

Innogy Renewables UK Ltd

Pen March Wind Farm **EIA Scoping Report**

Final report

Prepared by LUC

May 2020



Innogy Renewables UK Ltd

Pen March Wind Farm EIA Scoping Report

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Chapter 1

Introduction

1.1 Innogy Renewables UK Ltd (“the Applicant”) intends to apply to Welsh Ministers for permission to construct and operate Pen March Wind Farm (“the Development”) which would be located north of the A465 Heads of the Valleys road, north-west of the small town of Rhymney and north-east of Merthyr Tydfil. The Site location is shown on **Figure 1.1**.

1.2 The Development comprises the construction and operation of up to seven wind turbines with a maximum blade tip height of up to 180m and associated infrastructure. The Development will be a ‘Development of National Significance’ (DNS) as it is anticipated at present that the turbines will have a combined installed capacity of greater than 10 megawatts (MW). An indicative maximum development envelope for turbines and ancillary infrastructure is shown in **Figure 1.2**. The detailed locations of turbines and associated infrastructure will, however, be subject to iterative design through the Environmental Impact Assessment (EIA) process.

1.3 The majority of the Development Site is registered as Common Land and makes up part of Common Land Unit 38 (Gelligaer and Merthyr Common), which also extends to the south of the A465. Therefore, the DNS application will be accompanied by a separate application for consent to deregister and exchange common land and (where required) consent to carry out works on common land (sections 16 and 38 of the Commons Act 2006).

1.4 As the Development will exceed the threshold for wind developments set out in Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (as amended by the Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018) (‘the Regulations’), and as it is a scheme that could potentially result in ‘significant’ environmental effects according to the Regulations, the scheme is classified as an Environmental Impact Assessment (EIA) development and an Environmental Statement (ES) is required.

1.5 The Regulations make provision for obtaining a Scoping Direction from Welsh Ministers on the information to be included in the ES. This Scoping Report accompanies the Applicant’s written request to Welsh Ministers for a Scoping Direction. It provides details of:

- The proposed Development;
- Environmental desk and field-based survey undertaken to date;

- The potential significant environmental effects to be considered within the EIA and ES; and
- Proposed EIA survey and assessment methods.

1.6 In accordance with established guidance and good practice, the ES will focus on potentially significant effects only, partially or fully ‘scoping out’ topics from the EIA where significant effects are not anticipated. Proposals in this regard are set out in this Scoping Report.

1.7 Various EIA topic specialists have contributed to this Scoping Report, as detailed in **Table 1.1** below.

Table 1.1: EIA Scoping Team

Topic	Team
Landscape and Visual Amenity	LUC
Geology, Hydrology, Hydrogeology and Peat	Yellow Sub Geo
Ecology and Ornithology	SLR
Noise	Hoare Lea Acoustics
Cultural Heritage	LUC
Access, Traffic and Transport	Systra
Socio-Economics, Tourism and Recreation	LUC
Other Issues (telecoms aviation, shadow flicker, dust, climate change, human health and major accidents and disasters)	LUC/Coleman Aviation

The Applicant

1.8 Innogy Renewables UK Ltd (innogy) is a leading energy company which employs over 130 permanent employees across its four Welsh offices located at Mostyn, Dolgarrog, Llanidloes and Baglan. innogy is the largest renewable energy operator in Wales, generating one third of all of Wales’ renewable electricity. innogy’s onshore, offshore and hydro projects combined produce enough electricity to meet the equivalent needs of more than 550,000 homes – almost half of the households in Wales.

1.9 innogy’s portfolio in Wales includes involvement in an installed capacity of 957MW. innogy operates three offshore wind farms off the coast of North Wales: Gwynt y Môr (576MW), Rhyl Flats (90MW) and North Hoyle (60MW). Onshore, innogy also operates Brechfa Forest West Wind Farm in Carmarthenshire (57.4MW), Mynydd y Gwair Wind Farm north of Swansea (32.8MW) and the under-construction Clocaenog Forest Wind Farm (96MW) in Denbighshire and Conwy. innogy

also operates six hydro-electric sites in North Wales totalling over 40MW.

1.10 In August 2019, The Crown Estate agreed to an extension of Gwynt y Môr Offshore Wind Farm and innogy will now work with project partners to progress this. innogy was also successful in a tender exercise in 2017 run by Natural Resources Wales (NRW) and Dŵr Cymru Welsh Water (DCWW) for an option to develop a project in the Alwen Forest in North Wales. innogy is working with Community Energy Wales to develop this onshore wind farm which would offer the community up to 15% of the project under a shared ownership offering.

Document Structure

1.11 The remainder of this document is structured as follows:

- **Chapter 2** provides information on the EIA process;
- **Chapter 3** provides a brief description of the nature and purpose of the Development; and
- **Chapters 4 -11** outline the topic areas to be considered in the EIA and the elements that are proposed to be scoped out of EIA.

1.12 Appendix A provides a consolidated list of all consultee questions raised in this document, and **Appendix B** provides an outline structure of the ES.

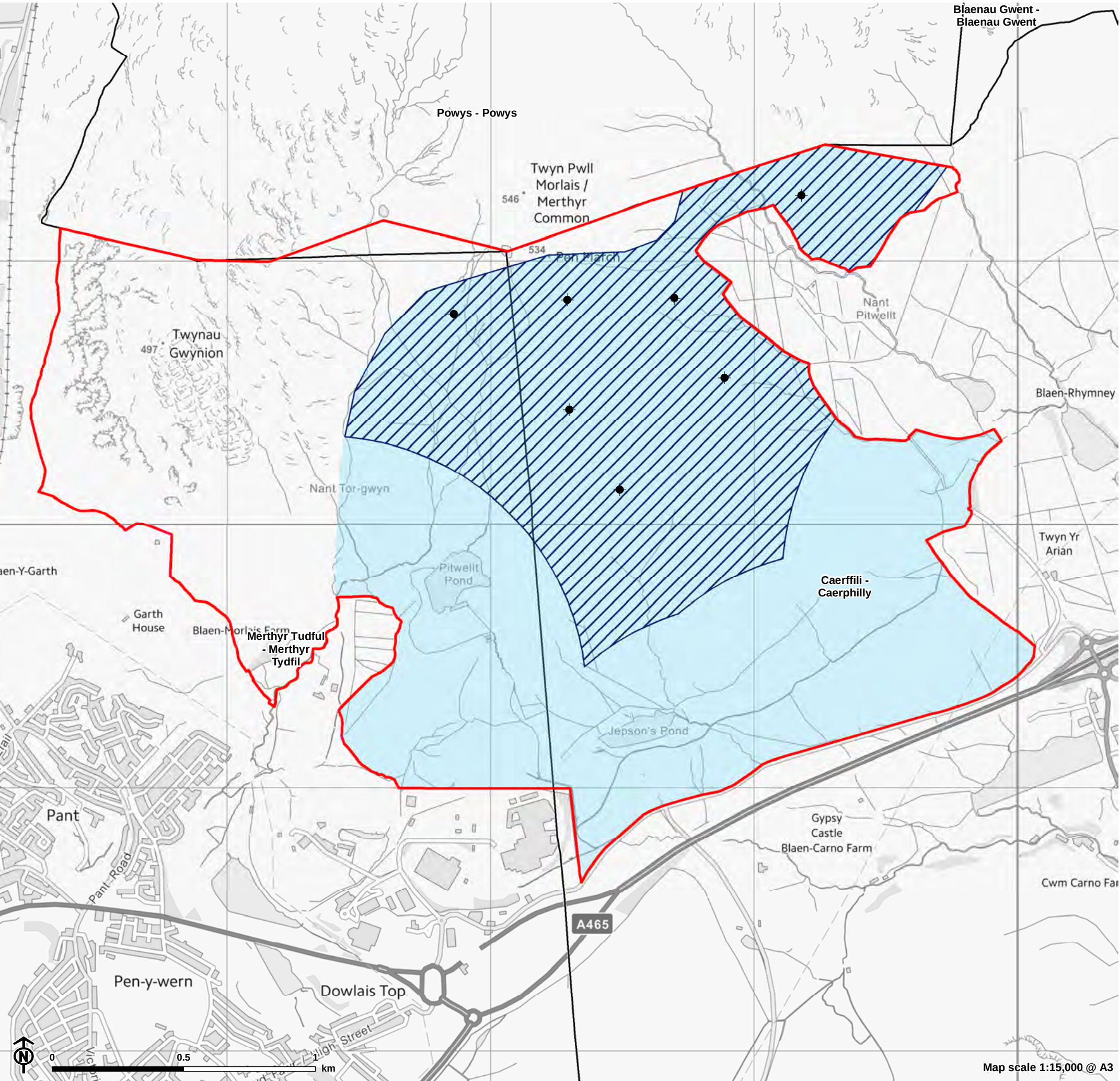
Figure 1.1: Site Location



- Site boundary
- 5km intervals from developable area
- 45km from developable area
- Local Authority boundary



Figure 1.2: Indicative Site Layout



- ◆ Indicative site layout
- ▭ Local Authority boundary
- ▭ Site boundary
- ▭ Developable area for all infrastructure
- ▨ Developable area for WTGS

Chapter 2

The Environmental Impact Assessment

2.1 EIA is the process of systematically evaluating and presenting all the likely significant environmental effects, both positive and negative, of a proposed development, to assist the determining authority in making an informed decision on an application for consent to undertake a development. It enables the significance of effects to be clearly understood, incorporating consideration of mitigation (for negative effects) and enhancement (for positive effects) measures. The final results of the EIA process are presented within an Environmental Statement ("the ES") to accompany an application for consent for the Development.

2.2 EIA is an iterative process which takes place alongside and informs project design. As potential effects are identified, the design of the Development will be modified to reduce or avoid adverse effects and enhance positive effects where possible.

Scoping

2.3 The purpose of scoping is to focus the EIA on the likely significant environmental effects of a proposal. Therefore, on the basis of the site work undertaken to date, desktop studies, the professional judgement of the assessment team and experience from other similar projects, as well as policy, guidance and relevant good practice, each topic-based section within this report outlines:

- Potentially significant effects associated with the construction and/or operation of the Development for detailed consideration within the ES;
- Mitigation measures likely to be required to ameliorate significant effects, or anticipated to be implemented through the design process; and
- Effects considered unlikely to be significant and therefore scoped out of the EIA.

2.4 Additional objectives of this Scoping Report are:

- To establish the availability of baseline environmental data and their sources;
- To define a survey and assessment framework from which an appropriately comprehensive assessment can be produced;

- To invite comments on the proposed survey and assessment methodologies;
- To invite responses to specific topic-based questions;
- To put forward proposals and receive comments concerning the way in which the EIA findings are to be presented in the ES;
- To invite Ministers and consultees to draw the Applicant's attention to any matters that are likely to be key to any decision on the forthcoming DNS application; and
- To provide and receive additional information relevant to the Development.

2.5 As mentioned above, key questions are included throughout the Scoping Report to help structure the feedback from Ministers and consultees and ensure realisation of the maximum value of the scoping process for all parties. A consolidated list of these questions is included in **Appendix A**.

Baseline Conditions

2.6 The Regulations require that the aspects of the environment which are likely to be significantly affected by a proposal should be defined within the ES.

2.7 To achieve this, it is necessary to gather information on environmental conditions in the absence of the Development (i.e. the environmental 'baseline') for each of the topics proposed for consideration as part of the EIA. This has already commenced for a number of topics in relation to Pen March and will continue via a combination of consultation with stakeholders, field survey work and desk-based research, as detailed further below.

Assessment of Effects

2.8 The assessment of potential effects, using a range of appropriate methodologies, will take into account the construction and operation of the Development in relation to the Site and its surroundings. At the end of the operational phase, the wind farm will either be decommissioned, or an application made for consent to extend its operational life or replace the turbines. Decommissioning will involve the removal of all above ground infrastructure, including the turbines. Access tracks are likely to be left in-situ but this would be discussed with the Landowner and Commoner's Association at that time. Decommissioning activities are in effect a reversal of the construction process; relevant effects are generally similar and decommissioning effects would be expected to be no greater than those associated with construction. The decommissioning effects will however be considered under each topic where deemed necessary.

2.9 An assessment will be made of the likely significant cumulative effects of the Development in combination with other developments including:

- Schemes which are subject to an application for planning consent which has not yet been determined;
- Consented schemes; and
- Schemes which are under construction or are operational.

2.10 As the cumulative baseline is constantly evolving and the relevant cumulative schemes will vary by topic, the schedule of cumulative schemes to be included in the assessment will be finalised following consultation with relevant consultees, in particular Caerphilly County Borough Council (CCBC), Merthyr Tydfil County Borough Council (MTCBC), Brecon Beacons National Park Authority (BBNPA) and Natural Resources Wales (NRW). A list of wind farm developments known to lie within approximately 20km of the Site are provided in Table 2.1 below. These projects are shown on **Figure 2.1**.

Table 2.1: Wind farm developments within approximately 20km of Site.

Wind Farm	No. of Turbines	Status	Distance from Pen March (km) ¹	Tip Height (m)
St Merryn Meat Factory	1	Consented	0.6	77
Pengarnddu Industrial Estate	1	Consented	1.8	65
Tafarnaubach Industrial Estate	1	Operational	2	77
Pen Bryn Oer	3	Operational	3.1	110
Oakdale Business Park	2	Operational	14.1	130
Mynachdy Farm	2	Operational	14.6	67.9
Mynydd Bwlfa	9	Operational	14.6	125
Maerdy	8	Operational	15.7	145
Abergorki	3	Consented	16.1	146.5
Ferndale	8	Operational	16.1	74
Llwyncelyn Farm	2	Consented (Application submitted for tip height increase)	17.3	125 (138.5m)
Pen y Cymoedd	76	Operational	20.2	145
Maesgwyn	13	Operational	21.2	125

2.11 Study areas (including cumulative study areas) will be defined separately for each EIA topic to reflect the likely extent of potential significant effects.

2.12 The ES topic chapters will each provide a detailed assessment of potential effects (direct and indirect, positive and negative, short term or long term), identify mitigation measures, and determine the significance of the residual effects (those remaining after the mitigation measures have been implemented). Chapters will be accompanied by technical appendices and figures where relevant. All relevant policy, guidance and data sources used will be fully referenced, as required by Part 10 of Schedule 4 of the EIA Regulations.

2.13 A consolidated list of all significant effects before and after mitigation will be included in a final chapter of the ES for ease of reference.

2.14 A standalone Non-Technical Summary (NTS) of the findings of the ES will also be produced as required by Part 9 of Schedule 4 of the EIA Regulations.

Mitigation and Monitoring

2.15 Part 7 of Schedule 4 of the EIA Regulations notes that the ES should include: “A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases”. These measures will be termed ‘mitigation measures’ and will be included for each topic area, where appropriate.

2.16 The EIA will identify and assess potentially significant effects prior to mitigation and, where mitigation measures are proposed, their likely effectiveness will be evaluated, and the significance of the ‘residual’ effect then assessed. The Applicant will be committed to implementing all the mitigation measures identified in the ES.

¹ Distance between the turbine developable area of the proposed wind farm and the center of the cumulative scheme

2.17 It is important to note that, given both the prior experience of the Applicant in implementing accepted good practice during the construction and operation of schemes such as this, and the current regulatory context, there are a number of relevant measures which are more appropriately considered to be an integral part of the design/construction process than 'mitigation', for example the use of good practice measures in relation to pollution prevention and soil compaction etc. Such measures will be described in detail within the ES where relevant but taken into account prior to assessment of the likely effects of the Development. Following this, further measures that may mitigate identified effects will then be considered prior to evaluation of the likely significance of residual effects.

2.18 It can be appropriate to scope out certain potential effects from an EIA on the basis that these will be avoided by standard good practice measures. Where appropriate, mitigation measures implemented will be monitored for effectiveness, as detailed in Regulation 25 (3) of the EIA Regulations. Proposed monitoring measures will be set out in the ES where relevant.

2.19 A Schedule of Mitigation will be included as an appendix to the ES and will provide a consolidated list of all proposed mitigation and monitoring measures identified in the EIA.

Uncertainty

2.20 The EIA process is designed to enable good decision-making based on the best possible information about the environmental effects of a proposed development. There will, however, always be some uncertainty as to the exact scale and nature of effects. This may arise through shortcomings in available information or due to the necessary limitations of the professional judgement process. As required in Schedule 4, Part 6 of the EIA Regulations, it is important that such uncertainty is explicitly recognised and that the ES includes "A description of the forecasting methods or evidence used to identify and assess the effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved."

2.21 Each topic chapter of the ES will include details of the assumptions made and limitations identified before assessing the significance of effects.

Competent Expert

2.22 As per Regulation 17 (4)(a), the ES must be prepared by "persons who in the opinion of the relevant planning authority or the Welsh Ministers, as appropriate, have sufficient expertise to ensure the completeness and quality of the statement" with a clear statement outlining the relevant competencies of those undertaking the EIA. A statement of expertise will be provided in the introductory chapters of the ES for the lead EIA

coordinator, and in each topic chapter for the assessment authors.

ES Introductory Chapters

2.23 In addition to its topic-specific chapters, the ES will contain a number of introductory chapters as indicated in Appendix B. These will include a Project Description chapter which will describe the evolution of the wind farm specification and design and the relationship of the final development design to the ES: in particular, it will set out how and where design choices have been made in order to avoid potentially significant effects, thereby removing the requirement for further detailed assessment of such effects. This is discussed further in relation to particular ES topic chapters below. The Project Description chapter will also meet the requirements of the EIA Regulations with regard to the consideration of reasonable alternatives. In the case of an onshore wind farm, this involves the reasons for selecting the Site along with an explanation of the design iterations made during the EIA process to respond to the relevant environmental and technical constraints on the Site and surrounding area, before arriving at the final design.

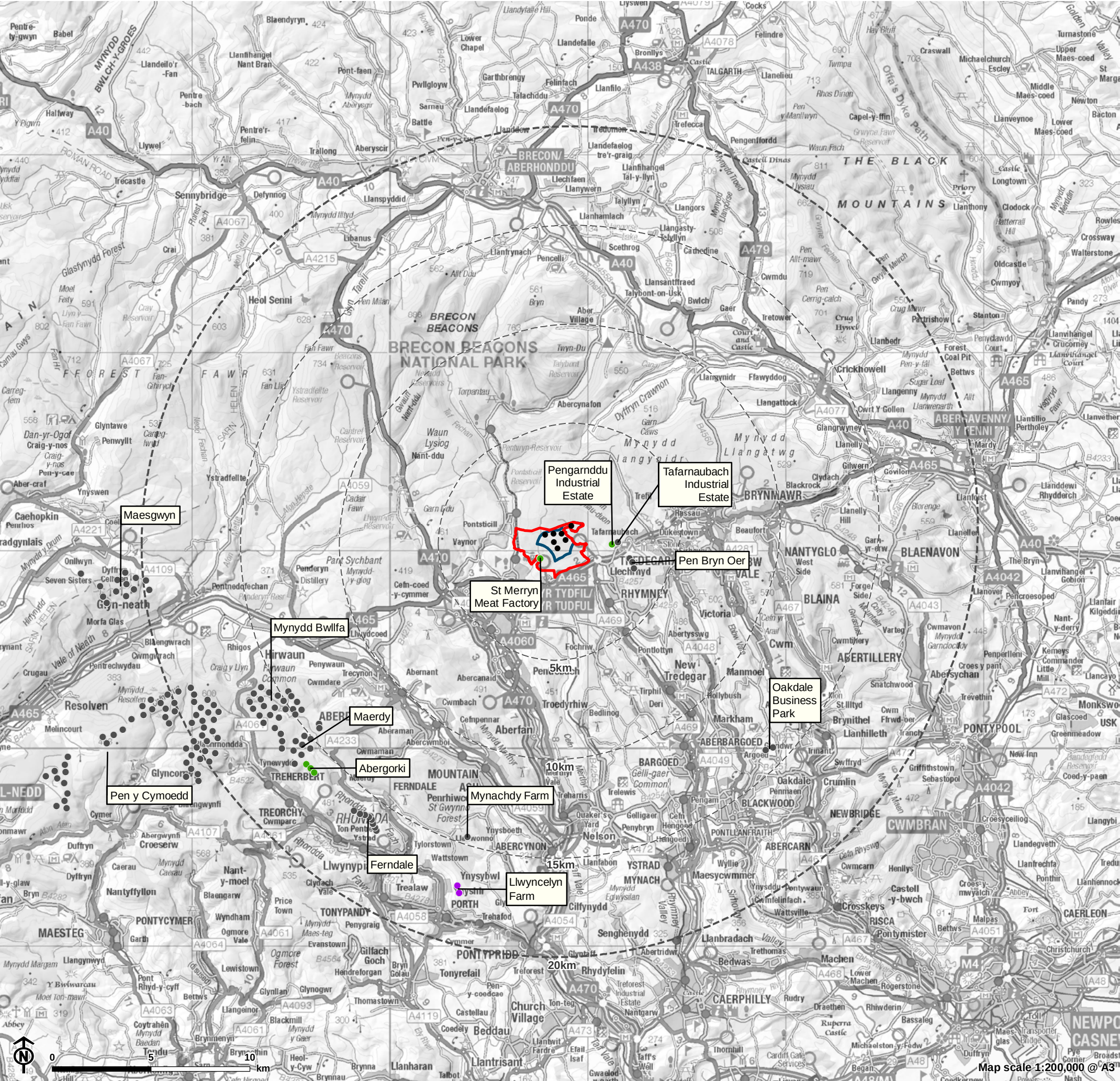
2.24 The planning policy context will be set out in the Planning Statement accompanying the application and in the interests of a proportionate ES it is not proposed to include a separate planning policy context chapter within the ES. The relevant policies/guidance for each topic area will be outlined within the topic chapters, where relevant.

Questions

Question 2.1: Are there other wind farms proposals or other developments that should be considered in the cumulative assessment?

Question 2.2: Do the consultees agree the approach to consideration of various standard good practice measures as 'pre-mitigation' is appropriate?

Figure 2.1: Wind Energy Developments within Approximately 20km of Site



Chapter 3

Project and Site Description

The Site and Surrounding Area

3.1 The Site occupies a total area of approximately 604.5 hectares (ha), however, the actual Development footprint will only occupy a small percentage of this area, with turbines expected to be concentrated towards the north-east of the Site.

3.2 The Site has been chosen due to its technical suitability for a wind farm development, with suitable wind speeds, good site access and access to a suitable grid connection.

3.3 Both the maximum turbine envelope and the indicative maximum development area have evolved through the scoping assessment.

3.4 The indicative **maximum turbine envelope** (which is currently defined by the Site boundary, application of a 1km property buffer and avoidance of ground conditions constraints (specifically a high risk of shake holes)) is shown in **Figure 1.2**, along with an indicative **maximum development area** for ancillary infrastructure (which is defined by the Site boundary and avoidance of ground conditions constraints (high risk of shake holes)).

3.5 Both areas are deemed to be the **maximum developable area** and through the process of EIA will be further refined as a result.

3.6 The Site comprises a broadly sloping area of purple moor grass *Molinia caerulea* dominated grassland, with small scattered areas of dense scrub, exposed rock, dry heath and standing open water habitats.

3.7 The Site is located approximately 1km north-east of Dowlais Top, on the north-eastern fringe of Merthyr Tydfil and 2km north-west of Rhymney town centre. The southern boundary of the Site lies approximately 90m north of the A465 Heads of the Valleys Road.

3.8 The surrounding landscape comprises grazed moorland habitats, with frequent scattered areas of industrial and residential development to the south, south-east and south-west of the Site and the Brecon Beacons National Park lying to the north of the Site.

Project Description

3.9 The main elements of the Development will comprise:

- Up to seven wind turbines, each with external transformers, turbine foundations, crane hardstandings and laydown/storage areas;
- An electrical substation and control building, along with potential battery storage facilities;
- Underground power cables linking the turbines and the on-site substation, generally laid in trenches alongside access tracks;
- New site access and on-site access tracks, with pipeline and watercourse crossings (if/where required);
- A steel tower anemometer mast for wind turbine performance monitoring;
- Borrow pit(s) (to be confirmed);
- A temporary construction and storage compound;
- Habitat Management Area; and
- Off-site works to facilitate the movement of abnormal loads (construction of over-run areas and temporary modifications to street furniture etc).

Wind Turbines

3.10 The proposed turbines will be three bladed horizontal axis turbines. The turbine towers will be of tapering tubular steel construction, likely to be finished in a light grey semi-matt colour. EIA scoping is based upon a maximum tip height for turbines of 180m, although the maximum turbine heights and turbine specifications in other respect will be considered further through the EIA process. The worst case candidate turbine can differ across the EIA disciplines (for example noise, ornithology, transport etc.) therefore different candidate turbines may be specified in the ES where necessary to inform assessments of effects.

3.11 A transformer will be required for each turbine. Depending upon the type of turbine selected, the turbine's electrical transformers may be located within or adjacent to the turbines. For the purposes of this report, it has been assumed that the transformers will be located adjacent to each turbine within the hardstanding areas.

3.12 The turbines will be installed on foundations comprising both stone and steel-reinforced concrete. The detailed design, sizing and specification for each foundation will depend on the final turbine type and the specific ground conditions encountered at each turbine location, which will be confirmed during pre-construction surveys.

3.13 Adjacent to each turbine, an area of hardstanding will be constructed for use as a crane pad. The exact geometry and position of the crane pads will depend on the turbine supplier's specifications, the crane selected for erection and detailed ground investigations prior to construction. In accordance with the turbine specification for the candidate turbine model, additional laydown and storage areas may be required adjacent to the crane hardstanding. The EIA will be based on indicative maximum crane pad dimensions together with appropriate micro-siting allowance.

Access and Vehicle Movements

Construction Traffic Route

3.14 It is anticipated that abnormal load vehicles carrying turbine components will travel to the Site from the port of entry at Swansea. The route from the port to Site is likely to be via the A483, M4, A465 and finally Common Road which runs along the southern boundary of the Site.

