



Esgair Galed Energy Park Ltd

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Information to support a Scoping Opinion Request

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1 INTRODUCTION

1.1 Background

- 1.1.1 Esgair Galed Energy Park Ltd (hereafter, the 'Applicant') has commissioned RSK Environment Limited (hereafter, 'RSK') to prepare an Environmental Impact Assessment (EIA) Scoping Report to accompany a request for a Scoping Opinion from Planning and Environment Decisions Wales (PEDW) (prepared on behalf of Welsh Ministers) for the proposed Esgair Galed Energy Park (hereafter, the 'Proposed Development').
- 1.1.2 The Planning (Wales) Act 2015 and the Developments of National Significance (Wales) Regulations 2016 (as amended) and subsequent regulations provide the statutory basis for a Development of National Significance (DNS). Any proposal to construct and operate an onshore wind development with a capacity over 10 megawatts (MW) falls under the DNS system and requires Welsh Ministers' consent.
- 1.1.3 The Proposed Development will comprise the construction and operation of up to twenty-six (26) wind turbines, an electrical substation and control building, underground power cables, anemometer mast, site access tracks, habitat management, and, where necessary, off-site highway improvements. The Proposed Development will be classed as a DNS as the combined installed capacity of the power generating elements will be greater than 10MW.
- 1.1.4 The purpose of this EIA Scoping Report is to establish the scope of the Environmental Statement (ES) that will be prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (hereafter, the 'EIA Regulations'), and will accompany the Applicant's DNS Application. In line with EIA Regulation requirements, the request for an EIA Scoping Opinion is made in relation to a DNS for the purposes of section 62D of the Town and Country Planning Act 1990.

1.2 Definition of an EIA

- 1.2.1 The term EIA describes a procedure that must be followed for certain types of projects before they can be given 'consent'. The procedure is a means of drawing together, in a systematic way, an assessment of a project's likely significant environmental effects. This helps to ensure that the importance of the predicted effects and the scope for avoiding, preventing, reducing or, if possible, offsetting them are properly understood by the public and the authority granting consent (the 'determining authority') before it makes its decision.

1.3 Requirement for EIA

- 1.3.1 The EIA Regulations require that, before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must be subject to an EIA (referred to as Schedule 1 development) and other developments, which may be subject to an EIA depending on certain parameters and/or their potential to give rise to significant environmental effects (referred to as Schedule 2 development).
- 1.3.2 The Proposed Development does not fall under any of the types of development set out in Schedule 1 of the EIA Regulations. However, the Proposed Development is of a type and scale described in Schedule 2 of the EIA Regulations 2017, as follows:
- “Energy industry*
- a) Industrial installations for the production of electricity, steam and hot water (projects not included in Schedule 1 to these Regulations).*
 - (i) Installations for the harnessing of wind power for energy production (wind farms);”*
- 1.3.3 For the purposes of the EIA Regulations, the Applicant considers the Proposed Development to be EIA development. Therefore, the Applicant is notifying PEDW (under Regulation 5(2)(a) of the EIA Regulations) of the intention to prepare and submit an Environmental Statement (ES) in support of the DNS Application without prior request for a Screening Opinion.

1.4 Purpose of the EIA Scoping Report

- 1.4.1 In accordance with Regulation 33 of the EIA Regulations, a person who is minded to make an EIA application may ask PEDW to state in writing their opinion as to the scope and level of detail of the information to be provided in the ES. Therefore, this EIA Scoping Report has been prepared in accordance with Regulation 33(2) of the EIA Regulations and PEDW’s ‘Developments of National Significance: Procedural Guidance’ (Appendix 3: EIA).
- 1.4.2 The purpose of this EIA Scoping Report is to ensure that the subsequent EIA is focused on the key impacts likely to give rise to significant environmental effects, and to obtain agreement on the EIA approach and scope. As well as identifying elements to be considered in the EIA, this EIA Scoping Report also identifies those elements that are not considered necessary to assess further. This approach is in line with the general aim to undertake proportionate EIA, as advocated by industry best practice.
- 1.4.3 Whilst this EIA Scoping Report seeks to establish the overall framework for the EIA in relation to the environmental factors and associated effects, the exact scope of the EIA will be influenced by the Scoping Opinion received, the on-going design evolution of the Proposed Development, and through on-going baseline data collection (e.g. field surveys etc.). In this regard, a list of ‘scoping questions’ is presented within **Chapter 6** of this EIA Scoping Report, the aim of which is to assist the determining authority and its consultees in forming the Scoping Opinion.

- 1.4.4 Where further evidence justifies a change to the scope of the EIA, this will be explained in the ES along with confirmation of whether the change has been agreed with relevant consultees.
- 1.4.5 Paragraph 3.14 and 3.15 of PEDW's DNS Guidance (Appendix 3: EIA) sets out what should be provided within the Scoping Report. This guidance document draws on Regulation 33(2) of the EIA Regulations and any additional information which needs to be provided in the Scoping Report. In accordance with the EIA Regulations and PEDW Guidance, **Table 1-1** sets out the information requirements and where this information can be found in this EIA Scoping Report.

Table 1-1: Information required by the EIA Regulations 2017 to accompany a request for a scoping opinion

Information Required	Location within Scoping Report
EIA Regulations	
A plan sufficient to identify the land.	Appendix A
A brief description of the nature and purpose of the development, including its location and technical capacity.	Chapter 2
An explanation of the likely significant effects of the development on the environment.	Chapter 6
A statement that the request is made in relation to a development of national significance for the purposes of section 62D of the 1990 Act	Chapter 1
Appendix 3 (DNS Guidance)	
An outline of the main alternatives considered and the reasons for selecting a preferred option.	Chapter 3
Results of desktop and baseline studies, where available.	Chapters 5 and 6
A record of consultation undertaken with relevant bodies (including any public engagement) to date.	Chapters 5 and 6
Referenced plans presented at an appropriate scale to convey clearly the information and all known aspects associated with the proposal.	Appendix B
Guidance and best practice to be relied upon, and whether this has been agreed with the relevant bodies (for example the statutory nature conservation bodies or local authorities) together with copies of correspondence to support these agreements.	Chapters 5 and 6
Methods used or proposed to be used to assess impacts and the significance criteria framework used.	Chapters 6 and Appendix K
Any mitigation proposed and the extent to which these are likely to reduce impacts.	Chapter 4, 5 and 6

Information Required	Location within Scoping Report
Where impacts from consequential or cumulative development have been identified, how applicants intend to assess these impacts in the ES (for example, a high-level assessment of the grid connection where this does not form part of the Proposed Development for a power station).	Chapter 4 and 7
An indication of any European designated nature conservation sites that are likely to be significantly affected by the Proposed Development and the nature of the likely significant impacts on these sites	Chapter 2 and 6
Key topics covered as part of applicants' scoping exercise.	Chapter 4, 5 and 6
An outline of the structure of the proposed ES.	Appendix J

- 1.4.6 In accordance with the EIA Regulations, the ES will be based on the Scoping Opinion received.

1.5 References

- Planning and Environment Decisions Wales. (June 2019). Development of National Significance Procedural Guidance: Appendix 3 – Environmental Impact Assessment. Available via: <https://www.gov.wales/developments-national-significance-guidance-environmental-impact-assessment>
- Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 (as amended). Available at: [The Town and Country Planning \(Environmental Impact Assessment\) \(Wales\) Regulations 2017](https://www.legislation.gov.uk) (legislation.gov.uk)

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Introduction

- 2.1.1 This chapter provides a description of the Site (and surrounding area) and Proposed Development for the purposes of identifying and reporting the potential environmental impact and likely significant effects in this EIA Scoping Report. The description of the Proposed Development represents the current understanding of the design parameters. However, as part of an ongoing design process, the detail provided in this chapter will be further refined for the Environmental Statement (ES).
- 2.1.2 The final built form and layout of the Proposed Development, as well as the installation/construction methods to be utilised will, eventually, be determined by a chosen contractor. However, all works will be required to be undertaken within the parameters assessed for the Proposed Development. With this in mind, the EIA will represent a 'worst-case', ensuring a robust assessment of the likely significant effects.
- 2.1.3 Where appropriate, the design of the Proposed Development will take account of the following guidance:
- Design Commission for Wales (2023) Designing for Renewable Energy in Wales; and
 - Scottish Natural Heritage (2017) Siting and Designing Wind Farms in the Landscape (Version 3).

2.2 The Application Site

- 2.2.1 For the purposes of this Scoping Report, **Appendix A** identifies the location of the Site. The Site boundary shown on **Appendix A** is the area (approximately 1489.5 hectares [ha]) within which the Proposed Development would be located.
- 2.2.2 The design of the Proposed Development is not yet complete, and as such, details of any off-site requirements, such as for access of Abnormal Indivisible Loads (AIL) and other construction traffic, are yet to be confirmed. Where possible, all potential effects from expected development and construction activities have been considered within the Scoping Report.

2.3 The Site and surrounding area

- 2.3.1 The Site is located in mid-Wales, within the administrative boundary of Powys County Council. It lies approximately 500m from the Powys/Ceredigion administrative border at the closest point.
- 2.3.2 The Site is located approximately 11km north-west of Llanidloes, immediately to the west of the settlement of Staylitle/Penffordd-Las, and south of the settlement of Dylife.

- 2.3.3 The landform of the main section of the Site is varied, ranging from approximately 300m Above Ordnance Datum (AOD) in the valleys to the east (Afon Bachog) and south-east (Afon Clywedog), to peaks of approximately 500m AOD in the west of the Site. The separate north-western section of the Site falls from approximately 450m AOD near the summit of Foel Fadian in the south-east to approximately 150m AOD at Aberhosan in the north-west.
- 2.3.4 The Site is predominantly comprised of agricultural land, upland rough grassland and peatland. There is a large area of commercial conifer plantation forestry across the centre of the Site.
- 2.3.5 A plan showing environmental and planning features within the Site boundary and near to the Site can be seen at **Appendix C**.
- 2.3.6 The Site is not located within any nationally or locally designated landscapes. The closest nationally designated landscape is Eryri National Park (Snowdonia) approximately 7.5km to the north-west of the Site boundary. The closest locally designated landscape is the Northern Uplands Special Landscape Area (SLA) in Ceredigion, extending to within approximately 1 km south-west of the Site.
- 2.3.7 Pumlumon (Plynlimon) Site of Special Scientific Interest (SSSI), designated for its habitats and the bird fauna they support, lies adjacent to the western boundary of the Site. Ceunant Twymyn SSSI and Dylife Mine SSSI, designated for their geological interest, lie adjacent to the northern boundary of the Site and approximately 300m beyond the northern boundary respectively.
- 2.3.8 There are areas of ancient woodland present within the Site boundary, although these are limited to the separate north-western section of the Site, towards Aberhosan.
- 2.3.9 There are five Scheduled Monuments located within the Site boundary: four barrows or groups of barrows (Cadw Scheduled Monument [SM] Refs. MG171, MG266, MG282, and MG105) and the Dyngwm or Castle Rock Lead Mine (MG247). There are 28 further scheduled Monuments within 5km of the Site but outside of the Site boundary, and another 37 within 10km of the Site.
- 2.3.10 There are no listed buildings located within the Site. There are 30 listed buildings within 5km of the Site but outside of the Site boundary, the majority of which are Grade II Listed but three are Grade II* Listed. There are four Grade II Listed Buildings within 1km of the Site, the closest of which (Cadw Listed Building Ref. 84421) is within 150m of the Site.
- 2.3.11 This area is important for its evidence of early mining and processing of lead ore, possibly dating back to the Roman period. The focus of the mining activity within the Site at Dyngwm (MG247) is scheduled and there are numerous non-designated historic assets associated with mining activities within the Site boundary.
- 2.3.12 There are three Conservation Areas outside of the Site boundary but within 5km of the Site: at Llawr-y-glyn to the east, at Abercegir to the north-west and at Darowen to the north of the Site.
- 2.3.13 A large portion of the Site lies within the Clywedog Valley Landscape of Special Historic Interest (LSHI). The LSHI comprises a series of Historic Landscape

Character Areas (HLCA) and the Site overlaps with three of these: the Dylife HLCA, Staylittie HLCA and Hafren Forest HLCA.

- 2.3.14 There are no Registered Historic Parks and Gardens within 5km of the Site.
- 2.3.15 No major waterbodies are present within the Site; however, the Glaslyn, Llyn Cwmbyr and Bugeilyn waterbodies are all located just beyond the western Site boundary.
- 2.3.16 The Afon Clywedog runs eastwards through the Site, and there are a number of minor watercourses which drain southwards into it, eastwards into the Afon Bachog or northwards into the Nant Dropyns. The Afon Lwyd forms the majority of the southern Site boundary and drains into the Llyn Clywedog reservoir to the east of the Site. There are many associated minor tributaries, and some wet ditches across the Site.
- 2.3.17 Parts of the Site are located within open access 'open country', 'dedicated forests' and 'Woodland Opportunity Map 2021 (WOM21)' land. A number of local bridleways and public rights of way (PRoW) cross the Site. The Glyndwr's Way National Trail and Cambrian Way long-distance footpath both run through the Site in an east to west alignment, in places following an existing network of tracks. National Cycle Network (NCN) Route 8 follows the northern and eastern Site boundaries, on the B4518 and other local roads, and a short section passes through the south-eastern corner of the Site.

2.4 Proposed Development description

Summary of Key Components

- 2.4.1 The main elements of the Proposed Development will comprise:
 - Up to twenty-six (26) wind turbines and associated infrastructure, including; transformers, foundations, crane pads, and laydown/storage areas.
 - An on-site electrical substation and control building.
 - Underground power cables linking the wind turbines and on-site substation and control building.
 - New site entrance and internal access tracks.
 - Permanent anemometer masts for monitoring wind speeds and wind turbine performance.
 - Borrow pit(s) where feasible.
 - One or more temporary construction and storage compounds.
 - Off-site works (where necessary) to facilitate the transport of abnormal loads.
- 2.4.2 Energy storage facilities will be included in the Application if it is deemed a viable option at the Site, following the completion of further technical studies. The energy storage infrastructure is likely to take the form of containerised battery units, with some external ancillary infrastructure to store electricity generated by the Proposed Development, allowing this to be exported when required.

Wind Turbines

- 2.4.3 Based on known environmental and technical constraints, the Site can accommodate up to 26 wind turbines; refer to **Appendix B** for an indicative turbine layout.
- 2.4.4 The proposed turbines would be three bladed horizontal axis turbines. The turbine towers would be of tapered tubular steel construction, likely to be finished in a light grey semi-matt colour.
- 2.4.5 This EIA Scoping Report has been prepared based upon a maximum tip height for wind turbines of up to 220m, although the maximum turbine heights and turbine specifications in other respects will be considered further through the EIA process. Further detail on the indicative dimensions and location of the proposed wind turbines is provided in **Table 2-1**.

Table 2-1: Indicative information on dimensions and locations of proposed wind turbines

Turbine No.	Indicative hub height	Indicative rotor diameter	Indicative co-ordinates	
			Easting	Northing
Turbine 1	142.5m	155m	283469.34	293383.34
Turbine 2	142.5m	155m	283222.75	293783.72
Turbine 3	142.5m	155m	283555.10	294329.49
Turbine 4	142.5m	155m	284015.86	294876.11
Turbine 5	142.5m	155m	284232.71	294475.40
Turbine 6	142.5m	155m	284019.13	293965.34
Turbine 7	142.5m	155m	284035.78	293500.96
Turbine 8	142.5m	155m	285481.19	293002.21
Turbine 9	142.5m	155m	286206.99	293107.25
Turbine 10	142.5m	155m	286611.42	292794.85
Turbine 11	142.5m	155m	285889.15	292565.69
Turbine 12	142.5m	155m	286531.81	291819.95
Turbine 13	142.5m	155m	285951.55	291920.77
Turbine 14	142.5m	155m	285235.19	292432.10
Turbine 15	142.5m	155m	284728.88	292569.35
Turbine 16	142.5m	155m	284310.52	292796.46
Turbine 17	142.5m	155m	283539.77	292736.42
Turbine 18	142.5m	155m	283843.52	292380.29
Turbine 19	142.5m	155m	283281.78	292121.40
Turbine 20	142.5m	155m	283181.35	291703.37
Turbine 21	142.5m	155m	283934.88	291880.56
Turbine 22	142.5m	155m	284667.52	292062.81

Turbine No.	Indicative hub height	Indicative rotor diameter	Indicative co-ordinates	
			Easting	Northing
Turbine 23	142.5m	155m	285054.97	291761.28
Turbine 24	142.5m	155m	285425.71	291428.98
Turbine 25	142.5m	155m	285799.76	291205.47
Turbine 26	142.5m	155m	286440.65	291282.10

- 2.4.6 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.
- 2.4.7 A transformer would be required for each wind 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 EIA Scoping Report, it has been assumed that the transformers will be external and located adjacent to each turbine within the hardstanding areas.
- 2.4.8 The wind turbines would be installed on foundations. The detailed design specification for each foundation will depend on the type of turbine procured and the specific ground conditions at the location of each wind turbine. A crane pad would be required for each turbine and would consist of an area of hardstanding adjacent to the turbine. The exact specification and position of the crane pad will depend on the turbine supplier's specifications, the crane selected for erection, and specific ground conditions. The EIA will be based on indicative maximum crane pad dimensions together with appropriate micro-siting allowance.

Aviation Lighting

- 2.4.9 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 Air Navigation Order 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).
- 2.4.10 In terms of the requirement for lighting wind turbines in accordance with the *Air Navigation Order 2016*, 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 onshore wind turbine generators with a maximum height of 150 m AGL or above, 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.
- 2.4.11 The anticipated height of the wind turbines means there will be a statutory requirement for aviation obstacle lighting (AOL). Any required lighting scheme will be agreed with relevant consultees (including the CAA) and assessed in the ES.

On-site Electrical Substation and Control Building

- 2.4.12 The proposed wind turbines would produce electricity at typically up to 1,000 Volts. The electricity would then be transformed to 33,000 Volts (33 kV) via a transformer located immediately adjacent to the tower of each turbine, depending on the final turbine model used. Cables from each turbine and transformer would be connected underground to a purpose-built electrical substation and control building, which would include switchgear and metering equipment.
- 2.4.13 The dimensions and the location of the electrical substation and control building are not yet finalised, but they would be sited within the Site boundary. The location of the substation and control building would be influenced by factors such as the distance to the point of connection, access during the operation of the Proposed Development, and environmental constraints, all of which will be considered further throughout the iterative design process.

Access and vehicle movements

- 2.4.14 The size and / or weight of the turbine components and transformers require specialist lorries to carry them to Site – these are classed as abnormal loads. It is anticipated that abnormal load vehicles carrying turbine components will travel to the Site from north-east Wales, with the exact routing to be finalised and reported through the EIA process. The Applicant will look to agree the route to Site with relevant consultees and will ensure that it meets the requirements of appropriate guidelines (such as visibility, construction materials, surface water drainage, gradient and safety of other road users).
- 2.4.15 The Proposed Development will include a new network of on-Site access tracks to enable construction and maintenance, once operational. This will include a main Site access track running from the new access junction. These tracks are anticipated to have a maximum running width of approximately 6.5m (widening at bends) with standard design drainage included throughout the track network. The design of the new access tracks will follow the topography of the Site, avoiding steep gradients and environmental constraints (e.g. valuable areas of terrestrial habitat), where possible.

On-site Cabling

- 2.4.16 It is anticipated that electric cabling connecting the wind turbines and the control building will be laid in underground trenches running alongside the new access tracks. The dimensions of the trenches will vary depending on the number of ducts they contain and are assumed to be up to approximately 2m in width and up to approximately 1m in depth.

Permanent Anemometer Mast

- 2.4.17 A permanent steel tower anemometer mast may be required to provide ongoing monitoring of the wind conditions after commissioning of the Proposed Development with an application for this being prepared outside of the EIA process.

- 2.4.18 If an anemometer mast is required, the height of the mast would align with the chosen wind turbine model. Further detail on the location and size of the anemometer mast would be provided in the ES.

Temporary Construction Compounds and Working Areas

- 2.4.19 The construction works are likely to require one or more temporary construction compound. The main construction site office and compound will likely comprise: temporary cabins to be used for the site offices (including welfare facilities for Site staff); parking for construction staff, visitors and construction vehicles; and security fencing around the compound.
- 2.4.20 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.
- 2.4.21 The construction disturbance associated with the temporary construction compound is expected to be 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, geofabric removed and the surface soils re-spread allowing the area to regenerate. Best practice soil handling techniques will be followed.
- 2.4.22 The major structural components of the turbines will be delivered directly to Site. Temporary lay-down areas will be provided for parking and unloading delivery vehicles and, in particular, abnormal loads.

Stone and Aggregate

- 2.4.23 The Proposed Development will require crushed stone to construct the new access tracks, turbine foundations, crane pads and laydown areas. Suitable stone will be sourced, wherever possible, from on-site borrow pits to minimise the need to import rocks into the Site. Should sufficient stone not be available on-site, a local quarry will be used if possible to minimise HGV traffic. The potential benefit of including borrow pits as part of the Proposed Development include:
- Allows extracted aggregate to be transported to construction locations (largely via site access tracks) within the Site.
 - Generates significantly lower levels of Heavy Goods Vehicle (HGV) movements on the local highway network than importation of aggregate from commercial quarries.
 - Reduces cost risks arising from double handling, importation from commercial quarries and landfill disposal.
- 2.4.24 The benefit of using borrow pits will be carefully considered against any potential environmental impacts. If borrow pits are included as part of the Proposed Development, further detail on the approach to identifying suitable borrow pit locations and justification for their inclusions as part of the Proposed Development will be provided as part of the ES.

Construction Phase

2.4.25 It is expected that the construction of the Proposed Development will be completed over a period of approximately 18–24 months and will consist of the following principal activities:

- Advance works including:
 - Site investigations further to those already undertaken.
 - Pre-construction environmental surveys (if required).
 - Preliminary mitigation works and advanced site access works.
 - Tree felling.
- Civil engineering and ancillary works including:
 - The working of borrow pits (if suitable materials identified).
 - The upgrading/creation of site access tracks, including passing places, turning heads, junctions and drainage.
 - Construction of temporary compounds.
 - Construction of onsite substation.
 - Construction of turbine foundations at each turbine location.
 - Construction of crane hardstandings and laydown/storage adjacent to each turbine.
 - Excavation of trenches and laying of electrical cable adjacent to the access tracks connecting the turbines to the onsite substation.
 - Delivery and erection of wind turbines (including installation of aviation warning lights).
- Testing and commissioning of site equipment.

Construction Environmental Management Plan

2.4.26 A framework Construction Environmental Management Plan (CEMP) will be submitted in support of the DNS Application and will set out the key measures to be employed during construction to control and minimise the impacts on the environment.

2.4.27 The details and implementation of the CEMP will be secured by a planning condition. The purpose of a CEMP is:

- To ensure nuisance levels as a result of construction and operation activities are kept to a minimum.
- To comply with relevant regulatory requirements and environmental commitments.
- To ensure procedures are put into place to minimise environmental effects during construction.

Construction Traffic Management Plan (CTMP)

- 2.4.28 A Construction Traffic Management Plan (CTMP) will be submitted in support of the DNS application and will propose measures to control the delivery of materials and staff onto the Site during the construction phase.
- 2.4.29 The principles of the CTMP will be available for comment as part of the statutory consultation process to ensure that the comments of local residents and stakeholders are taking into account in its development.

Abnormal Indivisible Load (AIL) Management Plan

- 2.4.30 An AIL Management Plan will be submitted in support of the DNS application and will identify the key points, issues and management proposals associated with the off-site access route that may require remedial works to accommodate the predicted loads.

Operational Phase

- 2.4.31 The Proposed Development is likely to be operational for a limited period of 40 years. Minor maintenance works are expected to occur throughout the operating life of the Proposed Development. It is assumed that routine inspections will be carried out and access will use the previously built construction roads.

Decommissioning Phase

- 2.4.32 At the end of the operational period, the Proposed Development would be decommissioned. Any above ground infrastructure would be dismantled and removed in accordance with industry best practice at the time. The use of decommissioned materials would follow the waste hierarchy such that they would be reused where possible before recycling and disposal were considered.
- 2.4.33 At the time that decommissioning would take place, the regulatory framework, good industry practices and the future baseline could have altered. The Applicant would consider and implement a Decommissioning Environmental Management Plan (DEMP) taking account of good industry practice, its obligations to landowners under the relevant agreements and all relevant statutory requirements.
- 2.4.34 There may be potential to extend the life of the Proposed Development or replace the turbines and other electricity infrastructure, which would be subject to a new application.

Grid Connection

- 2.4.35 In Mid Wales, the existing electricity network does not have the capacity to connect all the planned new renewables to homes and businesses.
- 2.4.36 Green GEN Cymru, part of the Bute Energy Group, will develop and consent separately the new electricity infrastructure needed to connect the Esgair Galed Energy Park. Information on the proposed grid connection will be shared when available.

2.5 Approach to addressing uncertainty

- 2.5.1 In order to define the Proposed Development and determine where detail is to be included at the DNS application stage and where it may be deferred until after consent is granted, the Applicant will identify the level of flexibility required (e.g. in relation to the size of the wind turbines or construction methods).
- 2.5.2 The final built form and layout of the Proposed Development, as well as the installation / construction methods to be utilised will, eventually, be determined by a chosen contractor. However, all works will be required to be undertaken within the parameters assessed for the Proposed Development. With this in mind, the EIA will represent a 'worst-case', ensuring a robust assessment of the likely significant effects.
- 2.5.3 Many promoters of renewable energy projects seek to maximise flexibility in their consents, given the long lead in times to consent and subsequent engagement of EPC (engineering, procurement, and construction) contractors. It is typical for large infrastructure projects to contain the ability to alter the final design of a scheme by having "limits of deviation" or including for a "micro-siting allowance".
- 2.5.4 Furthermore, such flexibility may be useful where a change in the design or capacity of the Proposed Development is anticipated, but not yet certain. Therefore, it may be possible that a particular element of the design will be subject to on-going technological advancements. It will be important that a lack of flexibility in the DNS Application does not unduly hinder the Applicant's ability to consider and adopt such future technological advancements. This is of particular importance to maintaining flexibility due to the rapid pace of change in renewable energy technologies.
- 2.5.5 It is therefore necessary for the EIA to assess an 'envelope' within which the works will take place. To remain in accordance with the EIA Regulations, it will be essential that the parameters are defined to ensure that 'likely significant effects' are identified, rather than unrealistically amplified effects, which could be deemed unlikely. These parameters will be considered in detail by the technical authors in the ES to ensure the realistic 'worst case' effects of the Proposed Development are assessed for each potential receptor.

