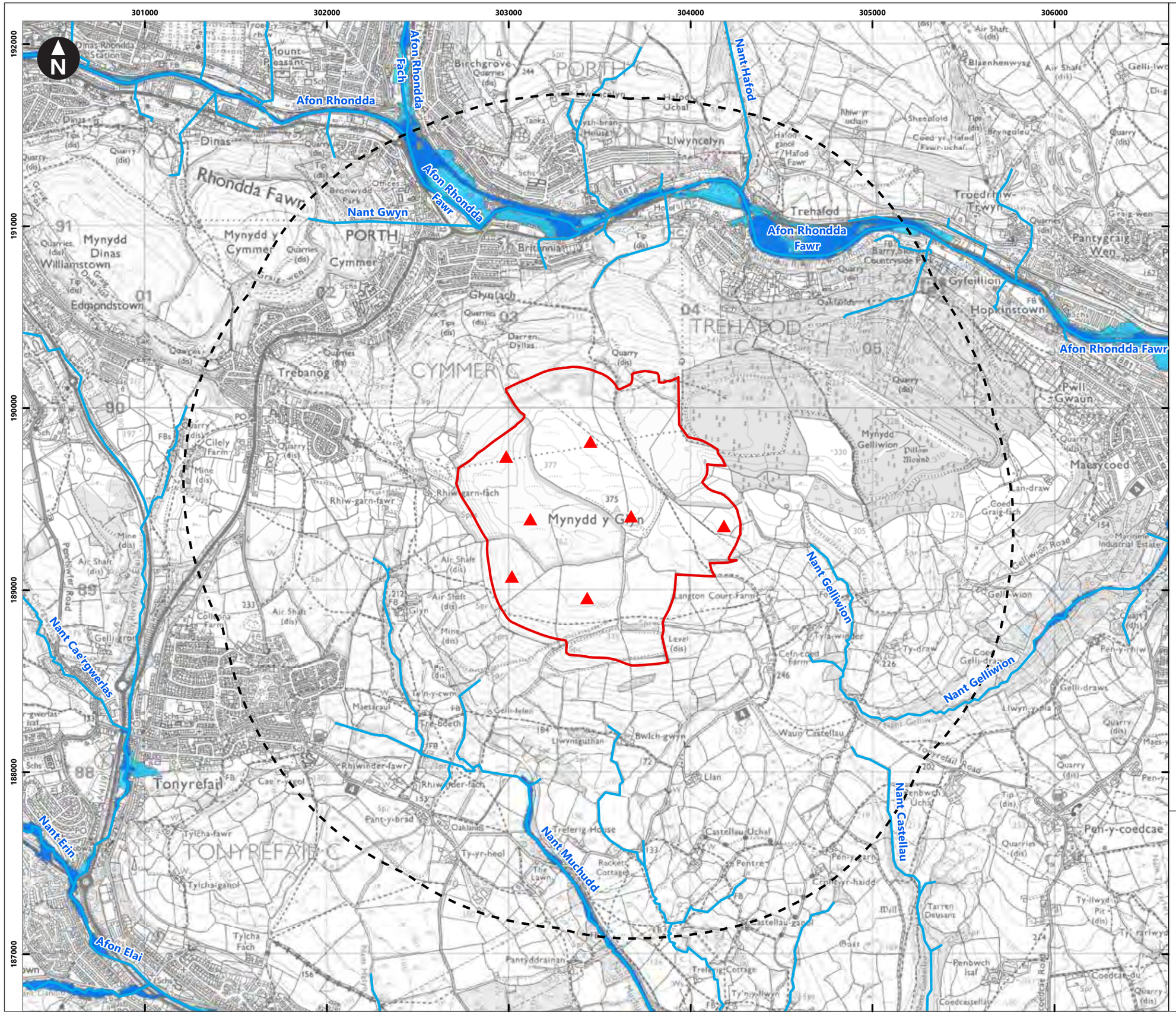

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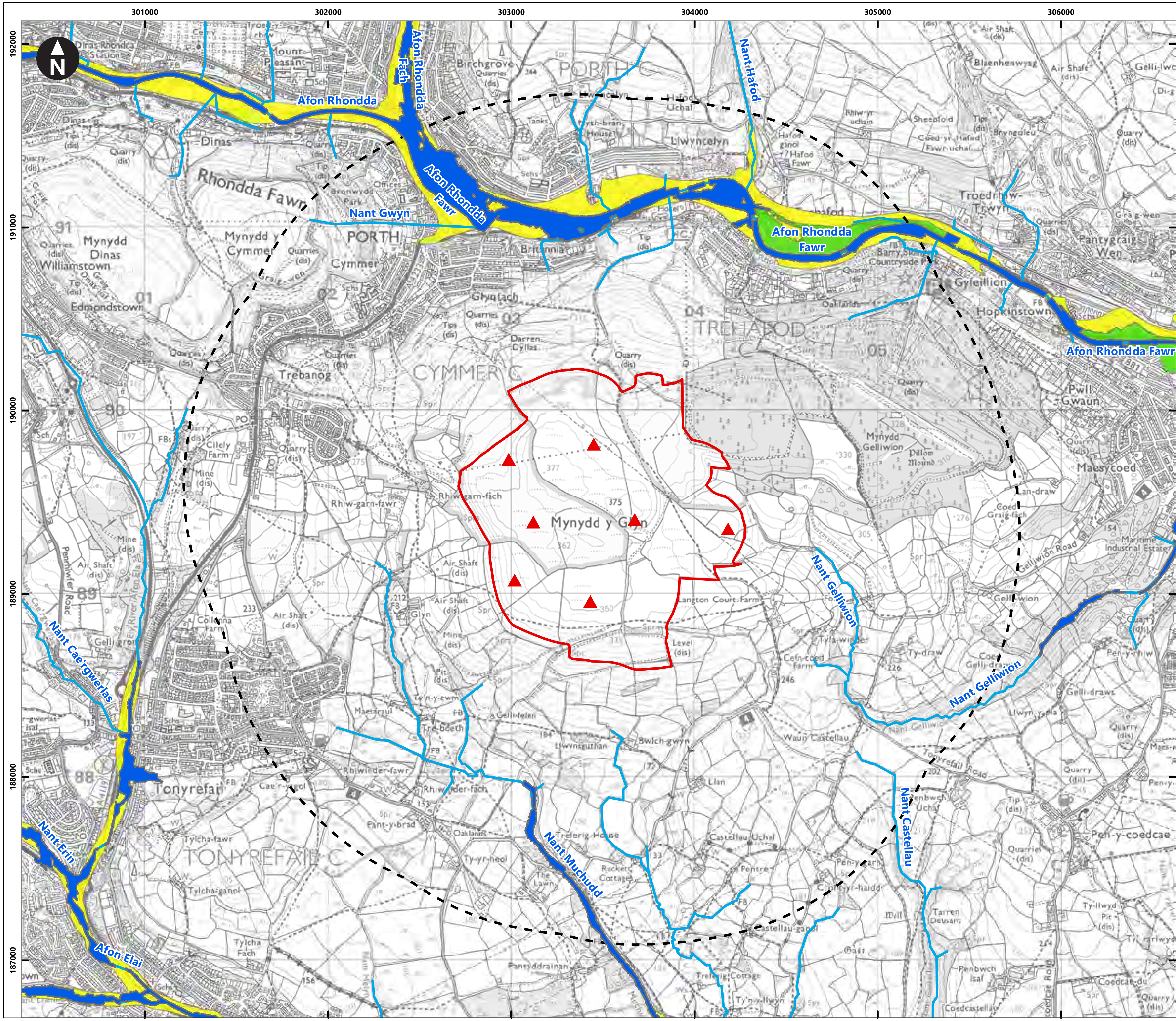
Figure 9.2 NRW Flood Risk Map for Planning

August 2021

wood.



Key

- Scoping Site Boundary
- 1.5km study area
- Location of turbines
- Watercourses
- Development Advice Map - Zone A
- Development Advice Map - Zone B
- Development Advice Map - Zone C1
- Development Advice Map - Zone C2

0 300 600 900 1,200 m

Scale at A3: 1:20,000

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Figure 9.3 NRW Development Advice Map (Flood Zones B, C1 and C2)