3.15 General construction traffic (transportation of plant and materials to Site and construction staff) routes are likely to include the A4060, A470, A465 and the Common road.

Access Track

3.16 The main access point into the wind farm is likely to be via a new access off the Common Road which runs along the southern boundary of the Site. From the Site access, a new access track will be constructed heading north to the proposed turbine locations. The track is anticipated to have a typical running surface width of approximately 5m (depending on the turbine supplier specifications) as necessary to facilitate the safe passage of Abnormal Indivisible Loads. An exception to this will be at bends where surface width will be widened as required to accommodate the 'swept path' of vehicles carrying long and wide loads.

On-Site Access Tracks and Cable Runs

3.17 The Development will be served by a new network of on-site access tracks to enable construction and maintenance once operational. These tracks are again anticipated to have a maximum running width of approximately 5m (widening at bends). It is anticipated that cabling connecting turbines and the control building (see below) will be laid in trenches running alongside the access tracks. These will be excavated to an indicative maximum depth of 1m and backfilled. The layout of the tracks will be determined by the final turbine positions and informed by consideration of relevant environmental receptors and effects, including on-site ecology.

Control Building and Electrical Substation

3.18 It is proposed to connect the wind farm to Western Power Distribution's (WPD) network at 33kV via their Dowlais BSP substation. This voltage connection means that all grid connection equipment will be housed inside of the control building/substation. The dimensions of the building are not yet finalised and will depend on both innogy's and WPD's requirements but is expected to have a footprint of approximately 15m x 20m.

3.19 The location of the control building/substation is not yet known and is influenced by a number of factors such as distance to the point of connection, access during the operation of the wind farm, and environmental constraints, all of which will be considered further throughout the iterative design of the wind farm and EIA process.

Temporary Construction Compound

3.20 The temporary construction compound will likely be located close to the Site access point so as to control all access on to the Site. A typical compound will be in the region of 120m x 50m to give flexibility for dedicated storage and parking areas so improving site safety through vehicle/pedestrian segregation.

3.21 The construction disturbance associated with the temporary construction compound is minimal. Typically, surface soils will be stripped and stockpiled and the surface then capped with geofabric and aggregate. Once construction is complete the stone is lifted and the surface soils re-spread allowing the area to regenerate.

Borrow Pits

3.22 The stone required for the tracks, turbine bases and hardstandings for the operation of cranes will be either be sourced from a local quarry, from on-site borrow pit(s), or a combination of both. Whichever option is considered most appropriate will be fully assessed in the ES.

Aviation Lighting

3.23 The UK statutory requirements for the lighting of en-route obstacles (i.e. those away from the vicinity of a licensed aerodrome) are set out in Article 222 of the UK Air Navigation Order (ANO) 2016. This article requires medium intensity (2000 candela) steady red aviation warning lights to be mounted as close as possible to the top of all structures at or above 150m above ground level (AGL). In terms of the requirement for lighting wind turbines in accordance with the ANO, the Civil Aviation Authority (CAA) considers the top of a wind turbine to

be the maximum blade tip height. In terms of the positioning of aviation obstruction lighting on wind turbine generators with a maximum height of 150m AGL or above onshore, the CAA interprets 'as close as possible to the top of the obstacle' as the fitting of lights on the top of the supporting structure (the nacelle) rather than the blade tips.

3.24 The CAA Policy Statement (2017)² on aviation warning lighting states that lighting should only be visible to aircraft when light levels fall below 500 LUX (measure of luminance) and can be deactivated once light levels rise above 500 LUX. Therefore, lighting will not be visible outside these times. In addition, the Policy Statement highlights that 2000 candela lighting can be reduced to 10% of its peak intensity (i.e. 200 candela) should horizontal meteorological visibility be more than 5km.

3.25 Medium intensity lighting is not required to be visible at elevations less than -1 degree from the horizontal at the point of affixation to the turbines. Lights which are not visible or have significantly reduced visibility at -1 degree from the horizontal may be considered as part of the assessment.

3.26 In addition, Article 222(7) (of the ANO) allows the CAA to grant permissions for lighting schemes other than as specified in ANO Article 222(1). In this regard, the CAA has in individual cases allowed lighting to be installed on certain outer turbines of a wind farm only; and options for radar-controlled lighting have also been being explored. However, approval of such approaches to lighting is subject to agreement on a case by case basis.

3.27 In relation to Pen March, the maximum requirement according to the ANO is being taken as the initial default position i.e.:

- 2 No. fixed red 2000 candela lights to be installed on the nacelle of each turbine (one operating and one for backup); and
- 3 No. fixed red 32 candela lights on the tower at half the nacelle height (to provide the 360-degree coverage).

3.28 If one or more turbines in the final wind farm design fall below 150m, or an alternative lighting approach is agreed with the CAA, then the assumed lighting scheme for the purposes of the EIA will be modified accordingly. This will be reported within the Project Description ES chapter.

² CAA (2017) Lighting of Onshore Wind Turbine Generators in the United Kingdom with a Maximum Blade Tip Height at or in Excess of 150m Above Ground Level.

Grid Connection

3.29 It is likely that the wind farm will benefit from a relatively short grid connection into the Dowlais Substation which lies approximately 0.5km southwest of the Site. Connection from the on-site substation to the wider electricity network is likely to be at 33 kilovolts (kV) and involve either underground cables, an overhead line on wooden poles, or a combination of the two.

3.30 The grid connection will be undertaken either by innogy or the local distribution network operator (Western Power Distribution), with either party seeking the relevant consents as required.

3.31 The ES will include an assessment of the proposed grid connection routing options (to the extent known at the time of submission). A high level assessment of the potential effects associated with the grid connection routing options will be undertaken for each relevant topic within the ES for the wind farm and included as an appendix to the ES.

Micro-siting

3.32 The requirement for a micro-siting allowance for the turbines and the other infrastructure elements will be ascertained as part of EIA assessment. Should micro-siting be required, the allowance sought will be made clear in the ES and will be assessed under each of the relevant topics.

Construction Phase

3.33 It is expected that the construction of the Development will be completed over a period of approximately 12 months and will consist of the following principal activities:

- Public road improvements and junction upgrades;
- Construction/upgrading of main site access track off A465;
- Construction of the temporary construction compound;
- Opening of on-site borrow pit and extraction of stone;
- Construction of all on-site access tracks;
- Design and construction of temporary and permanent drainage measures and cable trenches;
- Laying of electricity and communications cables in trenches;
- Construction of turbine foundations, crane hardstandings and laydown areas;
- Construction of control building and substation, along with battery storage facilities (if applicable);
- Delivery, installation, testing and commissioning of wind turbines and permanent meteorological mast and ancillary equipment;

- Installation of external turbine transformers and switchgear in enclosed kiosks; and
- Site reinstatement and restoration.

Operational Phase

3.34 It is proposed that planning permission will be requested to allow for an operational period of 30 years. Maintenance work will involve visiting the Site regularly to undertake scheduled maintenance and operational checks. Annual servicing will involve the undertaking of non-essential repairs on blades, gearboxes and generators.

Decommissioning Phase

3.35 At the end of the operational period, the Development will be decommissioned and the turbines removed. Alternatively, a new application may be made to extend its life or replace the turbines.

Chapter 4

Landscape and Visual Amenity

Introduction

4.1 This chapter of the Scoping Report considers the potential effects of the Development on landscape and visual amenity. It includes a baseline description, followed by the proposed assessment methodology to be used for the Landscape and Visual Impact Assessment (LVIA) to be completed as part of the Pen March EIA.

4.2 The primary guidance for LVIA is the Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (GLVIA3)³. In addition, Scottish Natural Heritage (SNH) has published a number of documents that have been adopted as industry standard good practice for proposed wind farm LVIA's. The LVIA will be completed by Chartered Landscape Architects, and in accordance with relevant best practice documents.

4.3 In accordance with GLVIA3³, landscape and visual effects will be considered separately. The landscape assessment will consider the effects of the proposed Development on the existing landscape character and the rural and urban elements within the study area. The visual assessment will consider the visual impact of the Development over the study area, including the magnitude of visual effect on nearby settlements, roads and public places of interest. The LVIA will focus on receptors that may experience potentially significant effects. The LVIA will take into account any potential micro-siting that may be required, as determined through the EIA process.

4.4 A residential visual amenity study will also be undertaken to examine effects on the visual component of residential amenity at properties within 2km of the nearest proposed turbine.

4.5 An indicative Zone of Theoretical Visibility (ZTV) map has been generated for an illustrative seven turbine layout with turbines of a maximum tip height of 180m and is shown on **Figure 4.1**, with a more detailed ZTV provided in **Figure 4.2**. This has been used to inform elements of the proposed LVIA scope such as the indicative viewpoint list. However, further ZTV maps will be undertaken as the design of the wind farm evolves, with the detailed scope of the LVIA to be adjusted accordingly in further consultation with Welsh Ministers and other relevant stakeholders (see 'Consultation' below).

³ Landscape Institute and the Institute of Environmental Assessment (2013) *Guidelines for Landscape and Visual Impact Assessment*. 3rd Edition

4.6 It is proposed that the study area for the wind farm component of the Development in the LVIA will initially cover a radius of up to 45km from the outermost turbines. However, the LVIA will focus on potentially significant effects within this radius, which in practice are not expected in general to occur beyond around 25km. SNH guidance on the Visual Representation of Wind Farms⁴ states that an initial distance of 45km should be considered based on the maximum size of the turbines proposed (up to 180m to tip). The study area for the high-level grid connection section of the LVIA will cover a radius of 4km from the selected route, if it comprises an overhead line. This is considered to be a maximum distance, beyond which significant effects are unlikely to occur.

Consultation

4.7 Subsequent to adoption of the scoping direction, Caerphilly County Borough Council (CCBC), Merthyr Tydfil County Borough Council (MTCBC), Brecon Beacons National Park Authority (BBNPA) and Natural Resources Wales (NRW) will be consulted further on the detailed approach to the assessment of effects on landscape and visual amenity: in particular, the selection of viewpoints for the visual assessment, and information regarding developments to be included in the cumulative assessment. The methodology will be finalised following this consultation process.

Existing Conditions

Information Sources:

4.8 The following sources of information have been reviewed during the desk-based research for this Scoping Report:

- NRW's National Landscape Character Areas (NLCAs);
- LANDMAP and associated guidance notes;
- Relevant aspects of Local Development Plans, including the Brecon Beacon National Park Authority Supplementary Planning Guidance (SPG): Landscape Character (September 2012);
- Natural Resources Wales (2018) Landscape Sensitivity and Capacity in relation to on-shore wind and solar photovoltaic developments: An assessment approach for Wales; and
- Ordnance Survey Maps and aerial photographs.

4.9 The Site comprises mainly south facing upland slopes between the Brecon Beacons National Park to the north, the Pontsticill Valley to the west and Merthyr Tydfil/Rhymney to the south. The land falls from a high point of 534m AOD at Pen

March in the north (on the National Park boundary) to around 350m in the south.

4.10 The Site is open and exposed moorland/rough grassland, with evidence of past and current extractive activity, including disused quarries at Twynau Gwynion (498m AOD) in the west of the Site and Pitwellt Pond and Jepson's Pond in the south. The Site is drained by streams which flow southwards and include the Nant Tor-gwyn and Nant Pitwellt. Areas of shake holes are also apparent across parts of the Site, indicating the presence of limestone as the underlying geological strata.

4.11 The southern and western parts of the Site in particular are influenced by neighbouring terraced housing, large scale industrial development and retail parks on the edges of Merthyr Tydfil, Rhymney and Tredegar, and along the A465/Heads of the Valleys Road. The closest properties are Blaen-morlais Farm on the south-western Site boundary and farmsteads around Blaen Rhymney to the east. Overhead lines cross the southern part of the Site.

4.12 The small settlement of Pontsticill lies in the valley to the west, at the southern end of the Pontsticill Reservoir. The Brecon Mountains Railway runs through this valley, along the western Site boundary, and has stations at Pant and Pontsticill. The Taff Trail and National Cycle Network (NCN) routes 46 and 8 also run through this valley. NCN 46 continues to the east, along the A465.

Assessment Methodology

Legislation, Policy and Guidance

4.13 The following guidance documents will inform the approach to the design and assessment of the Development:

- Landscape Institute and the Institute of Environmental Assessment (2013). Guidelines for Landscape and Visual Impact Assessment. 3rd Edition;
- Natural Resources Wales (2013) LANDMAP Guidance Note 3: Guidance for Wales, Using LANDMAP for Landscape and Visual Impact Assessment of Onshore Wind Turbines;
- Landscape Institute (2019) Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19;
- Design Commission for Wales (2014) Designing Wind Farms in Wales;
- Scottish Natural Heritage (2017) Siting and Designing Windfarms in the Landscape. Version 3a; and

⁴ Scottish Natural Heritage (February 2017) *Visual Representation of Wind Farms Guidance. Version 2.2*

- Scottish Natural Heritage (February 2017) Visual Representation of Wind Farms Guidance. Version 2.2.

4.14 In addition to the above, Natural Resources Wales (NRW) has recently published draft guidance on Landscape Sensitivity and Capacity⁵ in relation to both onshore wind and solar photovoltaic developments, which advocates a specific assessment approach for Wales, utilising both existing Landscape Character Assessment (LCA) and LANDMAP baseline information. Although the guidance is still in draft, once finalised it will assist local planning authorities in the preparation of Local Development Plans, including Renewable Energy Assessments, as part of the Welsh Government's Renewable Energy Toolkit⁶.

4.15 The LVIA will draw upon and make reference to the above guidance where relevant.

Design Considerations

4.16 The design of the proposed wind farm development will aim to achieve a coherent and structured form, in line with guidance provided by Welsh Government⁷ and SNH⁸. The ES will present the rationale behind the final design strategy. The objective in designing the wind farm will be to develop a layout that accords with its setting in terms of landform and pattern, and which presents a simple visual image, avoiding the clustering of turbines and the isolation of outlying turbines in views from key locations where possible, whilst recognising that the final layout will need to balance a wide range of technical and environmental considerations.

4.17 All elements of the proposed wind farm infrastructure will be considered in terms of locational and design choice, and the LVIA will set out how the design of ancillary elements has evolved to minimise visual impact, especially from nearby and sensitive visual receptors.

Landscape Character

4.18 Landscape receptors to be considered will include:

- Landscape elements and features within the Site;
- Landscape character types and/or areas, as identified in published Landscape Character Assessments (LCA) (or LANDMAP aspect areas where there is no published LCA);
- LANDMAP aspect areas; and

- The implications of effects on landscape character for the special qualities of landscape-related planning designations at the national, regional and local level.

4.19 Predicted changes in both the physical landscape and landscape character will be identified. Effects will be considered in terms of the magnitude of change (taking account of size, scale, geographical extent, duration and reversibility of the change) to the landscape, including its key characteristics as set out in published landscape character assessments and LANDMAP data. The sensitivity of the landscape will also be taken into account, acknowledging its underlying susceptibility, and the value placed on the landscape by society, which may be indicated through designation or LANDMAP evaluation.

4.20 NRW's National Landscape Character Areas (NLCAs) form the broadest scale of landscape character assessment in Wales. The Site is within the Dyffrynnoedd y De/South Wales Valleys NLCA.

4.21 The 45km radius study area includes parts of the Welsh unitary authorities of Caerphilly, Merthyr Tydfil, Powys, Blaenau Gwent, Rhondda Cynon Taf, Torfaen, Neath Port Talbot, Bridgend, Vale of Glamorgan, Cardiff, Newport, Monmouthshire and Carmarthenshire. It also includes the local authorities of Herefordshire and the Forest of Dean District in England. There are current published Landscape Character Assessments for Neath Port Talbot, Bridgend, Vale of Glamorgan, Cardiff, Monmouthshire, Herefordshire and the Forest of Dean District. The landscape of the Brecon Beacons National Park is described in the National Park Authority's SPG: Landscape Character (September 2012).

4.22 Significant effects on landscape character are more likely to occur in areas which have a strong landscape or visual relationship with the landscape of the Site. Each character type/area within 45km will be considered in terms of its relationship to the Site and the extent of the ZTV, to determine whether an assessment of effects is required.

LANDMAP

4.23 In accordance with LANDMAP Guidance Note 3⁹, all five aspect areas (Geological Landscape, Landscape Habitats, Visual and Sensory, Historic Landscape and Cultural Landscape) will be considered in the LVIA, with reference to published LANDMAP data. LANDMAP aspect areas within the Site are listed in **Table 4.1**.

⁵ Natural Resources Wales (2018) *Landscape Sensitivity and Capacity in relation to on-shore wind and solar photo-voltaic developments: An assessment approach for Wales*. <https://cdn.naturalresources.wales/media/687423/2018-08-14-lsca-context-summary-commissioning-using.pdf?mode=pad&rnd=131868426950000000>

⁶ Welsh Government (2015) *Practice Guidance: Planning for renewable and low carbon energy – a toolkit for planners*.

<https://gwedidill.gov.wales/docs/desh/publications/151021renewable-energy-toolkit-en.pdf>

⁷ Design Commission for Wales (2014) *Designing Wind Farms in Wales*

⁸ Scottish Natural Heritage (August 2017) *Siting and Designing Windfarms in the Landscape. Version 3a*

⁹ Natural Resources Wales (2013) *LANDMAP Guidance Note 3: Guidance for Wales, Using LANDMAP for Landscape and Visual Impact Assessment of Onshore Wind Turbines*

Table 4.1: LANDMAP Aspect Areas within the Site

Aspect Area	Aspect ID	Area name	Overall Evaluation
Cultural Landscape	BRCKNCL839	The Beacons	Outstanding
	CynonCL056	Designated Landscape Areas	High
	MRTHRCL007	Morlais Castle and Quarries	Outstanding
	MRTHRCL010	Dowlais Superstore Estate	Outstanding
	MRTHRCL015	Merthyr Common	High
Geological Landscape	BRCKNGL372	Mynydd Llangynidr - Mynydd Llangatwg	Outstanding
	BRCKNGL785	Dyffryn Cwannon	Outstanding
	CynonGL007	Uppermost Rhymney valley	Outstanding
	MRTHRGL008	Dowlais Top	Moderate
	MRTHRGL009	Pen-y-darren	Moderate
	MRTHRGL010	Bryniau	High
	MRTHRGL011	Cwm Taf Fechan	Outstanding
Historic Landscape	BRCKNHL133	Mynydd Llangynidr	Outstanding
	CynonHL706	Pen March	Moderate
	CynonHL866	Blaen Rhymni	Moderate
	MRTHRHL003	HL003 Taff Fechan valley	High
	MRTHRHL005	HL005 Merthyr Tydfil Core	Outstanding
	MRTHRHL009	HL009 Pen March	High
	MRTHRHL019	HL019 Twynau Gwynion	High
Landscape Habitats	BRCKNLH265	Mynydd Llangynidr	High
	BRCKNLH807	Byniau Gleision - Waun y Gwair	High
	CynonLH107	<i>No name in data</i>	High
	CynonLH108	<i>No name in data</i>	High
	MRTHRLH007	<i>No name in data</i>	High
Visual and Sensory	BRCKNVS372	Mynydd Llangynidr and Mynydd Llangattock	High
	CYNONVS361	rhoslas	Moderate
	MRTHRVS122	Merthyr Tydfil	Low
	MRTHRVS288	Taff Fechan	High
	MRTHRVS313	Merthyr North Flank	Moderate

Source: LANDMAP

4.24 In accordance with LANDMAP Guidance Note 3, for Geological Landscape and Landscape Habitats the assessment will consider aspect areas within and adjacent to the Site. For Visual and Sensory, Historic Landscape and Cultural Landscape, the assessment will consider aspect areas within 15km of the Site and which are intervisible with the proposed wind farm development. The LANDMAP aspect areas through which the grid connection route passes will be a subset of those assessed as part of the wind farm LVIA. In accordance with LANDMAP Guidance Note 3, the assessment will focus on aspect areas of 'outstanding' or 'high' overall evaluation. Visual and Sensory aspect areas of 'moderate' overall evaluation will also be considered where scenic quality and/or character criteria are 'outstanding' or 'high'. The LANDMAP assessment will be included as an appendix to the LVIA.

Designated Landscapes

4.25 Designated landscapes are shown on **Figures 4.1 and 4.2**. The Site does not fall within any nationally designated landscapes but does border the Brecon Beacons National Park. The eastern half of the Site also lies within the locally designated Upper Rhymney Valley Special Landscape Area (SLA). Effects on the integrity of nationally and locally designated landscapes within the 45km radius study area will be considered in the assessment. These include:

- Brecon Beacons National Park, adjacent to the north of the Site;
- Rhymney Valley SLA, encompassing the Site; and
- Other SLAs within the study area including the Trefil and Garnlydan Surrounds SLA to the east of the Site.

4.26 For each of the above designations, careful consideration will be given to the identified effects of the Development on landscape character and visual amenity within the designated area. Any resulting effects on the published special qualities of the designation will be identified, and an assessment will be made of the implications for the integrity of the designated area. The key characteristics of landscape character areas within the Brecon Beacons National Park are set out in the National Park Authority's SPG: Landscape Character (September 2012) and the published special qualities are set out in 'A Management Plan for the Brecon Beacons National Park 2015 -2020'. The primary landscape qualities and features of the Rhymney Valley SLA, and the need for the designation is set out in Appendix 1 to the 'Caerphilly County Borough Council Local Development Plan up to 2021 (Adopted November 2010)'.

Visual Receptors

4.27 Visual receptors to be considered will include:

- People within settlements;

- People travelling on major roads;
- People using walking routes and cycle routes; and
- People visiting areas of interest such as visitor attractions, viewpoints and hill summits.

4.28 The assessment will consider effects on towns, villages and hamlets within approximately 5km of the Site, including:

- The settlements of Merthyr Tydfil, Rhymney, Tredegar and Beaufort along the A465 Heads of the Valleys Road to the south;
- Settlements within the Pontsticill Valley to the west including the villages of Pontsticill, Vaynor and Pant; and
- The small village of Trefil in the Sirhowy Valley to the north-east.

4.29 The assessment will also consider effects on larger settlements beyond 5km, where the ZTV indicates theoretical visibility.

4.30 The assessment will consider effects on A roads within the study area, where theoretical visibility is indicated by the ZTV. This will include the A465 Heads of the Valleys Road, the A469 and the A470. Minor roads within 5km of the Site will also be considered.

4.31 The assessment will consider effects on popular walking and cycling routes within the study area, where theoretical visibility is indicated. A number of national trails cross through the study area including the Brecon Beacons Way to the north of the Site and the Taff Trail to the north and west. Local routes within approximately 5km of the Site will also be considered.

4.32 Visual effects are experienced by people at different locations around the study area, at static locations (for example settlements or viewpoints) and transitional locations (such as sequential views from routes). Visual receptors are the people who will be affected by changes in views at these places, and they are usually grouped by what they are doing at those places (for example residents, motorists, recreational users and visitors to attractions).

4.33 GLVIA3³ states that the nature of visual receptors, commonly referred to as their sensitivity, should be assessed in terms of the susceptibility of the receptor to change in views/visual amenity and the value attached to particular views. The nature of the effect should be assessed in terms of the size and scale, geographical extent, duration and reversibility of the effect. These aspects will all be considered to form a judgement regarding the overall significance of effect.

4.34 Viewpoint locations have been selected to provide a representative range of viewing distances and viewing experiences, including views from settlements, points of interest and sequential views along routes. A list of proposed viewpoints for the assessment is set out in **Table 4.2**, and these are also shown on **Figures 4.1 and 4.2**. Assessment of the visual effects of the Development will be based on analysis of the ZTVs, field studies and examination of visualisations. Visualisations for each of the assessment viewpoints will be prepared in line with SNH guidance¹⁰. It is proposed that for the

more distant viewpoints, where significant effects are considered to be unlikely, wireframes only will be produced (i.e. Viewpoints 18 and 19, which lie more than 15km from the maximum developable area).

4.35 Should the turbines exceed 150m to tip, the visual assessment will consider the effects of visible aviation lighting, with night-time visualisations prepared for two of the closer roadside viewpoints being used to illustrate the effects of the proposed wind farm development during night-time.

Table 4.2: Preliminary LVIA Viewpoints - to be refined through fieldwork and consultation

Viewpoint No.	Name	Easting	Northing	Approximate Distance to Nearest turbine	Reason for Selection
1	A465/Heads of the Valleys Road, near Blaencarno Farm	308772	208797	0.8km	Represents views from the A road.
2	NCN 46 adjacent to Tair Twynau, Pant, Merthyr Tydfil	307019	209151	1.25km	Represents views from users of the cycle route and residents on the settlement edge of Pant.
3	Path crossing Brecon Beacons National Park (Waun y Gwair)	307937	212114	1.3km	Represents close views experienced by walkers from within the Brecon Beacons National Park
4	Pant Station, Brecon Mountain Railway	305939	209698	1.6km	Represents views from the Brecon Mountain Railway.
5	A469/Rhymney Valley Road (NCN 468)	310505	208774	1.8km	Represents views from the A road and users of the cycle route.
6	Heol Uchaf, to the north of Rhymney	311061	209005	2.15km	Represents views from residents on the settlement edge of Rhymney.
7	Cefn yr Ystrad	308685	213741	2.4km	Represents views from a popular summit in the Brecon Beacons National Park.
8	Tynewydd, to the north of Tredegar	312589	211154	3.4km	Represents views from residents on the settlement edge of Tredegar.
9	Minor lane in Trefil	312191	212900	3.6km	Represents views from residents within the settlement of Trefil.
10	Cefn Brithdir, Rhymney Valley Ridgeway Walk	312778	203875	7km	Represents views from the ridge top walks in the Rhymney Valley to the south of the Site.
11	Cefn Manmoel, Sirhowy Valley Walk	316193	207485	7.5km	Represents views from the ridge top walks in the Sirhowy Valley to the south of the Site.
12	Brecon Beacons Way (Craig Y Fan Ddu)	305428	218334	7.8km	Represents views from a national trail in the Brecon Beacons National Park.