2.6 References

- Welsh Government. (2020). Future Wales: The National Plan 2040. Available at: <https://www.gov.wales/future-wales-national-plan-2040-0>

3 REASONABLE ALTERNATIVES CONSIDERED

3.1 Introduction and Approach

- 3.1.1 Schedule 4, paragraph 2 of the EIA Regulations states that an ES should include:
‘A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant or appellant which are relevant to the Proposed Development and its specific characteristics and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.’
- 3.1.2 Although the Site is based in Wales, guidance from other parts of the UK can inform good practice when writing an Environmental Statement. Section 9.3 of the Planning Inspectorate’s Advice Note Seven states that a good ES is one that ‘explains the reasonable alternatives considered and the reasons for the chosen option taking into account the effects of the Proposed Development on the environment’. The ES will include a description of the reasonable alternatives that have been considered, including a clear narrative on the main reasons for selecting the chosen option, including a comparison of the environmental effects.
- 3.1.3 The reasonable alternatives assessment will focus on; the Site selection process, design layouts / opportunities within the Site, the sizing and scale of infrastructure, and alternative technologies. A ‘no development’ alternative would not deliver the additional electricity generation capacity associated with the Proposed Development and will therefore not be considered further.
- 3.1.4 The consideration of alternatives and design evolution will be undertaken with the aim of avoiding and / or reducing adverse environmental effects, maintaining operational efficiency and cost-effective design solutions, and with consideration of other relevant matters such as available land and planning policy.

3.2 Alternatives studied to date

Introduction

- 3.2.1 The Applicant has a well-established process for selecting sites and identifying land for wind farm development. The overall approach to wind farm site selection is to identify areas of land where the siting of a wind farm would result in minimal environmental effects, be free from overriding technical constraints, and be economically viable. This initial site identification exercise involves:
- A review of current and emerging planning policy (at the National and Local level).
 - Geographical Information System (GIS) constraints analysis, including analysis of wind speed data.
 - A review of suitable site access points and related transportation issues.

- 3.2.2 A feasibility study was undertaken for the Proposed Development Site in 2021. The aim of the study was to help understand the planning and environmental considerations relevant for developing an energy park at this location and to subsequently use the supporting environmental and technical assessments to inform the initial Site layout.

Planning Policy Framework Considerations

- 3.2.3 The Proposed Development relates to the generation of electricity from renewable energy sources and will be a response to the national energy policy and planning objectives. The Environment (Wales) Act 2016 sets a target to reduce greenhouse gas emissions in Wales by 100% by 2050. Furthermore, the Welsh Government has declared a climate emergency and in March 2021 the Senedd Cymru approved a net zero target for 2050. Renewable energy is a key component to achieving greenhouse gas emission reduction. In 2017, the Welsh Government announced a target of meeting 70% of Wales's electricity consumption from renewable electricity sources by 2030. This figure was recently updated (July 2023) and the Welsh Government has committed to the target of Wales ensuring that 100% of its annual electricity consumption will come from renewable sources by 2035, and to continue to keep pace with consumption thereafter.
- 3.2.4 Future Wales: The National Plan 2040 provides a framework for planning change and development and has development plan status. Policy 17 on renewable and low carbon energy and associated infrastructure and Policy 18 on renewable and low carbon energy developments of national significance, provide the strategic spatial and detailed criteria-based policies for renewable and low carbon energy developments and these are the main policies against which the Proposed Development will be considered. Policy 17 provides that the Welsh Government strongly supports the principle of developing renewable and low carbon energy from all technologies and at all scales to meet Wales's future energy needs.
- 3.2.5 Planning Policy Wales (PPW) details the land use planning policies of the Welsh Government, with the objective to ensure the delivery of sustainable development. PPW identifies that low carbon electricity must become the main source of energy in Wales. PPW also recognises that wind energy forms a key part of meeting renewable energy production due to Wales's considerable wind resource.
- 3.2.6 On the 18th October 2023, Welsh Government issued an update to PPW, specifically in relation to Chapter 6 – Distinctive and Natural Places. The updates are focussed on: taking a proactive approach to green infrastructure, securing net benefit for biodiversity (through the application of the step-wise approach¹), a strengthened approach to the protection of Sites of Special Scientific Interest (SSSI), and the promotion of new tree planting as part of any proposed development.

¹ The step-wise approach is the means of demonstrating the steps which have been taken towards securing a net benefit for biodiversity. The onus is on developers to bring forward proposals in a way which will achieve a net benefit for biodiversity demonstrating how they have used the step wise approach.

The Local Development Plan

- 3.2.7 The Local Development Plan (LDP) is the Powys LDP (2011-2026) adopted in April 2018 (Powys Council, 2018). It sets out the Council's policies for the use of land in Powys.
- 3.2.8 Relevant policies to be considered include the following:
- Policy SP7 – Safeguarding of Strategic Resources and Assets;
 - Policy DM2 – The Natural Environment;
 - Policy DM4 – Landscape;
 - Policy DM7 – Dark Skies and External Lighting;
 - Policy DM8 – Minerals Safeguarding;
 - Policy DM13 – Design and Resources; and
 - Policy RE1 – Renewable Energy.
- 3.2.9 The adopted LDP is undergoing review and a replacement LDP (RLDP) is intended to be operative by April 2026. Pre-Deposit consultation on the RLDP is expected to take place in the period May-June 2023. Public consultation on the Deposit Plan is expected to take place in the period February to March 2024. Supplementary Planning Guidance (SPG) (Powys Council, 2019) is also in place, including the following of relevance:
- SPG – Renewable Energy; and
 - SPG – Landscape.
- 3.2.10 The Renewable Energy SPG provides little detail with regard to wind development, referring to the LDP policy and Welsh national policy, including TAN 8, therefore it is dated. The guidance provides an overview of the criteria for determining renewable energy projects, however this is not detailed or specific to any site or technology.
- 3.2.11 The Landscape SPG guidance is more informative, detailing how local landscape policy is implemented, how to identify landscape characteristics and qualities during assessment and the use of LANDMAP, the Welsh national landscape resource where characteristics, qualities and influences on the landscape are recorded for use during assessment and decision-making.
- 3.2.12 The national and local planning policy framework applying to the site will be taken into account in the iterative EIA design process.

GIS Constraints Analysis

- 3.2.13 GIS constraints analysis involves identifying and mapping environmental, technical, and engineering constraints to wind farm development. Constraints that were considered as part of the site selection exercise for the Proposed Development included:
- Aviation interests: Including local licensed aerodromes and visibility to radars, both military and civilian.

- Landscape designations: Including National Parks and local landscape designations.
- Ecological designations: Including International designations (e.g. Special Protection Areas), National designations (e.g. Sites of Special Scientific Interest), and Local designations (e.g. Local Nature Reserves).
- Cultural heritage designations: Including Registered Gardens and Designed Landscapes, Registered Battlefields, World Heritage Sites, Listed Buildings, Conservation Areas and Scheduled Ancient Monuments.
- The pattern of settlement and land use: With buffers provided around residential properties and settlements.

Suitable Access Considerations

- 3.2.14 Given the size and scale of abnormal indivisible loads (AILs) associated with wind farm development, a site must demonstrate that it is accessible for construction and operational traffic. At an early stage of site development, the Applicant has undertaken an access route survey to help inform the likely issues associated with the development of the site with regards to off-site transport and access for AIL traffic.

Summary

- 3.2.15 The site for the Proposed Development demonstrated the necessary attributes for the construction and operation of a wind farm development without significant technical or environmental constraints.

3.3 References

- Planning Inspectorate. (June 2020). PINS Advice Note 7: Environmental Impact Assessment: Process, Preliminary Environment Information and Environmental Statements. Available at: <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/>
- Welsh Government. (2017). Energy Generation in Wales 2017. Welsh Government. Available at: <https://www.regen.co.uk/wp-content/uploads/Energy-Generation-in-Wales-2017.pdf>
- Welsh Government. (2021a). Planning Policy Wales Edition 11. Welsh Government. Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf
- Welsh Government. (2021b). Future Wales: The National Plan 2040. Welsh Government. Available at: <https://gov.wales/sites/default/>

4 APPROACH TO EIA

4.1 Introduction

- 4.1.1 This chapter sets out the overall approach that will be taken to the EIA for the Proposed Development. The ES will contain the information specified in Regulation 17 and Schedule 4 of the EIA Regulations. The approach to the assessment has been informed by current best practice guidance.
- 4.1.2 An overview of the guidance and methodology adopted for each environmental factor is provided within the respective environmental factor chapters of this EIA Scoping Report.
- 4.1.3 The environmental factors listed under Regulation 4(2) and Schedule 4 (Paragraph 4) of the EIA Regulations are presented below:
- Air quality.
 - Biodiversity (split into ‘terrestrial ecology’ and ‘ornithology’ for the purposes of reporting).
 - Climate.
 - Cultural Heritage.
 - Population.
 - Human health.
 - Land and soil (factors combined for the purposes of reporting)
 - Landscape and visual.
 - Material assets.
 - Water (combined with ‘land and soil’ for the purposes of reporting).
- 4.1.4 It should be noted that although not listed as specific environmental ‘factors’ under Regulation 4(2) and Schedule 4 (Paragraph 4) of the EIA Regulations 2017, the following are also considered within this EIA Scoping Report:
- Aviation.
 - Forestry.
 - Heat and Radiation.
 - Major Accidents and Disasters.
 - Noise and vibration.
 - Shadow Flicker.
 - Telecommunication and utilities.
 - Traffic and transport.
- 4.1.5 The proposed structure of the Environmental Statement is set out in **Appendix J**.
- 4.1.6 The significance of effects during the decommissioning phase of the Proposed Development are anticipated to be equal to or less than those identified during the

construction phase. Therefore, unless discussed within **Section 6** of this EIA Scoping Report below, the decommissioning phase is proposed to be scoped out of further assessment.

4.2 Consultation

- 4.2.1 Consultation alongside the EIA process is critical to the development of a comprehensive and proportionate ES. The views of statutory and non-statutory consultees are important to ensure that the EIA from the outset focuses on specific issues where significant environmental effects are likely, and where further investigation is required.
- 4.2.2 The consultation, as an ongoing process, enables embedded and additional mitigation measures to be incorporated into the Proposed Development to limit adverse environmental effects and optimise environmental benefits. Early and ongoing engagement with consultees will be important to influence the design process of the Proposed Development by seeking an appropriate level of feedback from consultees, to ensure that comments are considered in the evolving design.
- 4.2.3 As part of the EIA process, consultation will be undertaken with a range of statutory and non-statutory consultees. It is anticipated at this stage that consultees will include (but are not limited to):
- Powys County Council.
 - Ceredigion County Council.
 - Llanbrynmair Community Council.
 - Cadfarch Community Council.
 - Trefeglwys Community Council.
 - Blaenrheidol Community Council.
 - Welsh Government.
 - Natural Resources Wales.
 - Cadw.
 - Clwyd-Powys Archaeological Trust.
 - Dyfed Archaeological Trust.
 - North and Mid-Wales Trunk Road Agency.
 - Radnorshire Wildlife Trust.
 - Royal Society for the Protection of Birds (RSPB).
 - Snowdonia (Eryri) National Park Authority.
- 4.2.4 The purpose of this consultation will be to brief consultees on the Proposed Development, seek feedback on the approach to assessment, and obtain baseline data. A summary of consultation will be included within the ES and technical consultation will be summarised within the individual technical chapters.

- 4.2.5 The applicant intends to carry out community consultation, with public exhibitions and circulars. The outcome of the consultation process will be compiled into a Pre-Application Consultation Report to accompany the Application, detailing the consultation undertaken and any changes made to the proposal as a result.

4.3 General difficulties and uncertainties

- 4.3.1 Factor specific difficulties and uncertainties are set out in **Chapter 6** of this EIA Scoping Report.
- 4.3.2 The following key general difficulties and uncertainties apply to a number of factors:
- The period of validity for each set of baseline data collected will be set out in the ES and, where appropriate, the requirement for any repeat surveys will be specified, such as for species data.
 - It may be necessary to collect data on site. Where it is not possible to access private land, data will be collected from publicly accessible land only.

4.4 Defining the study area

- 4.4.1 Study areas have been defined individually for each environmental factor, taking into account the geographic scope of the potential impacts relevant to that factor and the information required to assess those impacts. The proposed study areas are described within **Chapter 6** of this EIA Scoping Report.

4.5 Establishing baseline conditions

- 4.5.1 Likely significant environmental effects of the Proposed Development will be described in the ES in relation to the extent of changes to the existing baseline environment as a result of the construction, operation and (where considered appropriate) the decommissioning of the Proposed Development. The baseline environment will comprise the existing environmental characteristics and conditions, based upon desk-top studies, field surveys undertaken and information available at the time of the assessment.
- 4.5.2 Baseline conditions will be established by:
- Site visits and surveys;
 - Desk based studies; and
 - Modelling.
- 4.5.3 The baseline conditions for each environmental factor, as they are currently known, are set out within **Chapter 6** of this EIA Scoping Report.
- 4.5.4 The baseline conditions used in the ES will vary depending on the timing of surveys or the date at which data sources have been produced / assessed. It is anticipated that information required to inform the baseline environment for the assessments will be based on data obtained or surveys completed between 2019 and 2023. Where

appropriate, existing baseline data collected prior to this may be used to inform the assessment if it is deemed to remain relevant.

- 4.5.5 Data obtained from third party sources may be older, but the origin of all third-party data will be clearly outlined, alongside any limitations and assumptions.
- 4.5.6 Baseline data which is deemed to be confidential in nature, such as that relating to protected species, will be provided in separate confidential appendices to the ES, due to the sensitivity of such species records.

4.6 Establishing future baseline conditions

- 4.6.1 Schedule 4, paragraph 3 of the EIA Regulations 2017 requires consideration of the likely evolution of the current state of the environment (baseline scenario) in the absence of the Proposed Development, as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge (the 'future baseline').
- 4.6.2 Whilst there are considerable limitations to the predictions that can be made about natural baseline conditions at a future point in time, reasonable effort will be made to characterise the future baseline in the absence of the Proposed Development in each topic assessment. In addition, some assessments require projections to account for future change, such as traffic growth within the assessment of likely significant effects associated with the Proposed Development.

4.7 Approach to mitigation

- 4.7.1 Mitigation can be relied on to reduce any potential significant effects from the Proposed Development. The sequential steps of the mitigation hierarchy are as follows:
 - Avoidance: Take measures to avoid creating impacts from the outset;
 - Minimisation: Measure taken to reduce the duration, intensity and extent of the impact if they cannot be avoided;
 - Restoration: Measures taken to improve ecosystems following exposure to unavoidable impacts; and
 - Offset: Measure taken to compensate for any residual impacts.
- 4.7.2 The Institute of Environmental Management and Assessment's (IEMA) 'Environmental Impact Assessment Guide to Delivering Quality Development' (2016) refers to three distinct forms of mitigation:
 - Primary: An intrinsic part of the project design.
 - Secondary: Typically described within the specific factor chapters of the ES, but often are secured through planning conditions and / or management plans.
 - Tertiary: Required regardless of any EIA, as it is imposed, for example, as a result of legislative requirements and / or standard sectoral practices.

- 4.7.3 For the purposes of this EIA Scoping Report and the ES, embedded ‘primary’ mitigation measures will form part of the Proposed Development for which development consent is sought.
- 4.7.4 **Table 4-1** describes the currently known embedded (primary) environmental mitigation measures that are considered to be an inherent part of the Proposed Development i.e. the project design principles adopted to avoid or prevent adverse environmental effects, based on the design of the Proposed Development to date. It should be noted that these will likely evolve over the course of the design evolution, up to submission of the DNS application.
- 4.7.5 These embedded (primary) environmental mitigation measures should not be confused with additional (secondary and tertiary) mitigation measures proposed in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment, which are described under the ‘Additional (Secondary and Tertiary) Mitigation’ section within each environmental factor assessment chapter (see **Chapter 6**).

Table 4-1: Embedded (primary) environmental mitigation measures

Environmental Factor to which the Embedded Environmental Mitigation Measure Relates	Embedded Environmental Mitigation Measure and Associated Benefit
Landscape and visual Land, soils and water Ecology Ornithology Noise Access, traffic, and transport Cultural heritage	Locating turbines to avoid sensitive environmental receptors The indicative turbine layout presented in Appendix B has considered the following features: • Residential properties (at least 700m from properties which are not financially involved). • At least 50m from watercourses. • At least 50m from Scheduled Monuments located on the Site. • Implementation of species specific no disturbance zones around identified birds’ nests.
Telecommunications and utilities Access, traffic, and transport	Locating turbines to avoid existing infrastructure, engineering constraints and land use features The indicative turbine layout presented in Appendix B has considered / avoided the following features: • Slopes of greater than 12 degrees. • At least 200m from the local highway network. • Locations on or close to National Trails

Environmental Factor to which the Embedded Environmental Mitigation Measure Relates	Embedded Environmental Mitigation Measure and Associated Benefit
Aviation Landscape and visual	Avoidance of potential impacts on aviation and radar receptors The following measures will form part of the Proposed Development to avoid potential impacts on aviation and radar receptors: • All structures of more than 91.4m in height will be charted on aeronautical charts and reported to the Defence Geographic Centre (DGC), which maintains the UK's database of tall structures (Digital Vertical Obstruction File) at least ten weeks prior to construction. • Any temporary obstacles associated with wind farms which are of more than 91.4m in height are to be alerted to aircrews by means of the Notice to Airmen (NOTAM) system.

4.8 Assessment of likely significant effects

- 4.8.1 The ES will report on the likely significant environmental effects for the site preparation, earthworks and construction (hereafter referred to as 'construction'), operational (i.e., once completed and open to use), and decommissioning (i.e., once the Proposed Development has reached its end of life) phases of the Proposed Development (where considered appropriate).
- 4.8.2 The design of the Proposed Development will continue to be progressed and there will be a need to continue refining the design up to the detailed design stage, requiring a certain level of flexibility to be maintained (e.g., micro-siting of wind turbines and other infrastructure). However, the assessment will be based on a cautious 'worst case' approach and the level of information provided will ensure that likely significant effects are identified.
- 4.8.3 The following criteria will be taken into account when determining significance:
- Likelihood of occurrence.
 - Adherence of the Proposed Development to legislation, planning policy, international, national, and local standards.
 - The receptors / resources (natural and human) which would be affected and the pathways for such effects.
 - The geographic importance, sensitivity or value of receptors / resources.
 - The duration (short-term, medium-term or long-term); permanence (permanent or temporary) and changes in significance (increase or decrease).

- Reversibility - e.g., is the change reversible or irreversible, permanent or temporary.
- Environmental and health standards (e.g., local air quality standards) being threatened.
- Inter-relationship between effects (both cumulatively and in terms of potential effect interactions).
- The outputs of stakeholder and public engagement.
- Feasibility and mechanisms for delivering mitigating measures, e.g. Is there evidence of the ability to legally deliver the environmental assumptions which are the basis for the assessment?

4.8.4 The method for assessing significance of effects varies between environmental factors but, in principle, will be based on the environmental sensitivity (or value / importance) of a receptor / resource and the magnitude of change from the baseline conditions. The approach to assessing the significance of effects for each individual factor is outlined within **Chapter 6** and **Appendix K** of this EIA Scoping Report.

4.8.5 Summary of effect tables that summarise the likely significant effects associated with each of the environmental factors will be provided in the Environmental Statement at the end of each factor assessment chapter. These tables will outline sensitive receptors, additional mitigation measures and residual effects. A distinction will be made between direct, indirect, secondary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects. Cumulative effects will be considered as a single coordinated assessment.

4.9 Opportunities for enhancing the environment

4.9.1 Where possible, there will be a commitment to identifying opportunities for enhancement within the relevant environmental factor assessments. Enhancement is taken to be a measure that is over and above what is required to mitigate the adverse effects of a project. Therefore, any identified enhancement measures will not be taken into account when determining the significance of effects.

4.9.2 Enhancement measures will be assessed in accordance with steps set out in PPW.

4.10 References

- Institute of Environmental Management and Assessment (IEMA). (2016). Environmental Impact Assessment Guide to Delivering Quality Development. Available at: <https://www.iema.net/download-document/328273>
- Welsh Government. (2021). Planning Policy Wales. [Online]. Available at: https://gov.wales/Sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf [Accessed: 02/12/2022]

5 ENVIRONMENTAL FACTORS PROPOSED TO BE SCOPED OUT

5.1 Introduction

- 5.1.1 As part of the EIA process and based on the information available to date, there are a number of environmental factors, as listed under **Section 4.1**, for which it is considered an assessment as part of the EIA is not justified, and therefore a standalone chapter will not be presented in the ES.

5.2 Air Quality

- 5.2.1 There are no air quality management areas (AQMA) within 2km of the Site boundary, along the off-site access route, or along the potential route for any abnormal indivisible load (AIL) deliveries.
- 5.2.2 During construction, it is anticipated that any emissions (associated with construction activities and traffic) would be minimal and temporary. Localised dust and traffic emissions would be controlled by the adoption of construction best practices, with all relevant procedures to be documented in the Outline CEMP that will be submitted in support of the Application. It is expected that adherence to the measures in the CEMP will ensure no significant effects occur during construction in relation to dust or traffic emissions.
- 5.2.3 Once operational, the Proposed Development is not expected to generate any significant level of emissions to air. Traffic on Site will be limited to infrequent movements of maintenance vehicles and therefore this will not lead to significant traffic emissions or levels of dust.
- 5.2.4 During decommissioning, the levels of emissions to air are expected to be similar to those during the construction phase and again not significant.
- 5.2.5 As no significant air quality impacts associated with the Proposed Development are predicted, it is proposed that air quality be scoped out of further assessment in the ES.

5.3 Aviation

- 5.3.1 Developments which include wind turbine infrastructure 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. Early feasibility work completed at the Site included an initial assessment of the potential aviation effects.

5.3.2 There is no low level air defence radar coverage in this area. There are no radar equipped civil licensed aerodromes within or even close to consultation distance, nor are there any non-radar equipped licenced aerodromes or unlicensed aerodromes within consultation distance. Operators of any private airstrips that are not listed in publications or marked on charts but that are identified during further assessments will be consulted accordingly. However, the following considerations were identified:

- **Ministry of Defence (MoD) air traffic control (ATC) radar:** The closest military ATC radar is located at RAF Shawbury, over 74km to the north-east of the Site.
- **MoD low flying:** The Site is located within a MoD Tactical Training Area (TTA 7), which sits within the overarching Low Flying Area (LFA 7).
- **NATS En Route Plc (NERL) radar:** The turbines at the Proposed Development would be visible to the National Air Traffic Services (NATS) Clee Hill radar.

5.3.3 Further consultation with relevant stakeholders, including the MoD and NATS, will be undertaken as the design of the Proposed Development develops. Any relevant restrictions on the design of the Proposed Development (turbine heights, micro-siting etc.) and any required mitigation, such as aviation lighting, will be referenced within the ES as part of the description of the Proposed Development.

5.3.4 Where a requirement for aviation warning lights is specified by consultees, this will be assessed in the Landscape and Visual Impact Assessment. Please refer to **Section 6.2**.

5.3.5 A standalone technical report, based upon the guidance in CAA Publication CAP 764 Policy and Guidelines on Wind Turbines Version 6 (2016), will be prepared and submitted in support of the DNS application to present an analysis of the aviation issues pertinent to the Proposed Development. This will be undertaken outside of the EIA process. The report will primarily consider effects to the following:

- MoD ATC radar (RAF Shawbury);
- MoD low flying;
- NERL radar issues; and
- The requirement for aviation lighting as part of the Proposed Development.

5.4 Forestry

5.4.1 A section across the centre of the Site, on the southern side of the Afon Clywedog valley, comprises a large area of commercial plantation forestry managed by Natural Resources Wales, the full extent of which is located within the Site boundary. The current design of the Proposed Development includes wind turbines and associated infrastructure within the plantation forestry area. As such, a Forestry Assessment will be undertaken and submitted as a standalone report in support of the DNS application.

5.4.2 Forests are dynamic and constantly changing through landowner activities and natural events. Any changes to the forest structure resulting from the incorporation of

the Proposed Development will be assessed. This will include changes to, for example, the woodland composition and felling programmes.

- 5.4.3 The description of the forestry baseline will include total area, species composition, age class structure, yield class, other relevant crop information, baseline felling and restocking plans, as available. The baseline will be prepared from existing records, site surveys and aerial photography.
- 5.4.4 Consultation with relevant interested parties, including the local authority and NRW, will be undertaken in order to ensure their views are taken into account within the assessment and to ensure any proposed changes are appropriate. In addition, the Applicant will look to explore opportunities for appropriate compensatory planting and habitat enhancement to ensure they align with green infrastructure aspirations and meet the requirements of local and national policy. Any replacement planting shall be at a ratio equivalent to the quality, environmental, and ecological importance of the tree(s)/habitat lost.
- 5.4.5 Potential impacts on forestry assets will be minimised where practicable during the design of the Proposed Development. Additionally, none of the activities to be undertaken during construction, operation or decommissioning of the Proposed Development are expected to have a significant effect on forestry. Therefore, the Forestry Assessment will be undertaken outside of the EIA and forestry is proposed to be scoped out of further assessment in the ES. The effects of any changes to forest design as a result of the Proposed Development will be considered within other relevant chapters of the ES, including terrestrial ecology and landscape and visual.

5.5 Heat and radiation

- 5.5.1 The requirement to consider heat and radiation in UK EIA practice was introduced via the EIA Regulations 2017.
- 5.5.2 Schedule 4(5)(c) of the EIA Regulations 2017 requires that an ES includes:
'A description of the likely significant effects of the development on the environment resulting from, inter alia:
(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste.'
- 5.5.3 Due to the scale and nature of the Proposed Development, it is not anticipated that there will be any significant sources of heat or radiation during construction, operation, or decommissioning. The consideration of heat and radiation emissions has therefore been scoped out of further assessment and has not been considered further in this EIA Scoping Report.

5.6 Human Health

- 5.6.1 As described in **Section 5.7** in relation to major accidents and disasters, relevant safety considerations informing the final Energy Park design will be described in the Project Description ES chapter. The Proposed Development is not likely to give rise

to significant adverse air quality impacts and hence there would not be significant related risks to health as a result.

- 5.6.2 It is proposed that consideration of the potential effects to human health as a result of the Proposed Development will be covered through the findings of other assessments undertaken as part of the EIA process, which may include the following:
- Landscape and visual;
 - Land, soils, and water (in relation to potential mining works and contamination);
 - Noise and vibration; and
 - Traffic and transport.
- 5.6.3 Each of these chapters within the EIA Scoping Report and subsequent ES will consider the potential effects to human health within their own assessments, although they are not anticipated to give rise to significant effects.
- 5.6.4 As any potential human health impacts will be captured by the aforementioned assessments and there are not expected to be any significant human health impacts outside of these assessments, it is proposed that human health is not subject to dedicated assessment and should therefore be excluded from the scope of the ES.