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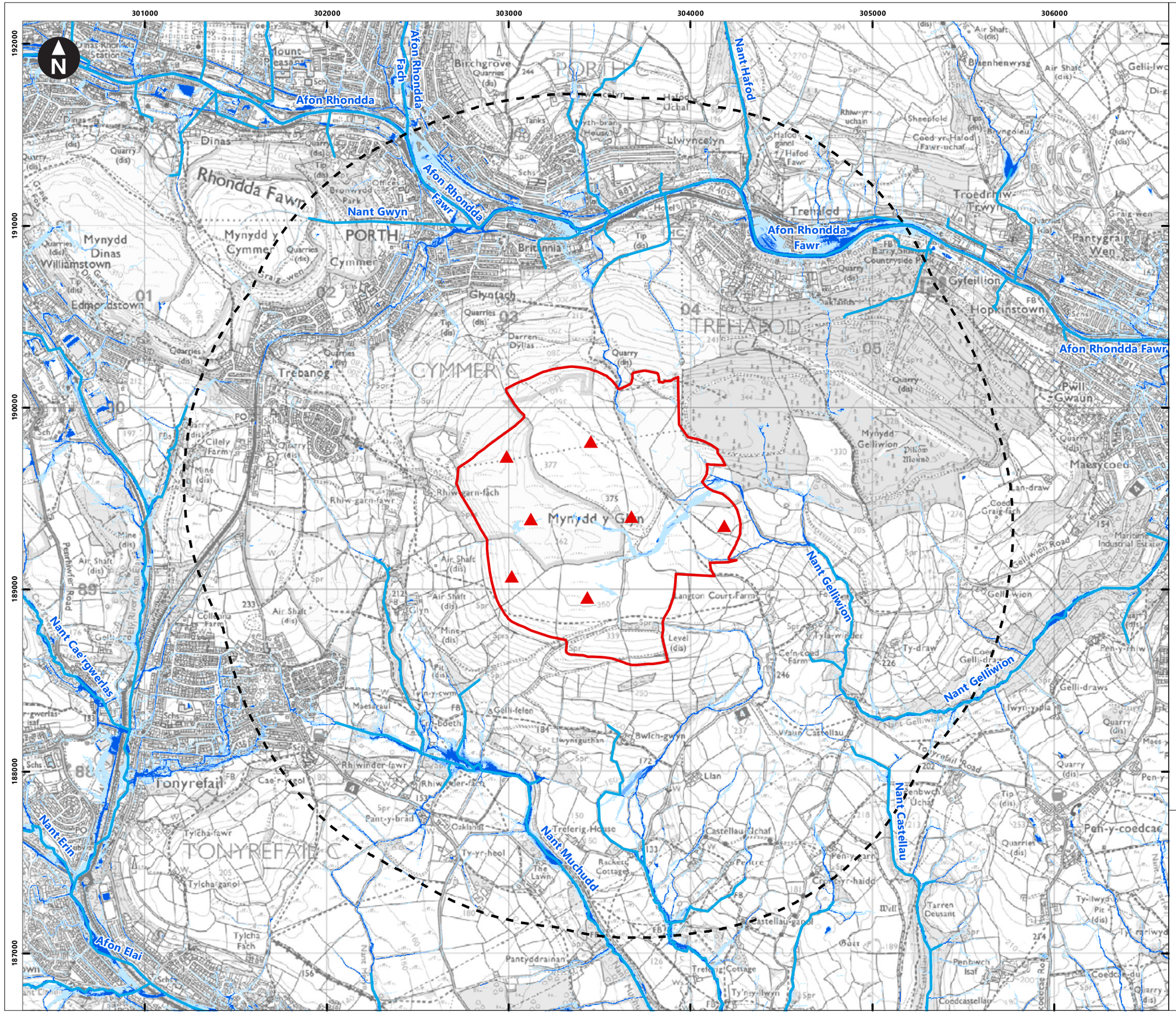

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Figure 9.4
NRW Flood Risk Map for Surface Water

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302000
303000
304000
305000
191000
190000
189000
188000
N
Afon Rhondda Fawr
Nant Gwyn
PORTH
Cymmer
Graigwen
Trebanog
Mynydd y Glyn
Trehafod
Nant Gelliwion
Nant Muchudd
Nant Castellau

Key

Scoping Site Boundary
1.5km study area
Location of turbines
Watercourses

Risk of flooding from reservoirs – depth

0 - 0.3m
0.3 - 2.0m
Greater than 2.0m

0 300 600 900 m
Scale at A3: 1:15,000

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Figure 9.5
NRW Reservoir Flood Risk Map

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wood.

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