¹⁰ Scottish Natural Heritage (February 2017) *Visual Representation of Wind Farms Guidance. Version 2.2*

Viewpoint No.	Name	Easting	Northing	Approximate Distance to Nearest turbine	Reason for Selection
13	B4560, Cefn Pwll-coch	316498	214889	8.3km	Represents views from the B road in the Brecon Beacons National Park.
14	Mynydd Carn-y-cefn	318711	208491	9.6km	Represents views from ridge top walks in the Ebbw Valley to the south of the Site.
15	A4059	298845	215196	10.2km	Represents views from the A road in the Brecon Beacons National Park.
16	Pen y Fan	301203	221553	12.5km	Represents views from a popular summit in the Brecon Beacons National Park.
17	Mynydd Cefn-y-Gyngon	296323	203495	13.6km	Represents views from ridge top walks between the Cynon and Dare valleys.
18	The Black Mountains, Pen Cerrig-calch	321711	222372	16.9km	Represents views from a popular summit in the Brecon Beacons National Park.
19	Sugar Loaf	327243	218785	19.7km	Represents views from a popular summit in the Brecon Beacons National Park.

Residential Visual Amenity Assessment

4.36 Effects upon residential visual amenity become a matter of public rather than private interest when properties or groups of properties become widely regarded as unattractive places to live. The Residential Visual Amenity Study (RVAS) will be undertaken in accordance with the recently published LI Technical Guidance Note¹¹.

4.37 A RVAS will be undertaken for all properties/groups of properties within 2km of the nearest proposed turbine. For each property or group of properties, the assessment will be informed by detailed ZTVs, aerial photography, wireframes and field work undertaken from either publicly accessible areas (or where agreed with the homeowner, the property itself) to identify the scale and extent of visual effects. The level of detail and illustrative material provided for each property will be proportionate to the likely effects.

4.38 For those properties likely to be most affected, information including wireframes and any available aerial photography will be provided, alongside a detailed description of the predicted view from the property and its curtilage and access drive (where applicable). The focus of the RVAS will be on identifying whether any visual effects are likely to be considered to affect living conditions such that a property becomes widely regarded as an unattractive place in which to live.

Cumulative LVIA

4.39 A cumulative LVIA (CLVIA) will be undertaken in accordance with GLVIA3³ and SNH Guidance¹². Initial consideration will be given to all wind farms within 45km which have a valid application, are consented, under construction or are operational. Single turbines, and turbines less than 50m height to tip, will not be considered within the CLVIA, unless they are within 3km of the Site. Turbines of less than 20m height to tip will not be considered. Schemes at scoping will not be considered unless they are very close and sufficient information is available.

4.40 A 'sieving' process will be undertaken for all schemes within 45km, to understand those that have a potential for significant cumulative effects, which will then be subject to the cumulative assessment set out below. Based on experience from similar projects, it is anticipated that schemes beyond 20km are unlikely to result in significant cumulative effects.

4.41 The intervisibility of the Development with other wind farms in the surrounding area will be illustrated using combined ZTV (CZTV) maps, using ZTVs of each wind farm overlaid on a base map. ZTVs will be prepared for each of the closer wind farms or groups of wind farms where they can be considered together. A combined cumulative ZTV will be shown in a figure, with selected wind farm ZTV pairs or groups also being

¹¹ Landscape Institute (2019) *Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 2/19*.

¹² Scottish Natural Heritage (March 2012) *Assessing the Cumulative Impact of Onshore Wind Energy Developments*

provided, where there is potential for effects to be significant. The figures will illustrate the key relationships between the proposed wind farm development and other existing or proposed wind farms close to the Site. Cumulative visual effects will be assessed through analysis of CZTVs, views from individual viewpoints and sequential views from key routes, based on computer-generated wireframes. The magnitude of cumulative change to landscape character reflects the additional influence the proposed wind farm development has on the character of the landscape, assuming the other wind farms are already present. Various scenarios will be considered, reflecting the status and therefore the level of certainty of other wind farms being present in the landscape (i.e. consented, or in planning).

4.42 Table 2.1 (in Chapter 2) presents key known wind energy developments within 20km that fit the cumulative criteria discussed above. These projects are shown on **Figure 2.1**. It is accepted that cumulative schemes will change over time and hence the final list of schemes to be included in the cumulative assessment will be finalised subsequent to the consultation process referenced.

4.43 Assembly of information regarding cumulative schemes and their status can be onerous, requiring consultation of multiple planning registers and other sources. Information provided by consultees concerning developments falling within the criteria detailed in paragraph 4.39, and potential non-wind developments of relevance, would therefore be welcomed.

Construction

4.44 The direct landscape effects relating to the construction of the proposed Development on the Site itself will be considered in the assessment. Visual effects during the construction phase are temporary in nature and are unlikely to exceed the level of effect associated with operational visual effects and will therefore not be considered.

Decommissioning

4.45 At the end of the operational phase, the wind farm will either be decommissioned, or an application made for consent to extend its operational life or replace the turbines. Decommissioning will involve the removal of all above ground infrastructure, including the turbines. Access tracks are likely to be left in-situ, but this would be discussed with the Landowner and Commoner's Association at that time. The changes to the landscape arising from the decommissioning of the wind farm will be very similar to those arising from construction.

Potential Significant Effects of the Development

4.46 Taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this preliminary stage, the potential visual, landscape and cumulative effects that will be assessed in the EIA are described below.

Landscape Effects

4.47 The following list summarises the potential landscape effects:

- Direct effects on the landscape character of the Site;
- Direct and indirect effects on the LANDMAP aspect areas listed in Table 4.1, as well as those in the wider area;
- Direct landscape effects on the Upper Rhymney Valley SLAs and indirect effects on other SLA's in the wider area; and
- Indirect landscape effects on the special qualities of the Brecon Beacons National Park.

Visual Effects

4.48 The following list summarises the potential visual effects:

- Visual effects on local residents (including local farmsteads and residential properties within 2km, Trefil and the larger settlements of Merthyr Tydfil, Rhymney and Tredegar);
- Visual effects from within the Brecon Beacons National Park;
- Visual effects on road users (e.g. A465, A469); and
- Visual effects on recreational receptors (e.g. users of National Cycle Route 46, Taff Trail, Brecon Beacons Way, Brecon Mountains Railway and core paths/open access land).

Cumulative Effects

4.49 Cumulative landscape and visual effects are not likely to be a key determining issue as there are few other existing or proposed schemes within 10km of the Site. However, this will be carefully assessed as part of the EIA.

Effects Scoped Out

4.50 On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from similar projects and consultation responses, it is proposed that the following effects can be scoped out:

- Effects on landscape receptors beyond 15km and visual receptors beyond 25km from the nearest turbine, where it is judged that significant effects are unlikely to occur;
- Effects on receptors outside the visual envelope (ZTV) of the proposed development;
- Effects on LANDMAP aspect areas outside of the study area as defined in LANDMAP Guidance Note 3 (NRW, 2013), where it is judged that potential significant effects are unlikely to occur;
- Landscape and visual effects during the construction phase, other than the direct landscape effects on the Site; and
- Effects of decommissioning of the proposed wind farm at the end of its operational phase.

Approach to Mitigation

4.51 The primary form of mitigation for landscape and visual effects is through iterative design of the layout of the turbines and associated infrastructure, as seen from key viewpoints.

Questions

Question 4.1 Do consultees consider the size of the initial 45km radius study area to be appropriate, while recognising that significant effects within this radius is not likely to be beyond an expected 20km?

Question 4.2: Are there any other relevant parties who should be included within the post-scoping consultation process for the LVIA?

Question 4.3: Is the proposed approach and scope for the assessment of effects on landscape character and LANDMAP aspect areas considered to be appropriate?

Question 4.4: Is the proposed approach and scope for the assessment of effects on designated landscapes considered to be appropriate?

Question 4.5 Do consultees consider that the proposed viewpoints are appropriate to inform the visual assessment, and that the suggested presentation of visualisations is proportionate?

Question 4.6: Is the approach to inclusion of schemes within the cumulative assessment appropriate?

Question 4.7: Is the approach to the assessment of effects on residential visual amenity appropriate?

Question 4.8 Do consultees consider the effects to be scoped out appropriate?

The ZTV is calculated to turbine tip height (180m) from a viewing height of 2m above ground level. The terrain model assumes bare ground and is derived from OS Terrain 50 height data (obtained from Ordnance Survey in July 2019). Earth curvature and atmospheric refraction have been taken into account. The ZTV was calculated using ArcMap 10.5.1 software.

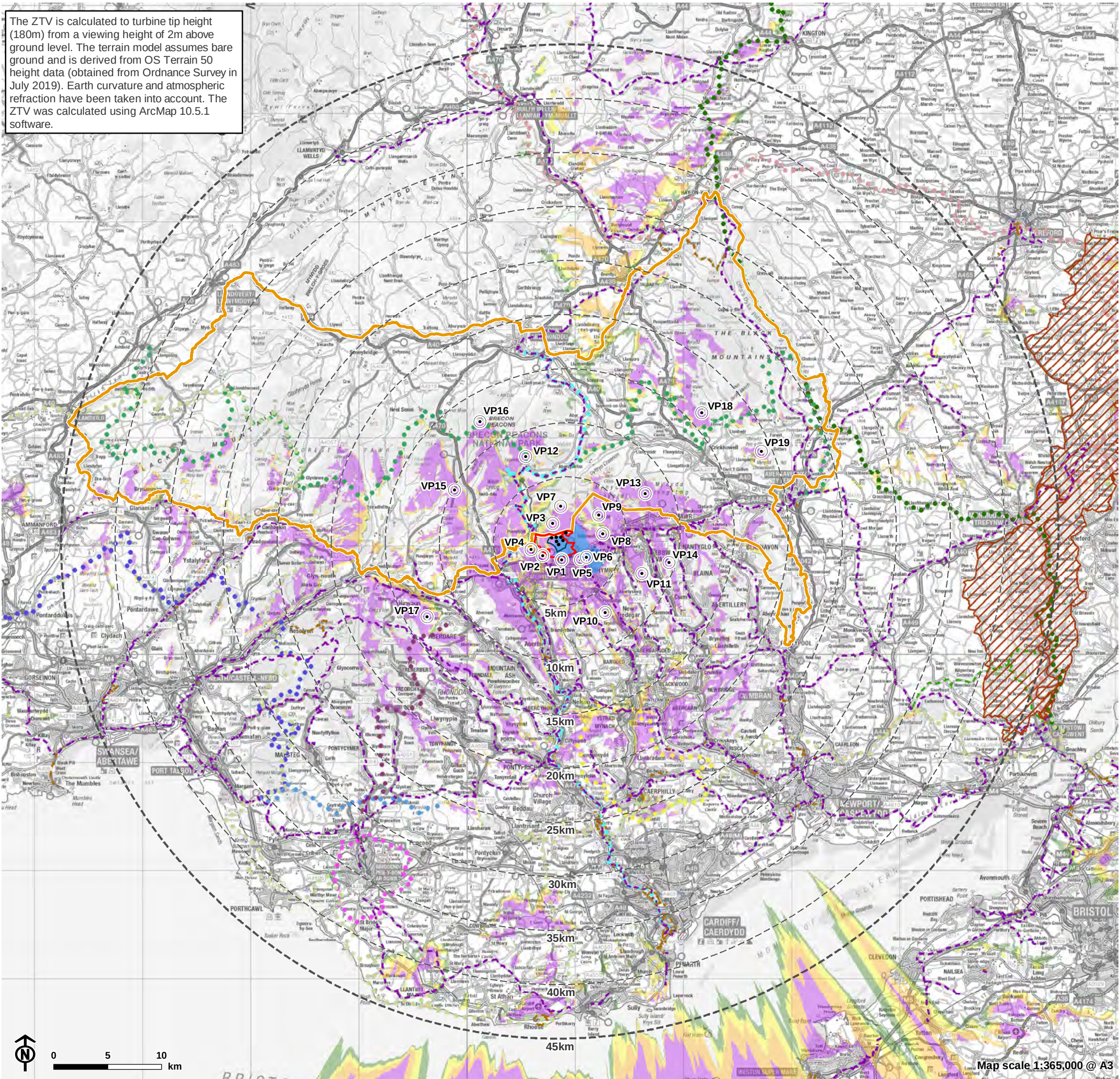


Figure 4.1: Blade Tip Height (180m) Zone of Theoretical Visibility (ZTV) and Viewpoint Locations to 45km

• Indicative turbine location

Site boundary

Developable area for WTGS

5km intervals from developable area

45km from developable area

Viewpoint

- 1: A465 / Heads of the Valleys Road, near Blaencarno Farm
- 2: NCN 46 adjacent to Tair Twynau, Pant, Merthyr Tydfil
- 3: Path crossing Brecon Beacons National Park (Waun y Gwair)
- 4: Pant Station, Brecon Mountain Railway
- 5: A469 /Rhymney Valley Road (NCN 468)
- 6: Heol Uchaf, to the north of Rhymney
- 7: Cefn yr Ystrad
- 8: Tynewydd, to the north of Tredegar
- 9: Minor lane in Trefil
- 10: Cefn Brithdir, Rhymney Valley Ridgeway Walk
- 11: Cefn Manmoel, Sirhowy Valley Walk
- 12: Brecon Beacons Way (Craig Y Fan Ddu)
- 13: B4560, Cefn Pwll-coch
- 14: Mynydd Carn-y-cefn
- 15: A4059
- 16: Pen y Fan
- 17: Mynydd Cefn-y-Gyngon
- 18: The Black Mountains, Pen Cerrig-calch
- 19: Sugar Loaf

Landscape

Wye Valley Area of Outstanding Natural Beauty (AONB)

Brecon Beacons National Park

Upper Rhymney Valley Special Landscape Area - indicative

Recreation

National Cycle Network

NCN Link

Regional Cycle Route

Brecon Beacons Way

Bridgend Circular Walk

Celtic Way

Ogwr Ridgeway Walk

Rhymney Valley Ridgeway Walk

Sky To Sea Walk

St Illtyd's Walk

Taff Trail

Wye Valley Walk

National Trail - Offas Dyke footpath

Theoretical turbine visibility

1-2 Turbines are visible

3-4 Turbines are visible

5-6 Turbines are visible

7 Turbines are visible

The ZTV is calculated to turbine tip height (180m) from a viewing height of 2m above ground level. The terrain model assumes bare ground and is derived from OS Terrain 50 height data (obtained from Ordnance Survey in July 2019). Earth curvature and atmospheric refraction have been taken into account. The ZTV was calculated using ArcMap 10.5.1 software.

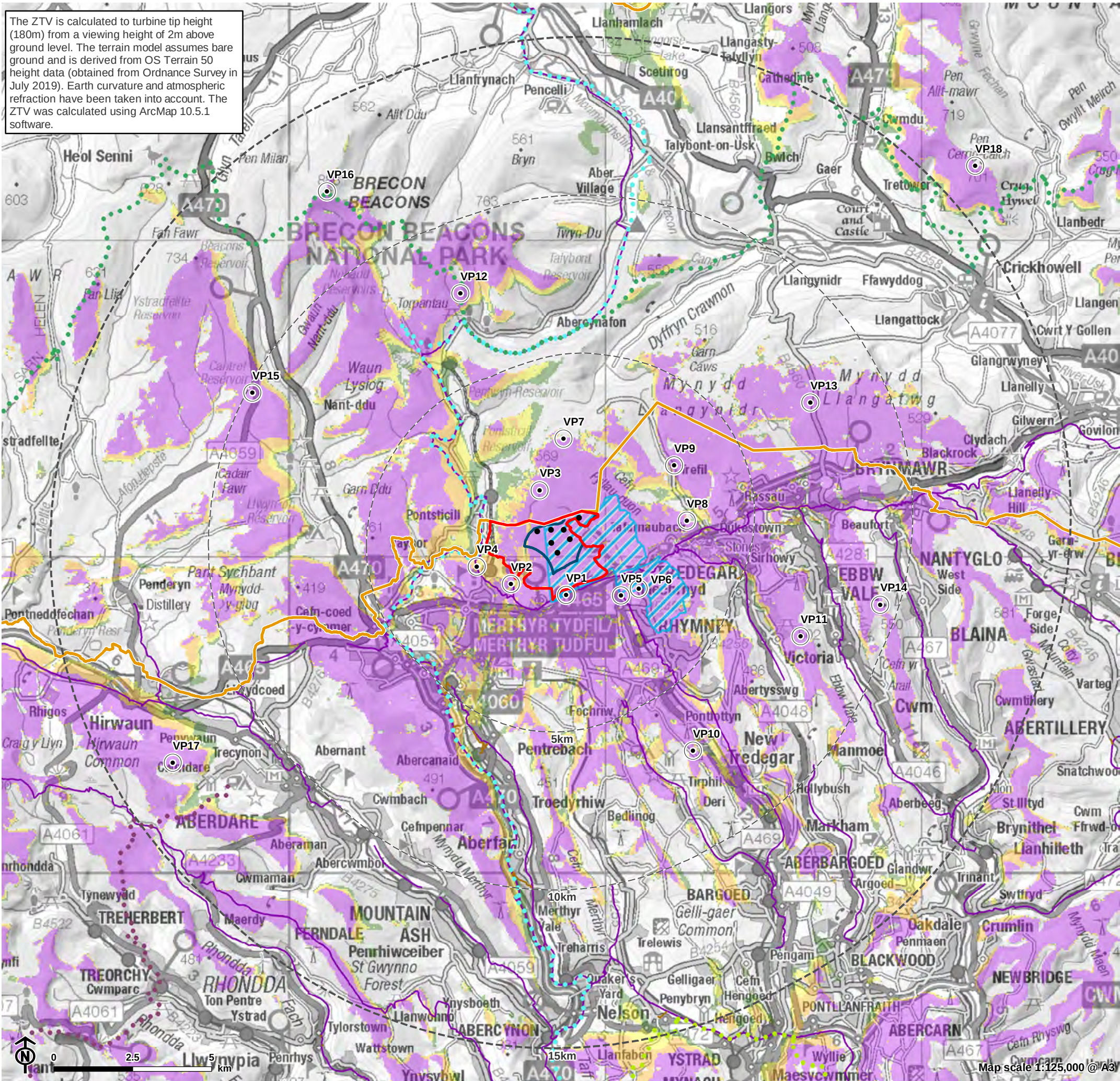


Figure 4.2: Blade Tip Height (180m) Zone of Theoretical Visibility (ZTV) and Viewpoint Locations to 15km

- Indicative turbine location
 - Site boundary
 - Developable area for WTGS
 - 5km intervals from developable area
 - 15km from developable area
 - Viewpoint
- 1: A465 / Heads of the Valleys Road, near Blaencarno Farm
 - 2: NCN 46 adjacent to Tair Twynau, Pant, Merthyr Tydfil
 - 3: Path crossing Brecon Beacons National Park (Waun y Gwair)
 - 4: Pant Station, Brecon Mountain Railway
 - 5: A469 /Rhymney Valley Road (NCN 468)
 - 6: Heol Uchaf, to the north of Rhymney
 - 7: Cefn yr Ystrad
 - 8: Tynewydd, to the north of Tredegar
 - 9: Minor lane in Trefil
 - 10: Cefn Brithdir, Rhymney Valley Ridgeway Walk
 - 11: Cefn Manmoel, Sirhowy Valley Walk
 - 12: Brecon Beacons Way (Craig Y Fan Ddu)
 - 13: B4560, Cefn Pwll-coch
 - 14: Mynydd Carn-y-cefn
 - 15: A4059
 - 16: Pen y Fan
 - 17: Mynydd Cefn-y-Gyngon
 - 18: The Black Mountains, Pen Cerrig-calch
- Landscape**
- Brecon Beacons National Park
 - Upper Rhymney Valley Special Landscape Area - indicative
- Recreation**
- National Cycle Network
 - NCN Link
 - Brecon Beacons Way
 - Rhymney Valley Ridgeway Walk
 - Sky To Sea Walk
 - Taff Trail
- Theoretical turbine visibility**
- 1-2 Turbines are visible
 - 3-4 Turbines are visible
 - 5-6 Turbines are visible
 - 7 Turbines are visible

Chapter 5

Geology, Hydrology, Hydrogeology and Peat

Introduction

5.1 This chapter considers the potential effects of the Development on geology, hydrology, hydrogeology and peat. It includes a baseline description, followed by the proposed assessment methodology of the potential effects to be assessed in the ES.

5.2 This chapter has been prepared by Yellow Sub Geo.

Existing Conditions

Information Sources:

5.3 The following sources of information have been reviewed during the desk-based research for the purposes of this scoping report:

- British Geological Survey 1:50,000 mapping, including Sheet 231¹³ and Sheet 232¹⁴ Solid and Drift;
- British Geological Survey 1:10,000 mapping, Sheet SO00NE¹⁵ and SO01SE¹⁶;
- The Land Consultancy (TLC) site reconnaissance report¹⁷;
- Natural Resources Wales Long Term Flood Risk Maps¹⁸;
- Coal Authority Interactive Viewer¹⁹;
- Coal Authority CON29M Non-Residential Mining Report (obtained by The Land Consultancy);
- Cranfield University Soilscales Viewer²⁰;
- Lle.gov.uk Source Protection Zones²¹; and
- SLR Phase 1 Habitat Survey Report²².

¹³ BGS Geological Survey of Great Britain (England and Wales). 1:50,000 Series 231 Merthyr Tydfil. Her Majesty's Stationery Office

¹⁴ BGS 1990. Geological Survey of Great Britain (England and Wales). British Geological Survey 1:50,000 Series Sheet 232, Abergavenny. Her Majesty's Stationery Office

¹⁵ Geological Survey of Great Britain (England and Wales). British Geological Survey 1:10,000 Series Sheet SO00NE

¹⁶ Geological Survey of Great Britain (England and Wales). British Geological Survey 1:10,000 Series Sheet SO01SE,

¹⁷ TLC, 2020. Report on-site reconnaissance works undertaken in relation to the proposed Pen March Windfarm site, South Wales. The Land Consultancy, 2020

¹⁸ Natural Resources Wales Long Term Flood Risk Maps 2020¹⁸ (<https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en>) Accessed 21/02/2020

¹⁹ Coal Authority 2020. Coal Authority Interactive Viewer <https://mapapps2.bgs.ac.uk/coalauthority/home.html>. Accessed 20/02/2020

²⁰ Cranfield University, 2020. Soilscales Viewer. <http://www.landis.org.uk/soilscales/>. Accessed 20/02/2020

²¹ Welsh Government, 2020. Source Protection Zones (merged) dataset. <https://lle.gov.wales/catalogue/item/SourceProtectionZonesSPZMerged/?lang=en>. Accessed 19/02/2020

²² SLR 2019. Pen March Windfarm Habitat Survey Report. 406.02273.00063. December 2019.

Geology

5.4 The Site is underlain by rocks of the Lower Carboniferous era, which dip by about 5° towards the south. The south and east of the Site is underlain by mudstones and sandstones of the Lower Coal Measures. The progressively older rocks beneath these are then exposed as you move north across the Site comprising, in descending sequence; Twrch Sandstone, Oxwich Head Limestone, Penderyn Oolite and Dowlais Limestone. Together, the latter three form the upper portion of the Carboniferous Limestone sequence in South Wales.

5.5 The Lower Coal Measures are typically characterised by a cyclic sequence of sandstones, siltstones, mudstones and coals. Only the very lowest (oldest) Coal Measures are mapped as present beneath the Site, comprising a sequence of mudstones and sandstones and the Subcrenatum Marine Band. No significant coal seams are mapped as present beneath the Site and the Coal Authority do not map any coal seam outcrops, mine entries or known underground mining beneath the Site with the exception of the extreme south-west corner.

5.6 The extreme south-western corner (between Penygarnddu Industrial Estate and the minor road south of Jepson's Pond) lies within a Coal Authority Development High Risk Area. It is intended to avoid this area for development infrastructure, subject to detailed design.

5.7 The tract of upland plateau that stretches east-west to the north of the A465 Heads of the Valleys road and across the southern boundary of the Brecon Beacons National Park is renowned for the presence of shake holes - collapsed doline features that manifest as typically circular surface depressions. These depressions can take the form of small ponds up to large landscape features over ten metres deep and tens of meters in diameter. On-site observations recorded by TLC suggest that the maximum size of the voids which have collapsed within the limestone may be up to 30-50m deep and wide. This phenomenon is the result of interstratal karst - the dissolution of limestone beneath a cap rock of Twrch Sandstone (formerly known as Millstone Grit). Rainfall infiltrating the Twrch Sandstone becomes more acidic, thus further exacerbating limestone dissolution and therefore collapse.

5.8 This phenomenon is restricted to a relatively thin zone where the Carboniferous Limestone is covered by Twrch Sandstone, and the sandstone is sufficiently thin to collapse into limestone caverns beneath. As you move further southwards, the Twrch Sandstone cover rock becomes sufficiently thick that it can bridge limestone voids, or if it collapses the bulking factor prevents propagation of collapse to the surface. As you move further northwards, the absence of Twrch Sandstone also means infiltrating water is less acidic, and the limestone is less prone to cavern formation (although some do still occur).

5.9 The northern and western Site boundary lies within the Twrch Sandstone outcrop, and hence lies within the zone of risk from collapse. As one walks southwards from the Site boundary, a point is reached where the sandstone cover rock is thick enough to prevent propagation of collapse to the surface. TLC has undertaken a comprehensive mapping exercise of the Site in order to identify the conjectured location of gradation from higher risk of shake holes to lower risk. TLC define the higher risk areas as those where surface evidence of karst and shake holes are evident. Lower risk areas are defined as having no such surface evidence. The medium risk zone is described by TLC as the buffer zone between higher and lower risk areas. The resultant zoning is illustrated in **Figure 5.1**.