5.7 Major Accidents and Disasters

- 5.7.1 The construction, operation and decommissioning of the Proposed Development 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 Act 1974.
- 5.7.2 The Site is not located in an area with a history of natural disasters, such as extreme weather events.
- 5.7.3 The design will take into account the potential for adverse effects of climate change which could manifest during the design life of the Proposed Development (such as stormier weather, increased risk of floods etc.).
- 5.7.4 There may be a requirement to consider the risk of peat slide if deep peat (i.e. areas of peat greater than 30cm) cannot be avoided. In such a case, a Peat Slide Risk Assessment will be prepared in support of the DNS application.
- 5.7.5 A description of relevant safety features of the Proposed Development will be included in the ES within the description of the Proposed Development.
- 5.7.6 A BESS facility is being considered as part of the Proposed Development. If the BESS facility is included, the Applicant will consider the requirement for an Outline Battery Safety Management Plan as part of the DNS application. Furthermore, the construction and operation of the BESS would be in line with best practice safety measures and routine maintenance of the BESS facilities would be undertaken during the operational phase of the Proposed Development. Such safety measures would be expected to minimise the potential for any hazards or major disasters occurring.

- 5.7.7 It is therefore not considered necessary to include a separate assessment of major accidents and/or disasters within the ES and this topic is therefore scoped out.

5.8 Material Assets and Waste

- 5.8.1 Material assets can be defined as “substances used in each lifecycle stage of a development, with particular focus on the construction, operation and maintenance, and decommissioning or ‘end of first life’ (deconstruction, demounting, demolition and disposal) phases” (IEMA, 2020). Material assets can include ‘material’ (i.e. physical resources that are used across the lifecycle of a development) and ‘excavated arisings’ (i.e. soil, rock, or similar resource generated by excavations).
- 5.8.2 Waste is defined as ‘any substance or object which the holder discards or intends or is required to discard’ (IEMA, 2020). The Waste Framework Directive definition includes any substance or object that is discarded for disposal or that has not been subject to acceptable recovery (including reuse and recycling).
- 5.8.3 The main impacts (changes) and effects (consequences) of materials consumption and waste disposal relevant to the Proposed Development are presented in **Table 5-1**.

Table 5-1: Impacts and effects of material consumption and waste disposal relevant to the Proposed Development

Matter	Direct Impacts	Adverse Effects	Applicable Development Phase
Materials	Consumption of resources	Depletion of resources, resulting in the temporary or permanent degradation of the natural environment.	Construction and decommissioning.
Waste	Generation and disposal of waste	Reduction in landfill capacity. Unsustainable use or loss of resources to landfill that result in the temporary or permanent degradation of the natural environment.	Construction and decommissioning.

- 5.8.4 The indirect impacts associated with materials consumption and waste disposal (e.g. release of greenhouse gas emissions, water consumption, amenity impacts, ecological impacts, etc) will be assessed elsewhere within the EIA. Similarly, the indirect impacts of any off-site waste management facilities and material production facilities are expected to be assessed (and where necessary, mitigated) under the planning and permitting regime for those sites and thus do not form part of an EIA for a development that uses such facilities for material supply or waste management.

- 5.8.5 A description of the potential streams and volumes of construction materials and waste disposal will be described within the ES. In addition, the Outline CEMP will set out how construction materials and waste will be managed on-site, and opportunities to recycle waste will be explored. Where possible, development-specific commitments for sustainable resource management will be presented within the ES.
- 5.8.6 As part of any final CEMP, there would be a requirement to develop and implement a Site Waste Management Plan (SWMP) and Materials Management Plan (MMP) in advance of the construction works.
- 5.8.7 It is also not intended to remove significant quantities of excavated arisings from the Site during construction (there are currently no demolition works proposed, for example). There may, however, be a need to remove some soils from the Site for treatment or disposal, if found to be contaminated, and it is not practical to treat this on-Site. However, where possible, soil arisings will be balanced through a cut and fill exercise to retain volumes on Site.
- 5.8.8 There will be relatively little waste produced during the operational phase and the requirement for material assets will be limited to maintenance and replacement parts, as required.
- 5.8.9 During decommissioning, the removal of any material assets and waste will be recycled or disposed of in accordance with good practice and market conditions at that time. If items can be recycled, this will be the first-choice option.
- 5.8.10 Taking the above into account, it is proposed to scope out material assets and waste from further assessment in the ES.

5.9 Population

Socio-economics

- 5.9.1 Potential socio-economic effects of renewable energy projects have historically been taken into account as part of the EIA process and reported on in the ES. However, these assessments frequently come to the conclusion that any such effects identified do not meet the threshold for significance.
- 5.9.2 It is therefore suggested to exclude all socio-economic effects from the ES in order to address those likely significant effects. However, there is still a requirement that social and economic factors be taken into account when making planning decisions at the national and local tiers.
- 5.9.3 The Welsh Ministers and local planning authorities are required to take social and economic factors into account as part of their mandate to ensure sustainability and well-being, even though it is acknowledged that socio-economic benefits are not material considerations under the land-use planning system.
- 5.9.4 A Socio-Economics Statement will therefore be submitted in support of the DNS Application to explain how the socio-economic effects of the proposed development are anticipated to benefit the local and wider community.

Land Use and Public Access

- 5.9.5 The Site is predominantly comprised of agricultural land, upland rough grassland and peatland. There is a large area of commercial conifer plantation forestry towards the south of the Site, on the southern side of the Afon Clywedog valley. Once operational, the Proposed Development would have a relatively small footprint. Furthermore, it is anticipated that the existing land use would continue during the operation of the Proposed Development. Therefore, significant land use effects are not predicted.
- 5.9.6 There are a number of PRow within the Site boundary that allow movement across the Site for walkers, cyclists and horse riders. The Glyndwr's Way National Trail and Cambrian Way long-distance footpath both run through the Site. National Cycle Network (NCN) Route 8 follows the northern and eastern Site boundaries, on the B4518 and other local roads.
- 5.9.7 It is anticipated that some of these PRow will be temporarily and / or permanently diverted as a result of the Proposed Development. Therefore, an Outline Access Management Plan (OAMP) will be prepared outside of the EIA process and submitted in support of the DNS Application. The OAMP, which will be developed in consultation with Powys County Council, will identify PRow that will be affected by the Proposed Development and will detail relevant mitigation measures that will minimise the effects of these changes. The OAMP will also detail how PRow will be managed during the construction phase to ensure as many PRow are kept open for users, therefore minimising impacts.
- 5.9.8 Impacts to users of PRow are therefore expected to be minimised and where they do occur they will be short term and temporary. As such, it is not expected that changes to the PRow will significantly impact recreational use of the Site.
- 5.9.9 The Proposed Development also has potential to give rise to visual effects for any users of PRow. Visual effects have therefore been considered within the Landscape and Visual Impact Assessment of this Scoping report (**Section 6.2**) and will not be repeated in this section. As no significant land use and public access impacts are predicted, it is proposed that this topic be scoped out of further assessment.

5.10 Shadow Flicker

- 5.10.1 Rotating wind turbine blades can cause brightness levels to vary periodically at locations where they obstruct the sun's rays. This can result in a nuisance when the shadow is cast over the windows of residential properties. This intermittent shadow is described by the term 'shadow flicker'. Shadow flicker can be a cause of annoyance at residences near onshore wind turbines if it occurs for a significant period of time during the year; however, no significant negative health effects are understood to be associated with this phenomenon (Front Public Health, 2014).
- 5.10.2 The likelihood and duration of shadow flicker depends upon:
- The orientation of a residential property's windows relative to the proposed wind turbines – in the UK, only residential properties within 130 degrees either

side of north, relative to the proposed wind turbines, can be affected, as wind turbines do not cast long shadows on the southern side.

- Distance from the proposed wind turbines – the further the observer is from the proposed wind turbine, the less pronounced the effect would be.
- The proposed wind turbine height and rotor diameter.
- The time of year and time of day.
- Weather conditions.

- 5.10.3 Once the design of the Proposed Development has taken account of all known environmental, engineering, and technical constraints (including the proximity of the proposed wind turbines to residential properties), a technical assessment of the potential for shadow flicker will be undertaken, with reference to the above criteria, focussing on the operational effects of the Proposed Development.
- 5.10.4 The technical assessment will determine whether there will be any shadow flicker effects on properties which lie within ten rotor diameters and 130° either side of north from each of the proposed turbines. Effects will be quantified using a computer model and mitigation, if required, will be implemented.
- 5.10.5 There is no formal limit on the amount of shadow flicker that is considered acceptable within the UK. A typical limit, which has been utilised in Northern Ireland, Germany and Belgium, is 30 hours per year with a maximum of 30 minutes per day. If shadow flicker effects are predicted beyond this limit, mitigation may be required to eradicate the occurrence of shadow flicker.
- 5.10.6 In the event that it is not possible to completely remove shadow flicker effects on residential properties, the Proposed Development will include mitigation measures to reduce any effects to the limits specified above.
- 5.10.7 Mitigation could include a shutdown scheme which defines the times between which a wind turbine should be shut down to eliminate (or reduce to acceptable limits) shadow flicker effects on each receptor, assuming clear sunny skies. The term 'shutdown' means that the rotating blade is completely still and does not move for the period of time specified.
- 5.10.8 The potential impacts relating to shadow flicker will be assessed in a stand-alone report outside of the EIA process, which will be submitted in support of the DNS application. Furthermore, any potentially significant shadow flicker effects will be mitigated through the measures described above. Therefore, it is proposed to scope shadow flicker out of further assessment in the ES.

5.11 Telecommunications

- 5.11.1 Wind turbines have the potential to cause interference with telecommunication systems, including terrestrial fixed microwave links, terrestrial radio telemetry links, and television broadcasts.

- 5.11.2 With respect to terrestrial television services, any impacts can be mitigated through the simple repositioning/reorientation of antenna or the installation of alternative satellite or cable infrastructure. Given the above, it is considered that effects upon television signals do not require further consideration as part of the EIA.
- 5.11.3 A feasibility assessment of terrestrial fixed microwave links and terrestrial radio telemetry links has been completed for the Site. Early consultation has been carried out with various stakeholder, including Arqiva, Complete Security Services (CSS) Telecoms, and Joint Radio Company (JRC). A number of potential microwave / telemetry links were identified close to / running across the Site, particularly towards the south-eastern portion of the Site where the density of links is greatest.
- 5.11.4 Consultation with relevant link operators will continue until the design of the Proposed Development has been fixed. Consultation will include identifying appropriate separation distances from operating links and, where necessary, other forms of mitigation that would need to be included as part of the Proposed Development. This process can be undertaken outside of the EIA process and therefore it is proposed to scope out telecommunications from further assessment within the ES.

5.12 References

- Front Public Health. (2014). Wind Turbines and Human Health. Available online: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4063257/>
- IEMA. (2020). IEMA guide to: Materials and Waste in Environmental Impact Assessment. Available online: <https://www.iema.net/download-document/236692>

6 ENVIRONMENTAL FACTORS PROPOSED TO BE SCOPED IN

6.1 Introduction

- 6.1.1 As part of the EIA process and based on the information available to date, there are a number of environmental factors, as listed under **Section 4.1**, for which it is considered an assessment as part of the EIA is required, and therefore a standalone chapter will be presented in the ES.

6.2 Landscape and Visual

6.2.1 Consultation

No consultation to inform the scope of Landscape and Visual Impact Assessment (LVIA) has been undertaken to date. However, dependent on the response to this EIA Scoping Report, it is proposed to consult with the following statutory bodies to agree the extent of the study area, methodology and viewpoint locations:

- Powys County Council;
- Ceredigion County Council;
- Gwynedd Council;
- Eryri National Park Authority; and
- Natural Resources Wales (NRW).

6.2.2 Study area

The Landscape and Visual section of the ES will assess effects on the physical landscape within the Site boundary, together with the wider landscape character and visual amenity extending to a distance of 30km from the outermost turbine (refer to **Figure 6.2.1 in Appendix D**).

The extent of the study area is based on information provided within Natural Resources Wales (NRW) Guidance Note 46: *Using LANDMAP in Landscape and Visual Impact Assessments GN46*. This guidance note indicates that a study area of 30km would be appropriate for the size of turbine proposed.

The study area for the Residential Visual Amenity Assessment (RVAA) will be in accordance with Landscape Institutes Technical Guidance Note 2/19 – *Residential Visual Amenity Assessment (RVAA) 15th March 2019*. This recommends a preliminary study area of 1.5-2km. It is therefore proposed to include a 2km within the RVAA, offset from the proposed turbines.

6.2.3 Data sources to inform the EIA baseline characterisation

The assessment will adopt a methodology developed in accordance with the following current guidance:

- Guidelines for Landscape and Visual Impact Assessment, Third Edition. Landscape Institute with the Institute of Environmental Management and Assessment (2013);

- Assessing the Cumulative Impact of Onshore Wind Energy Developments, NatureScot, (March 2021);
- Siting and Designing Wind Farms in the Landscape, Version 3, NatureScot (2017);
- NRW Guidance Note 046, 'Using LANDMAP in Landscape and Visual Impact Assessments, (LVIA),' January 2021;
- Visual Representation of Wind Farms, Version 2.2, NatureScot (February 2017);
- Visual Representation of Development Proposals – Technical Advice Note 06/19, Landscape Institute (September 2019), including supporting Technical Information Notes 07/19, 08/19 and 09/19;
- An Approach to Landscape Sensitivity Assessment – To Inform Spatial Planning and Land Management, Natural England (June 2019); and
- Assessing Landscape Value Outside National Designations -Technical Guidance Note 02/21, Landscape Institute (2021).
- Residential Visual Amenity Assessment (RVAA) -Technical Guidance Note 02/19, Landscape Institute (2019).
- Special Report: The State of Environmental Impact Assessment Practice in the UK. IEMA (2011).

Whilst several of the guidance documents noted above have been published by Nature Scot for projects in Scotland, in the absence of similar guidance, they have become established best practice for LVIA across the UK.

In addition to the above guidance used to inform the methodology, the following planning documents and published reports will be used to help inform the LVIA chapter of the ES.

- Natural Resources Wales National Landscape Character Areas
- Powys County Council Local Development Plan 2011 – 2026 (adopted April 2018)
- Powys County Council Local Development Plan 2011 – 2026: Supplementary Planning Guidance (SPG) Landscape (adopted April 2018)
- Powys County Council Local Development Plan 2011 – 2026: SPG Historic Environment including Historic Environment Records (adopted July 2021)
- Powys County Council Local Development Plan 2011 – 2026: SPG Renewable Energy (adopted April 2019)
- Local Landscape Assessment for the Powys Local Development Plan Area, Landscape Character Assessment Report (March 2022)
- Ceredigion County Council Local Development Plan 2007 – 2022 (adopted April 2013)
- Ceredigion County Council Local Development Plan 2007 – 2022: SPG Renewable Energy (adopted January 2015)
- Ceredigion County Council Local Development Plan 2007 – 2022: SPG Special Landscape Areas (adopted April 2014)
- Ceredigion County Council Local Development Plan 2007 – 2022 (adopted April 2013)
- Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (adopted July 2017)
- Gwynedd Council SPG Landscape Character (adopted November 2009)
- Gwynedd Council SPG Onshore Wind Energy (adopted June 2014)
- Eryri National Park Local Development Plan 2016 – 2031 (adopted February 2019)

- Eryri National Park SPG Landscape Sensitivity and Capacity Assessment (adopted October 2016)
- Eryri National Park SPG Landscapes and Seascapes of Eryri (adopted July 2014)

6.2.4 Surveys to inform the EIA baseline characterisation

Site visits to each of the viewpoints will be undertaken to verify the key receptors and to record the existing visual baseline. Site assessment work will also verify the descriptions of the LCAs within published Landscape Character Assessments, noting any changes to the baseline since publication.

6.2.5 Baseline conditions

The Site and Immediate Surroundings

The Proposed Development is located to the west of the settlement of Staylittie/Penffordd-Las and to the south of Dylfie. The nearest main settlement to the Proposed Development is Llanidloes, located approximately 11km to the south-east. Other key settlements within the 30km study area include Caersws, Llandinam, Carno, Llanbrynmair, Machynlleth, Tywyn, Borth, Aberystwyth and Llangurig.

The Site and surrounding area are described in **Section 2.3** of this report and is located within National Landscape Character Area (NLCA) 21: Cambrian Mountains and partially extending across the Landscape Character Areas (LCA) 18 – Dyfi & Twymyn Hillside, LCA23 – Llyn Clywedog and LCA24 – Plynlimon as described within the Powys Landscape Character Assessment Report and illustrated in **Figure 6.2.3 in Appendix D**. Broadly, the Site is located within an extensive area of land used for upland grazing that forms part of the watershed between the catchments of the River Severn and River Dyfi. A large block of commercial coniferous forestry plantation is located within the southern part of the Site. Commercial forestry plantations are a feature throughout the wider study area, including Hafren Forest that lies immediately adjacent to the southern boundary of the Site. As noted within **Section 2.3**, the Clywedog Valley Landscape of Special Historic Interest lies partially within the proposed Site boundary and is a key sensitive receptor in terms of its character. Two long distance footpaths, Cambrian Way, and Glyndŵr's Way pass through the southern part of the Site and are recognised as a sensitive receptor due to their recreational value.

The Wider Study Area

Beyond the Red Line Boundary, within the wider study area to the east and north-east of the Site, the landscape is predominantly upland in character and contains a number of large-scale wind farms, including Carno I and II, Mynydd Clogau, Tirgwynt and Cemmaes 2. Sensitive receptors within this part of the study area include the Caersws Basin Registered Historic Landscape and the Severn Way long distance footpath.

Located approximately 7.5km from the Site boundary and encompassing the north-western areas of the study area is Eryri National Park (Snowdonia). This is an upland landscape that contains many summits, including those of Cader Idris, Maesglase, Craig Portas, Cribin Fawr and Waun-oer, and across which passes a section of the long-distance footpath, including the Cambrian Way. As a tourist and recreational attraction, the National Park is a sensitive receptor within the study area.

To the south and south-east of the Site, the landscape is dominated by the exposed upland moorland plateaus of the Cambrian Mountains that comprise shallow rolling slopes and valleys. Commercial forestry plantations are a dominant feature, as are existing wind farm developments, including Bryn Titli, Cefn Croes, Bryn Blaen and Llandinam. The landscape

within the part of the study area is incised by a number of river valleys, including the Wye Valley. Llyn Clywedog and Nant-y-moch Reservoir, the former of which includes a number of recreational facilities, including provision for fishing and sailing. Glyndŵr's Way National Walking Trail extends along the south edge of the reservoir. The Elan Valley, which has been designated as a Registered Historic Landscape consists of several reservoirs and dams, and is a tourist destination, located on the southern fringe of the study area.

As illustrated in **Figure 6.2.5 in Appendix D**, to the west and south-west, the landscape is dominated by the Ceredigion uplands, which has been designated as a Special Landscape Area (SLA), although includes the wind farm of Rheidol. The existing wind farm of Mynydd Gorddu is located adjacent to the western boundary of the SLA. To the western fringe of the study area, the landscape is coastal in character and includes the town of Aberystwyth. Much of the coastal edge is also designated as an SLA, including the Ceredigion Coast and, Dyfi Estuary and Valley Ceredigion. In addition to the SLAs, the long-distance footpaths, of Borth to Devil's Bridge to Pontrhydfendigaid Trail, Wales Coast Path and the Ceredigion Coast Path, together with the SLAs are all sensitive receptors within this part of the study area.

6.2.6 Additional (secondary and tertiary) mitigation

An iterative design approach will be taken to minimise effects on landscape character and visual amenity. The design will seek to avoid overly complex and visually confusing layouts, while reducing overall impact when viewed from local settlements and key sensitive receptors that have been identified within the study area.

6.2.7 Description of likely significant effects

Significant effects on landscape character are likely to occur as a result of:

- Direct change to the landscape character within the Red Line Boundary during the construction, operation and decommissioning phases of the Proposed Development, as a result of new elements that change the existing pattern of elements that define the existing character, or through indirect changes to character through visibility of the Proposed Development, which may change the way in which the pattern of existing elements is perceived. Significant effects may occur across Landscape Character Areas and landscape designations.

Significant effects on visual amenity are likely to occur as a result of:

- Significant changes in views as a result of the Proposed Development during the construction, operational and decommissioning phases, where there will be a change to the existing views, to the extent that the Proposed Development is the defining feature of views. Significant effects may occur across a range of visual receptors, including people using recreational trails and residential settlements.

Significant cumulative effects on landscape character and visual amenity are likely to occur where:

- The introduction of the Proposed Development, when viewed cumulatively with another wind farm development(s), would result in wind farms becoming the defining landscape or visual characteristic.

6.2.8 Receptors / elements to be scoped into the assessment

The following receptors / elements are proposed to be scoped into the assessment.

Receptor / Element	Phase	Justification
Landscape Character Areas	Construction / Operational / Decommissioning	Potential for significant effects from LCAs that extend across the Site and also from where there is extensive visibility of the Proposed Development. This includes areas within the following NLCA's: • NLCA 06: Eryri / Snowdonia • NLCA 16: Y Bertwn / Berwyn • NLCA 17: Bryniau a Dyffrynnoedd Trefaldyn / Montgomeryshire Hills and Vales • NLCA 19: Dyffren Hafren / Severn Valley • NLCA 20: Bryniau Sir Faesyfed / Radnorshire Hills • NLCA 21: Bryniau'r Canolbarth / Cambrian Mountains
Eryri National Park (Snowdonia)	Construction / Operational / Decommissioning	Statutory designated landscape of national importance located approximately 7.5km north-west of the Site, with the potential for significant effects from areas within proximity to the south-eastern boundary of the Park. Refer to Figure 6.2.4 in Appendix D.
Registered Landscapes of Outstanding and Special Historic Interest in Wales	Construction / Operational / Decommissioning	The proposed boundary of the Site partially extends within the boundary of Clywedog Valley Registered Landscape of Special Historic Interest and therefore the Proposed Development has the potential for significant direct and indirect effects on this landscape. In addition, as illustrated by Figure 6.2.4 in Appendix D, the theoretical visibility of the Proposed Development extends across a notable proportion of the Caersws Basin Registered Landscape of Special Historic Interest and therefore there is the potential for indirect effects on this landscape.
Special Landscape Areas (SLA)	Construction / Operational / Decommissioning	A non-statutory designation. As illustrated by Figure 6.2.5 in Appendix D, the Proposed Development will be potentially visible from the following SLAs and therefore there is the potential for significant indirect effects: 1. Northern Uplands 2. Southern Uplands 3. Corris

Receptors using National Trails/Long Distance Footpaths	Construction / Operational / Decommissioning	Figure 6.2.6 in Appendix D indicates that there is the potential for views of the Proposed Development from the Long Distance / National Trails of Glyndŵr's Way National Trail and Waun Linau / Cambrian Way. There is the potential for significant direct and indirect effects on receptors using these routes.
Receptors using National Cycle Routes (NCR)	Construction / Operational / Decommissioning	NCR 8 passes adjacent to the northern boundary of the Site (refer to Figure 6.2.6 in Appendix D) and also to the eastern boundary, including a short section that passes through the south-eastern corner. Therefore, there is the potential for significant direct and indirect effects on receptors using this route.
Major transport routes/scenic driving routes	Construction / Operational / Decommissioning	A section of The Llanidloes to Machynlleth scenic driving route that passes adjacent to Clywedog Reservoir extends along the northern boundary of the Site (refer to Figure 6.2.6 in Appendix D). In addition, a section of the scenic driving route that extends from Staylittie / Penffordd-Las to Llanidloes and passes through the Hafren Forest extends through part of the eastern half of the Site. Therefore, there is the potential for significant direct and indirect effects on receptors using these routes.
Local residential Receptors within 2km of a proposed turbine	Operational	Potential for significant effects on visual amenity from individual properties and farmsteads.
Residents of settlements	Construction / Operational / Decommissioning	Potential for significant effects on visual amenity from settlements within the study area, including Dylfie, Staylittie / Penffordd-Las, Caersws, Llanbrynmair and Machynlleth.

6.2.9 Receptors / elements to be scoped out of the assessment

The following receptors / elements are proposed to be scoped out.