5.10 Superficial deposits comprising Glacial Till are mapped by the British Geological Survey (BGS) as present across parts of the Site. The eastern edge of the Site and patches on the southern third of the Site are shown to be covered in Glacial Till, with an absence of superficial deposits shown elsewhere.

Soils

5.11 Cranfield University (2020) indicate that all but the south-west corner of the Site is covered in soil pertaining to Soilscape 19. The characteristics of this soil are slowly permeable, wet, very acid upland soils with a peaty surface and impeded drainage. This is described as having low fertility, capable of supporting little other than upland rough grazing or forestry and with typical habitats comprising grass moor and some heather with flush and bog communities in wetter parts.

5.12 The south-western corner of the Site (from Jepson's Pond southwards and westwards) is described by Cranfield University to Soilscape 24: Restored soils mostly from quarry and opencast spoil.

Hydrology

5.13 The Site forms a watershed between the Rhymney Valley to the east and the Taff Valley to the west. The plateau of upland off-site to the north provides the watershed between these two catchments and the catchment of the River Usk to the north.

5.14 The western edge of the Site is drained by a series of tributaries of the Nant Morlais and Nant Tor-gwyn. The latter then joins the Nant Morlais off-site to the south-west, and the Nant Morlais flows, via two reservoirs in Dowlais, into the River Taff in Merthyr Tydfil town centre.

5.15 The eastern edge of the Site is drained by a series of tributaries of the Nant Pitwellt which flows, via a reservoir, into the River Rhymney in the area of enclosed fields to the west of the site known as Blaen Rhymney.

5.16 Other than these stream systems along the western and eastern boundaries, there are no watercourses across the upland plateau area and south-facing slope that forms the northern portion of the Site.

5.17 Moving southwards, the central portion of the Site has a single stream, which collects from approximately 460m AOD and drains into an area of marshy ground above Jepson's Pond.

5.18 The southern third of the Site is relatively lower lying (though still above 350m AOD). It is drained by a series of watercourses, some of which are likely man-made associated with the construction of Jepson's Pond. These watercourses collect in Jepson's Pond and just downslope from it, where a watercourse carries the water off-site and beneath the A465 and into Cwm Carno, which drains into the River Rhydney near Rhydney.

5.19 The entirety of the Site is shown by NRW to lie entirely outside of Flood Zones 2 or 3.

Hydrogeology

5.20 The Lower Coal Measures that lie beneath the southern two-thirds of the Site are classified as Secondary (A) Aquifer (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).

5.21 Whilst it does not crop out on the Site, the Carboniferous Limestone that lies beneath the Lower Coal Measures at depth is classified as a Principal Aquifer (layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale). The Site lies entirely within the Source Protection Zone (SPZ) that covers the Carboniferous Limestone outcrop and its surface catchment. The data source (Welsh Government, 2020) does not provide differentiation between different zones of protection within this overall SPZ. Information is not currently held on the presence/absence of private water supplies in the area but will be sought as part of the EIA process.

5.22 Drainage within that area of the Site covered in Glacial Till or underlain by Lower Coal Measures will likely have limited soil permeability, with the primary drainage being throughflow and overland flow to surface water bodies. The northern and western edges of the Site will have increased infiltration potential via fractures in the Twrch Sandstone. Preferential pathways for drainage will likely be present beneath shake holes, potentially providing a direct pathway down into the underlying limestone aquifer. However, across most of the Twrch Sandstone outcrop, soil permeability will remain low due to its high organic content, with overland flow being the dominant drainage feature.

Peat

5.23 Four stages of work have been undertaken in order to assess the presence/absence of peat on the Site. These comprise:

- Desk study review of published geological mapping (1:10,000 scale);
- During the Phase 1 Habitat Survey, information on peat depth was recorded to aid the habitat mapping exercise. This used a probing stick pushed through the substratum until a hard layer was reached. The depth of peat was then measured off the stick. In each location where this was completed, a minimum of three sample readings were taken and then averaged to ensure a representative result;
- TLC has undertaken a walkover survey of the Site to inform their ground conditions assessment; and
- Yellow Sub Geo has undertaken a walkover of the proposed turbine envelop to assess ground conditions to inform this Scoping Report.

5.24 Geological mapping indicates that peat deposits are absent from the Site, suggesting a lack of significant peat at a landscape scale.

5.25 This predominant absence of peat was confirmed during the Habitat Mapping probing exercise, which recorded peat to be less than 0.5m deep across the entirety of the Site, with the exception of two small locations, TN51 and TN85, these locations are highlighted in **Figure 5.2**.

5.26 TN85 comprises the base of a shake hole and recorded to support bottle sedge *Carex rostrata*, with bog bean, round-leaved sundew *Drosera rotundifolia*, Sphagnum sp. moss and common cotton-grass also scattered throughout. The peat depth in this area was approximately 1m.

5.27 TN51 was recorded as an area of acid flush dominated by Sphagnum moss sp. and common cotton-grass, with round-leaved sundew, bog asphodel and bulbous rush also frequent. Star sedge and cross-leaved heath were both occasional on the margins. The habitat was restricted to a small, level, 10m x 10m area on a broad slope, with the peat depth ranging between 0.7 – 0.8m. The ground was saturated and noticeably spongy, with water likely fed into the area from the surrounding marshy grassland.

5.28 During its walkover of 6th February 2020, TLC also noted a possible small area of peat at approximate NGR 308841E, 210764N (see **Figure 5.2** for location). This was based on surface observations and was estimated to be 0.5 – 1.0m thick and is in a gently sloping area where runoff collects to form the headwaters of a tributary of the Nant Pitwellt. They also noted a possible small area of peat at NGR 308604E, 210198N see

Figure 5.2 for location). This was again noted based on visual surface observation, estimated at 0.5 – 1.0m thick. This latter position is in the same vicinity as TN51 noted by SLR during the Phase 1 habitat survey and may be associated with the collection of runoff water that forms the headwaters of a stream in this location.

5.29 Observations made by Yellow Sub Geo during a site walkover in February 2020 corroborate the work of SLR and TLC in confirming a predominant absence of peat, based on surface observations (a predominant lack of suitable vegetation and lack of ground shake underfoot). Where soil is exposed in sheep scrapes and stream banks, the presence of a thin peaty topsoil layer less than 0.3m thick is confirmed, as illustrated in **Figure 5.2**.

5.30 In summary, four small areas of peat have been identified during the surveys undertaken to date (which include a site-wide peat probing exercise as part of the Phase 1 Habitat mapping). In each case, these are small localised areas associated either with depressions in underlying soil surface, or with areas where water collects to create stream headwaters. The vast majority of the Site is lacking in peat.

Proposed Surveys and Assessment Methodologies

Guidance

5.31 The assessment of effects of the Development will be carried out in accordance with the principles contained within the following documents:

- Countryside Council for Wales (CCW) Guidance Note Assessing the impact of windfarm developments on peatlands in Wales²³;
- Planning Policy Wales Technical Advice Note 15: Development and Flood Risk. 2004;
- NRW Flood estimation: technical guidance Reference number: GN008. 2017;
- Welsh Government Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems. 2018;
- Control of Pollution Act 1974;
- Environmental Protection Act 1990;
- Land Drainage Act 1991;
- Environment Act 1995;
- Groundwater Regulations 1998;

- UK Water Quality (Water Supply) Regulations 2000;
- Water Framework Directive (2000/60/EC);
- BS5930:1999 as amended 2007: Code of practice for site investigations;
- Environment Agency. 2013 Groundwater protection: Principles and practice (GP3) Version 1.1;
- CIRIA Report C532 – Control of Water from Construction Sites; and
- CIRIA Report C692 – Environmental Good Practice On-site. 3rd Ed. 2010.

Proposed Study Area

5.32 With respect to the assessment of geology and peat, the proposed study area will be the Site itself, including the proposed grid connection to the Dowlais Substation. The study area for hydrogeology and hydrology will primarily be constrained to the Site, but with due consideration of downstream and catchment scale effects (for example, consideration of the wider aquifer system(s) and consideration of any changes to flood consequences that the Development may cause outside of the Site boundary - principally to the River Rhymney catchment).

Desk Study and Field Surveys

Desk Study

5.33 A desk-based Flood Consequence Assessment will be compiled in accordance with the guidance set out in TAN15. This will include an Outline Drainage Strategy, setting out the principles to be adhered to in the design and construction of the Development to ensure that the Development does not provide impediment to the conveyance of surface water nor cause any increase in site runoff above the current greenfield (upland) rates. No fieldwork is considered necessary to inform the FCA nor to inform assessment of effects on hydrology and flood risk.

5.34 A desk-based study of the ground conditions will identify the key characteristics of the Site and will collate baseline information from available sources. The desk-based study will involve the following elements:

- Undertaking of a review of published geological and hydrogeological mapping and literature, including data on private water supplies; and
- Review of the body of work already compiled by TLC on the shake hole risk and ground conditions beneath the Site.

²³ CCW 2010. Guidance Note Assessing the impact of windfarm developments on peatlands in Wales. Countryside Council for Wales.

5.35 The work already undertaken by TLC includes fieldwork surveys of the ground conditions and assessment of shake holes. Non-intrusive geophysical survey is proposed beneath each turbine location as part of the process of finalising the turbine layout for planning. No other fieldwork is planned ahead of planning submission.

5.36 Following granting of planning consent, a detailed intrusive site investigation will be carried out ahead of construction to inform the final detailed design.

5.37 Further work is proposed for the Site to assess the presence/absence of peat beneath the proposed development footprint, as set out below.

Field Surveys

5.38 The CCW Guidance sets out the required methodology for assessing peat resource. Section 4.1 of the CCW guidance describes the required habitat mapping whilst Section 4.2 sets out the proposed peat-probing approach. Section 4.2 states that *“when assessing the appropriateness of any peat depth mapping undertaken in relation to the resource and the impacts, the ES needs to demonstrate that impacts on peat have been avoided or minimised.”* Within the CCW document, a site-wide survey is stated as required to fulfil this requirement. However, ‘site’ in this context clearly refers to the area within which development may take place. In the case of Pen March, the outer site boundary as shown on **Figure 1.2** is based upon the area over which the Applicant has development rights under a land agreement. A more appropriate definition of the ‘site’ in terms of compliance with the CCW guidance is the maximum development envelope defined in **Figure 1.2** i.e. the ‘developable area’ for both turbines and other infrastructure. The majority of this area has already been subject to appropriate peat survey in the form of peat probing during the Phase 1 habitat survey (SLR 2019). This confirms a predominant lack of peat resource across the vast majority of the surveyed area. The remainder of the potential development envelope will be subject to supplementary Phase 1 survey, applying the same methodology, during 2020 as is detailed further in Chapter 6 of this report (Ecology). No further site-wide peat survey is therefore considered necessary. It is instead proposed that a sequenced approach to the consideration of peat be undertaken, whereby;

- a preliminary turbine and ancillary infrastructure layout be drawn up based on all known constraints, including appropriate measures to manage the interaction with the areas of peat mapped via the Phase 1 habitat survey (and NVC survey if undertaken), as set out in Paragraphs 5.24 to 5.29 above;
- a site walkover survey be undertaken covering the proposed locations of turbines and ancillary infrastructure, to allow additional assessment of the

potential for presence/absence of peat based on visual observations; and

- if site walkover observations suggest the potential for peat, an additional focussed peat probing exercise will be undertaken in the relevant locations to confirm peat presence or absence (in line with the CCW guidance note).

5.39 The layout will then be further reviewed to avoid any significant effects on localised areas of peat that is identified via probing. This may include (for example) revising the layout, and/or employment of suitable mitigation or compensatory measures.

Consultation

5.40 The consultees below will be contacted for information to inform the EIA:

- Natural Resources Wales;
 - For flood modelling data;
 - To confirm the proposed peat assessment methodology.
- Caerphilly County Borough Council;
 - Local Drainage Officer;
 - To obtain private water supply records.
- Merthyr Tydfil Borough Council.
 - Local Drainage Officer;
 - To obtain private water supply records.

Assessment Method

5.41 Following the baseline studies and the confirmation of final layout design, the potential effects on geology, hydrology, hydrogeology and peat will be assessed based on the guidance noted above.

5.42 A Flood Consequences Assessment (FCA) will be undertaken. This report will include an Outline Drainage Strategy, which will set out the principles that will be adhered to in the design and construction of the Development, to avoid any significant effect on either the proposed development or the wider catchments into which the Site feeds.

5.43 The FCA will be appended to the ES. The process of design iteration used to avoid any significant effects will be summarised in the ES Project and Site Description chapter.

5.44 As the Development design will be finalised so as to either avoid or mitigate any effects on peat, it is not anticipated that the Development will have a significant effect on peat. However, in recognition of the need for additional information

and assessment once the proposed layout has been finalised, it is intended to include an assessment of effects upon peat resource within the scope of the ES. A focussed peat resource assessment will be undertaken and appended to the ES. If this demonstrates significant effects that require mitigation, the subject area will then be assessed in a bespoke peat chapter. If impact to peat has been avoided through design, then the process of design iteration to avoid peat will be summarised in the ES Project and Site Description chapter. The proposed development layout is currently being refined using the ground conditions survey undertaken by The Land Consultancy. The areas of higher risk of shake hole presence are to be avoided. Notwithstanding this, a programme of work to confirm the absence of voiding beneath each turbine position is proposed ahead of planning submission, through the use of non-intrusive geophysical techniques.

5.45 Assessment results will be appended to the planning application and the process of design iteration to avoid areas of higher shake-hole risk and to assess turbine locations for shake hole risk will be described in the Project and Site Description chapter of the ES.

Potential Significant Effects of the Development

Construction

5.46 A significant effect on the peat resource of the Site is not considered likely. However, it is proposed to include peat within the scope of assessment at present, pending the gathering of focussed data on the peat resource once the final development layout has been defined.

5.47 An Outline Construction Environmental Management Plan (CEMP) will be compiled and included as an appendix to the ES. This will set out the principles that will be adhered to during design and construction (including temporary works) to ensure that the potential construction phase effects on geology, hydrogeology, soils and hydrology are fully controlled.

5.48 Taking this into account, and taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this preliminary stage, the construction phase of the proposed wind farm is not anticipated to result in any significant effects on geology, soils, hydrology or, hydrogeology.

Operation

5.49 The operational phase of the proposed wind farm is not anticipated to result in any significant effects on geology, soils, hydrology, hydrogeology or peat.

Effects Scoped Out

5.50 On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from similar projects and consultation responses, it is proposed that the following effects can be scoped out due to good design and implementation of standard good practice construction measures:

- Effect of interaction of the Development with shake-holes and other ground conditions. Evidence will be provided to demonstrate that the project has been designed to avoid significant interaction with features that could otherwise potentially lead to ground instability and/or connectivity with the Principal Aquifer;
- Effect of the Development on flood risk, either on-site or in the wider catchments to which it drains. An FCA will be appended to the ES Project and Site Description chapter and the project designed to maintain upland greenfield run-off rates. Demonstration that the project will not cause detriment to flood risk and flood consequence is a requirement of planning outside of the EIA process; and
- Effect of the Development on hydrogeology.

Approach to Mitigation

5.51 The project design is to be finalised with due consideration to geology, hydrology, hydrogeology and peat such that primary mitigation of any effects on these aspects will be negligible.

5.52 No further mitigation is therefore envisaged over and above that incorporated into the design.

Questions

Question 5.1: Is there flood model data available for the Site?

Question 5.2: Are there any known flooding problems downstream that the Development might affect were it not properly designed?

Question 5.3: Is the proposed peat assessment methodology acceptable?

Question 5.4: Are there any known issues with aquifer contamination/known interconnectivity between the Site and Principal Aquifer at present?

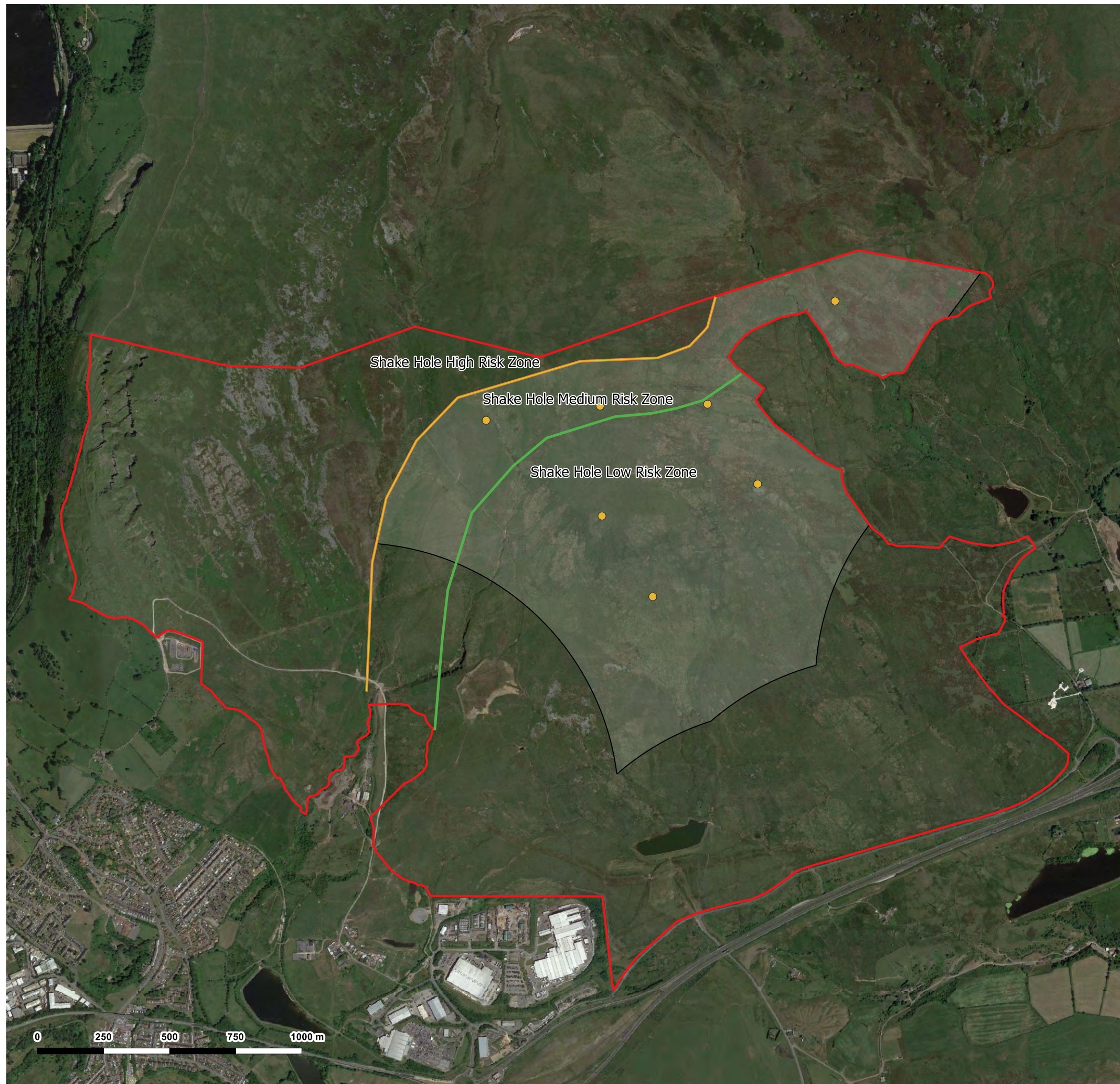
Question 5.5: Do the two Local Authorities hold any records of private water supplies within 1km of the Site boundary?

Question 5.6: Are there any other relevant consultees who should be consulted about the Geology, Hydrology, Hydrogeology and Peat assessment?

Figure 5.1: Shake Hole Risk Zones

Legend

- Shake hole low risk zone
- Shake hole high risk zone
- Site Boundary
- Developable area for wind turbines
- Indicative turbine locations



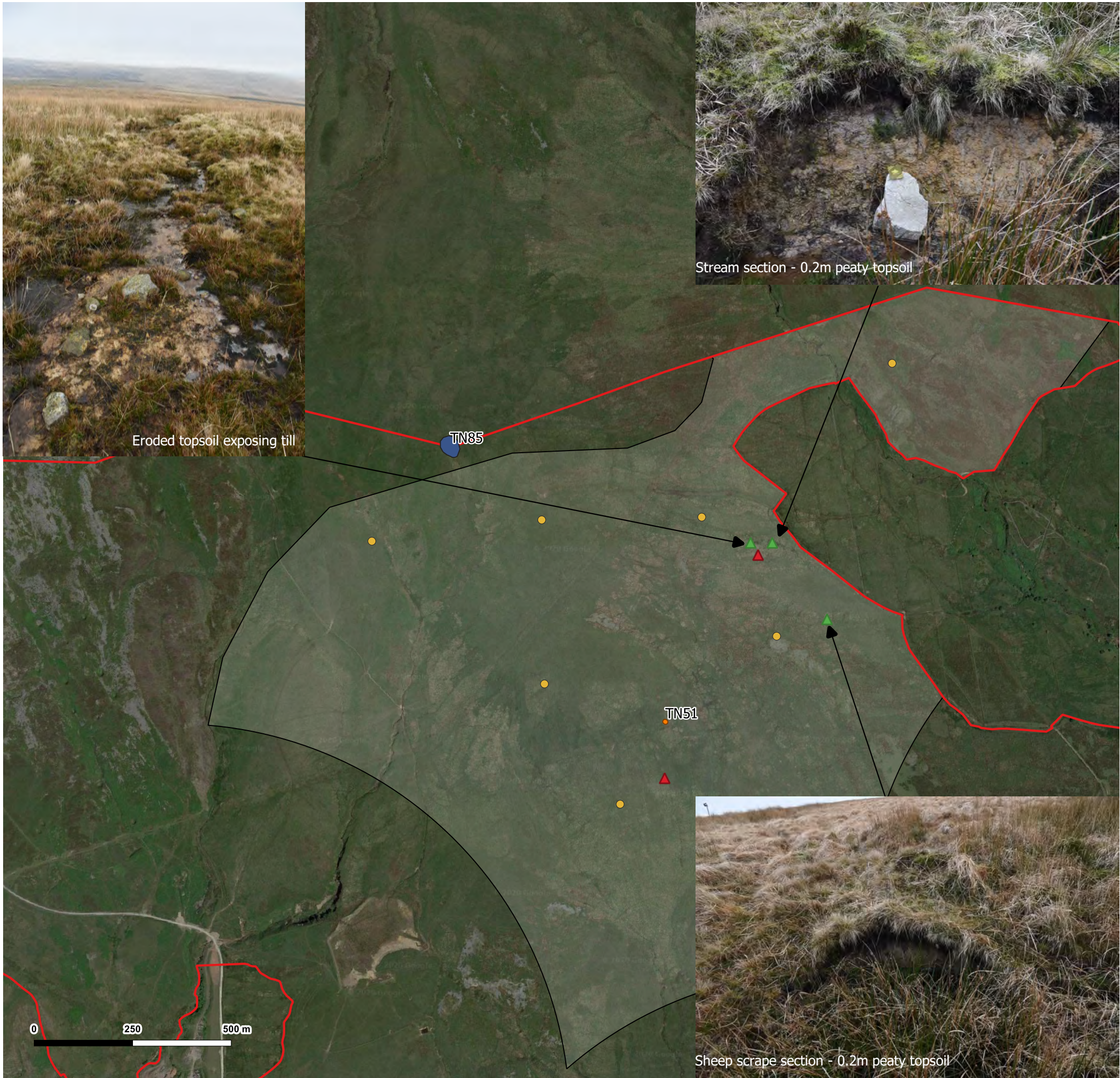


Figure 5.2: Recorded presence/absence of peat identified following assessment work by SLR (2019), TLC (2020) and Yellow Sub Geo (2020)

Legend

- Site Boundary
 - Developable area for wind turbines
 - Indicative turbine locations
 - Yellow Sub observations of exposed soils
 - Peat bodies identified by TLC
- Peat bodies identified by SLR
- Fen - basin mire (TN85)
 - Flush and spring - acid/neutral flush (TN51)

Chapter 6

Ecology

Introduction

6.1 This chapter considers the potential effects of the Development on ecology (plants and animals). It includes a baseline description, followed by the proposed assessment methodology of the potential effects to be assessed in the ES.

6.2 This chapter has been prepared by SLR.

Existing Conditions

Information Sources:

6.3 The following sources of information have been reviewed during the desk-based research to inform this scoping report:

- Data provided by South East Wales Biodiversity Records Centre (SEWBRc). An ecological data search was requested from SEWBRc in June 2019. The data search provided records of protected and notable species and ecological designations for the Wind Farm Site boundary and land within a 2km radius, extended to 10km in respect of bats in line with current guidance²⁴; and
- Natural Resources Wales Website²⁵ and Lle Geo-Portal for Wales²⁶.

Designated Sites

6.4 There are 21 statutory ecological designated sites with a 10km radius of the Site boundary, although none occur within the Site itself. This includes Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI). These are shown on **Figure 6.1** and described briefly in **Table 6.1** below.