Receptor / Element	Phase	Justification
Landscape Character Areas	Construction / Operational / Decommissioning	All LCAs from where this is no, or very limited visibility of the Proposed Development will be scoped out from further assessment. This includes the following NCLAs: NLCA 05: Bae Tremadog/Tremadoc Bay

		• NLCA 22: Glannau Aberdyfi/Aberdovey Coast • NLCA 23: Bryniau a Dyffrynnoedd Rheidol ac Ystwyth/Rheidol and Ystwyth Hills and Valleys • NLCA 24: Afordir Ceredigion/Ceredigion Coast • NLCA 25: Bro Ceredigion • NLCA 40: Dyffryn Teifi/Teifi Valley
Registered Historic Park and Gardens of Special Historic Interest	Construction / Operational / Decommissioning	As illustrated by Figure 6.2.4 in Appendix D , the ZTV indicates that there will be no Registered Historic Park and Gardens of Special Historic Interest from where the Proposed Development will be visible and therefore scoped out from further assessment.
Registered Landscapes of Outstanding/ Special Historic Interest in Wales	Construction / Operational / Decommissioning	As illustrated by Figure 6.2.5 in Appendix D the ZTV indicates that there will be no or limited visibility of the Proposed Development from the following Registered Landscapes of Outstanding / Special Historic Interest in Wales and therefore have scoped out from further assessment: 1. Vale of Dolgellau 2. Mawddach 3. Dysynni Valley 4. Arduwy 5. Upland Ceredigion 6. Elan Valley.
Special Landscape Areas	Construction / Operational / Decommissioning	As illustrated by Figure 6.2.5 in Appendix D the ZTV indicates that there will be no or limited visibility of the Proposed Development from the following Special Landscape Areas and therefore have scoped out from further assessment: 1. Barmouth 2. Dyfi Estuary and Valley 3. Ceredigion Coast – Llanrhystud to Aberystwyth 4. Ystwyth Valley 5. Rheidol Valley 6. Ceredigion Coast – Aberystwyth – Borth 7. Afon Wyre
Ceredigion Heritage Coast	Construction / Operational / Decommissioning	As illustrated by Figure 6.2.5 within Appendix D , the ZTV indicates there will be no visibility of the Proposed Development from the heritage

		coast and therefore scoped out from further assessment
Receptors using Long Distance Footpaths	Construction / Operational / Decommissioning	The ZTV (refer to Figure 6.2.6 in Appendix D) indicates that there will be no visibility of the Proposed Development from the following Long Distance/National Trails that are within the 30km study area. Therefore, they have been excluded from further assessment as there will be no scope for significant effects. 1. Borth to Devil's Bridge to Pontrhydfendigaid Trail 2. Cross Britain way 3. Llywbr Afordir Cymru/Wales Coast Path 4. Severn Way 5. Wye Valley Walk
Receptors using National Cycle Routes (NCR)	Construction / Operational / Decommissioning	As illustrated by Figure 6.2.6 in Appendix D , the ZTV indicates that, with the exception of the NCR8, there will be no or limited visibility of the Proposed Development from all other NCRs within the 30km study area and therefore have scoped out from further assessment.
Major transport routes/scenic driving routes	Construction / Operational / Decommissioning	As illustrated by Figure 6.2.6 in Appendix D , the ZTV indicates that, with the exception of the B4518, there will be no or limited visibility of the Proposed Development from all major transport routes (A roads and B roads) within the 30km study area and therefore have scoped out from further assessment.
Residents of settlements	Construction / Operational / Decommissioning	As illustrated by Figure 6.2.1 in Appendix D the ZTV indicates that there will be no or limited visibility of the Proposed Development from a number of settlements within the 30km study area, which have been scoped out from further assessment. This includes the settlements of: 1. Llanidloes 2. Llandinam 3. Carno 4. Tywyn 5. Borth 6. Aberystwyth 7. Llangurig
Residential Properties with no theoretical view of	Operational	Residential properties within the 2km RVAA study area where the ZTV indicates that there will be no visibility of the Proposed Development will be

the Proposed Development		excluded from further assessment as there is no scope for significant effects.
6.2.10 Opportunities for enhancing the environment		
Opportunities to enhance the environment may potentially include the upgrade of the public rights of way of the existing network, including the addition of gates, stiles, signage and improved connectivity with the wider local public footpath network.		
6.2.11 Proposed assessment methodology		
The LVIA will follow the approach as set out within the 'Guidelines for Landscape and Visual Impact Assessment (GVLIA), Third Edition (2013)' as published by the Landscape Institute and the Institute of Environmental Management and Assessment (IEMA). It will therefore focus on assessing the likely significant effects of the Proposed Development within the 30km study area. Therefore, for receptors where there is no potential for significant effects, these will be scoped out of further assessment. The significance of effects on both landscape character and visual amenity will be assessed in line with those listed in GLVIA as either very substantial, substantial, moderate, or slight. Effects determined to have substantial significance or above will be considered as significant. Conversely, effects determined to be slight will be considered not significant. Where effects are determined to have moderate significance, whether these effects are significant or not significant will depend on the individual and specific mitigating circumstances and the professional opinion of the landscape specialist will determine this. If any given receptors are subject to a series of moderate effects, such as a long a path or road corridor, the combined effects may be considered to be significant. Landscape Character Assessment It is proposed that the Landscape Character Areas (LCAs) within the landscape character assessments prepared by Powys County Council, Gwynedd Council and Eryri National Park Authority will be used to inform the baseline character of the landscape. Where no existing landscape character assessments exist within the 30km study area, LCAs will be based on LANDMAP data. This information will be supplemented with site assessment work to inform the key landscape receptors. The value and sensitivity of each LCA will be informed by LANDMAP data and also published Landscape Capacity and Sensitivity studies. Visual Assessment The assessment of effects on visual amenity will assess the significance of effects of the Proposed Development from a range of sensitive receptor groups. This will include settlements, walking routes, cycle routes, transport routes, including scenic driving routes and key tourist and recreational locations. The proposed viewpoint locations have been selected based on their potential for significant effects to occur and the extent of theoretical visibility of the proposed turbines as illustrated within the ZTV (refer to Figure 6.2.1 in Appendix D).		

Viewpoints

In order to identify potential sensitive landscape and visual receptors a desk-based assessment has been undertaken to include the identification of existing statutory and non-statutory landscape designations, recreational features and main transport corridors, including scenic driving routes, settlements, main tourist attractions, heritage areas, footpaths / trails and cycle routes.

Based on this information and an initial Zone of Theoretical Visibility (ZTV) plan, an initial field assessment of the 30km study area has been undertaken in order to identify, review and refine the viewpoints to be included within the LVIA. The location of these viewpoints is illustrated in **Figure 6.2.2**.

VP	Location	OS Grid Reference		Receptors
1	Minor road near Foel Fadian	283788	296166	Motorists on scenic driving route and cyclists on National Cycle Route (NCR) 8
2	Minor road, Waun Esgairgaled	283725	295233	Motorists on scenic driving route and cyclists on NCR8
3	Dylife	286260	294050	Settlement, walkers on Glyndŵr's National Trail, cyclists on NCR8
4	Staylitle/Penffordd-Las	288847	292172	Settlement
5	Scenic route to Llyn Clywedog	287775	291089	Motorists on scenic driving route and users of NCR8
6	Hafren Forst Hideaway	287307	290458	Motorists on scenic driving route and cyclists on NCR8
7	Llyn Clywedog	289274	288783	Visitors to Llyn Clywedog, road users
8	Minor road, north of Llyn Clywedog	290001	291154	Road users, farm workers
9	Cadair Idris	271104	313029	Visitors to nationally designated landscape/walkers on Camrian Way National Trail
10	Minor road, near Pennant	288157	299126	Road users
11	Machynlleth	274146	301904	Settlement, visitors to nationally

				designated landscape/walkers on Wales Coast Path
12	Glyndŵr's Way, north of Llanbrynmair	288882	304726	Walkers on Glyndŵr's National Trail and farm workers
13	Teifi Pools, Cambrian Way	279732	269908	Walkers on Cambrian Way National Trail
14	Cambrians Way/Glyndŵr's Way, South of Glaslyn,	282884	293597	Walkers on Glyndŵr's National Trail and Cambrian Way National Trail
15	Glyndŵr's Way, lower slopes of Crugyn Llwyd	301213	279408	Walkers on Glyndŵr's National Trail and farm workers
16	Pen Pumlumon Fawr	278970	286946	Walkers on Cambrian Way National Trail
17	Parking Area, overlooking Llyn Clywedog	291478	288761	Visitors to Llyn Clywedog at recognised picnic area/viewpoint

Following agreement with the statutory consultees regarding the number and location of the viewpoints to be included within the LVIA, a detailed field assessment will be undertaken to determine the effects of the Proposed Development on landscape character and visual amenity. Viewpoint photography will also be undertaken for production of the viewpoint visualisations.

Visualisations

All baseline photography, wirelines and photomontages from the agreed viewpoint locations will be prepared in accordance with NatureScot guidance 'Visual Representation of Wind Farms Version 2.2. (2017)'. As noted within the guidance, "*Not all viewpoints will require a photomontage. Distant viewpoints and those where there are no significant effects may be better illustrated by wirelines only*". It is therefore proposed to produce photomontages from viewpoints within 20km of the Site. From viewpoints beyond 20km it is proposed that these are represented by wirelines only. At this stage OS grid references are indicative only and are subject to change following on-site verification in order to avoid local screening features such as trees.

Cumulative Assessment

The cumulative assessment will consider all other wind farm developments within the 30km study area that are currently operational, have been consented, have been submitted for planning and not yet determined and those that have been submitted for EIA Scoping and where the turbine layout is within the public domain.

The cumulative assessment will consider the additional impacts of the Proposed Development and operational and under construction wind farms (the LVIA baseline) when considered with other consented, submitted and scoping stage wind farms

Turbines of a blade tip height of 50m or less will only be considered where they are within 5km of the proposed turbine.

The same viewpoints used to assess the individual effects of the Proposed Development will be used to assess cumulative effects.

Residential Visual Amenity Assessment

A separate standalone assessment/appendix will be produced to assess the effects of the Proposed Development on residential visual amenity. This will be carried out in accordance with the guidance as set out within the Landscape Institute's Technical Guidance Note 2/9: Residential Visual Amenity Assessment (RVAA). The proposed study area will extend for a distance of 2km from the proposed turbines and will include all residential properties within that radius.

Site assessment work to inform the Residential Visual Amenity Assessment (RVAA) will include:

- An initial site visit to each of the identified property/property groups within the 2km study area to make a judgement on the magnitude and significance of effects on residential visual amenity as a result of the Proposed Development taking account of local mitigating factors and identify those properties that require further detailed assessment.
- Following the identification of properties where the 'Residential Visual Amenity Threshold' may have the potential to be reached, a further detailed site visit from within the curtilage of the property to determine from which properties this occurs will be undertaken.
- Viewpoint photography will be undertaken to inform the baseline landscape and views towards the Site. A 360° panoramic photograph will be taken at each viewpoint location in accordance with published guidance.

6.2.12 Difficulties and uncertainties

The proposed methodology for the LVIA is based on experience of preparing LVIA's for similar sized wind farm projects and has not been informed by any consultation with PEDW or Powys County Council. In addition, the assessment work carried out to date to inform this section of the Scoping Report is based on the current design for the Proposed Development. The layout, including the location and number of wind turbines is likely to change as the project develops. The LVIA will be based on a frozen design.

6.2.13 References

Guidelines for Landscape and Visual Impact Assessment, Third Edition. Landscape Institute with the Institute of Environmental Management and Assessment (2013);

NatureScot, 'Visual Representation of Wind Farms, Version 2.2' February 2017; <https://www.nature.scot/sites/default/files/2019-09/Guidance%20->

[%20Visual%20representation%20of%20wind%20farms%20-%20Feb%202017.pdf](#)

(accessed November 2023)

NRW Guidance Note 046, 'Using LANDMAP in Landscape and Visual Impact Assessments, (LVIA),' January 2021; <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/evidence-to-inform-development-planning/using-landmap-in-landscape-and-visual-impact-assessments-gn46/?lang=en> (accessed November 2023)

Residential Visual Amenity Assessment (RVAA) -Technical Guidance Note 02/19, Landscape Institute (2019). <https://www.landscapeinstitute.org/technical-resource/rvaa/> (accessed November 2023)

Natural Resources Wales National Landscape Character Areas
<https://naturalresources.wales/evidence-and-data/maps/nlca/?lang=en> (accessed November 2023)

Local Landscape Assessment for the Powys Local Development Plan Area, Landscape Character Assessment Report (March 2022)
<https://en.powys.gov.uk/article/13408/Replacement-Local-Development-Plan-Latest-Evidence> (accessed November 2023)

Data Map Wales <https://datamap.gov.wales/> (accessed November 2023)

Special Report: The State of Environmental Impact Assessment Practice in the UK. IEMA (2011).

6.2.14 Scoping questions

- Do you agree with the proposed list of consultees?
- Do you agree with the proposed size of the overall study area of 30km?
- Do you agree that assessing the maximum blade diameter available for the tip height in question is appropriate?
- Do you agree that the data sources listed to inform the LVIA baseline characterisation are appropriate?
- Do you agree that the surveys proposed to inform the LVIA baseline characterisation are appropriate?
- Do you agree with the proposed additional (secondary and tertiary) mitigation measures and is this mitigation appropriate?
- Are any receptors / assets / resources not identified that you would like to see included in the LVIA?
- Do you agree with the receptors / matters that are proposed to be scoped in and out of the LVIA?
- Do you agree with the proposed LVIA methodology?
- Do you agree with the number, location and receptor types that have been selected as the representative viewpoints in order to assess the effects on visual amenity within the study area?
- Do you agree with the methodology used to determine which wind farms are to be included within the cumulative assessment?

- Do you agree with the 2km study area for the Residential Visual Amenity Assessment?

6.3 Terrestrial Ecology

6.3.1 Consultation

There has been no consultation on the scheme to date:

- A meeting with Natural Resources Wales (NRW) was requested in September 2023 via the Discretionary Planning Advice Service (DPAS), but could not be accommodated by NRW due to a lack of resources.
- A DPAS meeting will be reapplied for and a meeting with the planning authority ecologist for Powys requested. The purpose of both meetings would be to discuss the proposed scope of works, the key ecological issues, and how Net Benefit for Biodiversity might be demonstrated and achieved (with regard to recent updates to Planning Policy Wales).

6.3.2 Study area

Baseline botanical survey was completed in 2023, with protected species work due to be completed in 2024. The Study Area for habitat survey has taken in all land within the Site boundary in which Wind Turbines and/or associated infrastructure will be located, both as the design is still emerging (and all areas therefore need to be covered) and to identify habitat condition across the Site (and inform management options).

The Study Area for any further habitat survey and species-specific work is more likely to reflect emerging wind farm design (and to include appropriate perimeter areas around it in accordance with relevant guidance).

6.3.3 Data sources to inform the EIA baseline characterisation

Desk study is ongoing. To date it has involved review of:

- The proximity and qualifying features of statutory designated sites in relation to the Site boundary using online resources. Consideration has been given to Special Areas of Conservation (SAC) and Ramsar Sites within 10km of the Site and to Sites of Special Scientific Interest (SSSI) within 2km of the Site.
- Ordnance Survey maps and aerial photographs to initially understand Site characteristics, the distribution of habitats within the local landscape and the degree of ecological connectivity between the Site and semi-natural features; and
- Data from the local records centre (Biodiversity Information Service [BIS]) for information on protected and priority plant and animal species within 2km of the Site. Data on locally designated (non-statutory) sites has also been provided by BIS.

6.3.4 Surveys to inform the EIA baseline characterisation

Completed and forthcoming work involves:

- Phase 1 Habitat Survey of the Site, undertaken in August and early September 2023. The work was completed in accordance with industry standard guidance (JNCC, 2010). It is likely that an area extending to 250m around turbine locations will have been covered (reflecting SEPA [2017] guidance for groundwater dependent terrestrial ecosystems), but this will be kept under review as the design progresses. During the Phase 1 Survey, plant communities were assigned to broad NVC categories in the field based on the expert judgement of the surveyor.
- It is anticipated that a total of 14 bat detectors will be deployed at potential turbine locations for 10 nights in each of spring, summer and autumn 2024. Full spectrum detectors will be used. Complementary weather data will be collected (using a weather station installed within the Site). In the event the turbine locations are not fixed by Spring 2024, representative unconstrained habitats across the Site will be sampled. The requirement for roost surveys will be determined as the design of the wind farm starts to emerge. Initial bat data collection, on an earlier Site boundary, was completed by BIOME Consulting in 2020; the results are summarised in this EIA Scoping Report.
- Otter and water vole survey work will commence in Spring 2024 and will involve a walkover of all watercourses within the Site to search for signs of the respective species. The extent of the survey area will depend on how far the design has moved forward at the time of the work². A second visit (in accordance with guidance on water vole survey by Dean *et al.*, 2016) will be completed in Autumn 2024 when a design chill is likely to have been reached. It will focus on watercourse sections within 200m of proposed infrastructure.
- No ponds have been identified within the Site as a result of the habitat survey work. Surveys for great crested newts are therefore not proposed.
- No badger setts or signs of badger use of the Site were detected during the habitat surveys.
- Consideration will also be given to the following, with regard to emerging Site layout and consultee feedback:
 - Adder habitat assessment. The Quinquennial Review of Schedules 5 and 8 of the Wildlife and Countryside Act recommended that adder is afforded full protection. In the event that the development has the potential to affect areas that may support adder, a habitat quality assessment for the species (which will also include searching for animals) will be undertaken.
 - Pine marten and red squirrel survey. Habitat for these species within the Site is limited to commercial plantation. Woodland is otherwise very limited in extent and limited to small pockets towards the eastern Site boundary. If survey is required, it will involve deploying camera traps and will be completed in conjunction with the bat survey work.

6.3.5 Baseline conditions

Designated Sites

There are no international or national statutory designated sites within the Site boundary, as illustrated on **Figure 6.3.1 in Appendix E**.

The nearest internationally designated sites to the Site boundary are the River Wye SAC, approximately 7.5km to the south, and Coedydd Llwr-y-glyn SAC, approximately 3.2 km east

² It could be based around the unconstrained land within the Site boundary in the event the design is insufficiently progressed to be used as the basis for scoping the work.

of the Site boundary. Both SACs are designated for their riverine habitats (and sessile oak woodland in the case of the former) and their importance to species that include resident and migratory fish, white-clawed crayfish, and otter.

The nearest nationally designated sites to the Site boundary include two geological SSSIs (Ceunant Twymyn SSSI and Dylife Mine SSSI) located adjacent to and beyond the northern Site boundary respectively, and Pumlumon SSSI, which abuts the western Site boundary. The Pumlumon SSSI is notified for its habitats and bird fauna. These habitats include dwarf shrub heath, blanket bog and acid grassland.

There are no non-statutory designated sites within the Site boundary. Allt Ddu Site of Importance for Nature Conservation (SINC), an area of raised bog, is approximately 1.2 km to the east of the site boundary.

Habitats

Habitats within the Site boundary are illustrated on **Figure 6.3.2 in Appendix E** and are described below.

- A large proportion of the Site comprises agriculturally improved grassland. This occurs on the more level ground near the valley bottom in the eastern part of the Site, and is widespread on the tops of hills and ridges in the northern and the south-eastern parts of the Site.
- Steeper hill slopes and land furthest from the farms and access tracks typically support semi-improved or unimproved acidic grasslands (and to a lesser extent gorse scrub and more locally dry heath, which forms a mosaic with the acidic grassland in places).
- Wetter ground supports marshy grassland types including communities dominated by purple moor-grass, large areas of which occur in the northern part of the Site, and by soft rush where there is impeded drainage. Areas of pasture with abundant sharp-flowered rush also occur. The rush-dominated marshy grassland is widespread within the Site, mainly occurring as long, narrow flushes along small watercourses and below springs and seepages.
- Fragments of dry heath habitat occur on very steep slopes, for example in the far north-western part of the site, and on steep banks alongside watercourses. This heath forms a mosaic with unimproved acid grassland in various places. The large central conifer plantation also has extensive tracts of remnant dry heath that is partially overgrown by young trees, particularly on the steep northern slope. Scattered to dense western gorse scrub is found in similar situations on many of the steep valley sides with thin soils across the Site.
- Blanket bog occurs in the south-western part of the Site, and is associated with peat deposits, which are locally over two metres deep. Wet modified bog habitat is present in localised depressions in the northern and western parts of the Site. An extensive area of wet heath occurs in the south-western part of the Site, and in smaller pockets, sometimes in a mosaic with acid grassland, wet modified bog and acid flushes elsewhere.
- Two large west to east-flowing rivers, Afon Clywedog and Afon Lwyd, cross the Site or follow the Site boundary respectively, with many associated minor tributaries and some wet ditches within the Site boundary.
- Acidic flushes and acid / neutral flushes are a feature of the Site. Within the improved grassland these are often very species-poor (and some may be a consequence of impeded surface runoff rather than springs). However, some examples are more diverse, either with abundant sharp-flowered rush, or in a few cases sedge-rich vegetation with Sphagnum bog-mosses.

- A few more base-rich springs and flushes are present; these are typically quite species-rich but very small in size. A scarce example of a basic flush is a long strip of greater tussock sedge, embedded in a marshy valley bottom in the south-eastern part of the Site; this is indicative of groundwater outflow. Two very large groundwater-fed systems are situated in the far north-west of the site, where a series of vigorous acidic springs irrigate extensive valley bottom wetlands. Mire and wet heath communities are associated with this area.
- Other habitats include large patches of dense bracken on some of the steeper slopes, hedgerows (a mixture of intact species-poor, defunct species-poor and species-poor hedgerow with trees recorded), localised dense and scattered scrub, the large central conifer plantation (some of which is on peat), numerous small conifer plantations (in the eastern part of the Site) and some very limited and fragmented areas of broad-leaved woodland (mostly associated with steep valleys and river corridors).
- Farm buildings, barns, out-houses, and associated patches of bare ground are present in various locations, mainly in the eastern part of the Site.

Bat community

- Results from sampling at 16 locations in the northern and central parts of the Site in Spring, Summer and Autumn 2020 (BIOME Consulting, 2020) indicated a minimum of seven species of bats use the area. These were common pipistrelle, soprano pipistrelle, noctule, Leisler's bat, serotine, one or more *Myotis* species and brown long-eared bat.
- Habitats sampled included a variety of grassland types, heath and coniferous plantation.
- Activity in almost all species was highest in autumn and lowest in summer. Overall, summer had 5% of the bat encounters recorded in autumn.
- The most commonly encountered species were soprano pipistrelle, common pipistrelle and noctule. All three species were recorded at far lower levels in summer than in autumn (e.g. 354 noctule passes in autumn, 32 in spring and 1 in summer). All five of the Leisler's bat passes and all 64 of the serotine passes were in autumn.
- Analysis of bat data in combination with weather data suggested that levels of use of the Site were higher in warmer temperatures, at lower wind speeds and in periods without rainfall.

A limitation of the work was that there was no attempt made to determine whether an estimation could be made of the number of bats accounting for peaks in activity (e.g. whether the 354 noctule passes were likely to refer to a small number of animals using the airspace for prolonged foraging or whether these were bats moving through).

6.3.6 Additional (secondary and tertiary) mitigation

Opportunities for secondary mitigation to maintain and enhance the condition of semi-natural habitats and deliver Net Benefit for Biodiversity in line with planning policy include:

- Ditch blocking in areas of peat and other wet ground to raise the water table and improve habitat condition.
- Removal of conifers from an area of peatland in the western end of the main plantation. In the absence of trees this area would be likely to revert to bog or wet heath vegetation, and further drying and damage to the peat resource would be avoided.

- Enhancement of a hollow in the central part of the plantation through the removal of feral (self-sown) trees and the pushing back of the surrounding conifers to allow a mosaic of wet and dry heath, scrub and broadleaved trees to become established.
- Restoration of dry heath on the northern slopes of conifer plantation above the river. Patchy heathy growth in this area indicates the potential for recovery. Feral trees would need to be removed.
- Fencing out some of the steep valley sides to reduce grazing pressure to allow natural regeneration of heathland, scrub, and native woodland.
- Hedgerow restoration and management.
- Creation of features for hibernating reptiles, and a patchwork of mixed-age heather, scrub and open areas for foraging animals.
- The work will need to be delivered through a long-term management plan that would extend over the operational life of the wind farm. It would include a rolling programme of feral tree removal. The feasibility of other complementary options, such as pond creation, could be investigated and incorporated given the lack of still waterbodies within the Site.

Measures to ensure legislative compliance and protect ecological features through the development process (tertiary mitigation) are likely to include:

- A preconstruction ecological survey programme to provide updated baseline information to feed into the CEMP and other operational plan documents.
- The development of a detailed CEMP in consultation with stakeholders (i.e. NRW, Powys County Council) to build on the principles of the outline CEMP submitted as part of this planning application. The CEMP will include provisions such as:
 - A pre-construction walkover of the Site to ensure no material ecological changes (such as the construction of badger setts).
 - A reptile construction method statement. This will aim to ensure that killing and injury of reptiles is avoided, and that any hibernation features (such as walls or stone piles) are avoided or compensated for if impacted.
 - Measures to ensure that larger mammals such as otter and badger do not become entrapped in trenches / voids if commuting across the Site nocturnally.
 - Onsite speed limits for all construction vehicles, to minimise the potential for incidental killing of mammals crossing the Site.
 - Appointment of a suitably qualified and experienced ECoW to oversee the implementation of the CEMP.
 - Confinement of all construction activity to clearly defined working areas and the storage of materials to areas of hardstanding.
- Vegetation stripping and areas of hardstanding to be kept to a minimum to reduce the need for additional drainage provision.
- The application of best practice in accordance with SEPA Guidance for Pollution Prevention.
- Avoidance of natural water features with a 50m stand-off (where possible) for all construction works, alongside measures including silt traps, check dams and barriers to prevent silt-laden run-off from entering watercourses, provision of temporary / permanent drainage routes, including cross-drainage at access tracks, and sensitive design of drainage ditches to avoid potentially silt-laden run-off flowing directly into natural channels or ephemeral streams.
- Sensitive location and containment of storage areas and stockpiles

- Where practicable, refuelling of vehicles and machinery in designated areas, and on impermeable surfaces, well away from any watercourse.
- An ecologically-led lighting plan. If lighting is required during the construction phase, it will be designed in accordance with industry guidance (Institute of Lighting Professionals and Bat Conservation Trust, 2018) with input from a consultant ecologist.

6.3.7 Description of likely significant effects

This section sets out the ecological features that are scoped into the Ecological Impact Assessment at this stage. It assumes that no new features will be identified during the survey work between April and October 2024 (the period in which further survey will be conducted) that change the baseline and require consideration in the assessment.

Construction

Potential construction phase effects include:

- Indirect impacts on the Pumlumon SSSI due to changes to hydrological regime that impact groundwater dependent habitats within it.
- Direct loss of and physical damage to European and Welsh priority habitats for nature conservation, including European dry heath / upland heath, blanket bog, wet heath, and upland flush, fen and swamp habitats.
- Indirect loss and damage to European and Welsh priority habitats through changes to groundwater flows. These habitats include upland flushes, fens and swamps and rush pastures which meet priority habitat definitions.
- Direct loss (through severance or land take) or damage to Welsh priority habitats including hedgerow, semi-natural woodland, rock outcrops and areas of gorse heath (upland heathland).
- Impacts on local landscape-scale ecological connectivity and permeability through hedgerow loss.
- Impacts on bats through loss of roosting resource (through tree removal).
- Sedimentation / pollution of water courses. This could potentially impact on SACs (and component SSSIs) offsite in the event that watercourses on Site fall within the same river catchments.
- Disturbance, through machinery noise and construction phase lighting, leading to displacement of protected species, such as otter and impacts on bat foraging resources.
- Direct habitat loss / deterioration in habitat quality for otter, water vole and reptiles. Otter range widely, and animals using the Site could therefore be part of local SAC populations.
- Traffic deaths of protected species as a result of increased vehicle movements on and close to Site.

The extent of many of these potential effects can be significantly reduced through primary and tertiary mitigation (i.e. the application of the mitigation hierarchy which will help avoid, reduce and mitigate potential impacts). In accordance with the step-wise approach advocated in PPW, as ecological features are identified, these can also become the focus of enhancement measures, contributing to the Net Benefit for Biodiversity solution.

Operation

Operational impacts on ecological features are likely to be largely limited to potential for bat fatality as a results of collision / trauma caused by the wind turbines.

Initial data collection, completed in 2020, has identified that a range of species that are considered to be of high population vulnerability to additive fatality resulting from wind farm development use the airspace over the Site. The high vulnerability species recorded are Leisler's bat, noctule and serotine. Moderate vulnerability species are common and soprano pipistrelle.

To inform the impact assessment, analysed data for 2024 will be presented as bat passes per detector-hour, and relative activity obtained from the Mammal Society's EcoBat tool (if available) or through comparison with data from other wind farm sites held by BSG Ecology or otherwise in the public domain. Bat activity will also be compared to collected weather data to determine whether any significant correlation between the data sets exist. This process will inform proportionate additional mitigation.

6.3.8 Receptors / elements to be scoped into the assessment

The following receptors / elements are proposed to be scoped into the assessment.