²⁴ Scottish Natural Heritage, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter & Bat Conservation Trust (2019) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

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/>

²⁶ <https://lle.gov.wales/catalogue?lang=en&c=2007>

Table 6.1: Designated Sites within 10km

Designated Site.	Approximate distance from Site boundary (m).	Reason for designation.
Baltic and Tyler'r Quarries SSSI.	63	Geological.
Lower House Stream Section SSSI.	463	Geological.
Cwm Taf Fechan Woodlands SSSI.	520	Mixed deciduous woodland associated with underlying limestone.
Abercriban Quarries SSSI.	1060	Geological.
Nant Glais Caves SSSI.	2006	Geological.
Cwar Yr Ystrad SSSI.	2345	Geological.
Mynydd Llangynidr SSSI.	3264	Geological.
Daren Fach SSSI.	4207	A mosaic of calcareous habitats associated with a limestone escarpment and scree.
Penmoelallt SSSI.	4407	A mixed woodland associated with Carboniferous limestone.
Cwm Glo a Glyndryys SSSI.	4569	A mosaic of habitats including woodland, heath and extensive areas of marshy grassland.
Brecon Beacons SAC and SSSI.	6075 (SSSI) and 8451 (SAC)	A mosaic of habitats associated with the Old Red Sandstone which includes arctic-alpine communities, bog, heath and grassland in addition to geological interest.
Cefn Y Brithdir SSSI.	6143	Of interest for the dwarf shrub heath communities.
Bryncarnau Grasslands SSSI.	7037	A series of species-rich meadows which include fen meadow.
Mynydd Llangatwg SSSI.	7355	A mosaic of base-rich habitats associated with a limestone cave system which is of special interest for lesser horse-shoe bat.

Designated Site.	Approximate distance from Site boundary (m).	Reason for designation.
Usk Bat Sites SAC	7359	In addition to a range of Annex I habitats, the area contains up to 5% of the UK population of lesser horseshoe bat.
Caeau Nant Y Groes SSSI.	8077	Of special interest for the species-rich neutral grassland communities.
Tir Mawr A Dderi Hir SSSI.	8449	Species-rich neutral and marshy grassland including fen meadow.
Cwm Merddog Woodlands SSSI.	8782	An extensive area of beech woodland.
Cwm Cadlan SAC and SSSI.	8839	Of special interest for the marshy grassland, including the largest area of fen meadow in Wales, and other communities associated with underlying sandstone and limestone geology.
River Usk SAC and River Usk (Tributaries) SSSI.	9210	A linear habitat used as a corridor and migration route by a range of important species.
River Usk (Upper) SSSI.	9329	A linear habitat used as a corridor and migration route by a range of important species.

6.5 The majority of the developable area occurs within the Pen March and Traed y Milwyr Site of Importance for Nature Conservation (SINC) which extends to 491ha and continues east beyond the Site boundary (Figure 6.2). The SINC is broadly described as an 'extensive area of open countryside where semi-natural upland features predominate' and containing a mix of 'wet and dry acid grassland and heath'.

6.6 The remainder of the developable area occurs within Merthyr Common North SINC. This SINC is described as 'an extensive area of common land with a range of habitats, predominantly acidic but some calcareous grassland associated with limestone outcrops'.

6.7 It is noted, however, that most of the habitats within the part of the SINC areas surveyed in 2019 (see paragraphs 6.10-6.13) are of limited conservation value.

6.8 Tyle Haidd SINC partially occurs within the Site boundary although beyond the developable area. This SINC comprises of a habitat mosaic above the Taf Fechan.

6.9 Blaenmorlais SINC partially occurs within the Site boundary although beyond the developable area. This SINC comprises an upland habitat mosaic dominated by acid grassland.

Habitat Surveys

Completed Surveys

6.10 A Phase 1 Habitat Survey²⁷ was completed in July 2019. The area surveyed and the habitats present are shown in **Figure 6.3**.

6.11 The survey identified 17 habitats within the survey area: Marshy Grassland (B5); Semi-improved Acid Grassland (B2); Marshy Grassland (B5)/ Semi-improved Acid Grassland (B2) Mosaic; Marshy Grassland (B5)/ Semi-improved Neutral Grassland (B2.2) Mosaic; Scattered Scrub (A2.2)/ Semi-improved Acid Grassland (B2) Mosaic; Rock Exposure (I4.1)/ Semi-improved Acid Grassland (B2) Mosaic; Rock Exposure (I4.1)/ Marshy Grassland (B5) Mosaic; Rock Exposure (I4.1) and Dry Heath/ Acid Grassland Mosaic (D5); Dry Heath/ Acid Grassland Mosaic (D5); Standing Open Water (G1); Semi-improved Neutral Grassland (B2.2); Running Water (G2); Mixed Plantation Woodland (A1.1); Bare Ground (J4); Fen-Basin Mire (E3.2); Acidic Flush (E2.1) and Dry Ditch (J2.6).

6.12 The survey area comprises primarily habitats of limited nature conservation value with Marshy Grassland (312.43ha or approximately 85%) dominating the area surveyed. The low nature conservation value of the Site is attributed largely to heavy modification by livestock grazing, resulting in most habitats present being relatively species poor and dominated by common plant species, resilient to the effects of grazing.

6.13 Habitats of potential conservation importance do however occur in small scattered patches within the area surveyed. These habitats include those listed on Annex I of the Habitats Directive (Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and flora) and/or those listed as 'priority habitats' under Section 7 of the Environment (Wales) Act 2016. The habitats of potential conservation importance occurring within the survey area are Dry Heath (2.58ha), Fen – Basin Mire (0.2ha), Acid Flush (0.01ha) and Standing Open Water (Ponds) (2.12ha) which collectively equate to an approximate 1.3% of the habitat survey area.

Protected Species Surveys

Completed Surveys

6.14 Bat activity surveys were undertaken during the period May to October 2019, following current guidelines²⁴.

6.15 A walkover survey of the Site was used to assess the area for potential bat roost features including trees, buildings and underground structures. The Site was scoped as likely to be of low value to bats with no potential roost habitat and no features or areas of high habitat connectivity which are likely to be important commuting routes.

6.16 Bat activity surveys were conducted with the use of static bat detectors (Anabat Express, Titley Scientific). The static bat detectors were deployed in five predetermined locations within the developable area for turbines, across three seasons, spring (late May-early June), summer (late July-early August) and autumn (October) 2019, to record bat activity over a period of 10 nights per season and set to record from half an hour before sunset until half an hour after sunrise on each night. In practice a minimum of 15 nights deployment was adopted to enable any nights in which weather conditions were unsuitable for bat activity to be discounted from the analysis.

6.17 During static detector surveys at least six bat species were recorded on the Site, including common pipistrelle (*Pipistrellus pipistrellus*) soprano pipistrelle (*P. pygmaeus*), *Myotis* sp., serotine (*Eptesicus serotinus*), noctule (*Nyctalus noctula*), long eared sp. (*Plecotus* sp.) and 'big bats', i.e. *Nyctalus*/ *Eptesicus* sp., where it was not possible to distinguish between *Nyctalus* and *Eptesicus* species.

6.18 Although a slight peak in activity was recorded in summer, bat activity was still relatively low during all seasons (relative levels of activity compared with other sites through the use of the secure online tool Ecobat²⁸). Overall, it was concluded that the relative level of bat activity across all seasons was 'low' for all species, with the exception of common pipistrelle for which activity was considered to be 'low to moderate'.

6.19 Baseline reports providing further details of the surveys completed to date can be provided to relevant organisations on request.

²⁷ Handbook for Phase 1 Habitat Survey (Anon, 2010) and Guidelines for Baseline Ecological Assessment (Anon, 1995)

²⁸ <http://www.mammal.org.uk/science-research/ecostat/>

Proposed Surveys and Assessment Methodologies

Legislation, Policy and Guidance

6.20 The assessment of effects of the Development will be carried out in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (henceforth the CIEEM Guidelines).

6.21 The assessment will also have regard for the principles contained within the following:

- The Conservation of Habitats and Species Regulations 2017 (as amended)²⁹;
- The Wildlife and Countryside Act 1981 (as amended);
- The Environment (Wales) Act 2016;
- Planning Policy Wales (PPW) (Edition 10, December 2018). PPW is supplemented by a series of Technical Advice Notes (TANs) of which TAN 5 is relevant to nature conservation and planning;
- Caerphilly Local Development Plan (LDP) adopted 2010;
- The Replacement Merthyr Tydfil Local Development Plan (LDP) 2016 – 2031;
- Scottish Natural Heritage, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, University of Exeter & Bat Conservation Trust (2019) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation;
- Scottish Renewables (2015) Good Practice during Wind Farm Construction. Version 3; and
- SNH (2018b) Assessing the Cumulative Impact of Onshore Wind Energy Developments.

Proposed Study Area

6.22 The study area for the assessment will be based upon the developable area, plus any necessary buffer zones.

Field Surveys

6.23 It is noted that the developable area has increased in size slightly since the surveys were undertaken in 2019 and therefore small areas now lie outside the area surveyed. Additional Phase 1 survey will therefore be carried out for parts of the developable area not covered by the survey in 2019 during spring/summer 2020. Where possible, habitats of potential conservation importance will be avoided by the Development layout but if impacts are unavoidable additional Phase 2 (National Vegetation Classification³⁰) surveys of the areas to be affected may be required and these will be undertaken in spring/summer 2020.

6.24 Surveys for great crested newt will be required for all suitable waterbodies within 250m of the developable area. A presence/absence survey of suitable waterbodies will be undertaken in spring 2020 using the environmental DNA (eDNA) method³¹.

6.25 Further bat activity survey will be undertaken in 2020 to reflect the revised proposal for up to seven wind turbines (surveys in 2019 were based on there being a maximum of five turbines). Survey effort will follow that of the 2019 survey but with seven static detectors being used to reflect the revised Development proposals.

6.26 Survey of potentially suitable habitat for protected mammal species (badger³², otter³³ and water vole³⁴) will be undertaken in spring/summer 2020 in accordance with standard methods. Surveys will cover the developable area plus appropriate buffer zones (30m for badgers, up to 250m for otter and water vole).

6.27 Whilst we would make every effort to meet the proposed survey programme and efforts set out above, by necessity some timings and approaches may be subject to change in response to the developing situation regarding COVID-19. Any deviation from standard guidelines will be as a result of following relevant government or CIEEM guidance in relation to COVID-19 and associated limitations would be assessed appropriately. We would welcome discussions with relevant stakeholders on this subject if survey methods or timings are affected.

²⁹ The UK exited the European Union (EU) on 31st January 2020 and is currently within a transition period, until the end of 2020, during which EU legislation and policy will be followed. As such, during the transition period the Habitats Regulations will continue to be officially referred to as the 'Conservation of Habitats and Species Regulations 2017 (as amended)'. See: <https://cieem.net/referencing-environmental-eu-legislation-post-brexit/> [last accessed 7th March 2020].

³⁰ Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough. Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough. Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough, ISBN 978 1 86107 574 1. Rodwell, J.S. (2006) NVC Users' Handbook, JNCC, Peterborough, ISBN 978 1 86107 574 1.

³¹ Biggs J, et al. (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.

³² Harris, S, Cresswell, P and Jeffries, D, (1989). *Surveying Badgers* (Volume 9, Occasional Publication). Mammal Society.

³³ Chanin P. (2003) *Monitoring the Otter Lutra*. Conserving Natura 2000 Rivers Monitoring Series No.10 English Nature, Peterborough.

³⁴ Strachan, R, Moorhouse, T & Gelling, M, (2011). *Water Vole Conservation Handbook 3rd edition*. Wild CRU, Oxford.

Consultation

6.28 The consultees below will be contacted for information to inform the EIA:

- Natural Resources Wales; and
- The Merthyr Tydfil and Caerphilly Council Ecologists.

Assessment Method

6.29 The CIEEM Guidelines will form the basis of the impact assessment with other relevant guidance, as listed in paragraph 6.21, referred to as appropriate. In accordance with the CIEEM guidelines, only ecological receptors which are considered to be important and/or are subject to legal protection should be subject to detailed assessment.

6.30 Ecological receptors will be considered within a defined geographical context. The following geographic frame of reference is likely to be used:

- International;
- National (i.e. Wales);
- Regional (South Wales);
- Local (i.e. the Site plus circa 10km); and
- Less than local.

6.31 The impact assessment process involves the following steps:

- Identifying and characterising impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects (if required); and
- Identifying opportunities for ecological enhancement in order to provide a net benefit for biodiversity.

6.32 When describing impacts, reference will be made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

6.33 Both direct and indirect impacts will be considered. Direct impacts are changes that are directly attributable to a defined action, e.g. the physical loss of a habitat during the construction process. Indirect impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or receptor, e.g. the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wetland habitats.

6.34 In accordance with CIEEM guidelines, a 'significant effect' is an effect that either supports or undermines conservation objectives for 'important ecological features'. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). Effects can be considered significant at a wide range of scales from international to local. For example, a significant effect on a regionally important population of a species is likely to be of regional significance.

6.35 Consideration of conservation status is important for evaluating the effects of impacts on protected species and assessing their significance. 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.

Grid Connection

6.36 The grid connection from the on-site substation to the wider electricity network will be subject to a separate consenting process and a separate assessment of ecological effects. However a high level assessment of the potential effects of the grid connection will be summarised within the ES for the proposed wind farm.

Cumulative Effects

6.37 The potential for cumulative impacts with other projects will be assessed. For (non-avian) ecological receptors potential cumulative impacts are only likely to be significant for other developments within the same hydrological catchment(s) or located within the regular range of more mobile species, e.g. bats. As such the cumulative assessment will be restricted to other development projects within the same hydrological catchments and other wind farms within 10km. The assessment will include operational projects; projects under construction; consented projects which are not yet under construction and projects for which planning applications have been submitted.

Potential Significant Effects of the Development

Construction

6.38 Taking account of the findings of the work undertaken to date, whilst still adopting a precautionary approach at this preliminary stage, potential construction (including cumulative) effects to be assessed in the EIA include:

- Habitat loss, including SINC designated land: Construction of turbine bases, access tracks and other structures will lead to permanent and temporary habitat loss;
- Sedimentation or other pollution of watercourses: From construction activities and vehicular traffic;
- Killing or injury of fauna: During construction and initial habitat removal. If protected, this may represent an offence under the relevant legislation; and
- Disturbance/displacement of fauna: During the construction stage of the proposed development, the potential effects of associated noise and visual disturbance could lead to the temporary displacement or disturbance of faunal species. If protected, this may represent an offence under the relevant legislation.

Operational

6.39 Taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this preliminary stage, potential operational (including cumulative) effects to be assessed in the EIA include:

- Disturbance/Displacement: The operation of wind turbines and associated human activities for maintenance purposes has the potential to cause disturbance and displace fauna although such effects during the operational phase will be less than during the construction phase, as species are likely to become habituated to wind turbines and disturbance due to human activities will be considerably reduced;
- Environmental incidents and accidents (e.g. spillages): Incidents are possible during wind farm maintenance, although the potential for significant effects will be significantly lower than during construction; and
- Mortality of bats: Due to collision with turbines or barotrauma.

Effects Scoped Out

6.40 It is proposed to scope out formal reptile surveys. The presence of common lizard and adder has already been confirmed during the Phase 1 habitat survey and further

surveys will be both impractical on a site of this size and unlikely to generate any additional data that will affect the conclusions of the assessment. Whilst mitigation for reptiles will be required, it is considered that an appropriate mitigation scheme can be designed to avoid impacts upon reptiles given the extent of suitable habitats present and localised nature of any required site infrastructure.

Approach to Mitigation

6.41 A sequential process will be adopted to follow the mitigation hierarchy i.e. avoid, mitigate, compensate and enhance.

6.42 The EIA will clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided e.g. through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible; and
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

6.43 Mitigation may include micro-siting of turbines or other infrastructure to avoid or reduce environmental effects. In order to avoid micro-siting leading to negative effects on important ecological receptors, restrictions on micro-siting in specific areas will be stated, if required.

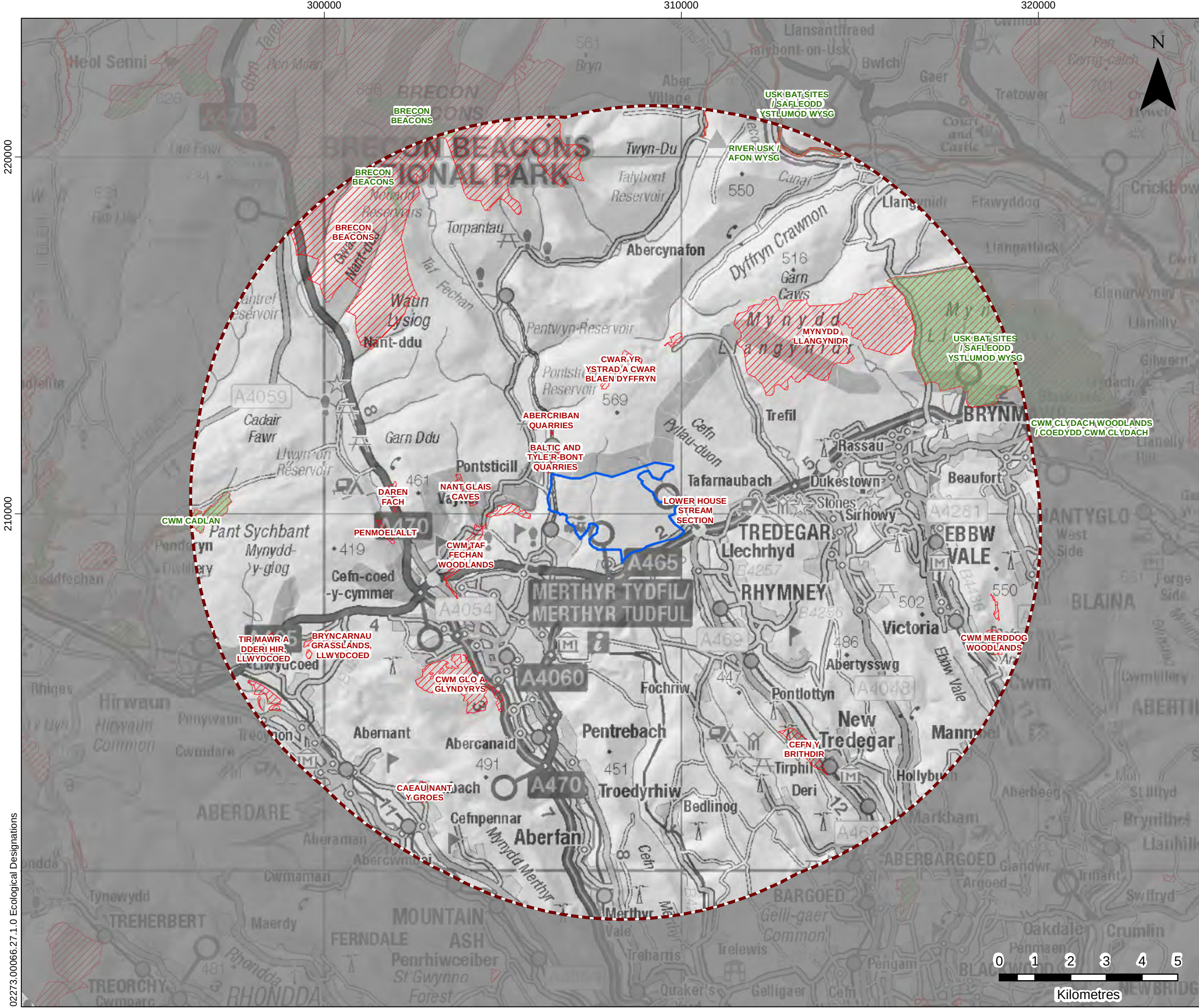
6.44 Where deemed necessary, a Habitat Management Plan (HMP) will be produced to set out mitigation, compensation and/or enhancement measures for biodiversity and agreed with relevant consultees, prior to development commencing. The HMP will also seek to provide a net benefit for biodiversity. Where required, outline details of measures to be included within the HMP will be provided in the ES chapters.

6.45 At this stage it is not possible to define potential mitigation or compensation requirements for particular species, although based on survey results obtained to date extensive mitigation and compensation is considered unlikely to be required given actual losses will be localised and relatively minor in the context of the wider Site area and habitat to be retained.

Questions

Question 6.1: Do the consultees agree with the scope of survey work completed and proposed along with the proposal to scope out formal reptile surveys?

Question 6.2: Are there any other relevant consultees who should be consulted about the Ecology assessment?



LEGEND

- PEN MARCH SITE BOUNDARY
- 10KM BUFFER FROM SITE BOUNDARY
- SPECIAL AREA OF CONSERVATION
- SITES OF SPECIAL SCIENTIFIC INTEREST



4/5 LOCHSIDE VIEW
EDINBURGH PARK
EDINBURGH
EH12 9DH
T: +44 (0)131 335 6830
www.slrconsulting.com

PEN MARCH WIND FARM

EIA SCOPING REPORT

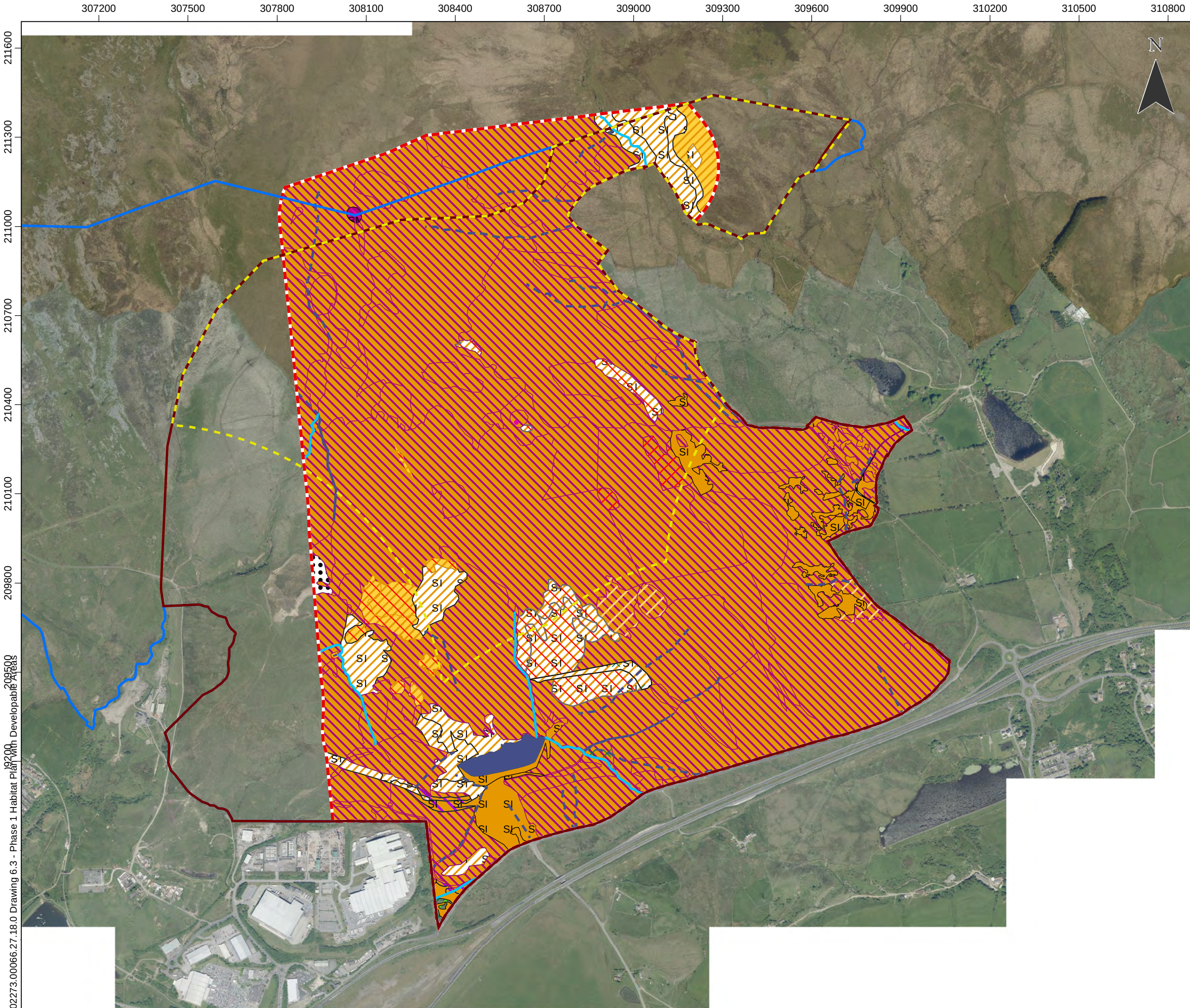
STATUTORY DESIGNATED SITES WITHIN 10KM
RELEVANT TO ECOLOGY & ORNITHOLOGY

Figure 6.1

Scale
1:100,000 @ A3

Date
APRIL 2020

02273.00066.27.1.0 Ecological Designations



LEGEND

- PEN MARCH SITE BOUNDARY
- 2019 PHASE 1 HABITAT SURVEY AREA
- DEVELOPABLE AREA ALL INFRASTRUCTURE
- DEVELOPABLE AREA FOR TURBINES
- STANDING WATER
- RUNNING WATER
- DRY DITCH
- PLANTATION MIXED WOODLAND
- SEMI-IMPROVED ACID GRASSLAND
- SEMI-IMPROVED ACID GRASSLAND AND SCATTERED SCRUB
- ROCK EXPOSURE/SEMI-IMPROVED ACID GRASSLAND MOSAIC
- SEMI-IMPROVED NEUTRAL GRASSLAND
- MARSHY GRASSLAND
- MARSHY GRASSLAND AND SEMI-IMPROVED ACID GRASSLAND MOSAIC
- MARSHY GRASSLAND AND SEMI-IMPROVED NEUTRAL GRASSLAND MOSAIC
- MARSHY GRASSLAND AND SCATTERED SCRUB
- MARSHY GRASSLAND AND ROCK EXPOSURE MOSAIC
- DRY HEATH/ACID GRASSLAND MOSAIC
- ROCK EXPOSURE AND DRY HEATH AND ACID GRASSLAND MOSAIC
- ACID FLUSH
- BASIN MIRE
- STANDING WATER
- BARE GROUND

0 100 200 300 400 500
Metres

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EDINBURGH PARK
EDINBURGH
EH12 9DH
T: +44 (0)131 335 6830
www.slrconsulting.com

PEN MARCH WIND FARM

EIA SCOPING REPORT

PHASE 1 HABITAT MAP

Figure 6.3

Scale 1:12,000 @ A3

Date MARCH 2020

02273.00066.27.18.0 Drawing 6.3 - Phase 1 Habitat Plan With Developable Areas

Chapter 7

Ornithology

Introduction

7.1 This chapter considers the potential effects of the Development on ornithology (birds). It includes a baseline description, followed by the proposed assessment methodology of the potential effects to be assessed in the ES.

7.2 This chapter has been prepared by SLR.

Existing Conditions

Information Sources:

7.3 The following sources of information have been reviewed during the desk-based research to inform this Scoping Report:

- Data provided by South East Wales Biodiversity Records Centre (SEWBRc). An ornithological data search was requested from SEWBRc in June 2019. The data search provided records of protected and notable species and ornithological designations for the Wind Farm Site boundary and land within a 2km radius; and
- Natural Resources Wales Website³⁵ and Lle Geo-Portal for Wales³⁶.

Designated Sites

7.4 There are no statutory designated sites notified or classified for their ornithological interest within 10km³⁷ of the Site (**Figure 6.1**). The nearest Special Protection Area (SPA) is the Severn Estuary SPA (Wales) which is located more than 34km to the south-east. It is therefore proposed that effects on statutory designated sites can be scoped out of the ornithological assessment.

7.5 There are a number of non-statutory designated sites within 2km of the Site (see **Figure 6.2**). The following Merthyr Tydfil County Borough Council Sites of Importance for Nature

³⁵ <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/>

³⁶ <https://lle.gov.wales/catalogue?lang=en&c=2007>

³⁷ Existing data for species and non-statutory designated sites were requested for the area within 2km of the site boundary in line with standard practice and

matching the maximum survey buffers required under current bird survey guidance for wind farms. For statutory designated sites the search area was extended to 10km to identify any sites notified for mobile features, which could potentially use areas well beyond designated site boundaries.

Conservation (SINCs)/Wildlife Sites include birds within their site description:

- Blaenmorlais;
- Cwm Taf Fechan;
- Merthyr Common Central; and
- Merthyr Common North.

Existing Records

7.6 SEWBRc provided data on protected, priority and other species of conservation concern occurring within a search distance of 2km. Of these species, the following are relevant in terms of their likelihood of occurrence and being potentially vulnerable or sensitive to wind farm developments according to Scottish Natural Heritage (SNH) guidance (which is also applicable in Wales)³⁸:

- Red kite;
- Marsh harrier;
- Hen harrier;
- Goshawk;
- Kestrel;
- Merlin;
- Osprey;
- Peregrine;
- Lapwing;
- Curlew;
- Barn owl; and
- Short-eared owl.

Completed Surveys

7.7 Surveys began in April 2019 and consisted of the following:

Breeding Season 2019

- **Flight Activity Surveys – Vantage Point (VP) Surveys.** In accordance with current SNH guidance³⁸, 36 hours of survey were carried out between April and August from each of two VPs, utilising 2km viewing arcs. VP locations and viewsheds, in relation to the maximum extent of the area in which turbines could be located (the developable area for turbines), are shown on **Figure 7.1**. As can be

seen from **Figure 7.1**, the two VPs provide good coverage of possible turbine locations plus appropriate buffer zones, although there is a small gap in the visibility apparent in the centre of the potential developable area due to the nature of the terrain. Despite this, it is considered that the vantage point data will be representative of the Site as a whole and sufficient to inform a robust assessment of the Development. Eight primary target species were recorded during these surveys. The most frequent flight activity was by red kite, with other target species activity much less frequent. The following is a full list of primary target species recorded:

- Mallard;
- Red kite;
- Marsh harrier;
- Hen harrier;
- Kestrel;
- Peregrine;
- Curlew; and
- Snipe.

- **Breeding Wader Surveys.** Surveys were based on current SNH guidance, which includes recommendations set out in Calladine *et al.* (2009)³⁹, requiring an adapted Brown & Shepherd⁴⁰ method with four survey visits, at least seven days apart, between mid-April and early July. Surveys covered all accessible suitable habitat for breeding waders within 500m of possible infrastructure locations under consideration at that time. The survey area is shown on **Figure 7.2** in relation to the developable area for infrastructure. It is noted that the developable area has increased in size slightly since the surveys were undertaken and therefore small areas now lie outside the area surveyed in 2019. These areas will be surveyed in 2020 (see below). Breeding wader surveys in 2019 recorded one target species (curlew, of which one confirmed and one possible territory were identified in the southern part of the survey area, outside the developable area for turbines) with one additional species (snipe) recorded during other surveys, just outside the survey area.

³⁸ Scottish Natural Heritage. 2017. Recommended bird survey methods to inform impact assessment of onshore wind farms. March 2017, Version 2.

³⁹ Calladine, J., Garner, G., Wernham, C. & Thiel, A. (2009). The influence of survey frequency on population estimates of moorland breeding birds. *Bird Study*, 56: 3, 381-388.

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

- **Breeding Raptor Surveys.** Methods followed Hardey *et al.* (2013)⁴¹. Four visits to all accessible suitable habitat (moorland and crags) were undertaken for hen harrier, merlin, peregrine and short-eared owl within 2km of the developable area for turbines under consideration at that time between April and July. In addition, potentially suitable habitat (woodland and mature trees), where accessible, was surveyed for breeding red kite within 2km of the developable area between March and August. Survey area boundaries are shown on **Figure 7.2**. As noted in respect of breeding wader surveys the developable area for turbines has increased in size slightly since the surveys were undertaken and small areas now lie within 2km that were not surveyed in 2019. Where accessible and where potentially suitable for raptors, these areas will be surveyed in 2020 (see below). Breeding raptor surveys recorded four primary target species and one secondary species, with none confirmed breeding within 2km. These are listed below:

- Red kite;
- Kestrel;
- Peregrine;
- Short-eared owl; and
- Buzzard.

Non-breeding season surveys 2019-2020

- **Flight Activity Surveys – Vantage Point (VP) Surveys.** In accordance with current SNH guidance, 36 hours of survey were carried out between September and February from each of two VPs, as described above. The most frequent flight activity was by red kite (19 flights recorded), with other target species activity less frequent (all other target species were recorded four times or less). The following primary target species were recorded during flight activity surveys:
 - Mallard;
 - Goosander;
 - Tufted duck;
 - Red kite;
 - Hen harrier;
 - Kestrel;

- Peregrine; and
- Golden plover.

7.8 Baseline reports providing further details of the surveys completed to date can be provided to relevant organisations on request.

Ongoing Surveys

7.9 Breeding season surveys in 2020 will repeat the surveys carried out in 2019 and commenced in March. Survey areas for breeding waders and raptors have been extended slightly to include relevant buffer zones around the developable area now under consideration.

7.10 Whilst we would make every effort to meet the proposed survey programme and efforts set out above, by necessity some timings and approaches may be subject to change in response to the developing situation regarding COVID-19. Any deviation from standard guidelines would be as a result of following relevant government or CIEEM guidance in relation to COVID-19 and associated limitations would be assessed appropriately. We would welcome discussions with relevant stakeholders on this subject if survey methods or timings are affected.

Proposed Surveys and Assessment Methodologies

Legislation, Policy and Guidance

7.11 The assessment of effects of the Development will be carried out in accordance with the principles contained within the following documents:

- The Conservation of Habitats and Species Regulations 2017 (as amended)⁴²;
- The Wildlife and Countryside Act 1981 (as amended);
- The Environment (Wales) Act 2016;
- Planning Policy Wales (PPW) (Edition 10, December 2018). PPW is supplemented by a series of Technical Advice Notes (TANs) of which TAN 5 is relevant to nature conservation and planning;
- Caerphilly Local Development Plan (LDP) adopted 2010;
- Merthyr Tydfil County Borough Council Replacement LDP (2016 - 2031) adopted 2020;

⁴¹ Hardey, J., Crick, H.Q.P., Wernham, C., Riley, H., Etheridge, B., Thompson, D. (2013). Raptors: A field guide for surveys and monitoring (3rd Edition). The Stationery Office Edinburgh.

⁴² The UK exited the European Union (EU) on 31st January 2020 and is currently within a transition period, until the end of 2020, during which EU

legislation and policy will be followed. As such, during the transition period the Habitats Regulations will continue to be officially referred to as the 'Conservation of Habitats and Species Regulations 2017 (as amended)'. See: <https://cieem.net/referencing-environmental-eu-legislation-post-brex/> [last accessed 7th March 2020].

- Band *et al.* (2007) Developing field and analytical methods to assess avian collision risk at wind farms;
- Johnstone and Bladwell (2016). Birds of Conservation in Wales 3: the population status of birds in Wales;
- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine;
- Ruddock and Whitfield (2007) A Review of Disturbance Distances in Selected Bird Species;
- Scottish Renewables (2015) Good Practice during Wind Farm Construction. Version 3;
- Scottish Natural Heritage (SNH) (2018a) Assessing Significance of Impacts from Onshore Wind Farms on Birds Outwith Designated Areas. Version 2;
- SNH (2018b) Assessing the Cumulative Impact of Onshore Wind Energy Developments;
- SNH (2016a) Assessing Connectivity with Special Protection Areas (SPAs);
- SNH (2016b) Environmental Statements and Annexes of Environmentally Sensitive Bird Information; and
- SNH (2017) Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms. Version 2.

Proposed Study Area

7.12 The study area for the assessment will be based upon the relevant developable area, plus any necessary buffer zones. Bird surveys are being carried out within species-specific buffer zones, according to current guidance. Further details on buffer zones were provided in paragraph 7.7.

Desk Study and Field Surveys

Desk Study

7.13 Additional desk-based study will involve the following elements:

- Review of published estimates of bird populations in Wales and the UK (e.g. from the Avian Population Estimates Panel (APEP))⁴³;
- A search for and review of any ES chapters, survey reports and post consent monitoring reports from other nearby developments;

- Review of Welsh Ornithological Society Reports;
- Review of relevant local authority biodiversity and species action plans; and
- Review of relevant online resources (e.g. BTO website).

Field Surveys

7.14 Surveys are ongoing and methods were described in paragraph 7.7, with further details available in the relevant baseline reports.

Consultation

7.15 The consultees below will be approached for information to inform the EIA:

- Natural Resources Wales (NRW);
- RSPB;
- Local Raptor Study Group; and
- Other relevant consultees as necessary.

Assessment Method

Methodology for Assessing Ornithological Features

7.16 The CIEEM Guidelines for Ecological Impact Assessment in the UK (CIEEM 2018)⁴⁴ will form the basis of the impact assessment with other relevant guidance, as listed in paragraph 7.11, referred to as appropriate. In accordance with the CIEEM guidelines, only ornithological receptors which are considered to be important and potentially affected by the project should be subject to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened and resilient to project impacts and would remain viable and sustainable.

7.17 Ornithological receptors will be considered within a defined geographical context. The following geographic frame of reference is likely to be used:

- International;
- National (i.e. Wales);
- Regional (i.e. South Wales);
- Local (i.e. the Site plus circa 10km); and
- Less than local.

7.18 The impact assessment process involves the following steps:

⁴³ Woodward, I., Aebischer, N., Burnell, D., Eaton, M., Frost, T., Hall, C., Stroud, D.A. & Noble, D. (2020). Population estimates of birds in Great Britain and the United Kingdom. *British Birds* 113: 69–104.

⁴⁴ Chartered Institute of Ecology and Environmental Management (CIEEM) (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.

- Identifying and characterising impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects (if required); and
- Identifying opportunities for ecological enhancement in order to provide a net benefit for biodiversity.

7.19 When describing impacts, reference will be made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

7.20 Both direct and indirect impacts will be considered. Direct impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a bird species during the construction process. Indirect impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or receptor, e.g. the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wetland habitats used by important bird species.

7.21 Disturbance/displacement effects will be assessed with reference to relevant scientific studies e.g. Pearce-Higgins *et al.* (2009)⁴⁵.

7.22 The standard Band Collision Risk Modelling (CRM) (Band *et al.* 2007⁴⁶) will be used to estimate levels of collision risk based on recorded target species activity levels and flight behaviour, proposed turbine numbers and specifications, and the relevant species biometrics and flight characteristics.

7.23 In accordance with CIEEM (2018) guidelines, a 'significant effect' is an effect that either supports or undermines conservation objectives for 'important ornithological receptors'. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). Effects can be considered significant at a wide range of scales

from international to local. For example, a significant effect on a regionally important population of a species is likely to be of regional significance.

7.24 Consideration of conservation status is important for evaluating the effects of impacts on bird species and assessing their significance. 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.

Grid Connection

7.25 The grid connection from the on-site substation to the wider electricity network will be subject to a separate consenting process and a separate assessment of ornithological effects. However, a high level assessment of the ornithological effects of the grid connection will be summarised within the ES for the proposed wind farm.

Cumulative Effects

7.26 SNH has produced guidance on assessing cumulative effects on birds due to onshore wind energy developments (SNH 2018b), which is also applicable in Wales. The approach proposed here is based on the SNH (2018) guidance.

7.27 Cumulative effects will be assessed for all species for which detailed assessment has been undertaken. The cumulative assessment will be based on consideration of residual effects, i.e. assuming that proposed mitigation and compensation measures for other projects are implemented.

7.28 With regard to the spatial extent of the cumulative assessment, the current SNH (2018b) guidance to assess cumulative effects at the Natural Heritage Zone (NHZ) scale, is not relevant in Wales where there are no NHZs. The proposed approach is to therefore use the core foraging range for each species included in the assessment, taken from SNH (2016a), to determine the spatial extent of the cumulative assessment. For example, for a species with a maximum core foraging range of 5km, all wind farms within 10km will be included in the cumulative assessment.

Potential Significant Effects of the Development

Construction

7.29 Taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this

⁴⁵ Pearce-Higgins, J.W., Stephen, L., Langston, R.H.W., Bainbridge, I.P. and Bullman, R. (2009). The Distribution of Breeding Birds Around Upland Wind Farms. *Journal of Applied Ecology* 46, 1323-1331.

⁴⁶ Band, W., Madders, M. and Whitfield, D.P. (2007) Developing Field and Analytical Methods to Assess Avian Collision Risk at Wind Farms. In: De Lucas, M., Janss, G. and Ferrer, M., Eds., *Birds and Wind Power*, Quercus Editions, Madrid, 259-275.

preliminary stage, potential construction (including cumulative) effects to be assessed in the EIA include:

- Nest damage or destruction: Damage or destruction to active nests could contravene the Wildlife and Countryside Act 1981 (as amended);
- Habitat Loss: Construction of turbine bases, access tracks and other structures will lead to direct and indirect habitat loss. This habitat loss is only likely to affect any important species breeding within the study area, which are likely to use these habitats for nesting and foraging; and
- Disturbance/displacement: During the construction stage of the proposed development, the potential effects of associated noise and visual disturbance could lead to the temporary displacement or disruption of breeding and foraging birds. The level of impact will depend on the timing of potentially disturbing activities, the extent of displacement (both spatially and temporally) and the availability of suitable habitats in the surrounding area for displaced birds to occupy.

Operational

7.30 Taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this preliminary stage, potential operational (including cumulative) effects to be assessed in the EIA include:

- Disturbance/displacement: The operation of wind turbines and associated human activities for maintenance purposes has the potential to cause disturbance and displace birds from the Site. Disturbance effects during the operational phase may be less than during the construction phase, as species may become habituated to wind turbines and disturbance due to human activities will be considerably reduced; and
- Collision with turbines: Collision of a bird with turbine rotors is almost certain to result in the death of the bird. The frequency and likelihood of a collision occurring depends on a number of factors. These include aspects of the size and behaviour of the bird (including their use of a site), the nature of the surrounding environment, and the structure and layout of the wind turbines.

Effects Scoped Out

7.31 On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from other similar projects and consultation responses, it is proposed that the following effects can be scoped out due to good design and implementation of standard good practice construction measures:

- Impacts on designated sites, due to distance between the Site and the nearest site(s) designated for their ornithological interest;
- Impacts on species of less than local importance. In accordance with CIEEM (2018) guidelines, in order for the assessment to focus on potentially significant effects, detailed assessment is only required for species with a certain level of importance; and
- Impacts on species/groups not susceptible to significant effects from wind farms (such as passerines) as specified in current SNH (2017) guidance.

7.32 In addition to the above, it is proposed to scope out a second year of non-breeding bird surveys. SNH (2017) guidance recommends survey for two years to allow for variation in bird use between years unless it can be demonstrated that a shorter period of survey is sufficient. In this case, the scale of development is relatively small (up to seven turbines), there are no designated sites likely to be affected and although target species were recorded during non-breeding surveys in 2019-20 activity was limited to birds occasionally flying over the developable area and for most species such flight activity was relatively low. It is therefore considered that the 2019-20 survey data are sufficient to inform a robust assessment.

Approach to Mitigation

7.33 A sequential process will be adopted to avoid, mitigate and compensate for ornithological impacts. This is often referred to as the 'mitigation hierarchy'.

7.34 The EIA will clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided e.g. through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible; and
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

7.35 At this stage it is not possible to define potential mitigation or compensation requirements, although based on survey results obtained to date extensive mitigation and compensation is considered unlikely to be required.

7.36 Mitigation may include micro-siting of turbines or other infrastructure to avoid or reduce environmental effects. In order to avoid micro-siting leading to negative effects on important ornithological receptors, restrictions on micro-siting in specific areas will be stated, if required.

7.37 Where deemed necessary, a Habitat Management Plan (HMP) will be produced to set out mitigation, compensation and/or enhancement measures for biodiversity and agreed with relevant consultees, prior to development commencing. The HMP will also seek to provide a net benefit for biodiversity. Where required, outline details of measures to be included within the HMP will be provided in the relevant ES chapters.

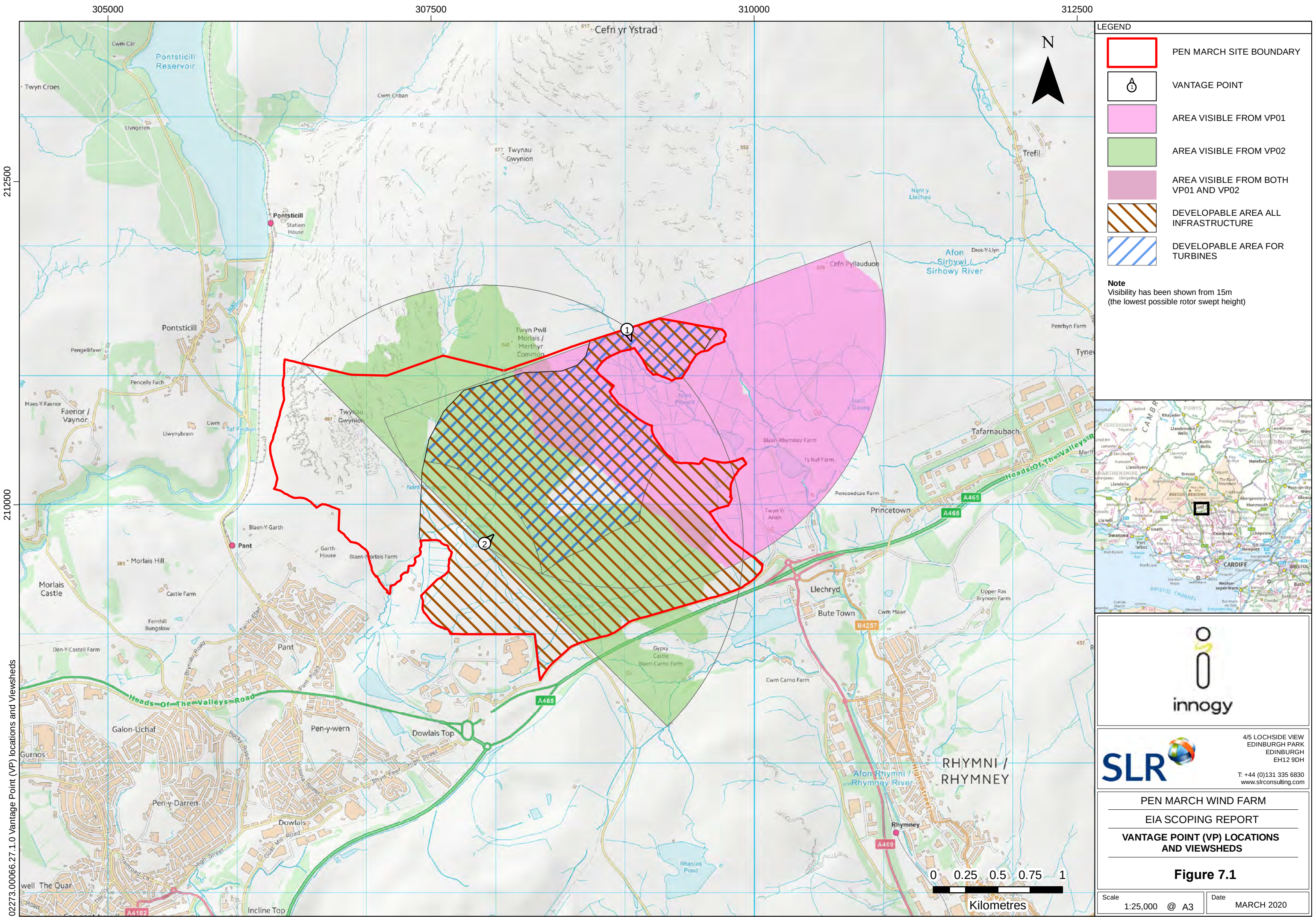
Questions

Question 7.1: Do the consultees agree with the scope of survey work completed to date and specifically the proposal to scope out non-breeding season flight activity surveys in Year 2 (winter 2020-2021)?

Question 7.2: Do the consultees agree with the proposed assessment methodology and specifically the spatial extent of the cumulative assessment?

Question 7.3: Do the consultees have any relevant information regarding potential sources of regional or local population data for key bird species or any other relevant bird data not collected to date?

Question 7.4 Are there any other relevant consultees who should be consulted about the Ornithology assessment?



LEGEND

- PEN MARCH SITE BOUNDARY
- VANTAGE POINT
- AREA VISIBLE FROM VP01
- AREA VISIBLE FROM VP02
- AREA VISIBLE FROM BOTH VP01 AND VP02
- DEVELOPABLE AREA ALL INFRASTRUCTURE
- DEVELOPABLE AREA FOR TURBINES

Note
Visibility has been shown from 15m
(the lowest possible rotor swept height)

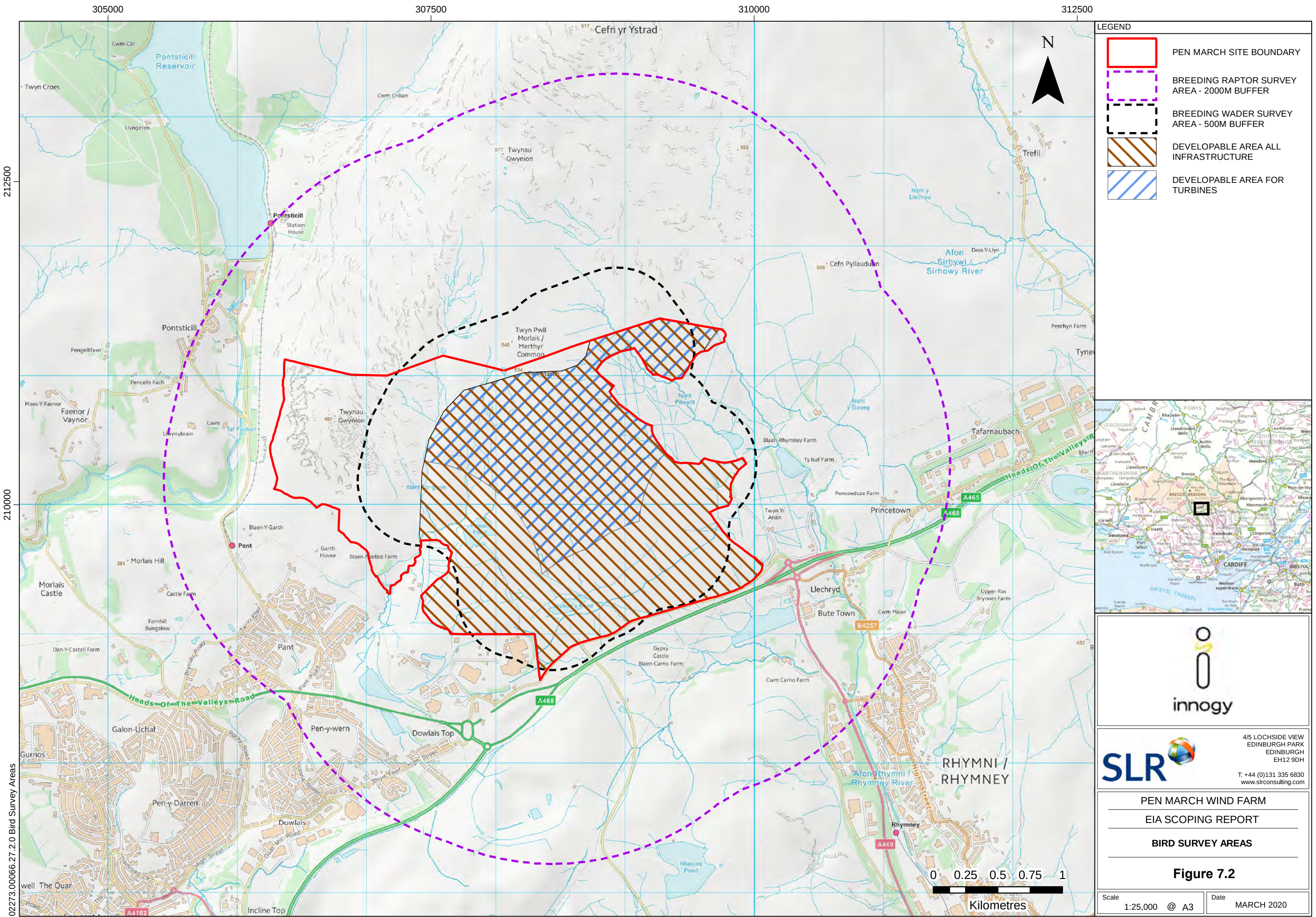


4/5 LOCHSIDE VIEW
EDINBURGH PARK
EDINBURGH
EH12 9DH
T: +44 (0)131 335 6830
www.slrconsulting.com

PEN MARCH WIND FARM
EIA SCOPING REPORT
VANTAGE POINT (VP) LOCATIONS AND VIEWSHEDS

Figure 7.1

Scale 1:25,000 @ A3	Date MARCH 2020
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LEGEND

- PEN MARCH SITE BOUNDARY
- BREEDING RAPTOR SURVEY AREA - 2000M BUFFER
- BREEDING WADER SURVEY AREA - 500M BUFFER
- DEVELOPABLE AREA ALL INFRASTRUCTURE
- DEVELOPABLE AREA FOR TURBINES



4/5 LOCHSIDE VIEW
EDINBURGH PARK
EDINBURGH
EH12 9DH
T: +44 (0)131 335 6830
www.slrconsulting.com

PEN MARCH WIND FARM

EIA SCOPING REPORT

BIRD SURVEY AREAS

Figure 7.2

Scale
1:25,000 @ A3

Date
MARCH 2020

02273.00066.27.2.0 Bird Survey Areas

Chapter 8

Noise

Introduction

8.1 This chapter sets out the proposed approach to the assessment of potential noise and vibration effects associated with the construction and operation of the Development.