Receptor / Element	Phase	Justification
Rive Wye and Coedydd Llawr-y-glyn SACs	Construction	Potential for sedimentation and pollution of watercourses that feed into SACs. Potential for impacts on otter that form part of SAC population.
Pumlumon SSSI	Construction and Operation	Potential for hydrological effects on groundwater dependent habitats, leading to drying and deterioration in quality.
Priority habitats	Construction	Potential for direct loss of extent, and additional damage of peripheral habitats as a result of construction. Potential for severance effects, reducing habitat connectivity and permeability. Potential for hydrological effects on groundwater dependent habitats, leading to loss of condition. Habitats to be considered will include blanket bog, wet and dry heath, flushes, swamps and fens, marshy grassland, hedgerows and semi-natural broadleaved woodland.
Bats	Construction and Operation	Potential for construction phase displacement (due to lighting) and roost loss, and operational phase fatality.
Otter	Construction	Potential for disturbance leading to displacement. Animals on Site could form part of SAC populations.

Water vole	Construction	Potential for habitat loss, killing and injury if present.
Reptiles	Construction	Potential for habitat loss, killing and injury if present.
6.3.9 Receptors / elements to be scoped out of the assessment		
The following features are proposed to be scoped out. • Improved and poor semi-improved grassland • Coniferous plantation • Great crested newt • Red squirrel and pine marten • Badger		
Receptor / Element	Phase	Justification
Improved and semi-improved grassland	Construction & Operation	Abundant agriculturally managed habitats of low nature conservation value
Coniferous plantation	Construction & Operation	Abundant commercially managed habitat in upland Wales. Low nature conservation value.
Great crested newt	Construction and Operation	There are no ponds on or within 250 m of the Site.
Red squirrel and pine marten	Construction and Operation	Available habitat is limited in extent and not well connected. Red squirrel extremely unlikely to occur given population levels and restricted distribution in Wales. Pine marten may move through, but extent of plantation limited, territories large, and resource on Site unlikely to be sufficient to support animals.
Badger	Construction & Operation	Has not been recorded on Site to date. Pre-construction checks will be completed to inform legislative compliance measures, but not an ecologically valuable feature.
6.3.10 Opportunities for enhancing the environment		
Opportunities for enhancement are discussed within Section 6.3.6 .		
6.3.11 Proposed assessment methodology		
Method of Assessment		

The approach to ecological impact assessment will be based on CIEEM guidance. Although this is recognised as the industry standard for ecological assessment, the guidance is not prescriptive and does not recommend the use of matrices; rather, it aims to “provide guidance to practitioners for refining their own methodologies”.

CIEEM recommended assessment involves:

- Identification of important ecological features in relation to a Site.
- Establishing a Zone of Influence (Zoi) based on desk study, field survey, consultation, an assessment of the sensitivity of ecological features, consideration of the outline design and liaison with other technical disciplines.
- Assessing the importance of the features within a geographical context.
- Identifying the nature of any potential effects.
- Assessing the significance of effects with reference to the integrity of sites or ecosystems and / or the conservation status of habitats or species. This will include assessing the risk to bats and the vulnerability of populations to the effects of wind farms through the application of NatureScot et al (2021) guidance.
- Applying mitigation to avoid or reduce the significance of effects.
- Assessment of residual effects.

Characterising and quantifying effects and assessing their significance will be completed through:

- Consideration of whether effects are: beneficial, adverse or neutral; their extent, magnitude, duration, reversibility, timing and frequency; and whether there is potential for their significance to be increased cumulatively as a result of other plans or projects; and
- Determining the significance of both beneficial and adverse effects (this will be completed in relation to the conservation status of each species at the geographical level at which it has been valued).

For the purposes of ecology assessment, apart from in exceptional circumstances, a significant effect is only considered to be possible where the feature in question is considered to be of regional / county, national or international importance. That is not to say that impacts from the Proposed Development could not result in effects on features of district or local importance, simply that those effects would not be considered significant in the assessment.

For the assessment of impacts to peatland habitats, information from the Hydrology, Hydrogeology, Geology and Peat chapter will be utilised where applicable.

Cumulative Effects

The cumulative assessment considers guidance which is published by PINS but endorsed by PEDW (Advice Note Seventeen: Cumulative effects assessment³). Cumulative effects are most likely to result with regard to those receptors for which a significant residual effect is predicted as a result of development. Effects are likely to arise if the extent or condition (habitats) or core range of those receptors (species) are also likely to be affected by planned, consented or built development. It is also possible that non-significant effects on ecological features from multiple projects may result in a significant cumulative effect.

³ Available at infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/ [Accessed 06/12/2023]

Cumulative effects may therefore be:

- Cumulative 'zone of influence' effects whereby two or more developments affect the same specific feature.
- Cumulative effects on the total resource (or population) of an ecological feature in a region due to two or more developments (e.g. two developments affecting the same feature reducing its overall extent or number).

For the Proposed Development a 10km ZoI is likely to be appropriate as this will extend beyond the foraging distances of bats and most other mobile species that may use the Site, and the likely maximum extent of any potential impacts on features remote from it that might result from construction or operation.

6.3.12 Difficulties and uncertainties

To ensure transparency within the EIA process, the following difficulties and uncertainties have been identified:

- There remains a lack of evidence as to the effect of wind farms on bat populations in the UK. Bat population sizes are also unknown and estimates are subject to wide confidence limits. Understanding the potential for population level effects to occur is therefore difficult.
- The Ecobat tool, which industry guidance (NatureScot et al., 2021) advocates should be used when considering relative bat activity levels between sites, has been offline since autumn 2022. While the usefulness of this tool (when working) is open to critical discussion, its long-term lack of availability (and prior to this regular issues regarding its functionality / coding) currently requires a bespoke approach to be taken to each wind farm assessment, which is extremely challenging.

6.3.13 References

CIEEM. (2018). Guidelines for ecological impact assessment in the UK and Ireland: terrestrial, freshwater and coastal. Second edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Dean, M., Strachan, R., Gow, D & Andrews, R. (2016). The water vole mitigation handbook (the Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.

JNCC (2010). Handbook for Phase 1 habitat survey. A technique for environmental audit. Joint Nature Conservancy Council. Peterborough. Available at hub.jncc.gov.uk/assets/9578d07b-e018-4c66-9c1b-47110f14df2a [Accessed 06/12/2023].

NatureScot, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust. (2021). Bats and onshore wind turbines: survey, assessment and mitigation. NatureScot, Inverness. Available at www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation [Accessed 06/12/2023].

Scottish Natural Heritage, Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust. (2019). Bats and onshore wind turbines: survey, assessment and mitigation.

SEPA (2014). Guidance on assessing the impacts of windfarm development proposals on groundwater abstractions and groundwater dependent terrestrial ecosystems. Land Use Planning System SEPA Guidance Note 31. Scottish Environment Protection Agency.

6.3.14 Scoping questions

- Are NRW satisfied that the scope of ecological survey and desk study is appropriate?
- Do NRW have ecological concerns with regard to the Proposed Development, and if so, could they outline what they see the principal ecological issues as being?
- Are there any other receptors not identified that consultees consider appropriate to include in the EIA?
- Are consultees content for survey for red squirrel and pine marten to be scoped out?
- Do consultees agree that the receptors/matters that are proposed to be scoped in and out of further assessment are proportionate?
- Does NRW have any understanding of whether the Ecobat tool is being repaired and will be maintained to inform assessment work?
- The developer is looking to deliver a Net Benefit for Biodiversity solution on-site. What would NRW be looking for in an on-site solution?

6.4 Ornithology

6.4.1 Consultation

There has been no consultation on the scheme to date:

- A meeting with Natural Resources Wales (NRW) was requested in September 2023 via the Discretionary Planning Advice Service (DPAS) but could not be accommodated by NRW due to a lack of resources.
- A DPAS meeting has been reapplied for, and a meeting with the planning authority ecologist for Powys requested. The purpose of both meetings would be to discuss the scope of works, the key ornithological issues, and how Net Benefit for Biodiversity might be demonstrated and achieved (with regard to recent updates to Planning Policy Wales).

6.4.2 Study area

Considerable baseline ornithological survey work has been completed at Esgair Galed. All of this work has been based on industry standard guidance (Scottish Natural Heritage, 2017^{4,5}), which sets out recommendations as to the extent of land around the periphery of a Site that survey should cover.

The ornithological Study Area has changed over time to reflect Site boundary changes. It will continue to evolve in response to multi-disciplinary constraints mapping work as the project approaches a design freeze.

⁴ Scottish Natural Heritage (SNH) is now NatureScot. However, the guidance remains an SNH publication until such time as it is reviewed and updated.

⁵ SNH guidance is applied in Wales in the absence of a Welsh equivalent, and is referred to by NRW and other stakeholders as industry guidance.

The final tranche of proposed survey work will be completed in the breeding season of 2024, and will involve a raptor survey extending to 2km around the Site boundary, and wader surveys to 800m from the Site boundary (albeit in the event the design is fixed these may well be reduced in extent to equivalent perimeters around the turbine array). Vantage points (VP) are being used to survey land within and immediately adjacent to the Site.

Breeding raptor, wader and nightjar survey areas are shown on **Figure 6.4.1 in Appendix F**. The locations of the current VPs (these are in use for winter survey work and will also be used during the 2024 breeding season) and their modelled viewsheds are shown on **Figure 6.4.2 in Appendix F**.

Survey areas and VP locations in relation to previous work are summarised in the baseline ornithological report at **Appendix G**.

6.4.3 Data sources to inform the EIA baseline characterisation

Desk study is ongoing. To date it has involved review of:

- The proximity and qualifying features of statutory designated sites in relation to the Site boundary using online resources. Consideration will be given to Special Protection Areas (SPA) within 10km of the Site and to SSSI within 2km.
- Ordnance Survey maps and aerial photographs to initially understand Site characteristics, the distribution of habitats within the local landscape and the degree of ecological connectivity between the Site and semi-natural features; and
- Data from the local records centre (BIS) and RSPB Cymru for information on protected and priority bird species within 2km of the Site. Data on locally-designated (non-statutory) sites has also been provided by BIS.

6.4.4 Surveys to inform the EIA baseline characterisation

Vantage-Point survey work between September 2019 and March 2023 included the following:

- 36 hours of non-breeding VP work from each of eight locations overlooking the Site between:
 - September 2022 and March 2023
 - October 2021 and March 2022
 - September 2019 and March 2020
- 36 hours of breeding season VP work from each of eight locations overlooking the Site between:
 - April 2022 and August 2022

Further VP hours were completed from four locations overlooking a reduced Site boundary between May and August 2020 (36 hours from each).

In addition to the VP work, the following have been completed:

- Breeding wader surveys in 2020 and 2022
- Breeding raptor surveys in 2020 and 2022
- Black grouse surveys in 2020 and 2022
- Nightjar surveys in 2021 and 2022

Winter walkovers (3 visits) during winter 2021/22 and 2022/23 (to supplement VP survey results).

Ongoing and forthcoming work involves:

- VP survey from seven locations overlooking the Site. 36 hours of VP work are being completed at each location between September 2023 and March 2024, and a further 36 hours will be undertaken between April and August 2024 inclusive.
- Raptor survey. A walkover of all accessible steep-sided stream valleys (including any with semi-natural woodland), areas of rank heather moorland, tussocky and rushy grassland, fence lines, rock escarpments, any quarries and plantation edge within 2km of the Site will be completed between late March 2024 and July 2024; this will initially focus on locating nest building kites (which are typically most active in late March and April), before changing focus to other species such as merlin and peregrine and, later in the season, hobby. Where access is not possible, due to terrain or land ownership, local VP locations will be identified and short watches completed over suitable habitat (each typically 30-40 minutes duration) from accessible areas.
- Additional searches for goshawk using temporary VP locations overlooking Bwlch y Garreg-Wen to the south of the Site boundary will be completed in February and early March 2024 (to look for evidence of displaying birds).
- Wader survey. Habitats suitable for breeding waders within ~800m of potential turbine locations will be surveyed between mid-April and the end of June 2024. A Brown & Shepherd (1993) survey (amended as per Calladine *et al.*, 2009) method will be applied, which is the industry standard wader survey technique for unenclosed moorland. Enclosed fields with potential wader habitat (rush cover) will also be walked, and fields without suitable breeding habitat scanned for foraging birds.
- Nightjar survey. Survey will be completed of suitable plantation habitats following reconnaissance, to map routes and identify new areas of felling (that will result in suitable clearfell habitats for breeding birds). The reconnaissance will be completed in May and the survey work in June and July 2024.

6.4.5 Baseline conditions

Habitats across the Site vary and influence the bird community present. The eastern and northern parts of the Site mainly comprise a mixture of improved and semi-improved agricultural pasture, with rough pasture on the higher ground and moorland habitats including heath and bog becoming more widespread towards the western Site boundary and (particularly) the south-western part of the Site. A large part of the central ridge of the Site supports coniferous plantation. Two small west-to-east flowing rivers, Afon Lwyd to the south and Afon Clywedog to the north, are also present. Elevations are generally greater to the west, with the land rising towards the edge of the Pumlumon Site of Special Scientific Interest (SSSI).

There are no SPAs within 10km of the Site⁶ as shown in **Figure 6.4.3 in Appendix F**. The Pumlumon SSSI lies adjacent to the Site and is notified for its habitats and for the bird assemblage using them. The citation⁷ states that the SSSI supports a range of bird species characteristic of upland Wales including peregrine falcon, red kite, merlin, hen harrier, short-eared owl, kestrel and buzzard. It notes that ring ouzel, golden plover, red grouse, common sandpiper, wheatear, whinchat and teal breed within the SSSI, and that Greenland white-fronted geese roost during the latter part of the winter on Llyn Bugeilyn.

⁶ The Elenydd-Mallaen SPA is approximately 10.5 km to the south-west. It is classified for its importance to breeding red kite and merlin. Peregrine was formerly included on the Natura 2000 Data Form for the SPA.

⁷ https://naturalresources.wales/media/677091/sssi_0285_citation_en001.pdf

Ceunant Twymyn SSSI and Dylife Mine SSSI, which lie adjacent to and just beyond the northern boundary of the Site respectively, are notified for their geological interest and are not considered further here.

A full account of ornithological survey work to date is provided in **Appendix G**. Ongoing work will be reported in autumn 2024.

Key findings of work completed between September 2019 and March 2023 are:

- Goshawk breeds locally in suitable mature woodland. Two territories were considered to be present within the raptor survey area in 2022. Some flight activity occurs over the Site.
- Hen harrier. Probably bred within the Pumlumon SSSI to the west of the Site in 2020, but there was no evidence of this in 2022. Flight activity over the Site has been very limited during survey work, suggesting the Site is not within the core foraging range of a pair or favoured by dispersing or wintering birds.
- Merlin. A total of 22 flights have been recorded. These have been biased towards the north-western part of the Site, and split between the breeding and non-breeding seasons (with slightly more flight activity in the former).
- Osprey. [REDACTED]
 [REDACTED] Birds using this nest bred in both 2020 and 2022. Nineteen flights have been recorded during VP watches, mostly outside the Site boundary. These flights have included up to four birds, indicating the presence of fledged young.
- [REDACTED]
 [REDACTED] Flights have almost exclusively been during the breeding season, and most have been around the periphery of the Site or outside the Site boundary.
- Red kite. [REDACTED]
 [REDACTED] Red kite has been by far the most regularly recorded focal species over the survey period, with over 1,000 flights mapped. This reflects the fact that the Site represents good foraging habitat for the species and that the population in Powys is very high.
- Kestrel has been regularly recorded on Site during the breeding season, but no nest sites have been recorded. It seems likely, based on flight activity, that the Site lies within the foraging territory of a breeding pair.
- Other focal species have included infrequent hobby, and occasional marsh harrier and barn owl.
- No breeding waders have been recorded during any of the survey work. Golden plover have been noted using the north-western part of the Site during the autumn passage period, but in low numbers.
- Black grouse has not been recorded during the species-specific surveys or any of the other work⁸.
- Nightjar hold territory in the plantation in the central part of the Site and in other suitable plantation woodland habitat around the periphery.
- Notable secondary species are yellowhammer (which is scarce in Powys) and declining passerines and near passerines including cuckoo, tree pipit, grasshopper warbler, spotted flycatcher and whinchat.

⁸ Recent liaison with NRW suggests that they consider it may be extinct in Powys.

6.4.6 Additional (secondary and tertiary) mitigation

Secondary mitigation will involve measures to enhance habitat away from the built wind farm. These measures will help achieve the Net Benefit for Biodiversity required under Welsh planning policy. They will be more ecologically than ornithologically focussed, but are likely to include:

- Habitat management to improve the condition of bog and heath habitat around the western fringes of the Site, thereby increasing their potential to support ground nesting birds, small mammals and raptors that prey on them.
- Measures to draw birds away from the Site, such as the location of nest boxes (e.g. for kestrel) close to suitable habitat for foraging located off site.
- Restoration of features likely to benefit passerines such as yellowhammer, including hedgerows and other field boundary features (margins, ponds etc).

Measures to ensure legislative compliance and protect ornithological features through the development process (tertiary mitigation) will include:

- A preconstruction ornithological survey programme to provide updated baseline information to feed into the site Construction Environmental Management Plan (CEMP) and other operational plan documents.
- The development of a detailed site CEMP in consultation with stakeholders (i.e. NRW, and Powys) to build on the principles of the outline CEMP submitted as part of this planning application. The CEMP will include provisions relevant to birds, to prevent an offence from being committed under the Wildlife and Countryside Act 1981 (as amended).
- A suitably qualified and experienced Ecological Clerk of Works (ECoW) will be appointed to oversee the application of the CEMP. The role of the ECoW will include:
 - Overseeing any necessary vegetation clearance, and advising on the best time to complete this in the context of the development.
 - Construction phase surveys of birds within the Site to record breeding success as far as is possible (avoiding disturbance, and following relevant survey guidance provided in SNH, 2017). The data will be used with pre-construction baseline survey data and future data obtained during monitoring work to provide population information across each phase of the Proposed Development
- On-site speed limits will be applied for all construction vehicles, to minimise the potential for incidental killing and disturbance of birds and their dependent young.

6.4.7 Description of likely significant effects

This section sets out the ornithological features that are scoped into the Ornithological Impact Assessment at this stage. It assumes that no new features will be identified during the survey work between September 2023 and August 2024 that changes the baseline and requires consideration in the assessment.

Construction

The extent of the effects of construction on birds will depend upon the timing of disturbing activities, the degree of displacement (spatially and temporally) that occurs, the size, suitability

and proximity of habitats available to displaced birds, and their capacity to accommodate them.

Potential for significant construction phase effects is limited to those birds that regularly use the Site for breeding or foraging. Consideration will be given to locally-breeding red kite, goshawk and nightjar, and to ground nesting species of birds (such as meadow pipit and skylark) that are likely to be present in grassland and moorland habitats. If plantation woodland is to be felled, consideration will also need to be given to tree-nesting species typical of this habitat.

Outside of the breeding season, the potential effect of displacement on species that breed in the Elenydd-Mallaen SPA and Pumlumon SSSI and range widely in winter will need to be considered.

It is unlikely that effects will be significant at more than the local level. They are therefore unlikely to be significant in EIA terms. Impacts on SPA species will also need consideration under a parallel Habitats Regulations Assessment process.

Operation

There are two ways in which birds can be affected by operational wind farms: through displacement due to ongoing disturbance caused by the turbine towers and moving blades (and by periodic servicing of them), and through collision with moving blades or associated infrastructure, e.g. the guy lines of meteorological masts.

Operational impacts on species associated with the Elenydd-Mallaen SPA and Pumlumon SSSI will need to be considered (noting that during the breeding season SPA species are unlikely to use the site due to their typical ranging distances and, in the case of peregrine, the low frequency of observations to date and likely nest site locations).

Species that will be scoped in are hen harrier, merlin, peregrine, osprey, red kite, kestrel, and autumn passage golden plover. It is unlikely, based on observed flight activity to date, that impacts on most of these species will be significant at the Site level, but there is potential for significant impacts on red kite and osprey at greater geographical levels to occur.

Measures to improve habitat quality for some species (particularly passerines) will also need to be assessed (to determine whether significant positive effects are likely).

6.4.8 Receptors / elements to be scoped into the assessment

The following receptors / elements are proposed to be scoped into the assessment.

Receptor / Element	Phase	Justification
Elenydd-Mallaen SPA	Construction and Operation	Potential for construction and operational phase displacement, and operational phase collision of SPA qualifying species.
Pumlumon SSSI	Construction and Operation	Potential for construction and operational phase displacement, and operational phase collision of qualifying species.

Breeding birds	Construction	Displacement effects on protected and priority species such as red kite, goshawk and nightjar have the potential to be significant. Impacts on more widespread ground nesting birds will also need consideration from a legislative compliance perspective. Consideration may need to be given to barn owl (breeding in buildings / trees) with regard to any Site access proposals and local transport network upgrades (other species may also need to be considered).
Breeding and foraging birds	Operation	Collision and displacement effects on hen harrier, osprey, merlin, peregrine, red kite, kestrel and golden plover will need to be considered. Hen harrier, osprey and merlin have relatively small and localised breeding populations in Wales, whereas red kite has a large and increasing population, but uses the Site with regularity. Modelling will determine the geographical significance of predicted collision of red kite, kestrel and osprey. Impacts on golden plover are unlikely to be significant beyond the Site level.

6.4.9 Receptors / elements to be scoped out of the assessment

The following receptors / elements are proposed to be scoped out.

- Infrequently or rarely occurring raptors (hobby and marsh harrier)
- Black grouse
- Breeding waders
- Nightjar (operational phase)

Receptor / Element	Phase	Justification
Infrequently and rarely recorded raptors	Construction & Operation	Significant displacement and collision impacts are unlikely
Black grouse	Construction & Operation	Survey suggests the species is absent from the Site, and it is understood it may be locally extinct.
Breeding waders	Construction & Operation	Survey has not recorded any breeding waders.

6.4.10 Opportunities for enhancing the environment

Opportunities for enhancement are included within **Section 6.4.6**.

6.4.11 Proposed assessment methodology

Method of Assessment

The approach to the ornithological impact assessment will be based on industry standard Chartered Institute of Ecology and Environmental Management (2018) guidance. Although this is recognised as the industry standard for ecological assessment, the guidance is not prescriptive and does not recommend the use of matrices; rather, it aims to “provide guidance to practitioners for refining their own methodologies”.

CIEEM recommends assessment involves:

- Identification of important ecological features in relation to a Site.
- Establishing a ZoI based on desk study, field survey, consultation, an assessment of the sensitivity of ornithological features, consideration of the outline design and liaison with other technical disciplines.
- Assessing the importance of the features within a geographical context.
- Identifying the nature of any potential effects.
- Assessing the significance of effects with reference to the integrity of sites or ecosystems and / or the conservation status of habitats or species. This will include collision risk analysis using the model developed by SNH (Band et al., 2007)
- Applying mitigation to avoid or reduce the significance of effects.
- Assessment of residual effects.

The ornithological features and designated sites identified within the study area would be assigned an ornithological importance using the standards set out by CIEEM. In order to characterise an impact on a feature, the following parameters would be considered:

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

Characterising and quantifying effects and assessing their significance will be completed through:

- Consideration of whether effects are: beneficial, adverse or neutral; their extent, magnitude, duration, reversibility, timing and frequency; and whether there is potential for their significance to be increased cumulatively as a result of other plans or projects; and
- Determining the significance of both beneficial and adverse effects (this will be completed in relation to the conservation status of each species at the geographical level at which it has been valued).

Any effect that is significant at the district level or above will be considered significant in EIA terms.

The flight data collected during the VP surveys will be used to undertake a Collision Risk Assessment (CRA) to predict the impact that the operational Proposed Development will have on local bird populations. The Band model, prescribed by NatureScot, is the standard model used to calculate this impact. The predicted annual fatality level generated by the model can be compared with local, regional and national population estimates and the significance of the impact assessed.

The likelihood of significant displacement and disturbance effects on nesting raptors and nightjar will be assessed with regard to published disturbance distances in e.g. Goodship & Furness (2022), wind farm monitoring studies, and professional experience.

Cumulative Effects

Cumulative effects are most likely to result with regard to those receptors for which a significant residual effect is predicted as a result of development. Effects are likely to arise if the extent or condition (habitats) or core range of those receptors (species) are also likely to be affected by planned, consented or built development. It is also possible that non-significant effects on ecological features from multiple projects may result in a significant cumulative effect.

Cumulative effects may therefore be:

- Cumulative 'zone of influence' effects whereby two or more developments affect the same specific feature.
- Cumulative effects on the total resource (or population) of an ecological feature in a region due to two or more developments (e.g. two developments affecting the same feature reducing its overall extent or number).

For the Proposed Development a 10km Zol is likely to be appropriate as this will cover the core ranging distance of mobile species using the Site and the likely maximum extent of any potential impacts on features remote from it that might result from construction or operation.

6.4.12 Difficulties and uncertainties

To ensure transparency within the EIA process, the following difficulties and uncertainties have been identified:

- Determining the number and locations of breeding raptor territories in the perimeter areas (due to a lack of access). This is particularly challenging for red kite, which tend to breed in valley woodland, shelter belts associated with farms and other inaccessible locations.
- In order to address this uncertainty a precautionary position has been taken. The maximum number of breeding individuals that could be inferred by observed behaviour and flight line activity will be considered as the baseline for assessment.

6.4.13 References

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

Brown, A.F and Shepherd, K.B. 1993. A method for censusing upland breeding waders. Bird Study, 40 : 189 – 195. [Taylor & Francis Online] [Web of Science®], [Google Scholar]

Calladine, J., Garner, G., Wernham, C & Thiel, A. (2009). The influence of survey frequency on population estimates of moorland breeding birds. Bird Study Volume 56: 3
<https://www.tandfonline.com/doi/full/10.1080/00063650902984604>

CIEEM. (2018). Guidelines for ecological impact assessment in the UK and Ireland: terrestrial, freshwater and coastal. Second edition. Chartered Institute of Ecology and Environmental Management, Winchester.

Goodship, N.M. & Furness, R.W. Disturbance distances review: an updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

6.4.14 Scoping questions

- Are consultees satisfied that the scope of ornithological survey and desk study is appropriate?
- Do consultees have ornithological concerns with regard to the Proposed Development, and if so, could they outline what they see the principal ornithological issues as being?
- Do consultees agree with the ornithological receptors that are proposed to be scoped in (and out) of further assessment, given the available evidence gathered to date (and presented in further detail in the report at **Appendix G**)?

6.5 Cultural Heritage

6.5.1 Consultation

The Clwyd-Powys Archaeological Trust (CPAT) and Dyfed Archaeological Trust (DAT) were consulted to agree the study area for Historic Environment Record (HER) data gathering to inform the EIA Scoping Report.

Post-scoping consultation will be carried out with Cadw, CPAT, DAT, Powys County Council and Ceredigion County Council. This will be undertaken to inform the baseline and respond to comments on proposed assessment methodology, and it will include suggested visualisations to inform the assessment.