8.2 This chapter has been prepared by Hoare Lea.

Existing Conditions

Information Sources

8.3 The Ordnance Survey information was reviewed during the desk-based research for this Scoping Report:

Existing Conditions

8.4 The Site is located approximately 1km north-east of Dowlais Top, on the north-eastern fringe of Merthyr Tydfil and 2km north-west of Rhymney town centre. The noise environment in the surrounding area is therefore expected to be characterised by a mix of 'natural' sources such as noise from vegetation, animals/birds and watercourses, as well as anthropogenic noise sources. The latter will include noise from road traffic, in particular the A4060 and A465, as well as industrial and farming activities. These sources will however likely have a reduced influence during quiet periods of the day (evenings and weekends) as well as at night.

8.5 The baseline environment will be assessed as described below by measuring background noise levels, as a function of site wind speed, at the nearest residential neighbours (or a representative sample of the nearest neighbours). This will take into account the quieter periods of the day highlighted above.

Proposed Surveys and Assessment Methodologies

Legislation, Policy and Guidance

8.6 The assessment of effects of the Development will be carried out in accordance with the principles contained within the following documents:

- Planning Policy Wales (edition 10, December 2018);

- Technical Advice Note (TAN, Wales) 11: Noise (1997);
- Technical Advice Note (TAN, Wales) 8, Planning for Renewable Energy (2005);
- The assessment and rating of noise from wind farms (ETSU-R-97) 1996;
- A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise, Institute of Acoustics (IOA), May 2013, (IOA GPG);
- British Standard BS 4142 (2014+A1:2019) (whilst this does not apply to wind farms, it may apply to the substation and/or battery storage);
- Environmental Protection Act 1990;
- Control of Pollution Act 1974;
- British Standard BS 5228 (2009+A1:2014), Code of practice for noise and vibration control on construction and open sites, parts 1 and 2; and
- Minerals Technical Advice Note (Wales) 1: Aggregates (MTAN1).

8.7 Planning Policy Wales (PPW) requires consideration of potential noise impacts for developments such as Pen March Wind Farm. PPW references TAN 8: Planning for Renewable Energy. TAN 11 supplements PPW by providing further specific advice on noise.

8.8 Both PPW and TAN 8 (which is itself referenced in TAN 11 in relation to wind turbines) make reference to the recommendations of ETSU-R-97 (The Assessment and Rating of Noise from Wind Farms) as relevant guidance when considering operational noise from wind farms. TAN 8 is due to be superseded by the National Development Framework 2020-2040 (NDF), and PPW will also be updated following NDF adoption. Based on the content of the published draft NDF and the wider policy framework and established good practice, reference will still be made to the ETSU-R-97 method when assessing wind farm noise effects.

8.9 Good practice in the application of the ETSU-R-97 methodology will be referenced, as set out in the Institute of Acoustics Good Practice document (IOA GPG).

8.10 In Wales, the Environmental Protection Act 1990 (EPA) and the Control of Pollution Act 1974 are two legislative instruments which address the effects of construction noise and vibration and nuisance.

8.11 To assess construction noise and vibration, Annex B of TAN 11 refers to BS 5228. Part 1 of the standard (BS 5228-1) provides guidance on a range of considerations relating to construction noise including the legislative framework, general control measures, example methods for estimating construction noise levels and example criteria which may be considered

when assessing the significance of any effects. Similarly, part 2 (BS 5228-2) provides general guidance on legislation, prediction, control and assessment criteria for construction vibration.

8.12 TAN11 does not deal specifically with noise from stone extraction (for example from borrow pits). However, Welsh planning guidance on surface mineral extraction provides guidance that is relevant to the types of mineral extraction activity associated with site construction works. Specifically, Minerals Technical Advice Note (Wales) 1: Aggregates (MTAN 1) can be referenced in addition to general guidance in BS 5228-1 and BS 5228-2.

Proposed Study Area

8.13 The assessment will consider noise sensitive residential locations in the vicinity of the proposed Development. Specifically, ETSU-R-97 states that operational noise levels will be considered acceptable, even in the absence of measured baseline data, if predicted noise levels (including cumulative contributions from all wind farms) do not exceed 35 dB L_{A90} . Therefore, the study area will encompass dwellings where predicted levels approach or are likely to approach this threshold.

8.14 An initial desktop study based on a preliminary turbine layout will form the basis of identifying receptors to include in this study area.

8.15 In addition, properties located along the Development construction access route will be considered.

Desk Study and Background Noise Surveys

Desk Study

8.16 The desk-based study will be designed to assist in determining the characteristics of the Site and will collate baseline information from available sources to inform the subsequent field survey. The desk-based study will typically involve the following elements:

- Operational noise modelling of the turbines based on the proposed layout iteration and representative emission data; and
- Modelling of effects of construction such as in particular the associated traffic on relevant noise-sensitive locations.

Baseline Noise Surveys

8.17 The baseline environment will be assessed by measuring background noise levels as a function of site wind speed at the nearest neighbours (or, at a representative sample of the nearest neighbours), as required under ETSU-R-97.

8.18 At this stage it is considered likely that this may involve several residential properties neighbouring the Development to the south-west, south and south-east. Properties that are relatively distant from the Development or such that noise levels above 35 dB L_{A90} are unlikely will not require consideration in the noise survey. The survey work will be undertaken when safe to do so with regards to the currently evolving COVID-19 outbreak.

Consultation

8.19 The consultees below will be approached for information to inform the EIA:

- Caerphilly County Borough Council;
- Merthyr Tydfil County Borough Council;
- Blaenau Gwent County Borough Council; and
- Powys County Council.

8.20 The choice of baseline measurement locations, as well as the details of the assessment methodology where relevant, will be determined in consultation with the Environmental Health Departments of the relevant local authorities.

8.21 Although the Development Site is located on the boundary of the above-listed local authority areas, it is considered likely that the properties considered in the baseline noise survey will be located in the Caerphilly and Merthyr Tydfil County Borough Council areas only and therefore detailed consultation is likely to be restricted to these local authorities.

Assessment Method

Construction Noise

8.22 In considering potential noise levels associated with construction traffic movement on public roads, reference will be made to the accepted UK prediction methodology provided by 'Calculation of Road Traffic Noise' (CRTN, 1988). The general guidance in BS 5228 will also be referenced.

Operational Noise

8.23 The methodology for the assessment of operational noise from wind farms recommended in planning guidance is that documented in ETSU-R-97. In summary, the assessment will:

- Identify the nearest noise sensitive receptor(s);
- Determine the quiet day-time and night-time noise limits from the measured background noise levels at the nearest neighbour(s);
- Specify a candidate turbine with noise emission characteristics of the possible wind turbines for the Site;

- Calculate noise immission levels owing to the operation of the wind turbines as a function of site wind speed at the nearest neighbours, including the cumulative effect of all turbines; and

- Compare the calculated wind farm noise immission levels with the derived noise limits.

8.24 Please note that the term 'noise emission' relates to the sound power level actually radiated from each wind turbine, whereas 'noise immission' relates to the sound pressure level (the perceived noise) at a receptor location due to the combined operation of all wind turbines.

8.25 The good practice guidance referenced above will be taken into account, including advice on baseline survey, wind shear assessment and noise prediction methodology.

8.26 The calculated wind farm noise immission levels will be compared with the noise limits derived in accordance with ETSU-R-97.

8.27 The noise limits derived according to ETSU-R-97 guidance, for each noise-sensitive receptor, apply to the total noise produced by all wind farms. Therefore, potential cumulative operational noise levels, including existing, consented and in planning wind turbines in the area, must be assessed relative to these limits.

8.28 In this instance however, most of the nearest existing or consented wind farm schemes are located 10km or more from the project area: on this basis, their influence in terms of noise is considered to be negligible and does not need to be considered further. The Pen Bryn Oer Wind Farm and individual wind turbine developments are in closer proximity, and, although it is considered unlikely that significant cumulative noise implications will arise, will be considered as part of a cumulative operational noise assessment.

8.29 Fixed plant associated with the proposed substation will be enclosed and therefore unlikely to be a significant source of noise. Operational noise from this proposed substation and/or energy storage plant will be assessed using BS 4142 which applies to general noise sources of this type. This will reference existing baseline noise levels in the area, as appropriate.

Potential Significant Effects of the Development

Construction

8.30 During construction and decommissioning, noise could arise from both activities within the project area, such as the construction of access tracks, turbine foundations, the control building (substation) etc., and also from the movement of construction related traffic both within the project area and travelling on public roads to and from the proposed

Development. Assessment of the temporary effects of construction noise and vibration is primarily aimed at understanding the need for dedicated management measures and, if so, the types of measures that are required.

8.31 Taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this preliminary stage, the potential construction effects to be assessed in the EIA will include:

- Noise associated with the construction traffic (including cumulative); and.
- Noise associated with stone extraction from borrow pits.

Operational

8.32 During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise will be caused by the interaction of the turbine blades with the air. Mechanically generated noise will be caused by the operation of internal components, such as the gearbox and generator, which are housed within the nacelle of the turbine. However, the level of mechanical noise radiated from current technology wind turbines is generally engineered to a low level.

8.33 Taking account of the findings of the work undertaken to date whilst still adopting a precautionary approach at this preliminary stage, potential operational (including cumulative) effects to be assessed in the EIA include:

- Noise during operation of the proposed development; and
- Cumulative operational impacts.

Effects Scoped Out

8.34 On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from other similar projects and consultation responses, it is proposed that the following effects can be scoped out due to good design and implementation of standard good practice construction measures:

- Noise and vibration associated with on-site construction and decommissioning activities;
- Vibration associated with construction traffic; and
- Vibration effects during operation.

8.35 As all on-site construction activities are likely to be relatively distant from the nearest noise-sensitive receptors, noise and vibration effects during the construction and decommissioning of the proposed Development are unlikely to be significant, provided that working hours are restricted, and it is therefore proposed that these effects will be scoped out of the ES. This will also apply to the works associated with the grid

connection which will be of very limited duration in any particular area. Similarly, decommissioning is likely to result in less noise than during construction of the proposed Development and is also proposed to be scoped out.

8.36 Occasional momentary vibration can arise when heavy vehicles pass dwellings at very short separation distances, but this is not sufficient to present a risk of significant effects. Therefore, vibration effects associated with construction are also proposed to be scoped out.

8.37 It is recognised that vibration resulting from the operation of wind farms is imperceptible at typical separation distances. It is therefore proposed to scope out the assessment of vibration produced during the operation of the proposed development.

Approach to Mitigation

8.38 Mitigation of operational noise will be achieved through the design of the project, such that the relevant ETSU-R-97 noise limits can be achieved at the surrounding properties with commercially available wind turbines, taking into account the noise immissions from cumulative wind farms in the area.

8.39 Regarding construction noise and vibration, relevant working practices, traffic routes, management procedures and proposed working hours will be set out in the noise chapter of the ES.

Questions

Question 8.1: Do the consultees agree with the suggested approach for the noise assessment?

Question 8.2: Do the relevant Local Authorities agree with the noise topics proposed to be scoped out of the EIA?

Question 8.3 Are there any other relevant consultees who should be consulted about the noise assessment?

Chapter 9

Access, Traffic and Transport

Introduction

9.1 This chapter sets out the proposed approach to the assessment of potential access, traffic and transport effects associated with the construction and operation of the Development.

9.2 This chapter has been prepared by Systra Ltd.

Existing Conditions

Information Sources

9.3 The following source of information was reviewed during the desk-based research to inform this Scoping Report:

- Blaen Sirhywi & Pen March Wind Farms – Abnormal Indivisible Load Route Survey.

Existing Conditions

9.4 The EIA will fully consider the access arrangements to the Development. As mentioned in **Chapter 3** of this Scoping Report, it is currently anticipated that abnormal load traffic will travel to the Site from the port of entry at Swansea. It will then route to the Site via the A483, M4, A465 and finally along the Common Road which runs along the southern boundary of the Site.

9.5 General construction traffic (transportation of plant, materials and construction staff to Site) will also need to be fully considered. The access routes to Site for general construction traffic will include the A4060, A470, A465 and the Common road. The environmental effects associated with this increase in traffic levels for the construction of the wind farm and grid connection will be assessed in the ES access, traffic and transport chapter.

9.6 There are a number of potential access points into the Site and these will be investigated further during the EIA process to establish a preferred access point. The preferred access point for abnormal loads is also highly likely to form the access into the Development for both general construction traffic and operational traffic

9.7 The main access point into the wind farm is likely to be via a new access off the Common Road which runs along the southern boundary of the Site.

Proposed Surveys and Assessment Methodologies

Legislation, Policy and Guidance

9.8 The assessment of effects of the Development will be carried out in accordance with the principles contained within the following documents:

- Guidelines for Traffic Impact Assessment (1994) Institution of Highways and Transportation (IHT);
- Guidelines for the Environmental Assessment of Road Traffic (2017) Institute of Environmental Management and Assessment (IEMA);
- National Transport Plan;
- Regional Transport Plan; and
- Design Manual for Roads & Bridges (DMRB).

Proposed Study Area

9.9 The proposed study area for the assessment of traffic and associated environmental effects will encompass receptors along the A465, Common Road, A4060 and A470 corridors which will provide access to the Site for general construction traffic and for abnormal loads. The main sensitive receptors to increased traffic levels and associated environmental effects are likely to be users of the existing roads within the study area (including pedestrians and cyclists) as well as settlements, schools and dwellings located adjacent to the road corridors.

Desk Study and Field Surveys

Desk Study

9.10 The scope of works relating to traffic and transport is likely to include the desk-based collation of traffic count data sourced either from historic traffic data for the area or from new traffic counts.

9.11 A site visit has already been undertaken along with an Abnormal Loads Assessment (ALA) to examine the potential abnormal loads route to the Site and the options for accessing the Site boundary from the local road network. The desk based element of the study includes identification of potential pinch points on the abnormal loads route and swept paths to determine the requirement for mitigation. The findings of the ALA will be submitted as a technical appendix to the ES.

Traffic Surveys

9.12 If suitable historic traffic count data is not available, it may be necessary to undertake further traffic count surveys. These will consist of 7-Day automatic traffic count surveys for the following road links:

- A465 Trunk road (Heads of the Valleys Road);
- Commons Road (Unclassified road running along southern boundary of the Site);
- A4060 Trunk Road; and
- A470 Trunk Road.

Consultation

9.13 The consultees below will be approached for information to inform the EIA:

- South Wales Trunk Road Agent;
- Merthyr Tydfil County Borough Council Highways; and
- Caerphilly County Borough Council.

Assessment Method

9.14 The effect of the increase in construction vehicle traffic movements will be quantified through comparison of existing traffic flows and vehicle composition (baseline data) with the flows predicted as a result of the construction of the Development. This will be undertaken for the key access routes within the study area (A465, the Common Road, A4060 and A470) that will be used by general construction traffic to access the Site. Consideration of the potential effect on other road users will also be undertaken where road links are affected by construction traffic.

9.15 In addition, the potential for cumulative effects will be considered with other wind farms and potentially other major developments which propose to use the same public roads as the Development during construction. The final list of developments to be included in the assessment of cumulative effects will be agreed via the process described in Chapter 2 of this report (Sections 2.8 and 2.9).

Potential Significant Effects of the Development

Construction

9.16 The IEMA guidelines set out a list of environmental effects which should be assessed for significance in relation to the transport resource (if the identified thresholds are exceeded, i.e. 'Rule 1' or 'Rule 2' described below), as follows:

- Noise and vibrations;
- Air pollution;
- Severance;
- Driver delay;
- Pedestrian delay and amenity;

- Accidents and safety;
- Dust and dirt; and
- Hazardous loads.

9.17 The EIA will explore whether effects on these are likely to be significant based upon two tests contained within IEMA Guidelines. The guidelines suggest that, in order to determine the scale and extent of the assessment and the level of effect that the Development will have on the surrounding road network, the following two 'rules' should be applied:

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

Effects Scoped Out

9.18 On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from other similar projects and consultation responses, it is proposed that the following effects can be scoped out due to good design and implementation of standard good practice construction measures:

- The effect of operational and maintenance vehicles on existing traffic flows and the local road network; and
- The effects of vehicles associated with the decommissioning stage of the Development.

Approach to Mitigation

9.19 It is anticipated that a mitigation package will be required to accommodate development traffic on the local road network during the construction phase of the Development. A Construction Traffic Management Plan (CTMP) will be proposed as a planning condition to secure mitigation of the effects of construction traffic (and associated environmental) effects. The CTMP will include measures under the following categories:

- Construction programme and phasing;
- Quantification of construction movements;
- Working hours;
- Measures to minimise construction traffic effects (delivery control, sustainability, speed limits, designated haul routes, staff induction, workforce travel arrangements, signage etc); and
- Communication arrangements (with local community, Caerphilly County Borough Council, Merthyr Tydfil.

County Borough Council, local employers and other construction sites).

9.20 The mitigation measures to form the CTMP will be subject to further explicit treatment within the ES.

Questions

Question 9.1: Can the consultees confirm the acceptability of scoping out operational and decommissioning effects?

Question 9.2 Are there any other relevant consultees who should be consulted about the Access, Traffic and Transport assessment?

Chapter 10

Cultural Heritage and Archaeology

Introduction

10.1 This chapter sets out the proposed approach to the assessment of effects of the Development on cultural heritage receptors (hereafter 'historic assets'), both during construction and operation.

10.2 This chapter has been prepared by LUC.

Existing Conditions

Information Sources

10.3 The following sources of information have been reviewed during the desk-based research to inform this Scoping Report:

- Cadw data, comprising:
 - Listed Buildings⁴⁷;
 - Scheduled Monuments⁴⁸;
 - Conservation Areas⁴⁹;
 - Historic Parks and Gardens⁵⁰;
 - World Heritage Sites⁵¹; and
 - Historic Landscapes⁵².
- Glamorgan Gwent Archaeological Trust (GGAT) Historic Environment Record (HER) data (received 26/02/2020) for a search area comprising a 5km buffer from the Site boundary;
- Published information on registered historic landscapes available on the Cadw and GGAT websites;
- Historic and current Ordnance Survey mapping;
- Recent digital aerial photography (available via Google Earth);
- Seven-turbine ZTV prepared to inform scoping; and
- Initial findings of other topics (LVIA, ground conditions).

⁴⁷ Revision date 14/02/2019

⁴⁸ Revision date 14/02/2019

⁴⁹ Revision date 28/07/2016

⁵⁰ Revision date 17/07/2017

⁵¹ Revision date 06/01/2017

⁵² Revision date 19/06/2017

Proposed Development Site

Designated Historic Assets

10.4 The Site boundary extends into the Merthyr Tydfil Landscape of Outstanding Historic Interest, hereinafter 'LOHI', a designated historic asset (see **Figure 10.1**). The LOHI occupies a natural basin at the head of the Taff valley, and was one of the largest iron-making towns in the world in the early to mid-19th century. Three of the LOHI's component Historic Landscape Characterisation Areas (HLCAs) lie within the Site boundary (Merthyr Common, Twynau Gwynion Quarries and Pengarnddu) and all relate to 19th century industrial activity.

Non-Designated Historic Assets

10.5 The GGAT HER data has numerous entries for the Site and surroundings, in part reflecting that several thematic studies (e.g. of ironworks and related features) have been undertaken in this area. The entries are shown on **Figure 10.1** and those specially referenced in the text below are labelled on this figure.

10.6 The earliest non-designated historic assets recorded within the Site but outside the Development area are a prehistoric ring cairn, enclosure and kerb cairn on Merthyr Common (GGAT HER 03139m, 04892m, and 04893m). The route of a Roman road is recorded as passing through the western extent of the Site. A medieval house platform is also recorded on Merthyr Common (GGAT HER 04894m).

10.7 The remaining non-designated assets within the Site boundary date to the post-medieval to modern periods, relating to mining and agricultural activity. Four lines of tramroad serving the Twynau Gwynion ironworks are recorded as passing through the western extent of the Site. The ironworks itself lies beyond the Site boundary within Merthyr Tydfil.

10.8 Within the developable area there are post-medieval irrigation structures as part of the Dowlais Free Drainage System, a sheepfold and shooting butt (GGAT HER 02708m, 02714m and 03138m). The drainage system was an engineered arrangement of leats and reservoirs which channelled water to service iron working.

Wider area

10.9 The following designated historic assets lie within 10km of the Site boundary:

- 108 scheduled monuments;
- 340 listed buildings (2 Grade I, 24 Grade II*, 314 Grade II);
- 11 conservation areas;
- 4 registered parks and gardens; and

- 2 registered landscapes, the East Fforest Fawr and Mynydd-y-Glog Landscape of Special Historic Interest (LSHI) and the Gelli-Gaer Common LOHI.

10.10 These assets span later prehistory (scheduled monuments associated with ritual and funerary activity) right up to the later twentieth century (the cemetery and memorial gardens at Aberfan which are a Grade II registered park and garden). The majority of assets relate to the growth of industry, particularly iron working, and associated settlement from the early 19th century. Such assets are mostly concentrated within the valleys, although related, usually non-designated, assets lie within the open moorland bordering the towns at the heads of the valleys.

10.11 The following designated historic assets lie within areas of turbine visibility within the seven-turbine ZTV prepared to inform scoping:

- 90 scheduled monuments;
- 187 listed buildings (12 Grade II*, 175 Grade II);
- 8 conservation areas;
- 3 registered parks and gardens; and
- East Fforest Fawr and Mynydd-y-Glog LSHI and the Gelli-Gaer Common LOHI.

Proposed Surveys and Assessment Methodologies

10.12 The assessment of effects of the Development will be carried out in accordance with the principles contained within the following documents:

- Welsh Government (2018) Planning Policy Wales (PPW);
- Welsh Government (2017) Technical advice note (TAN) 24: the historic environment;
- Cadw (2011) Conservation Principles for the sustainable management of the historic environment in Wales;
- Cadw (2017) Setting of Historic Assets in Wales;
- Cadw (2017) Heritage Impact Assessment in Wales;
- Chartered Institute for Archaeologists (2017) Standard and guidance for historic environment desk-based assessment; and
- If relevant (see para.10.21) Cadw (2017) Guide To Good Practice On Using The Register Of Landscapes Of Historic Interest In Wales In The Planning And Development Process (2nd edition) (aka ASIDOHL2).

Proposed Study Area

10.13 There is no industry-wide accepted methodology for the assessment of effects to cultural heritage and archaeology within EIA. As such, the study areas proposed are based upon recent practice within EIA for wind energy projects. The Development has the potential to cause direct physical effects to historic assets lying within the Site and may cause effects to assets lying in proximity to the Site due to the change in their setting the presence of the scheme would cause. The following study areas are proposed for the wind farm element of the scheme:

- A Primary Study Area consisting of the land within the Site boundary. All historic assets lying within this area will be considered;
- An Inner Setting Study Area consisting of land lying within the Site boundary and a 5km buffer from it. Historic assets lying within this area will be considered for the potential for effects due to setting change; and
- An Outer Setting Study Area consisting of land lying between the 5 and 10km buffers from the Site. Designated historic assets lying within this area will be considered for the potential for effects due to setting change.

10.14 An appropriate study area would be developed for a high level grid connection assessment This will be dependent on the nature of grid connection proposed (i.e. OHL or undergrounded). The extent of the grid connection study area will be guided by the understanding of the likely direct physical effects of the proposed connection and understanding of experiential changes the connection may cause to or in the setting of historic assets (e.g. level and extent of visibility of the connection).

Desk Study and Field Surveys

Desk Study

10.15 The desk-based study will identify the key characteristics of the Site and surrounding area and will collate baseline information from available sources to inform the subsequent field survey. The desk-based study will typically involve review of the following:

- Cadw datasets on designated historic assets and GGAT HER;

- Published sources on the archaeological and historical background of the area (incl. information on registered historic landscapes);
- Historic mapping, including archival sources such as tithe mapping;
- Aerial photography – both recent digital and historic coverage (historic aerial coverage is held by RCAHMW and Welsh Government);
- ZTVs; and
- Findings of other topics (LVIA, ground conditions, noise and vibration).