6.5.2 Study area

The following study areas were used for data gathering to inform scoping:

- **The Site** – designated historic assets and CPAT HER entries reviewed.
- **Core Study Area** (land within 5km from the Site boundary) – designated historic assets and CPAT and DAT HER entries reviewed.
- **Wider Study Area** (land beyond 5km but within 10km from the Site boundary) – designated historic assets reviewed.

The location of the Site and the extent of the study areas are shown on **Figure 6.5.1 in Appendix H**.

The following study areas are proposed for the ES:

- **The Site** – the potential for direct and indirect physical effects and effects related to setting change to all historic assets (designated and non-designated) will be considered in this study area.
- **Core Study Area** (land within 5km from the Site boundary) – the potential for effects related to setting change to all assets will be considered in this study area.
- **Wider Study Area** (land beyond 5km but within 10km from the Site boundary) – the potential for effects related to setting change to designated historic assets will be considered in this study area.

In recognition that change in setting can cause effects to historic assets beyond 10km, designated historic assets beyond the Wider Study Area identified as likely to experience effects related to setting change will be included in the ES and supporting studies.

6.5.3 Data sources to inform the EIA baseline characterisation

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

- Data on designated historic assets:
 - World heritage sites;
 - Scheduled monuments;
 - Listed buildings;
 - Conservation areas;
 - Registered historic parks and gardens (RHPG); and
 - Registered historic landscapes (RHL).
- CPAT and DAT HER data.
- Historic and current Ordnance Survey (OS) mapping.
- Recent digital aerial photography (available via Google Earth).
- Initial findings of other topics (e.g. Landscape and Visual Amenity [LVIA]; Hydrology, Hydrogeology and Geology).

Following scoping, additional desk studies and field survey will be undertaken to inform the ES.

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 involve review of:

- Data on designated historic assets identified at scoping.
- CPAT and DAT HER data (revised if required).
- Published sources on the archaeological and historical background of the area (incl. information on RHLs).
- Information held by Powys County Council in relation to conservation areas⁹ (e.g. conservation area designation statements, conservation area appraisals).
- Historic mapping, primarily the First and Second Edition OS mapping and archival sources such as Tithe maps.
- Aerial photography – both recent digital and historic aerial coverage.

⁹ No conservation areas within the Ceredigion County Council area lie within the Core or Wider Study Areas.

- LiDAR data, including a coverage due to be specifically flown for the Site at a resolution of 0.25m to inform this project.
- Zone of Theoretical Visibility (ZTV) and visualisations as required to inform the assessment (see **Section 6.5.1** above).
- Findings of other relevant topics (e.g. LVIA, ground conditions, noise)

The assessment of importance will also be informed by relevant national and regional research frameworks.

6.5.4 Surveys to inform the EIA baseline characterisation

Field surveys will be undertaken to inform the baseline conditions. This will comprise a walkover survey of the Site and site visits to those historic assets beyond the Site identified as likely to experience effects related to setting change. There have been several field surveys and programmes of archaeological recording undertaken within the Site, as well as extensive historical research focused on the area's historic mining activities, undertaken by CPAT and others (Brown, 2010; Bick, 1990; Council for British Archaeology, 2004; CPAT, 1998a; CPAT, 1998b; CPAT, 2000; CPAT, 2016; Trysor, 2014). This suggests that previously unrecorded historic assets associated with historic mining are unlikely to be discovered by survey and research being undertaken to inform the ES.

A detailed interrogation of the project-specific LiDAR data will be undertaken. This will provide further detail of known historic assets, including their extent, and allow identification of LiDAR anomalies likely to be of archaeological interest. The forthcoming walkover survey will, therefore, be focused on known historic assets, ground truthing LiDAR anomalies with the potential to be of archaeological interest, proposed infrastructure locations and micro-siting tolerances. Should any previously unrecorded historic assets be identified during the walkover survey, an appropriate record (i.e. location, extent, apparent form and importance of the asset) will be made.

Intrusive and non-intrusive archaeological investigations are not proposed at this time. For much of the Site the ground conditions are unsuitable for geophysical survey and, given the extent of previous field survey and proposed LiDAR assessment, the baseline conditions for the Site will be well-understood by the time of the ES assessment. As such, archaeological investigations are not considered likely to be necessary to support the application. The need for any such works will be kept under review as the ES baseline and assessment process progresses with relevant consultees engaged as appropriate.

6.5.5 Baseline conditions

The Site

The location of the Site and its topography is described in **Chapter 2** of this EIA Scoping Report. Six designated historic assets lie within the Site (refer to **Figure 6.5.2 in Appendix H**). These comprise:

- Four Bronze Age funerary assets:
 - Cefn Llwyd Round Barrow and standing stone (Cadw Scheduled Monument (SM) Ref. MG266);
 - Y Ffridd Round Barrow (Cadw SM Ref. MG282);
 - Barrow Group W of Staylittie (Cadw SM Ref. MG171); and
 - Pen y Crogben Round Barrow (Cadw SM Ref. MG105; also the site of a gallows)

- Dyngwm/Castle Rock Lead Mine (Cadw SM Ref. MG247) – a lead mining landscape, providing evidence for the development of mining activity from the Roman period to the late 19th century; and
- Clywedog Valley Landscape of Special Historic Interest (LSHI) (HLW (P) 6). The Site overlaps with three of the LSHI's Historic Landscape Character Areas (HLCA): Dylife HLCA, Staylittie HLCA and Hafren Forest HLCA.

The CPAT HER core database has 107 entries within the Site (excluding those entries associated with designated historic assets). These are a mix of possible Bronze Age barrows, assets associated with medieval to post-medieval agricultural activity (e.g. enclosures, farmsteads and sheepfolds) and assets connected to the mining activity within the Site (e.g. mine trials, levels, dressing floors, reservoirs, mine shafts, tramways and hushings).

The earliest HER entry within the Site is for a flint artefact of Neolithic or Bronze Age date recovered to the south-west of the Site at Nant-yr-hafod (CPAT HER Entry Ref. PRN5914). Three of the possible Bronze Age round barrows (CPAT HER Entry Refs. PRN38811, PRN38810 and PRN38812) are located in close proximity to the Cefn Llwyd Round Barrow (Cadw SM Ref. MG266).

To the north-east of the Site is the projected alignment of the Roman road between Carno and Penycrocbren (CPAT HER Entry Refs. PRN1150, PRN47026, PRN47024, PRN47023).

Several HER entries have been tentatively interpreted as evidence of medieval activity but may also be post-medieval in origin. These include the remains of possible medieval farmstead to the west of the Site above Afron Clywedog at Nant Ddu (CPAT HER Entry Ref. PRN110965) The remains of this farmstead are enclosed by a ditch with accompanying evidence of ridge and furrow cultivation.

Most HER entries date to the post-medieval period. These evidence agricultural and mining activity within the Site. Assets associated with agriculture include the poorly preserved remains of farmsteads and a hafod (a seasonally occupied building or hut), the sites of isolated houses (abandoned and survive only as building platforms and sheepfolds), as well as individual traditional farm buildings which remain in use today. Evidence of mineral extraction and processing are largely focused on Afon Clywedog which bisects the Site from west to east, and to the south of the Site at Afon Llwyd. These include the reservoir, water wheel pit, dressing floor and aqueducts associated with Cyfartha lead mine (CPAT HER Entry Refs. PRN48049, PRN8498, PRN8499, PRN48056 and PRN48051) and assets associated with the Dyngwm and Pen Dylife mines, such as the horse whim circle and hushings (CPAT HER Entry Refs. PRN8472 and PRN18623), which lie outside the scheduled area for Dyngwm/Castle Rock Lead Mine (Cadw SM Ref. MG247).

Several HER entries relate to historic assets which are assumed to have been removed by afforestation at Bwlch y Garreg-Wen, including Pen y Ffridd Mound (CPAT HER Entry Ref. PRN4295).

Historic mapping, including the 1848 Tithe map and the Second Edition OS 'Six inch' maps (1:10,560, published 1903), show that the Site's historic character (i.e. open unenclosed moorland, small farmsteads surrounded by associated piecemeal field enclosure and areas identified as 'disused' lead works) has changed little since the early 20th century. The key exception are the areas of late 20th century afforestation.

Core Study Area

The Core Study Area contains numerous historic assets, these comprise:

- 28 scheduled monuments;
- 30 listed buildings (three Grade II*; 27 Grade II);

- Abercegir, Darowen and Llawr-y-glyn conservation areas (Powys County Council Refs. WAL/POWY/2; WAL/POWY/27; WAL/POWY/70); and
- 1632 CPAT core HER entries and 10 DAT core HER entries (excluding those for natural features, findspots and entries associated with designated historic assets)

The locations of designated historic assets within the Core Study Area are shown on **Figure 6.5.1 in Appendix H**.

Wider Study Area

The following designated historic assets lie within this study area and are shown on **Figure 6.5.1 in Appendix H**:

- 37 scheduled monuments;
- 357 listed buildings (two Grade I; 20 Grade II*; 335 Grade II);
- Six conservation areas;
- Upland Ceredigion Registered Historic Landscape (HLW (D) 2); and
- Plas Machynlleth Registered Historic Park and Garden (PGW(Po)26(POW); Grade II).

6.5.6 Additional (secondary and tertiary) mitigation

In the first instance the Proposed Development will seek to avoid and minimise (as far as reasonable possible) effects by design. Where interaction cannot be completely avoided, good practice and additional mitigation measures to prevent, reduce, and/or where possible offset these effects will be proposed. This is likely to include, as a minimum, control measures within the CEMP and may include archaeological interventions (e.g. watching brief) if the scheme's likely effects require this form of mitigation.

Owing to the nature of the Proposed Development, it is envisaged that mitigation is likely to focus on addressing direct physical effects to historic assets, particularly those to below-ground historic assets (archaeological features and deposits). The approach to mitigation will be guided by industry best practice and appropriate procedures as laid out in the relevant Chartered Institute for Archaeologists (CIfA) standards and guidance documents. Adverse effects may be mitigated by an appropriate level of survey, excavation, recording, analysis and publication of the results, in accordance with a Written Scheme of Investigation (WSI).

The Proposed Development is located in a landscape of considerable historic environment interest associated with historic mining. An Outline Historic Environment Enhancement Plan (OHEEP) will be produced to explore opportunities for community heritage, access and interpretation measures to deliver enhanced public benefits. The OHEEP is intended to offer a series of ideas that can be developed in partnership with local, regional and national partners – with appropriate levels of resource from the scheme's community benefit fund – to support necessary physical works, technical advice and consultation. The OHEEP will form an appendix to the ES.

6.5.7 Description of likely significant effects

Significant effects are likely to occur as a result of:

- The truncation or removal of the physical remains of historic assets during construction (direct physical effects);
- Changes to their environment, such as hydrology and vibration, that may adversely affect the preservation of assets (indirect physical effects); and

- Changes to the setting of historic assets during construction or operation that effect the way setting contributes to their heritage significance.

6.5.8 Receptors / elements to be scoped into the assessment

Potential Effects Scoped into the assessment

At this stage, potential effects, including cumulative effects, associated with the construction and/or operation of the Proposed Development scoped into the assessment include:

- Direct physical effects to historic assets within the Site;
- Indirect physical effects to historic assets within the Site; and
- Effects related to setting change for assets.

Receptor / Element	Phase	Justification
Dyngwm/Castle Rock Lead Mine (MG247)	Construction and operation	These scheduled monuments are located within the Site. Construction activities have the potential to directly impact these assets, which have the potential to result in a significant effect. During operation the presence of the turbines and associated infrastructure have the potential to change the setting of these assets resulting in a significant effect.
Cefn Llwyd Round Barrow and standing stone (MG266)		
Y Ffridd Round Barrow (MG282)		
Barrow Group W of Staylittle (MG171)	Construction and operation	This scheduled monument comprises six barrows (prehistoric funerary assets). Construction activities have the potential to directly impact one barrow in this group located within the Site, which has the potential to result in a significant effect. During operation the presence of the turbines and associated infrastructure has the potential to change the setting of the barrows forming part of this asset resulting in a significant effect.
Pen y Crogben Round Barrow (MG105)	Construction and operation	Construction activities have the potential to directly impact Pen y Crogben Round Barrow (MG105) which lies in the Site and Core Study Area and has the potential to result in a significant effect. During operation the presence of the turbines and associated infrastructure have the potential to change the setting of these assets resulting in a significant effect.
Pen y Crogben Earthwork (MG106; Roman fortlet)		
Hengwm Ring Cairns (CD278)	Operation	These scheduled monuments are located within the Core Study Area. During operation the

Carn Fawr Round Cairns (CD246)		presence of the turbines and associated infrastructure have the potential to change the setting of these assets resulting in a significant effect.
Carn Fach Bugeilyn (MG113)		
Carn Biga Pumlumon Farw (MG110)		
Bryn Y Fedwen Round Barrows (MG107)		
Foel Fadian Round Barrow (MG108)		
Clywedog Valley LSHI (HLW (P) 6)	Construction and operation	There is the potential for physical effects to historic assets which lie within three Historic Landscape Character Areas (HCLA): the Dylife HLCA, Staylittie HLCA and Hafren Forest HLCA within the Site. During operation the presence of the turbines and associated infrastructure have the potential to change the historic landscape character of the RHL.
Non-designated historic assets of likely medium (regional significance) importance.	Construction and operation	There is the potential for physical effects to non-designated historic assets within the Site. During operation the presence of the turbines and associated infrastructure have the potential to change the setting of non-designated historic assets resulting in a significant effect.
Previously unrecorded historic assets, including buried archaeological remains.	Construction	There is the potential for physical effects to previously unrecorded historic assets, including buried archaeological remains within the Site.

6.5.9 Receptors / elements to be scoped out of the assessment

Potential Effects Scoped out of the Assessment

The current understanding of the baseline and nature of the Proposed Development indicate that the following types of effects are unlikely to arise so it is proposed that they are scoped out of the assessment:

- Direct physical effects (removal or truncation of physical remains) to historic assets beyond the Site;
- Indirect physical effects (changes to their environment, such as hydrology) to historic assets beyond the Site; and

- Effects resulting from decommissioning.

At the end of the operational phase, the Proposed Development will either be decommissioned or its operational lifetime extended through an additional, and separate, application to that of the Proposed Development. Decommissioning will involve the removal of all above-ground infrastructure such as the turbines. Access tracks will likely remain in place; however, this is subject to conversations with the landowners. As decommissioning is currently understood to not entail ground disturbance, any associated effects are not expected to be significant.

6.5.10 Opportunities for enhancing the environment

Enhancement opportunities for cultural heritage and archaeology will be identified in the OHEEP.

6.5.11 Proposed assessment methodology

Policy and Guidance

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

- Cadw (2017) Setting of Historic Assets in Wales;
- Cadw (2017) Heritage Impact Assessment in Wales;
- Cadw (2011) Conservation Principles for the sustainable management of the historic environment in Wales;
- Cadw (2007) Guide to Good Practice on Using The Register of Landscapes of Historic Interest in Wales in the Planning and Development Process: Revised (2nd) Edition Including Revisions to the Assessment Process (ASIDOHL2)
- ClfA (2017) Standard and guidance for historic environment desk-based assessment;
- IEMA, ClfA and IHBC (2021) Principles of Cultural Heritage Impact Assessment in the UK;
- Welsh Government (2021) Planning Policy Wales Edition 11; and
- Welsh Government (2017) Technical advice note (TAN) 24: the historic environment.

As there will be direct effects to the Clywedog Valley LSHI (HLW (P) 6) as a result of the Proposed Development, an Assessment of the Significance of the Impact of Development on Historic Landscapes (known as 'ASIDOHL2') assessment is proposed. This will form an appendix to the ES Report. Any effects to Upland Ceredigion Registered Historic Landscape (HLW (D) 2) will be covered as part of the setting assessment prepared as part of the ES.

In historic environment policy and guidance, the significance, hereafter referred to as 'heritage significance' to disambiguate from the EIA concept of 'significance', of a historic asset comprises a series of qualities, known as 'heritage values'. The heritage significance of assets will be articulated using Conservation Principles (Cadw 2011). This will include assessment and discussion of how an asset's setting contributes to its heritage significance and allows this to be appreciated, understood and experienced. This will be informed by Setting of Historic Assets in Wales (Cadw 2017).

Importance

Whilst heritage values help describe the heritage significance of assets, they do not articulate the relative importance of assets. For the purposes of the ES, the 'importance' of assets will

be ascribed using the following criteria, informed by the designation criteria and the Research Framework for the Archaeology of Wales:

- **High** – historic assets of national importance. This will comprise designated historic assets and non-designated assets of demonstrably equivalent heritage significance;
- **Medium** – historic assets of regional importance. Identified with reference to regional priorities from the Research Framework for the Archaeology of Wales; and
- **Low** – historic assets of local importance.

Significance of Effect

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 heritage significance of the historic asset. This will be articulated with reference to Cadw's Conservation Principles (2011). In articulating effects, a judgement will be made on the level of harm or benefit a historic asset will experience as a result of the Proposed Development, supported by an appropriate narrative linking this to how the asset will have its heritage significance changed. Assessment of effects related to setting change will be undertaken using the staged approach laid out in the Cadw setting guidance (2017). In articulating effects, a clear statement will be made as to whether the effect is considered to be significant in EIA terms.

There is currently no relevant professional guidance covering what constitutes an effect which is significant in EIA terms. In the absence of such guidance, a professional judgment will be made based on the level of direct physical and other effects to each asset. Although this will be evaluated on an asset-by-asset basis it is expected that an effect to an asset of at least medium importance (regional significance), and results in either its total removal or very much reduces its heritage significance, will be significant effects. This does not rule out significant effects arising as a result of other levels of effect to assets of lower levels of importance. The potential for such effects to be significant in EIA terms will be kept under review during the course of the assessment.

There is no industry-wide accepted methodology for the assessment of cumulative effects to historic assets within EIA. The assessment of cumulative effects will review the agreed list of cumulative schemes for the Proposed Development and identify whether any further effects (i.e. effects that will not be caused solely by the Proposed Development itself) will arise. This assessment will be undertaken and articulated in the same terms as the assessment of the effects of the Proposed Development in its own right.

Where relevant, asset-based ZTVs and visualisations will be prepared to support the assessment and articulation of effects. This may include visualisations to support the cumulative assessment. The need for asset-based ZTVs and visualisations will be agreed in consultation with relevant consultees.

6.5.12 Difficulties and uncertainties

To ensure transparency within the EIA process, the following difficulties and uncertainties have been identified:

- The information presented in this scoping opinion request is based upon the current extent of the Proposed Development. Detailed design will be undertaken during preparation of the ES and will include associated construction elements such as compound locations, borrow pits, access tracks and drainage and landscaping. As such, further design has the potential to alter the predicted effects of the construction and operation of the Proposed Development, and these will be fully assessed in the ES.

- HER data is limited to previous opportunities for research, fieldwork, and discovery. Where nothing of historic interest is shown in a particular area this can be due to a lack of targeted research or investigation rather than the genuine absence of sub-surface archaeological deposits. There is therefore the potential for previously unrecorded historic assets, including buried archaeology remains, within the Site. The potential for previously unrecorded surface historic assets will be addressed via field survey and the interrogation of LiDAR data. The potential for previously unrecorded buried archaeological and any potential effects will be reported in the ES.

6.5.13 References

Brown M (2010) A History of the Dylife Mines and Surrounding Area.

Bick D (1990) The Old Metal Mines of Mid-Wales. New Edition

Cadw (2017) Heritage Impact Assessment in Wales.

Cadw (2017) Setting of Historic Assets in Wales.

Cadw (2011) Conservation Principles for the sustainable management of the historic environment in Wales.

Cadw (2007) Guide to Good Practice on Using The Register of Landscapes of Historic Interest in Wales in the Planning and Development Process: Revised (2nd) Edition Including Revisions to the Assessment Process (ASIDOHL2)

Council for British Archaeology (2004) Mountains and Orefields: Metal Mining LANDSCAPES OF Mid and North-East Wales. CBA Research Report 142

CPAT (2016) Dylife Lead Mine Archaeological Assessment.

CPAT (2000) Montgomeryshire Wildlife Trust Reserves Archaeological Baseline Survey Stage 1.

CPAT (1998a) Prehistoric and Funerary & Ritual Sites: Upper Severn Valley.

CPAT (1998b) Deserted Medieval and Later Rural Settlements in Eastern Conway, Denbighshire and Montgomeryshire.

CIfA (2017) Standard and Guidance for Historic Environment Desk-Based Assessment.

Welsh Government (2021) Planning Policy Wales Edition 11.

Welsh Government (2017) Technical Advice Note 24: The Historic Environment.

Trysor (2014) Upland Initiative - Montgomeryshire Residual Moorland Archaeology Field Survey Part Three. The Royal Commission on the Ancient and Historic Monuments of Wales.

IEMA, CIfA and IHBC (2021) Principles of Cultural Heritage Impact Assessment in the UK.

6.5.14 Scoping questions

- Do consultees consider the study areas appropriate?
- Are there any other relevant consultees who should be consulted about this environmental factor?
- Are consultees aware of any other supplementary guidance of relevance to assessment of effects to historic assets?
- Is the approach to the assessment of effects, including those effects scoped in and out and the cumulative assessment, appropriate?
- Is the approach to field survey considered appropriate?

- Are consultees content with the proposed approach to scope out the topics from the ES, which are presented in **Section 6.5.9**?
- Do consultees consider the inclusion of the OHEEP as an appendix to the ES Report an appropriate approach to presenting enhancement opportunities to offset potential impacts to historic assets?

6.6 Land, Soil and Water

6.6.1 Consultation

Consultations have not yet been carried out; however, consultations will be carried out with the following stakeholders and organisations:

- Natural Resources Wales (NRW);
- Powys County Council;
- The Welsh Government;
- Dŵr Cymru Welsh Water;
- Severn Trent Water; and
- Local landowners.

6.6.2 Study area

The study area will include the Site boundary plus a buffer zone of 2km. For hydrological receptors, impacts up to 5km downstream from the Site boundary will also be considered, as impacts such as pollution events can be transmitted downstream for distances greater than 2km.

6.6.3 Data sources to inform the EIA baseline characterisation

The assessment will involve a desk study, to gather available data concerning the existing geological, hydrogeological, hydrological and soil / peat conditions in the study area.

Datasets anticipated to be used include:

- Geological maps, including both bedrock and superficial geology;
- Hydrogeological maps, including productivity and groundwater vulnerability;
- Cranfield University Soilscales digital mapping;
- High-resolution aerial or satellite imagery of the project area and its immediate surroundings;
- NRW's water quality and flood risk data for the project area;
- Vegetation mapping;
- Borehole records, where available. These will be sourced from records held by the British Geological Survey (BGS) and other sources as available;
- Local authority private water supply records;

- Any available utilities and Dŵr Cymru Welsh Water and Severn Trent Water investigations and details of public water supplies and assets;
- Previous assessments carried out in relation to neighbouring wind farm projects and previous studies undertaken within the Site; and
- Data gathered from site visits, including peat depth and vegetation surveys and any material arising from future surveys that may be relevant.

6.6.4 Surveys to inform the EIA baseline characterisation

Peat depth has been surveyed across the majority of the Site during Phase 1 surveys. A permission request has been submitted to gain access to the NRW-owned forestry land within the central section of the Site. Peat depth and walkover surveys will be completed for the remainder of the Site upon receipt of access permission. This information will be collected and used to inform the forthcoming ES chapter, thereby giving a site-wide overview of peat depth. Planned surveys to inform the assessment are:

- A hydrological and geological walkover survey to obtain site-specific detail on ground conditions and water environment features within the site and immediate surroundings, affirming the findings of the baseline desk-study;
- A Phase 2 peat survey focusing on locations where wind turbines and associated infrastructure are proposed.

6.6.5 Baseline conditions

Land use within and around the site boundary

Within the Site, there are dwelling houses, forest areas, agricultural lands, grazed pasture, farms and moorland. In the area surrounding the Site, there are privately owned agricultural lands, farms, forest areas and a disused quarry.

Resources and receptors within study area:

Geology

The main section of the Site is underlain by bedrock of Llandovery (Silurian) age consisting mainly of mudstones with some interbedded sandstones and siltstones across a number of named formations (BGS, 2023). The main rock formations are the Caerau Mudstones, Rhyader Mudstones, Blaen Myherin Mudstones and Glaslyn Formation mudstone and sandstone.

The area has been significantly affected by folding and faulting. Dominant fold axes run roughly north-to-south and include both synform (down-fold) and antiform (up-fold) structures. Two main sets of faults are present, with the Dylife Fault trending north-to-south and a regional set of faults oriented more north-north-east to south-south-west (BGS, 2023).

Superficial geology is primarily Diamicton till and Head with smaller areas of peat, river terrace, alluvial fan and alluvium deposits present in some areas (BGS, 2023). Mapped peat is mainly in the western part of the Site to the north and south of Glaslyn.

The northern part of the Site and areas to the north of the Site boundary have an extensive history of metal mining, with occurrences of copper, zinc, silver and lead recorded in the area (BGS, 2023). A number of disused quarries are indicated on OS base mapping (OS, 2023). There are no records of active mining or quarrying within the Site.

Soils and peat

The soils are dominated by acid loamy upland soils with a wet peaty surface. Some areas around the Site margins are free-draining acid loamy soils, with some slowly permeable wet acid upland soils with peaty surface present in the easternmost section. Cranfield University (2023) Soilscape soils mapping indicates a small area of blanket peat in the south-western corner of the site.

Small areas of the Site are mapped as Evidence Score 1 peatlands with small pockets of Evidence Score 2 peatlands in the middle sections. The Evidence Score defines the level of confidence in the presence of peat in any given grid cell on a scale of 1-10 (1 being the least and 10 being the highest) (NRW, 2022).

Based on initial Phase 1 peat survey coverage, most of the Site has peaty soils up to 0.4m in depth. Small, mainly isolated pockets with peat are present in places. One more extensive area of peat, with depths up to 3.8m, has been identified in the south-western corner of the Site.

Hydrogeology

The groundwater body associated with the Site is predominantly Llandoverly Rocks (Undifferentiated). It is considered to be a low productivity aquifer with flows all through fractures, consisting largely of hard, fine-grained (argillaceous) rocks with limited groundwater (BGS, 2023). A small area to the south-west of the Site is associated with the Ashgill Rocks (Undifferentiated) groundwater body. This is a low productivity, hardened multi-layer aquifer with flow through fractures and discontinuities and capable of producing small local yields (BGS, 2023).

Groundwater-dependent terrestrial ecosystems

Groundwater-dependent terrestrial ecosystems (GWDTE) are areas of wetland or marshy ground that are dependent on groundwater to maintain their function as a wetland or marsh area. Surveys of the Site have identified potential GWDTE habitat.

Hydrology

The main section of the Site lies across three hydrological catchments: Afon Twymyn, Afon Clywedog and Afon Lwyd catchments.

The Afon Twymwn catchment covers the northernmost margin of the Site, initially draining eastwards before turning north beyond the Site boundary. The Afon Twymyn is a tributary to the Afon Dyfi (River Dovey).

The Afon Clywedog catchment includes the central part of the Site, extending to the northernmost corner near Bryn y Fedwen. The Afon Clywedog forms the main watercourse in the catchment with a number of tributaries. It drains into the Llyn Clywedog reservoir to the east of the Site boundary.

The Afon Lwyd catchment covers the southernmost part of the Site, where the Afon Lwyd mainstem forms much of the southern boundary. Additional drainage is provided by a number of smaller tributaries. The Afon Lwyd also drains into the Llyn Clywedog reservoir to the east of the Site.

The small Site area at Foel Fadian lies within the Afon Dulas catchment, draining to the north-west. The Afon Dulas is a tributary to the Afon Dyfi.

NRW (2021) indicates the Afon Clywedog and Afon Lwyd catchments have the overall status of Good. The Afon Twymyn catchment has an overall status of Moderate. The Dulas south (upper) and Dulas south (middle) catchments have an overall status of Good.

Private water supply

The Powys County Council private water supplies (PWS) database indicates that there are three PWS within the main Site boundary and two PWS located on or adjacent to the Site boundary. An additional 26 PWS locations have been identified within 2 km of the main Site

boundary. A PWS risk screening will be undertaken to determine if any of the identified supply sources would be at risk from development in this area.

Water resources

Most of the main section of the Site is in the Severn Uplands - Lower Palaeozoic Groundwater Drinking Water Protected Area (DWPA). A small area to the north-west of the main Site and the two smaller areas to the north-west of the main Site are located in the Meirionnydd Groundwater DWPA. There are no source protection zones within the study area.

Llyn Clywedog is not used for drinking water abstraction directly, but its outflow is regulated to help manage river levels in the River Severn downstream and drinking water is abstracted from some locations lower in the catchment. Llyn Clywedog is managed by Severn Trent Water.

Flood risk

Flood risk is indicated to be relatively low within the site. High pluvial flood risk is confined to the watercourses on Site. River flood risk is indicated to be high, but is confined to the steep valley of the Afon Clywedog. Flood risk downstream of the Site is predominantly confined to the Llyn Clywedog Reservoir (NRW, 2023).

Designated sites

NRW (2023) indicates that there are no designated sites within the Site boundary. Several sites within the study area have been designated for reasons associated with geology, hydrogeology, hydrology or peat. A risk screening would be undertaken to determine any possible impact of the linkage between the site and the designated areas. Sites within 2 km of the Site boundary are:

- Coed Afon Crewi, SSSI (Site of Special Scientific Interest) (biological, soils): designated for the range and composition of plant species present owing to the soil type and steep slopes present.
- Pumlumon (Plynlimon), SSSI (soils, geomorphology, habitats & plants): designated for mountain and upland habitats, plants and animals; soil pipe network in the Maesnant valley; wetlands, springs and flushes.
- Dylife Mine, SSSI, GCR (Geological Conservation Review) and Regionally Important Geodiversity Site (RIGS) (geology): designated for minerals associated with mine tips including zinc and lead ores; a wide range of secondary mineral ores also present.
- Ceunant Twymyn, SSSI, and Afon Twymyn, GCR (geology, geomorphology): designated for an example of river capture; landscape change and evolution.

6.6.6 Additional (secondary and tertiary) mitigation

Construction

Key additional mitigation during the construction phase includes:

- Surface water and sediment management;
- Pollution prevention;
- Watercourse crossing and drainage design;
- Peat management and peat handling.

Operation

The main operational mitigation includes:

- Ongoing monitoring of water quality, drainage infrastructure and track status;
- Sediment management during maintenance;

- Pollution prevention.

6.6.7 Description of likely significant effects

Construction

There is potential for significant effects with regard to:

- Peat, peat soil and peatland;
- Surface water and groundwater arising from sediment release, spillages or pollution incidents;
- Surface water or groundwater flow paths arising from excavations and long-term infrastructure;
- Increase in downstream flood risk arising from development infrastructure and drainage.

Operation

There is potential for significant effects during operation with regard to:

- Water pollution arising from sediment release, spillages or pollution incidents;
- Increases in downstream flood risk arising from poor management and maintenance of drainage infrastructure.

6.6.8 Receptors / elements to be scoped into the assessment

The following features are proposed to be scoped into the assessment.

Receptor/Element	Phase	Justification
Surface water	Construction and operation	There are a number of watercourses and waterbodies within and adjacent to the proposed site boundary. It is anticipated that some watercourse crossings would be required in order to construct access tracks. There would be significant potential for impacts to water quality from sediment release, spillages or pollution incidents. Surface water flow paths would be disrupted by track construction and drainage infrastructure.
Groundwater and GWDTE	Construction and operation	It is likely that shallow groundwater is present in the near-subsurface within the proposed site boundary. Deep excavations for turbine foundations and borrow pits may encounter groundwater and could alter groundwater flow paths to sensitive receptors such as PWS and GWDTE. They could also provide a direct pathway for contamination to enter the aquifer. Spillages and pollution incidents could also impact on groundwater quality.

Peat, peat soil and peatland	Construction	Some areas of peat are present within the site, and much of the site has soils with a peaty surface layer. Construction activity would have a direct impact on peaty soils and may also affect areas of peat and peatland habitats. Effects on peat would be potentially significant in a Welsh context.
Designated sites	Construction	A number of designated sites are located near the Site and there is potential for direct and/or indirect effects on the features for which the sites are designated.
Mineral mining and former mine workings	Construction	Former mineral workings are present within the site boundary and are likely to have a heritage value. Some mineral workings are also designated sites.
Flood risk	Construction and Operation	Although flood risk within the site is relatively low, there are areas downstream where flood risk is significant. Water and drainage management within the site could have consequences for flood risk in areas downstream of the site.

6.6.9 Receptors / elements to be scoped out of the assessment

The following features are proposed to be scoped out of the assessment.

Receptor / Element	Phase	Justification
Geological receptors	Construction and operation	Impacts on geological receptors will be confined to specific areas (e.g. turbines, borrow pits and crane pads) within the Site. As these are limited in area and there are no particularly sensitive geological features within the Site, geological receptors will be scoped out. Effects on designated or otherwise important geological features would be included in the assessment.
Peat, peat soil and peatland	Operation	Once the construction phase is complete, there will be no requirement for additional works on areas of peat, peat soil or peatland and therefore no changes to assess. Therefore, assessment of impacts during operation is scoped out.
Designated sites	Operation	The type of works anticipated to be taking place during operation would be very limited in nature, with very limited potential for effects to transmit to designated sites. Therefore assessment of impacts during operation is scoped out.

Mineral mining and former mine workings	Operation	Once the construction phase is complete, there will be no requirement for additional works that could affect mineral mining and former mine workings, and therefore no changes to assess. Therefore, assessment of impacts during operation is scoped out.
6.6.10 Opportunities for enhancing the environment		
The distribution of peat around the site suggests that peatland restoration may be appropriate for some parts of the site, particularly in areas with eroding peat or locations where attempts have been made to drain peaty areas. The potential for peat restoration will be considered and any plans drawn up with input from the terrestrial ecology team as there is overlap with habitat management and potential net gains from a co-ordinated approach. Any such plans will be considered and included within the final version of the ES		
6.6.11 Proposed assessment methodology		
The proposed assessment method involves a combination of desk-based data gathering, site visits and site-specific data collection followed by data analysis to determine the potential significance of effects. Key legislation, regulation and guidance include: • Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675); • Environment Act 1995; • The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI2003/3242); • Planning (Wales) Act 2015; • Planning Policy Wales, 2021; • Future Wales: The National Plan 2040; • Planning: Guidance on Environmental Impact Assessments (Circular 11/99); • Flood and Water Management Act 2010; • The Flood Risk Regulations 2009; • Environment Agency Guidance to Protect Groundwater and Prevent Groundwater Pollution 2017 adopted by NRW; • Private Water Supplies (Wales) Regulations 2017; • Pollution Prevention & Control (England & Wales) Regulations 2000; • The Powys Local Development Plan (2011-2026); • NRW's Guidance for Pollution Prevention, including GPP1, GPP2, GPP5 and GPP21. Effects significance is assessed using a matrix based on sensitivity of the receptor, magnitude of effect and likelihood of effect. Four levels of significance are applicable: Negligible, Low, Moderate and High. Moderate and High are considered to be significant in terms of the EIA regulations. Details of the significance criteria are provided in Appendix K. Effects considered likely to require assessment for construction and operation are: • Physical changes to overland drainage and surface water flows; • Particulates and suspended solids;		

- Water contamination from fuels, soils, concrete batching or foul drainage;
- Changes in or contamination of water supply to vulnerable receptors;
- Increased flood risk;
- Modification to groundwater flow paths; and
- Soil erosion and compaction.

6.6.12 Difficulties and uncertainties

To ensure transparency within the EIA process, the following difficulties and uncertainties have been identified:

- Weather conditions during site surveys can affect the geographical coverage and quality of data collected. For example, under some circumstances weather conditions can make it too dangerous to access certain areas; preceding weather conditions can influence the appearance of watercourses and ground conditions – e.g. very wet weather may lead to over-estimation of ground wetness or watercourse size. Use of professional judgement and field experience can help to mitigate this; also scheduling site visits outwith the main winter period (November to February) reduces the risk of dangerously stormy weather.
- Private water supply data relies on information held by Powys County Council. This has been supplied by property owners and may be incomplete. Property owners/tenants may not be aware of the details of their own supplies. Attempts will be made to verify supply details. Where this is not possible, a worst-case scenario will be assessed, and contingency mitigation measures provided.

6.6.13 References

BGS (2010). Llanidloes. England and Wales Sheet 164. Bedrock and superficial deposits. 1:50,000. British Geological Survey, Keyworth, Nottingham.

BGS (2023). GeoIndex online geological mapping. British Geological Survey. Available at: <http://mapapps2.bgs.ac.uk/geoindex/home.html>, accessed September 2023.

BGS & NRW (2016) Hydrogeology of Wales. Available at: <https://nora.nerc.ac.uk/id/eprint/513064/1/Hydrogeology%20of%20Wales.pdf> accessed September 2023

Coal Authority (2023) Interactive Map Viewer Available at: <https://mapapps2.bgs.ac.uk/coalauthority/home.html> accessed November 2023

Cranfield University (2023) Soilscape soils mapping. Cranfield Soil and Agrifood Institute. Available at: <https://www.landis.org.uk/soilscape/index.cfm>, accessed November 2023.

NRW (2023) Flood Risk Assessment Wales. Available at <http://lle.gov.wales/catalogue/item/FloodRiskAssessmentWales/?lang=en> accessed September 2023

NRW (2022) Peatland Data Portal Map Layers. Available at: <https://naturalresources.wales/evidence-and-data/maps/peatland-data-portal-map-layers?lang=en> accessed September 2023

NRW (2023) Protect Areas of Land and Seas. Available at: <https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en> accessed September 2023

NRW (2023) Wales Environmental Information Portal: Welsh Peatlands Data Portal.
 Available at: <https://smnr-nrw.hub.arcgis.com/apps/d18ef8c74ecc4dc4a0cbf71ab6935ba0/explore> accessed Jan 2023
 Welsh Government (2022). Production of the Peatlands of Wales Map: Soil Policy Evidence Programme 2020-21 (Report code: SPEP2020-21/03, March 2022)

6.6.14 Scoping questions

- Are there any other key stakeholders or stakeholder organisations that should be consulted?
- Are there any additional data sources or guidance documents that should be considered?
- Do you agree that the surveys proposed to inform the EIA baseline characterisation are appropriate?
- Are any receptors/assets/resources not identified that you would like to see included in the EIA?
- Do you agree with the receptors/matters that are proposed to be scoped in and out of the EIA?
- Are there any known flooding concerns downstream that could be affected by the Proposed Development?

6.7 Climate Change

6.7.1 Consultation

No consultation to inform the climate assessment has been undertaken to date and no specific consultation in relation to the climate assessment is envisaged, over and above the consideration of comments received to this EIA Scoping Report.

6.7.2 Study area

Aligning with the Green House Gas (GHG) protocol, this assessment will consider Scope 1 (direct) emissions, Scope 2 (indirect) emissions, and any relevant Scope 3 emissions. Scope 1 greenhouse gas (GHG) emissions will include those emitted directly from all facilities and infrastructure as part of the Proposed Development, and likely within the Site boundary. Scope 2 and any relevant Scope 3 emissions are indirect emissions and thus may occur outside the proposed Site boundary. These include the embodied emissions from wind turbine manufacture and transport.

The receptor to GHG emissions is the global climate, and so when assessing the impact and significance of GHG emissions the national (Climate Change Act 2008 and associated Carbon Budgets) and global context (Paris Agreement) is considered.

6.7.3 Data sources to inform the EIA baseline characterisation

The GHG baseline characterisation will be conducted using a desk-based assessment of operation data provided by the Applicant to determine current, and proposed future, emissions sources. It will be undertaken in accordance with the IEMA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022), having consideration also for PAS 2080:2023 Carbon Management in Infrastructure and Royal Institution of Chartered Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment (2017). Standard emission factors will be applied, sourced from reputable agencies, such as Defra UK Government GHG Conversion Factors for Company Reporting (2022).

The national GHG baseline data will be obtained from the UK government (BEIS, 2022).

Flood risk in the Site has been assessed for this scoping report using Natural Resource Wales Flood Risk Assessment Map (2023), which ranks an area's flood risk probability from different sources on a scale of low, medium, and high.

6.7.4 Surveys to inform the EIA baseline characterisation

No surveys have been undertaken to date.

6.7.5 Baseline conditions

The baseline conditions describe the conditions of a business-as-usual scenario whereby the Proposed Development is not undertaken. The baseline comprises existing carbon stock and sources of GHG emissions of the existing activities on-site, within the Site boundary.

The Site is located to the west of Staylitttle and c.6.9km south-east of Machynlleth. Covering c. 1489.5ha, the site comprises agricultural land, upland rough grassland and peatland, as well as plantation forestry in the south. The Pumlumon SSSI is also located adjacent to the Site. There are several watercourses which run throughout the site. In the north of the site the Nant Blaen-y-cwm and Nant Fadian flow towards the Afon Dulas and the Afon Twymyn and Nant Dropyns flow towards the River Dovey. The Nant Ddu, Nant Goch, Afon Clywedog and Nant Cefn-Ilwyd are all located in the centre and south of the Site. Lastly, the the Afon Lwyd is located along the southern Site boundary and the Afon Bachog just beyond the eastern Site boundary. There are no water bodies located within the site, however several are present along the western Site boundary. The site is not identified within the 'Future Wales: the National Plan 2040' report by the Welsh Government (2021) as an area which is proliferent in natural resources. According to Natural Resource Wales' Flood Risk Assessment Map (2023), the site is not located within a flood risk zone for rivers. There are small pockets of medium to high flood risk from surface water and small watercourses.

With regards to the national baseline, the UK Government set out a legally binding framework to cut GHG emissions by at least 80% by 2050 in the Climate Change Act (2008); this was amended by the Climate Change Act 2008 (2050 Target Amendment) Order 2019, changing the 80% reduction to a 100% reduction, or net zero, by 2050.

The total UK GHG emissions for 2021 was 505 million tCO₂e, up by 6% from the year before. Overall, however, the trend of total UK GHG emissions shows a decreasing trajectory from 1990 to 2020. Emissions relating to 'Electricity, gas, steam and air conditioning supply' specifically show a significant reduction trend over the past decade, halving from 176 million tCO₂e in 2010 to 81 million tCO₂e in 2020 (BEIS, 2022).

The total perimeter of the Site falls under Powys County Council's jurisdiction, who have set the opportunities that arise from renewable energy generation as an area of focus within their Climate Change Strategy report (2021). The strategy covers five broad areas: building, mobility / transport, procurement, land use / agriculture and council / governance. The strategy

breaks down key aims and benefits for each area of focus. Powys County Council have also set a target to reduce their carbon emissions to net zero, in line with the Welsh Public sector target of 2030.

6.7.6 Additional (secondary and tertiary) mitigation

Construction

GHG emissions are inevitable during the construction phase. A Construction Environmental Management Plan (CEMP) should be implemented to identify good working practices in line with appropriate standards, including low carbon practices. Some mitigation measures that are anticipated to be taken into account are:

- Ensure minimum peat disturbance and forestry felling are considered during the design stage.
- Embed carbon reduction practices as a core principle for the design team. Where reduction ideas are suggested, they should be recorded and potential impact quantified. Earlier engagement with carbon reduction allows for the greatest returns.
- Where technical specifications allow, maximise the recycled content of construction materials such as concrete and steel.
- Maximise the specification of materials with an environmental product declaration with the aim of reducing embodied carbon emissions.
- Incentivise use of local suppliers with a view to shorten project supply chains and environmental footprint.
- Onsite mobile and non-mobile plant should conform to the latest emissions standards, with mobile vehicles conforming to EURO 6 standards as a minimum. All plant should investigate the option of using HVO fuels or electric versions where possible.
- Encourage main contractors to report on energy data, water usage and waste disposal and their GHG emissions as part of the CEMP.

Operation

The operation of the Proposed Scheme is anticipated to have a positive effect on the climate. Nonetheless, there is scope to further improve the site in terms of ecological enhancements and habitat creation, which can have a positive effect in terms of carbon sequestration. These will be documented in the Habitat Management Plan.

Decommissioning

The decommissioning process is likely to result in GHG emissions, particularly from the removal or renewal of turbines. Additional mitigation can be employed that aligns with the hierarchy for managing project-related emissions (avoid, reduce, substitute, and compensate). These will be detailed in the EIA chapter.

6.7.7 Description of likely significant effects

Construction

GHG emissions will be inevitable during the construction phase given the scale of the development and the methods available for it to be carried out (through the use of heavy machinery). Main emissions sources are likely to be through fuel consumption and the embodied emissions of materials. While mitigation measures are likely to be implemented to limit these emissions, they will still be significant based on current available information.

It is not expected that the emissions from construction will compromise the ability of the UK to meet its carbon reduction targets. However, in view of the cumulative contribution of all emissions towards climate change, and the fact that the global climate is highly sensitive to fluctuations in GHG emissions, the emissions associated with the construction of the Proposed Development have the potential to have a significant negative effect upon the climate.

Operation

The operation of the wind farm is unlikely to contribute a significant amount of GHG emissions, and can be viewed as achieving emissions savings by reducing the consumption of fossil fuel generated mains electricity.

Decommissioning

GHG emissions will be inevitable during the decommissioning phase of the development, again due to the necessary use of heavy machinery. As was the case with construction, the receptor is not confined to the immediate vicinity of the Site. Instead, it is the global atmosphere. As such, the receptor is highly sensitive, in view of the cumulative contribution of all emissions towards climate change. With this in mind, the emissions associated with the decommissioning of the Proposed Development are likely to have a significant negative effect upon the climate.

6.7.8 Receptors / elements to be scoped into the assessment

The following receptors / elements are proposed to be scoped into the assessment.

Receptor / Element	Phase	Justification
GHG emissions	Construction	Embodied carbon of wind turbines and any ancillary developments can potentially be significant. It is important to include construction-related emissions when considering the overall lifecycle emissions of the Proposed Scheme, to determine an accurate 'carbon-payback' time of the scheme.
GHG emissions	Operation	Aligned with IEMA guidance, a project that causes GHG emissions to be avoided has a beneficial effect that is significant.
GHG emissions	Decommissioning	The decommissioning process is likely to result in GHG emissions, particularly from the removal or renewal of turbines. It is important to include all emissions when considering the overall lifecycle emissions of the Proposed Scheme, to determine an accurate 'carbon-payback' time of the scheme.

6.7.9 Receptors / elements to be scoped out of the assessment

Receptor / Element	Phase	Justification
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Climate Change Risk	Construction, Operation & Decommissioning	UKCP18 projections suggest that climate change will lead to hotter drier summers, warmer wetter winters, increased likelihood of extreme weather events (e.g., heat waves, high rainfall events) and sea-level rise. Due to the embedded resilience of wind turbines to high heat and wind speeds, and the distance of the Site from coastline; these factors are not expected to significantly impact on the construction, operation, or decommissioning of the Proposed Development. Flooding is not expected to have any significant impact on the project, due both to the embedded resilience of wind turbines and the lack of recorded historical flooding within the site boundary.
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6.7.10 Opportunities for enhancing the environment

The Proposed Development is expected to have a net beneficial impact on the climate, in that it will reduce GHG emissions associated with electricity consumption on a national scale. Opportunities exist to further increase the environmental benefit of the Proposed Development by ensuring that emissions associated with the construction and decommissioning process are kept to a minimum. This can be ensured by the adoption of various mitigation measures as detailed in **Section 6.7.6**.

6.7.11 Proposed assessment methodology

The assessment of the effects of GHG emissions arising from the Proposed Development will be carried out in accordance with:

- The Scottish Government's carbon calculator tool (based upon Nayak et al., 2010 and Smith et al., 2011)
- The Institute of Environmental Management and Assessment Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022 edition);
- PAS 2080:2023 Carbon Management in Infrastructure ; and
- Royal Institute of Chartered Surveys (RICS) Whole life carbon assessment for the built environment (2017).

The assessment will quantify applicable Kyoto Protocol GHGs as measured in tonnes of carbon dioxide equivalence (tCO₂e), where equivalence means having the same warming effect as CO₂ over 100 years.

The Scottish Government's carbon calculator tool is considered the best available method to assess GHG emissions from wind farms within the UK. The tool provides for the calculation of CO₂ emissions savings against:

- Carbon loss due to turbine manufacture, construction, operation, and decommissioning;
- Loss due to backup power generation;
- Loss of carbon from the soil;
- Loss associated with runoff of dissolved and particulate organic carbon;

- Loss due to felling of forestry (if applicable); and
- CO₂ gain associated with habitat improvements at site.

In doing this, the tool provides for a determination of the net carbon impact of the Project and its subsequent carbon payback period.

Where possible, site-specific data will be used and input to the tool. Where this data is not available, default values, as set out in associated guidance, will be used. Where required, input from relevant hydrology, ecology and peatland specialists will be used. A record of all data used, and for what purpose, will be maintained throughout the assessment, and included within the appendices to the ES. At present (November 2023), the latest version of the carbon calculator tool is V1.7.0.

Although the Proposed Development is located in Wales, Scottish guidance and tools relating to Carbon calculation are used across all of the UK and reflect established best practice. The significance criteria that will be applied in the assessment are set out in **Appendix K**.

6.7.12 Difficulties and uncertainties

To ensure transparency within the EIA process, the following difficulties and uncertainties have been identified:

- The accuracy of a GHG assessment depends on the quality of the data provided. Primary data should always be used where available. Where it is not possible to collect this data, in view of the fact that this assessment represents a forecast of emissions and some information may not yet be known, secondary data (such as estimates, extrapolations, benchmarks and proxy data such as distance travelled) will be used. Assessments such as this, based largely on secondary data should only be viewed as an estimate of GHG emissions impact, and actual emissions may vary significantly.

6.7.13 References

BEIS (2022) Final UK greenhouse gas emissions national statistics: 1990 to 2020. Available at: <https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2020>

Defra and BEIS (2022) UK Government GHG Conversion Factors for Company Reporting.

IEMA (2022) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance

Natural Resource Wales (2023) Flood Risk Assessment Wales Map. <https://naturalresources.wales/flooding/check-your-flood-risk-on-a-map-flood-risk-assessment-wales-map?lang=en>

Nayak D.R., Miller D., Nolan A., Smith P., and Smith J. (2010) Calculating carbon budgets of wind farms on Scottish peatlands; Mires and Peat (Article 09), 4, 1-23. Available at: <http://mires-and-peat.net/pages/volumes/map04/map0409.php>

Nayak, D.R., Miller, D., Nolan, A., Smith, P., and Smith, J. (2008, revised 2010), Calculating carbon savings from wind farms on Scottish peat lands: a new approach. Available at: <https://www.gov.scot/publications/calculating-carbon-savings-wind-farms-scottish-peat-lands-new-approach/>

PAS 2080:2023 Carbon Management in Infrastructure

Powys County Council (2021). Climate Change Strategy Report. Available at:

https://en.powys.gov.uk/media/15212/Climate-Change-Strategy/pdf/odClimate_change_strategy_.pdf?m=1647938984100

Royal Institute of Chartered Surveys (RICS) Whole life carbon assessment for the built environment (2017).

Smith, J.U., Graves, P., Nayak, D.R., Smith, P., Perks, M., Gardiner, B., Miller, D., Nolan, A., Morrice, J., Xenakis, G., Waldron, S., and Drew, S. (2011), Carbon implications of windfarms located on peatlands – Update of the Scottish Government Carbon Calculator tool. Final Report, RERAD Report CR/2010/05.

The Greenhouse Gas Protocol (2004) Corporate Accounting and Reporting Standard

The Greenhouse Gas (GHG) Protocol, A Corporate Accounting and Reporting Standard (Revised Edition) <https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf> Accessed April 2023.

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

6.7.14 Scoping questions

- Do you agree that the data sources listed to inform the EIA baseline characterisation are appropriate?
- Are any receptors/assets/resources not identified that you would like to see included in the EIA?
- Do you agree with the proposed additional (secondary and tertiary) mitigation measures and is this mitigation appropriate?
- Do you agree with the receptors/elements that are proposed to be scoped in and out of further assessment?

6.8 Noise and vibration

6.8.1 Consultation

No consultation has been undertaken to date. Consultation will be undertaken with Powys County Council to discuss the assessment methodology (including baseline noise monitoring locations) following submission of the EIA Scoping Report.

6.8.2 Study area

The study area for the operational stage assessments will consider noise sensitive receptors in close proximity to the Proposed Development. These will be determined based on the guidance set out in The Institute of Acoustics Good Practice Guide to the Application of ETSU-97 and using professional judgement.

The guide advises 'The study area should cover at least the area predicted to exceed 35dB L_{A90} at up to 10m/s wind speed from all existing and proposed turbines' during low amenity daytime periods. In addition, for financially involved dwellings, the following is advised 'ETSU-R-97 considers it appropriate to allow a higher level of incident noise associated with turbine operation for properties with occupants that have an interest in the development, both as a

higher fixed level (45dB) and/or a higher level above the prevailing background noise level. It is considered that the occupants of a financially involved property should be direct beneficiaries to allow an increase to the fixed limit noise levels'.

6.8.3 Data sources to inform the EIA baseline characterisation

The data sets which have been utilised to determine the proposed assessment scope include:

- Aerial imagery and mapping

Additional data sets which will be used to inform the EIA (post-scoping) include:

- Third-party noise assessments, where available and applicable
- Any available baseline noise survey studies previously undertaken in the area.
- Baseline noise surveys for the Proposed Development at selected noise sensitive receptors, to establish the prevailing pre-development acoustic environment (as defined below).
- Candidate Turbine Sound Emission Data and other turbine characteristics

6.8.4 Surveys to inform the EIA baseline characterisation

No noise or vibration surveys have been undertaken to date.