Field Surveys

10.16 The field survey will comprise a walkover survey of the Site, focused around infrastructure locations, and visits to those historic assets identified as likely to experience effects related to setting change. Should any hitherto unidentified historic assets be identified during the course of the walkover survey, an appropriate record (i.e. location, extent, apparent form of and significance of asset) will be made of them.

Consultation

10.17 The consultees below will be approached for information to inform the EIA:

- Cadw;
- GGAT; and
- Merthyr Tydfil, Caerphilly and Blaenau Gwent local authorities⁵³.

Assessment Method

10.18 Historic assets will be considered in terms of their level of 'heritage significance'⁵⁴. Owing to the use of the term 'significance' in EIA practice to refer to the level of effect a receptor would experience as a result of a development, heritage significance will be referred to as the 'value' of the asset. Value will be ascribed with regard to the following criteria:

- **High** – historic assets of national significance. This will comprise designated historic assets and non-designated assets of demonstrably equivalent significance;
- **Medium** – historic assets of regional significance. Identified with reference to regional priorities, e.g. as identified in 'A Research Framework for the Archaeology of Wales'⁵⁵; and

⁵³ No consultation is proposed with Powys as there are no assets (i.e. Grade II listed buildings, conservation areas) within their remit as a consultee on this topic within the Inner Setting Study Area or Outer Setting Study Area.

⁵⁴ As articulated in Cadw Conservation Principles

⁵⁵ <https://www.archaeoleg.org.uk/intro.html>

- **Low** – historic assets of local significance.

10.19 All effects will be assessed in terms of the way in which the proposed development will, either physically or through change in setting, affect the significance of the historic asset. This will be articulated with reference to Cadw's Conservation Principles. In articulating effects, an overall judgement will be made on the level of harm or benefit a historic asset will experience as a result of the Development, supported by an appropriate narrative linking this to how the asset will have its significance changed.

10.20 Assessment of effects related to change in setting will be informed by review of ZTVs for the Development and visualisations such as wirelines and photomontages. The use of photomontages to support reporting of effects to particular assets will be agreed in the course of the assessment with the relevant consultee. Assessment of effects related to setting change will be undertaken using the staged approach laid out in the Cadw setting guidance.

10.21 Although the design of Pen March Wind Farm is at an early stage of development, it is possible that no infrastructure will eventually be sited in the Merthyr Tydfil LOHI. Initial consultation with the relevant consultee, Cadw, has established that, should this remain the case, then the appropriate means of assessing effects to this LOHI and the East Fforest Fawr and Mynydd-y-Glog LSHI and the Gelli-Gaer Common LOHI will be a setting assessment. Should any design changes mean that key aspects of infrastructure (e.g. turbines) were proposed for siting within the Merthyr Tydfil LOHI then Cadw has confirmed that an ASIDOHL2 will be required.

Cumulative Assessment

10.22 There is no industry-wide accepted methodology for the assessment of cumulative effects to cultural heritage and archaeology within EIA. The assessment of cumulative effects will review the agreed list of cumulative schemes for the Development (as detailed in Chapter 2 of this Scoping Report) and identify whether any further effects (i.e. effects that will not be caused solely by the Development itself) will arise. This assessment will be undertaken and articulated in the same terms as the assessment of the effect of the Development in its own right.

Potential Significant Effects of the Development

Construction

10.23 Taking account of the findings of the work undertaken to date, whilst still adopting a precautionary approach at this preliminary stage, potential construction (including cumulative) effects to be assessed in the EIA include:

- Direct effects to historic assets within the Development footprint; and
- Effects related to setting change for assets within the Site and setting study areas.

Operational

10.24 Taking account of the findings of the work undertaken to date, whilst still adopting a precautionary approach at this preliminary stage, potential operational (including cumulative) effects to be assessed in the EIA include:

- Effects related to setting change to assets within the Site and setting study areas.

Effects Scoped Out

10.25 On the basis of the work undertaken to date, the professional judgement of the assessment team and experience from other similar projects and consultation responses, it is proposed that the following effects can be scoped out due to good design and implementation of standard good practice construction measures:

- Direct effects to assets beyond the Development footprint; and
- Effects related to setting change for historic assets lying more than 10km from the Site.

Approach to Mitigation

10.26 Owing to the nature of the scheme, it is envisaged that mitigation is likely to focus on addressing direct effects to historic assets, particularly those of an archaeological nature. The approach to mitigation will be guided by industry common practice and appropriate procedures as laid out in the relevant standards and guidance documents from the Chartered Institute for Archaeologists.

Questions

Question 10.1: Do consultees consider the study areas appropriate?

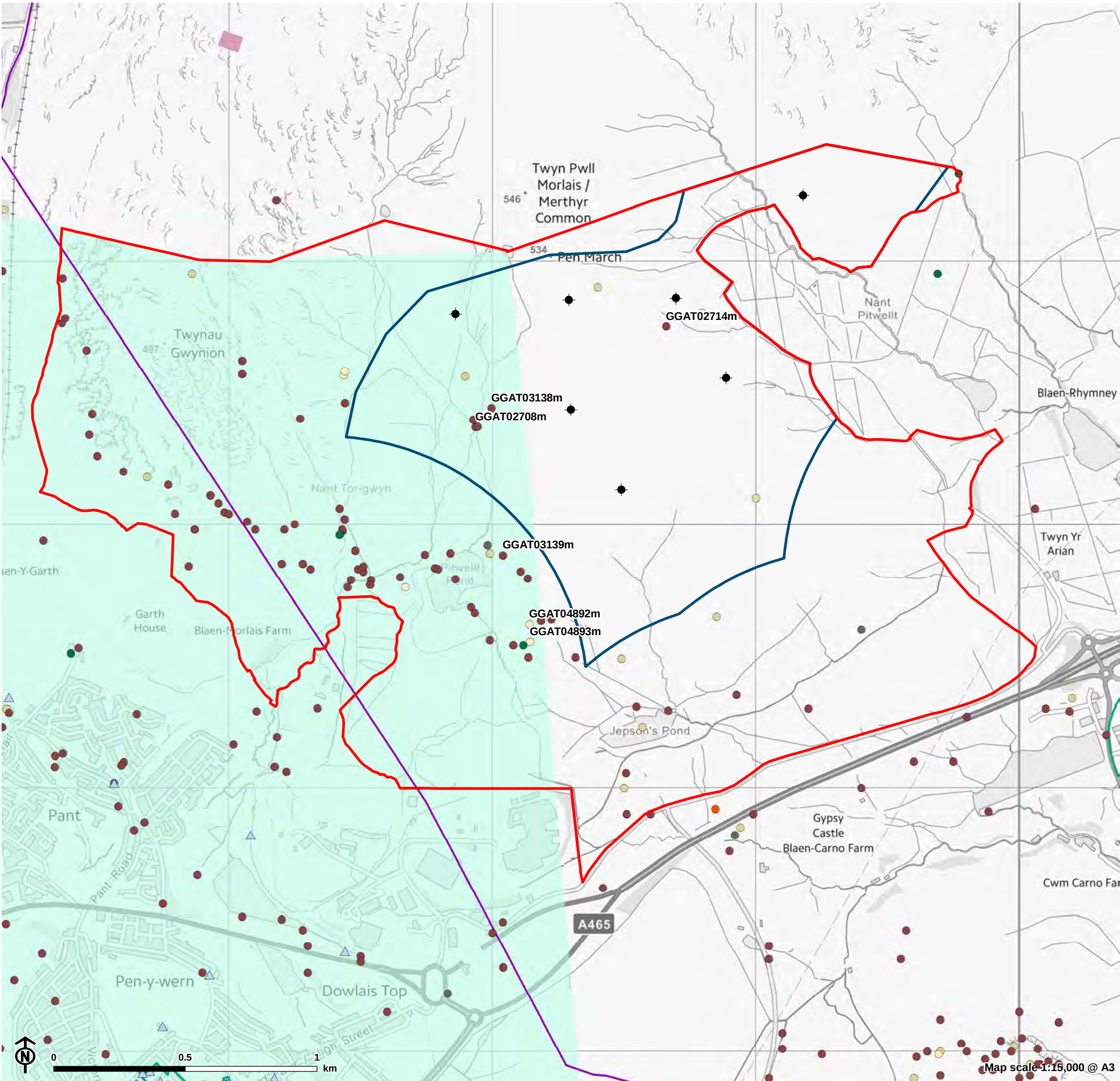
Question 10.2: Are there any other relevant consultees who should be consulted about this topic?

Question 10.3: Are consultees aware of any other supplementary guidance of relevance to assessment of cultural heritage and archaeology effects?

Question 10.4: Is the approach to the assessment of effects, including those effects scoped in and out and the cumulative assessment, appropriate?

Question 10.5 Is the approach to field survey considered appropriate?

Figure 10.1: Designated Historic Assets and GGAT HER entries



Chapter 11

Other EIA Topics

Introduction

11.1 This chapter of the Scoping Report considers other topics that have been considered for inclusion within the Pen March ES. These include the 'new' topics introduced by the current EIA Regulations of climate change, major accidents and disasters and human health.

Socio-Economics

Introduction

11.2 Wind farms may potentially have a variety of direct and indirect economic effects relating to matters such as change of land use, provision of employment and associated income, use of hospitality services by workers during construction, changes to recreational activity, and the potential for community or shared ownership.

11.3 Various studies and surveys have been undertaken of relevance to the impacts of wind farms specifically on tourism. These include research carried out by the Welsh Government in 2014⁵⁶ which found there is little evidence that wind farms have had or are having a negative effect on tourism across Wales and the UK as a whole.

11.4 In addition, a recent UK wide Energy and Climate Change Public Attitudes Tracker (PAT)⁵⁷ found that 82% of respondents supported renewable energy (an increase from 77% in the previous PAT). 74% of respondents supported onshore wind, opposition to renewables was very low at 3% with strong opposition at 1%.

11.5 Overall, the existing literature does not support the premise that wind farms may have significant negative effects on tourism, and in fact is suggestive of the potential for some positive effects (Whitelee Wind Farm near Glasgow is often considered a strong example of such effects). However, due to the scale of Pen March Wind Farm, such positive effects as may occur will not be expected to be significant according to the EIA Regulations. No significant effects on tourism (either positive or negative) are therefore expected in relation to Pen March Wind Farm and it is proposed to scope out tourism from the EIA and ES. It is noted that this approach has been previously accepted

⁵⁶ Welsh Government (2014) Study into the Potential Economic Impact of Wind Farms and Associated Grid Infrastructure on the Welsh Tourism Sector, <https://gov.wales/docs/desh/publications/140404economic-impacts-of-wind-farms-on-tourism-en.pdf> (accessed 19/02/2020)

⁵⁷ <https://www.gov.uk/government/statistics/energy-and-climate-change-public-attitudes-tracker-wave-23> (accessed 19/02/2020)

by Welsh Ministers (in particular in relation to innogy's Alwen Forest Wind Farm).

11.6 It has been relatively common practice in the past for other socio-economic effects of wind farms to be considered within the EIA process and reported on in the wind farm ES. However, the outcome of these assessments is routinely that such effects as will occur fall below the threshold of significance according to the EIA regulations. It is noted, for example, that this was the case for the ES for Pen y Cymoedd Wind Farm. Due to the scale of Pen March relative to Pen y Cymoedd, the socio-economic effects of the latter project are expected to be substantially greater. In the interests of focussing Pen March's ES on likely significant effects, it is therefore proposed to scope out all socio-economic effects from the ES. Instead, a standalone economic benefits statement will be submitted as part of the DNS application.

Land Use

11.7 The potential effects of the Development on Common Land Unit 38 (Gelligaer and Merthyr Common), will also be addressed within the ES.

11.8 The ES will provide a summary of the Development's effect on current farming practices and land use. More detail on the potential effects and mitigation will be provided within a 'Supporting Statement' that will accompany the Commons Application.

Telecommunications and Utilities

11.9 Wind turbines can potentially cause interference to telecommunication system signals such as terrestrial fixed microwave links, terrestrial radio telemetry links and television broadcasts. Effects upon television signals (not generally anticipated where signals are digital) can be readily mitigated in a variety of ways including repositioning/reorientation of domestic antennae and provision of infrastructure to allow alternative signal types (e.g. satellite). Appropriate mitigation strategies can be secured by a Section 106 Agreement. It is therefore considered that effects upon television signals should be scoped out of the Pen March ES.

11.10 An initial appraisal of potential effects of Pen March Wind Farm on other telecommunications interests has been undertaken via consultation of Ofcom's online open access information via the Spectrum Information System. The map service provided via the Spectrum Information Portal indicates that there are a limited number of communication links in the vicinity of the southern Pen March Site boundary, and further links at and around both Tredegar and Merthyr Tydfil, but none particularly near the potential turbine envelope. It is considered unlikely, therefore, that Pen March Wind Farm will have any significant effect upon these links.

11.11 Notwithstanding this, consultation with the operators of any potentially affected links will be undertaken during the EIA process. In the event that the consultation process does not result in any objection from the relevant stakeholders, then it is proposed that telecommunications be scoped out of detailed assessment within the ES. Instead, any relevant restrictions on project design in order to protect telecommunications interests (turbine heights, micro-siting etc.), will be referenced within the ES's Project and Site Description chapter.

11.12 However, if the stakeholder consultation process and any associated technical studies result in objections from stakeholders requiring detailed technical mitigation in order to be overcome, then the relevant effects will be subject to focused treatment within the ES. Defining grades of receptor sensitivity and effect magnitude is not considered appropriate in relation to telecommunications. Instead, any restriction to the required operational standards of telecommunications links will be treated as significant.

11.13 Utilities infrastructure (water, gas and electricity) may potentially be affected by turbines either due to disturbance during construction or in the very unlikely event of turbines components falling onto this infrastructure when the wind farm is in its operational stage. Operators impose appropriate separation distances between turbines and infrastructure in order to mitigate the latter risk in particular.

11.14 Initial searches have identified a high-pressure gas pipeline passing through Pen March's likely turbine envelope along with a low voltage over-head line crossing the south east corner of the Site (outside of the turbine envelope). Appropriate clearances between turbines and this infrastructure, along with the design of any gas pipeline crossings will be agreed with the relevant operators. On this basis, it is proposed that utilities be scoped out of detailed assessment within the ES; the effect of observing required separation distances on the wind farm's design will instead be reported on within the ES's Project and Site Description chapter. Effects during construction can be readily mitigated via good practice measures that will be appropriate to any development, and that can be readily secured by planning condition. It is proposed that such effects are therefore also scoped out of the ES.

Aviation

11.15 Wind developments have the potential to affect aviation interests, either by presenting a physical obstruction or collision risk to aircraft, or by interfering with the operation of navigational equipment. innogy has undertaken an initial feasibility assessment of the potential aviation effects of Pen March Wind Farm and the following considerations have been identified:

- **Cardiff Airport.** The Site is outside Cardiff Airport's statutory 30km consultation zone, but within the operating range of the Airport's Air Traffic Control radar. Due to the location of the Site and its distance from the airport, effects on the airport's operations are considered unlikely. However, this will be confirmed via a request to the Airport to carry out a preliminary aviation assessment. In the unlikely event that adverse effects are identified, these may be amenable to mitigation via a solution such as an infill radar;
- **National Air Traffic Services (NATS).** The Site is within range of some NATS radar systems although turbines may not be visible to any NATS radars (potentially contingent upon final layout and turbine scale). The Site is relatively close (approximately 4 Nautical Miles (NMs)) to the Brecon Distance Measuring Equipment (DME) navigation aid, and potentially to some radio antennae. NATS will therefore be commissioned to carry out a Technical and Operational Assessment (TOPA) in order to confirm whether there is any envisaged effect on their operations. In the unlikely event that adverse effects are identified with respect to NATS radars, these may be amenable to mitigation via a solution such as single-cell radar blanking; and
- **Ministry of Defence (MoD).** The Sites are located within a strategically important Low Flying Area (LFA 7) which is used as a dedicated training area for military low flying operations. The MoD will be consulted during the EIA process. If an initial objection is lodged by the MoD on the basis of effects on military low flying operations, it is likely that this objection will be subject to withdrawal conditional on turbines being equipped with appropriate lighting. The Applicant will seek to agree the installation of Infra-red lighting in the interests of visual amenity should this be a requirement.

11.16 As described above, consultation with the relevant stakeholders will be undertaken in relation to each of these considerations. In the event that the consultation process does not result in any objection from the relevant stakeholders, then it is proposed that aviation be scoped out of detailed assessment within the ES. Instead, any relevant restrictions on project design (turbine heights, micro-siting etc.), and required mitigation, will be referenced within the ES's Project and Site Description chapter.

11.17 However, if the stakeholder consultation process and associated technical studies result in objections from stakeholders requiring detailed technical mitigation in order to be overcome, then the relevant effects will be subject to focused treatment within the ES. Defining grades of receptor sensitivity and effect magnitude is not considered appropriate in relation to aviation. Instead, any restriction on aviation operations or

compromise to required operational standards of navigational/air traffic control equipment will be treated as significant.

Shadow Flicker

11.18 Shadow flicker occurs when a certain combination of conditions prevail at a certain location, time of day and year. It firstly requires the sun to be at a certain level in the sky. The sun then shines onto a window of a building from behind the wind turbine rotor. As the wind turbine blades rotate, this causes the shadow of the turbine to flick on and off. This may have a negative effect on the amenity of residents and occupants of affected properties. If shadow flicker cannot be avoided through design, technical mitigation solutions are available, such as shutting down turbines when the relevant conditions prevail.

11.19 In the UK, shadow flicker is only likely to occur in a building located within a distance of ten times the rotor diameter of a wind turbine and within 130 degrees either side of north.

11.20 Once the Applicant determines a range of candidate turbines for the Pen March project and further defines the siting of these turbines, the potential shadow flicker range of the project will be calculated. Should any of the properties that are in the vicinity of the Development fall within a distance of ten times the rotor diameter of a wind turbine and within 130 degrees either side of north, the ES will contain an assessment of shadow flicker. Any occurrence of shadow flicker will be treated as significant. The ES will, however, include consideration of the mitigation measures that may be applied in order to ensure that there are no significant residual effects subject to the imposition of an appropriate planning condition.

11.21 If no properties are located within the shadow flicker range, it is proposed to scope shadow flicker assessment out of the ES, with the lack of shadow flicker effects due to project design being subject instead to economic justification within the ES's Project and Site Description chapter.

Climate Change

11.22 The key means by which a wind farm may have effects relating to climate change is in its generation of low-carbon energy. The generation of electricity from wind farms results in reduced carbon emissions from other generation sources. However, emissions reductions of this nature also need to be understood in the context of the carbon emissions associated with the construction of the Development. The Pen March ES will therefore include a calculation of net carbon savings from the wind farm. This calculation will employ the latest version of the Scottish Government Carbon Calculator Tool (currently version 1.6.0), which remains the suitable standardised tool for use in relation to net carbon saving calculations.

Major Accidents and Disasters

11.23 The Development Site is not located in an area with a history of natural disasters such as extreme weather events, and its design, construction, operation and decommissioning will be managed within the requirements of a number of health and safety related Regulations, including the Construction (Design and Management) Regulations 2015 and the Health and Safety at Work etc. Act 1974. It is not therefore considered necessary to undertake an assessment of the Development with respect to major accidents and disasters within the ES. Relevant safety considerations informing the final wind farm design will instead be described in the Project Description ES chapter.

Human Health

11.24 It is not considered necessary to include a standalone Human Health Impact Assessment chapter within the ES.

11.25 Potential effects of Pen March Wind Farm with respect to human health will instead be considered via other relevant topics, including noise and access, traffic and transport.

11.26 As described above in relation to major accidents and disasters, relevant safety considerations informing the final wind farm design will instead be described in the Project Description ES chapter.

Questions

Question 11.1: Are the consultees in agreement with the scoping out of socio-economic effects?

Question 11.2: Are the consultees in agreement with the proposals for the assessment of effects on aviation, telecommunications and utilities, shadow flicker, climate change, human health and major accidents and disasters?

Question 11.3: Are there any other relevant consultees who should be consulted about the other EIA topic assessments?

Appendix A

List of Scoping Questions

List of Scoping Questions	
Chapter 2: The Environmental Impact Assessment	
Question 2.1:	Are there other wind farms proposals or other developments that should be considered in the cumulative assessment?
Question 2.2:	Do the consultees agree the approach to consideration of various standard good practice measures as 'pre-mitigation' is appropriate?
Chapter 4 Landscape and Visual Amenity	
Question 4.1	Do consultees consider the size of the initial 45km radius study area to be appropriate, while recognising that this is likely to be scoped back to an expected 20km in order to focus on likely significant effects?
Question 4.2:	Are there any other relevant parties who should be included within the post-scoping consultation process for the LVIA?
Question 4.3:	Is the proposed approach and scope for the assessment of effects on landscape character and LANDMAP aspect areas considered to be appropriate?
Question 4.4:	Is the proposed approach and scope for the assessment of effects on designated landscapes considered to be appropriate?
Question 4.5:	Do consultees consider that the proposed viewpoints are appropriate to inform the visual assessment, and that the suggested presentation of visualisations is proportionate?
Question 4.6:	Is the approach to inclusion of schemes within the cumulative assessment appropriate?
Question 4.7:	Is the approach to the assessment of effects on residential visual amenity appropriate?
Question 4.8:	Do consultees consider the effects to be scoped out appropriate?
Chapter 5 Geology, Hydrology, Hydrogeology and Peat	
Question 5.1:	Is there flood model data available for the Site?
Question 5.2:	Are there any known flooding problems downstream that the Development might affect were it not properly designed?
Question 5.3:	Is the proposed peat assessment methodology acceptable?
Question 5.4:	Are there any known issues with aquifer contamination/known interconnectivity between the Site and Principal Aquifer at present?
Question 5.5:	Do the two Local Authorities hold any records of private water supplies within 1km of the Site boundary?
Question 5.6:	Are there any other relevant consultees who should be consulted about the Geology, Hydrology, Hydrogeology and Peat assessment?
Chapter 6 Ecology	
Question 6.1:	Do the consultees agree with the scope of survey work completed and proposed along with the proposal to scope out formal reptile surveys?
Question 6.2:	Are there any other relevant consultees who should be consulted about the Ecology assessment??

Appendix A
List of Scoping Questions

Pen March Wind Farm
May 2020

List of Scoping Questions	
Chapter 7 Ornithology	
Question 7.1:	Do the consultees agree with the scope of survey work completed to date and specifically the proposal to scope out non-breeding season flight activity surveys in Year 2 (winter 2020-2021)?
Question 7.2:	Do the consultees agree with the proposed assessment methodology and specifically the spatial extent of the cumulative assessment?
Question 7.3:	Do the consultees have any relevant information regarding potential sources of regional or local population data for key bird species or any other relevant bird data not collected to date?
Question 7.4:	Are there any other relevant consultees who should be consulted about the Ornithology assessment?
Chapter 8 Noise	
Question 8.1:	Do the consultees agree with the suggested approach for the noise assessment?
Question 8.2:	Do the relevant Local Authorities agree with the noise topics proposed to be scoped out of the EIA?
Question 8.3:	Are there any other relevant consultees who should be consulted about the Noise assessment?
Chapter 9 Access, Traffic and Transport	
Question 9.1:	Can the consultees confirm the acceptability of scoping out operational and decommissioning effects?
Question 9.2:	Are there any other relevant consultees who should be consulted about the Access, Traffic and Transport assessment?
Chapter 10 Cultural Heritage	
Question 10.1:	Do consultees consider the study areas appropriate?
Question 10.2:	Are there any other relevant consultees who should be consulted about this topic?
Question 10.3:	Are consultees aware of any other supplementary guidance of relevance to assessment of cultural heritage and archaeology effects?
Question 10.4:	Is the approach to the assessment of effects, including those effects scoped in and out and the cumulative assessment, appropriate?
Question 10.5:	Is the approach to field survey considered appropriate?
Chapter 11 Other EIA Topics	
Question 11.1:	Are the consultees in agreement with the scoping out of socio-economic effects?
Question 11.2:	Are the consultees in agreement with the proposals for the assessment of effects on aviation, telecommunications and utilities, shadow flicker, climate change, human health and major accidents and disasters?
Question 11.3:	Are there any other relevant consultees who should be consulted about the other EIA topic assessments?

Appendix B

Indicative ES Structure

Pen March ES Structure

Non-Technical Summary

Chapter 1: Introduction

- Rationale for the Pen March Project;
- Legislative Requirements for EIA;
- Responsibilities for ES; and
- Structure of the ES.

Chapter 2: The Environmental Impact Assessment

- Introduction;
- The EIA Process;
- Scope of the EIA; and
- The do-nothing scenario.

Chapter 3: Site Selection and Design

- Introduction;
- Site Context;
- Design Strategy;
- Design Evolution; and
- Alternatives.

Chapter 5: Project Description

- Introduction;
- Study Area Description;
- Development Description;
- Construction Process;
- Operational Details; and
- Decommissioning.

Chapters 6 to 13: Landscape and Visual Impact Assessment; Geology, Hydrology, Hydrogeology and Peat; Ecology; Ornithology; Noise; Access, Traffic and Transport; Cultural Heritage; Other EIA topics.

Each chapter will include:

- Introduction;
- Assessment Methodology;
- Existing conditions;
- Modification to Development Design;
- Micro-siting;
- Proposed Good Practice Measures;
- Assessment of Construction Effects;
- Assessment of Operational Effects;
- High Level Assessment of Grid Connection;
- Cumulative Effects;
- Mitigation and Future Monitoring;
- Residual Effects; and
- Summary and Conclusions.

Chapter 14: Summary of Effects

Figures

Appendices

- LANDMAP Assessment;
- Outline Construction Environmental Management Plan (CEMP);
- Abnormal Loads Assessment (ALA);
- Topic relevant survey data;
- Schedule of Mitigation; and
- High Level Grid Connection Assessment.