The strategy for the proposed baseline noise surveys will be agreed with Powys County Council before any surveys are undertaken. At this stage, it is intended the baseline survey will comprise of unattended measurements taken over an initial period of four weeks at up to six receptors located in the vicinity of the Proposed Development, with the resulting dataset subsequently used to gain an understanding of the existing noise levels.

The noise survey will be undertaken in accordance with guidance as set out in ETSU-97. All equipment to be used on site will comply with guidance as defined in BS EN IEC 60942 and BS EN 61672-1.

6.8.5 Baseline conditions

The acoustic environment surrounding the Proposed Development site comprises a number of different noise sources including: agricultural activities, road infrastructure, industrial facilities, and commercial premises / activities. Receptors located within and around the site are likely to experience different noise sources depending on their proximity to the most prevalent noise source(s). Noise levels at receptors in the vicinity of the site are expected to be influenced by natural sources such as wind induced sound from trees and foliage, birds and noise from water courses and, potentially, the existing Carno windfarm, to the east. Baseline noise levels will be used to derive the design targets for the new scheme.

The receptors within the study area comprise isolated farmhouses and roadside dwellings.

The extent of the baseline survey will be dependent on the initial noise modelling of the current layout, using the candidate turbine (see below).

The initial contour plot based on 10ms⁻¹ wind speed noise emission data from a Siemens Gamesa 155 6.6MW (122.5m hub height) and a total of 26 turbines is presented in **Figure 6.8.1 in Appendix I**. The sound power level for this wind speed is 105dB(A), and the highest

emission across any wind speeds and operating modes, therefore presents a worst-case scenario. The manufacturer data does allow for curtailment and low operating noise mode, however these will be introduced if needed post baseline monitoring and assessment. The predictions allow for a +2dB uncertainty in source emission data, and a -2dB correction from L_{Aeq} to L_{A90} .

The initial noise model shows there are a number of receptors that fall within both the 35 dB contour line and the 45dB contour line.

This suggests that a baseline survey will be required, with monitoring likely at up to six locations. Final monitoring locations will be dependent on refinement of the candidate turbine, however will cover those within the 35dB(A) contour, representing a larger number of dwellings.

6.8.6 Additional (secondary and tertiary) mitigation

Construction

Following the outcome of the construction phase assessment (access road construction only), tailored mitigation would be proposed where the predicted noise and vibration levels have the potential to exceed the threshold significance criteria. These additional measures would be recommended where conventional Best Practicable Means (as defined by the Control of Pollution Act) would not be sufficient.

Operation

Primary mitigation is considered in the form of suitable scheme design to avoid significant noise effects where no additional secondary or tertiary mitigation measures are anticipated. If deemed necessary following the outcome of the impact assessment (in accordance with ETSU and the IOA Good Practice Guide), additional noise control measures in the form of turbine curtailment, or in worst case turbine removal, may be required.

6.8.7 Description of likely significant effects

During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise would be caused by the interaction of the turbine blades with the air. Mechanically generated noise would 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. The assessment of operational noise will also include the cumulative effects of other turbines in the area.

With regard to infrasound and low frequency noise, the Onshore wind turbines planning note, refers to a report for the UK Government which concluded that 'there is no evidence of health effects arising from infrasound or low frequency noise generated by the wind turbines that were tested'. The current recommendation is that ETSU-R-97 should continue to be used for the assessment and rating of operational noise from wind farms.

It is therefore not proposed to undertake specific assessments of infrasound and low frequency noise, but the noise chapter of the EIA report will consider the latest supporting information on these subjects and the topic of wind turbine blade swish or Amplitude Modulation (AM).

6.8.8 Receptors / elements to be scoped into the assessment

The following receptors / elements are proposed to be scoped into the assessment.

Receptor / Element	Phase	Justification
Human receptors affected by noise. Potential for significant adverse noise effects during operation due to noise emitting plant and equipment associated with the Proposed Development.	Operation	During their operation, wind farms have the potential to create noise effects through both aerodynamic noise and mechanical noise. Aerodynamic noise would be caused by the interaction of the turbine blades with the air. Mechanically generated noise would 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. The assessment of operational noise will also include the cumulative effects of other turbines in the area.
Noise associated with construction and decommissioning activities – access road (construction of)	Construction	The separation distance of access roads to receptors has the potential to be small and therefore construction of these roads may generate noise that is audible at nearby receptors for time periods long enough to change the localised noise environment. Therefore, this will be assessed.

6.8.9 Receptors / elements to be scoped out of the assessment

Receptor / Element	Phase	Justification
Noise and vibration associated with construction and decommissioning activities – Wind Turbine Erection	Construction and decommissioning	Construction activities (wind turbine erection) are likely to be relatively distant from the nearest sensitive receptors (500m+), noise and vibration effects during the construction and decommissioning of the turbine erection are unlikely to be significant, provided that works are undertaken during standard working hours only and that good practice construction measures/ BPM are implemented.
Vibration associated with access road construction	Construction	Vibration associated with access road construction is likely to be minimal with emission levels at receptors below levels of perception.

		Therefore, it is not considered for further assessment.
Noise and Vibration associated with access road operation	Operation	Noise and Vibration associated with access road operation is likely to be minimal with vibration at receptors below levels of perception and impact from a change in road noise levels insignificant. Therefore it is not considered for further assessment.
Noise and vibration associated with construction traffic.	Construction	The number of receptors in the area is low and any potential impact experienced would be temporary and short term. Potential adverse impacts can be reduced following CEMP and best practice construction measures.
Vibration from Proposed Development.	Operational	It is considered that vibration resulting from the operation of the wind turbines will be imperceptible at the existing separation distances between the turbines and the nearest sensitive receptors.
Vibration from Proposed Development.	Construction	Wind turbines will not be in place / operating during construction, therefore no operational vibration generated.
Human receptors affected by noise.	Construction	Noise effects at human receptors from installation and commissioning of operational plant and equipment during construction phases are unlikely to be significant provided that works are undertaken during standard working hours and that good practice construction measures/ BPM are implemented.
Noise associated with construction and decommissioning activities – access road (construction of).	Operation	Operational use of the access road during construction phases of the access road will not be assessed. Noise and Vibration associated with access road operation is likely to be minimal with vibration at receptors below levels of perception and impact from a change in road noise levels insignificant.
6.8.10 Opportunities for enhancing the environment		
No specific enhancement opportunities have been defined at this stage.		
6.8.11 Proposed assessment methodology		

For the EIA, the baseline environment would generally be assessed by measuring background noise levels as a function of site wind speed at the nearest noise sensitive neighbours (or, at a representative sample of the nearest neighbours), as required under ETSU-R-97, 'The Assessment and Rating of Noise from Wind Farms'.

For the construction phase of the Proposed Development, the assessment methodology set out in BS 5228-1 will be used. The prediction method considers the noise emission level of the proposed plant items, the separation distance between the source and the receiver, and the effect of the intervening topography, ground conditions and structures.

The significance criteria for the construction phase noise levels will be derived from Annex E of BS 5228-1. It is intended that construction activities undertaken during core daytime hours will be assessed against the lower bound cut-off value in Annex E of BS 5228-1.

Where necessary, construction induced vibration levels will be predicted using the empirical formula contained in BS 5228-2. The vibration levels will be assessed against the peak particle velocity threshold levels within the standard for humans and buildings. The significance criteria for the construction phase vibration levels will be derived from Annex B of BS 5228-2.

Assessment of operational noise from wind farms as recommended in planning guidance is that included in ETSU-R-97 'The Assessment and Rating of Noise from Wind Farms'. In summary, the assessment will:

- Identify the nearest noise sensitive receptors to the development site;
- Determine the quiet daytime and night-time noise limits from the measured background noise levels at locations representative of the nearest neighbours;
- Specify a candidate turbine with noise emission characteristics that can be considered representative of the wind turbines to be installed onsite;
- Calculate noise emission levels which would be due 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 (see below); and
- Compare the calculated wind farm noise emission levels with the derived noise limits.

ETSU-R-97 also offers an alternative simplified assessment methodology: if predicted noise levels do not exceed 35dB(A) up to 10ms⁻¹, then they are considered acceptable and background noise surveys are not considered necessary. In cases where it is considered likely that turbine noise levels would not exceed this threshold, based on worst-case assumptions, this simplified approach would be used instead.

The good practice guidance previously referenced (IOA GPG) will be taken into account, including advice on baseline survey, wind shear assessment and noise prediction methodology.

Depending on the availability of data from the existing Carno wind farm ES, monitoring may need to be extended to account for directional filtering to remove the noise contribution from it at receptors.

Vibration levels in the baseline environment will be negligible, and are likely to be restricted to vibration generated by domestic appliances, and confined to road traffic movement on poorly maintained roads. In both instances levels will not be discernible beyond the immediate vicinity (less than 5 m from source). Vibration assessment usually accounts for a comparison

with absolute criteria, rather than comparison with the existing baseline. Therefore, no vibration baseline monitoring is proposed for this study. In addition, the potential for vibration to be generated by any phase of the Proposed Development is limited.

The noise measurements will be plotted graphically against associated wind speeds, taking account of weather affected (rain) data to generate a regression analysis for amenity and night time hours. This allows the baseline noise levels across different wind speeds to be calculated and derived for assessment. This will be undertaken at each representative receptor.

Once the layout design has been frozen, and candidate turbine selected, the noise model prepared at scoping stage will be updated to predict levels at selected receptors. These will be compared with derived baseline criteria (+5 dB ETSU criteria correction).

Where predicted levels are above the derived criteria (baseline +5dB) at any wind speed, an analysis of contribution of each wind turbine will be carried out and curtailment or removal of individual turbines will be recommended or considered to ensure residual effects are not significant.

6.8.12 Difficulties and uncertainties

The following items are noted in respect of the noise and vibration assessment:

- The scoping chapter has been prepared on the basis of the current design as outlined within **Chapter 2** of this EIA Scoping Report, which is subject to change through the detailed design process.
- The scoping chapter is based on data available at the time of writing.
- The overview of baseline acoustic conditions is based on desk-based studies only at scoping stage.
- The cumulative effects assessment of nearby windfarms will depend on the availability of the noise data of those turbines.
- The operational assessment will be based on manufacturer noise data for the candidate turbine. This will typically include uncertainty levels, however where these are not available, a 2dB uncertainty correction would typically be applied to sound power levels at all wind speeds.
- The construction assessment will assume the use of standard construction techniques commensurate for the type of works being undertaken. The final techniques, plant selection and programme are expected to be determined by the appointed contractor, in consultation with relevant authorities prior to commencement of construction.
- Details of noise emitting plant/equipment associated with the Proposed Development have not been defined at this stage.
- Verification of residential dwellings considered in the assessment will be achieved through the consultation process and through visit(s) to the Proposed Development's surrounding area and along its surrounding local road networks (as per recommendations of IOA GPG). This is to ensure there is no misidentification and/or missed identification of residential dwellings within study area.
- ETSU-R-97 requires that any baseline noise measurements are not significantly influenced by noise from existing operational turbines, to prevent creep in (cumulative)

noise levels. Consideration of cumulative noise impacts may require the determination of partial noise limits which may be difficult to obtain unless the amenity noise limit is precisely determined. The approach to the influence of cumulative noise on baseline noise measurements would be agreed with PCC.

6.8.13 References

- British Standards Institution (2019) British Standard 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound. London: British Standard Institution.
- British Standards Institution (2014) British Standard 5228:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites (Part 1: Noise and Part 2: Vibration). London: British Standard Institution.
- British Standards Institution (2018) British Standard EN IEC 60942:2018, Electroacoustics – Sound calibrators. London: British Standard Institution.
- British Standards Institution (2013) British Standard EN 61672-1:2013, Electroacoustics - Sound level meters (Part 1: Specifications). London: British Standard Institution.
- Department of Trade and Industry (1997) The assessment and rating of noise from wind farms (ETSU-R-97); Didcot: ETSU.
- Institute of Acoustics (2013) A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise. St Albans: Institute of Acoustics.

6.8.14 Scoping questions

- Please confirm the suitability of using 35 dB(A) as the lower bounding threshold for impacts for operational wind farm noise, as per ETSU guidance.
- Please confirm if vibration is to be scoped out of the operational and construction assessment.
- Please confirm acceptance of ETSU and IOA Good Practice Guide as the defining documents for assessment and derivation of noise baseline.
- Please confirm if monitoring locations are to be agreed with PCC prior to commencement of survey works.
- Please confirm if the local authority wishes to accompany the survey team during installation.

6.9 Traffic and Transport

6.9.1 Consultation

No consultation to inform the traffic and transport assessment has been undertaken to date. The key consultees will be Local Highway Authority (LHA) and planning authorities which may be impacted during the construction phase of the Proposed Development, with the operational

phase anticipated to be scoped out from a traffic and transport perspective. Anticipated consultees are:

- Local Highway Authority (Powys County Council);
- National Highways (England for parts of the route related to the transport of large loads carrying turbine components);
- North and Mid-Wales Trunk Road Agency; and
- Welsh Government.
- Landowners affected by delivery routes and site access
- Local lead flood authority / Internal Drainage Board
- Natural Resources Wales

Once the scoping opinion has been received, the response will be analysed, and the relevant points raised therein taken forward and used to inform the Transport Assessment process. The specific outputs to support the DNS application will depend on the outcome of the agreed scope.

6.9.2 Study area

The study area has been developed based on the anticipated routing of construction vehicles transporting equipment, materials and personnel to / from the Proposed Development depending on the preferred access option, as follows:

- 1. A483, A470, B4518 and unclassified Road to Hafren Forestry Tracks (**Option 1**); or
- 2. A483, A470, A44 and unclassified road to Hafren Forestry Tracks (**Option 2**).

The proposed Port of Entry (POE) for turbine components is anticipated to be the Port of Birkenhead, located North of the Proposed Development. The proposed access route(s) for Abnormal Indivisible Loads is as follows:

Option 1

- Loads depart from the Port of Entry (POE) and access the A53 via the A41 Rock Ferry Bypass;
- Loads leave the A53, traversing onto the A55 south-east bound at Hoole Village;
- Loads continue via A55 and exit at Wrexham Road Interchange, joining the A438 southbound;
- Loads follow the A438 for approximately 84.9km (52.7 miles), then join the A489 westbound, at Newtown bypass roundabout;
- Loads travel west via the A489 for approximately 8.2km (5.1 miles) before continuing onto the A470 westbound;
- Loads follow the A470 for approximately 12.3km (7.6 miles) and join the B4518 at the Llanidloes roundabout, north-west bound; and
- Loads travel along the B4518 for a further 12.3km (7.6 miles) to C-road C2020 westbound to reach proposed site entrance.

Option 2

- Loads depart from the Port of Entry (POE) and access the A53 via the A41 Rock Ferry Bypass;
- Loads leave the A53, traversing onto the A55 south-east bound at Hoole Village;
- Loads continue via A55 and exit at Wrexham Road Interchange, joining the A438 southbound;
- Loads follow the A438 for approximately 84.9km (52.7 miles), then join the A489 westbound, at Newtown bypass roundabout;

- Loads travel west via the A489 for approximately 8.2km (5.1 miles) before continuing onto the A470 westbound;
- Loads follow the A470 for approximately 12.3km (7.6 miles), and continue southwards along the A470, taking the first exit at the Llanidloes Roundabout;
- Loads continue via the A470 for approximately 7.9km (4.9miles) to the Llangurig Roundabout, taking the second exit onto the A44;
- Loads follow the A44 to Troedryallt, before turning right onto unclassified road to Hafren Forestry tracks.

6.9.3 Data sources to inform the EIA baseline characterisation

For the Transport Assessment, suitable baseline traffic data classified by vehicle type for the roads within the defined study area will be obtained from the Department of Transport (DfT) and the relevant LHA where available. Any data gaps in this information will be supplemented with specifically commissioned traffic surveys.

Traffic survey data from DfT Traffic Count database are to be utilised and considered in line with traffic estimate data provided by the Applicant for the construction phase. They are:

- 811824 (B4518)
- 536 (A470)
- 30542 (A470)
- 50521 (A44)
- 91060 (A489)
- 78477(A489)
- 91063 (A483)
- 99897 (A483)
- 94062 (A483)
- 74093 (A483)
- 20558 (A483)
- 50549 (A483)
- 99571 (A483)
- 26446 (A41)
- 6440 (A41)
- 76041 (A554)
- 70052 (A554)

The Trip End Model Presentation Program (TEMPro) would be used to forecast the growth in trip origin to destination traffic in order to assess the traffic impact of the development on the local highway network.

Furthermore, road traffic collision data for the most recent five-year period would be obtained from the Department for Transport (DfT). ESRI ArcGIS software would be used to interrogate and map the accident locations and severity within a defined radius of the site.

6.9.4 Surveys to inform the EIA baseline characterisation

A preliminary review of the DfT online traffic data portal suggests that historic traffic counts are available for most of the main roads in the area up towards the Proposed Development (a total of 27 DfT count points). Data for more local roads (such as the unclassified road and B4518) is less readily available, therefore depending on the chosen access routes and points, additional surveys may be required. This requirement would be refined through the project development and EIA Scoping dialogue. Open-source aerial imagery and mapping may also be required.

6.9.5 Baseline conditions

The nearest feasible Port of Entry has been identified as the Port of Birkenhead, Liverpool. Birkenhead Port is operated by Peel Ports with the benefit of extensive experience in the transportation of both onshore and offshore WTG (Wind Turbine Generator) componentry.

Routing of construction vehicles will utilise adopted highways ranging from high quality major motorways, cascading down to single carriageway roads nearer the Proposed Development site, as detailed in **Section 6.9.2**.

No information on land ownership / highways boundary is known at this stage but would be relevant based on the access location if alterations are required.

The land use surrounding the Site is generally agricultural fields and local highway network.

6.9.6 Additional (secondary and tertiary) mitigation

Where adverse traffic and transport effects are identified, mitigation will be proposed to reduce the effect of the Proposed Development. Mitigation may include the production of a draft Construction Traffic Management Plan (CTMP), as part of the ES chapter. The CTMP will include a framework for managing any cumulative impacts. The CTMP will also provide assurance to stakeholders that any impacts will be mitigated

6.9.7 Description of likely significant effects

Construction

Turbine components will be transported by sea to a defined Port of Entry from which components will be transported to the Proposed Development site using abnormal load vehicles via an agreed route.

General construction material will need to be transported to the Site in standard HGVs, leading to a temporary increase in traffic volumes on the surrounding road network. This will be dependent on the Proposed Development construction material quantities required and their source which is unknown at this stage, and this will be factored in as a consideration for the construction programme. Additionally, a small number of trips will also be generated by personnel travelling to and from the Proposed Development Site.

Operation

Apart from occasional maintenance visits to service the Proposed Development, the operational phase is not considered to introduce a significant increase in traffic. It is therefore considered that no significant effects will arise during the operational phase and that the operational phase is to be scoped out of further assessment.

Decommissioning

Once the construction is complete and the Proposed Development reaches the end of its operational lifecycle, the anticipated traffic required to decommission the development would be significantly lower than those required in the construction and operational phases. Thus the decommissioning phase will have a significantly lower impact on the local road network and accordingly, is to be scoped out of further assessment.

6.9.8 Receptors/elements to be scoped into the assessment

The following receptors/elements are proposed to be scoped into the assessment.

Receptor/Element	Phase	Justification
A-Road A554	Construction	During the construction phase, traffic will be generated by a range of activities including: • Construction workers arriving and leaving Site areas; • Supply of construction materials and plant associated with the Site establishment and main construction works; • Movement of plant; • Removal of soil resources, spoil or waste; and • Service vehicles and visitors. Construction traffic estimates are as yet unknown but a large amount of fill material may require to be imported to construct the internal track network and the HGV traffic movements associated with this, and as such this phase of works has been scoped in to enable consideration of impacts on receptors within the study area against the Guidelines for the Environmental Assessment of Traffic and Movement (Institute of Environmental Assessment, 2023).
A-Road A41	Construction	
M53	Construction	
A-Road A55	Construction	
A-Road A483	Construction	
A-Road A5	Construction	
A-Road A483	Construction	
A-Road A489	Construction	
A-Road A470	Construction	
B-Road B4518	Construction	
A-Road A44	Construction	

6.9.9 Receptors/elements to be scoped out of the assessment

The following receptors/elements are proposed to be scoped out of the assessment.

Receptor/Element	Phase	Justification
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All roads referenced in Section 6.9.8	Operation	Once operational, the impact on the local road network will be minimal. Access will be required from occasionally for routine maintenance of infrastructure, and less frequently for major maintenance and upgrades. Therefore, it is not expected that the changes in traffic on the existing network will change by more than 10% for HGVs or 30% for all vehicle movements, these being defining thresholds for environmental effects on the local transport network.
All roads referenced in Section 6.9.8	Decommissioning	The levels of traffic associated with decommissioning are anticipated to be lower than those required during the construction phase, therefore will have a reduce impact compared to that assessed for construction phase. It is therefore proposed to scope out the assessment of the Proposed Development's decommissioning impacts as part of the EIA.
6.9.10 Opportunities for enhancing the environment		
No opportunities for enhancement in relation to the temporary traffic and transport effects on receptors associated with external highway network have been identified at this stage. The Proposed Development may present the opportunity for on-site improvement or expansion of networks for walking, cycling and horse riding.		
6.9.11 Proposed assessment methodology		
Assessment of the traffic and transport environmental impacts and their significance will be based on the Guidelines for the Environmental Assessment of Traffic and Movement (Institute of Environmental Assessment, 2023). This guidance provides two broad rules to be used as a screening process to identify the appropriate extent of the assessment area and likelihood of impacts. These are: • Rule 1 – 'Include highway links where traffic flows would increase by more than 30% (or the number of HGVs would increase by more than 30%); and • Rule 2 – 'Include any other specifically sensitive areas where traffic flows would increase by 10% or more.' Where the predicted increase in traffic flow is lower than the thresholds, the Guidelines suggest the significance of the effects can be stated to be low or insignificant and further detailed assessments are not warranted.		

Given that the day-to-day variation of traffic on a road is frequently at least plus or minus 10%, the Guidelines consider that projected changes in traffic flows of less than 10% create no discernible environmental impact, hence the second threshold as set out in Rule 2.

The specific traffic and movement related impacts that may be assessed are namely:

- Severance of communities;
- Road vehicle driver and passenger delay;
- Non-motorised user delay;
- Non-motorised user amenity;
- Fear and intimidation on and by road users;
- Road user and pedestrian safety; and
- Hazardous / large loads.

The traffic and transport assessment will also be based on LA104 Environmental assessment and monitoring, from the Design Manual for Roads and Bridges (DMRB) (2020) which sets out a framework for EIA. The significance of likely effects is determined by considering the sensitivity of receptors to change, taking account of the specific issues relating to the Study Area, and then the magnitude of that change.

The determining factors that need to be taken into account when assessing the impact of traffic and movement vary for each type of impact.

Having quantified the magnitude of the impact (i.e., the level of change), there are various ways of interpreting whether or not the resulting outcome is considered significant. There is no definition of a 'significant effect' in the EIA Regulations. Furthermore, for many effects, there are no simple rules that define appropriate assessment thresholds and therefore there is a need for interpretation and professional judgement. The ES will record judgements about the likely significance of effects arising from the Proposed Development based on professional judgement and experience of other similar developments.

A cumulative assessment of traffic, transport and access effects will also be undertaken, considering any developments (approved, consented but not yet under construction, submitted but pending decision or at appeal) that may be under construction concurrently with the Proposed Development and therefore provide the potential for significant cumulative construction effects

For specific criteria relating to the assignment of significance to the various traffic and transport impacts that may occur as a result of the Proposed Development, please refer to the updated IEMA Guidelines (2023) for the Environmental Assessment of Traffic and Movement.

6.9.12 Difficulties and uncertainties

To ensure transparency within the EIA process, the following difficulties and uncertainties have been identified:

- This EIA Scoping Report has been prepared on the basis of the current design of the Proposed Development, as outlined within **Chapter 2**;
- The overview of baseline conditions is based on desk-based studies only at scoping stage and on data available at the time of writing;
- The cumulative assessment will be based on the availability of information on cumulative schemes;
- The construction assessment will assume the use of standard construction techniques commensurate for the type of works being undertaken. The final techniques, plant

selection and programme are expected to be determined by the appointed contractor, in consultation with relevant authorities prior to commencement of construction; and

- Traffic estimates for any stage of the Proposed Development are not confirmed at this time and may be subject to change but will be confirmed prior to assessment in the ES.

6.9.13 References

Guidelines for the Environmental Assessment of Traffic and Movement (GEART)' (Institute of Environmental Assessment (2023)

LA104, Environmental assessment and monitoring, Design Manual for Roads and Bridges (DMRB) (Standards for Highways, 2020)

6.9.14 Scoping questions

- Do you agree with the proposed list of consultees?
- Do you agree with the proposed study areas?
- Do you agree that the data sources listed to inform the EIA baseline characterisation are appropriate?
- Are any receptors/assets/resources not identified that you would like to see included in the EIA?
- Do you agree with the proposed additional (secondary and tertiary) mitigation measures and is this mitigation appropriate?
- Do you agree with the receptors/elements that are proposed to be scoped in and out of the EIA?
- Do you agree with the proposed factor-specific assessment approach?

7 CUMULATIVE EFFECTS

7.1 Introduction and Approach

- 7.1.1 Paragraph (5)(e) of Schedule 4 of the EIA Regulations 2017 states that the Environmental Statement should include “*a description of the likely significant effects of the development on the environment resulting from... the cumulation of effects with other existing and / or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*”.
- 7.1.2 Regulation 4(2) states that the EIA must identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the Proposed Development on the following factors: population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and the landscape. Regulation 4(2)(e) refers to the need to assess the interaction between those factors.
- 7.1.3 There is no widely accepted methodology or best practice for assessing cumulative effects, although various guidance documents exist. However, relevant guidance has been considered, including from the Institute of Environmental Management and Assessment (IEMA). The proposed assessment methodology also reflects that set out in the Planning Inspectorate’s Advice Note Seventeen: Cumulative Effects Assessment which; although is written for projects in England is used in this context as best practice guidance to aid in assessing cumulative effects.
- 7.1.4 The following approach will be adopted for the assessment of cumulative effects, based on previous experience, the types of receptors being assessed, the nature of the Proposed Development, the other developments under consideration and the information available to inform the assessment.
- 7.1.5 The following types of cumulative effects will be considered in accordance with the EIA Regulations 2017 and best practice guidance:
- Intra-project combined effects – the interaction and combination of different environmental residual (post-additional mitigation) effects from within the Proposed Development affecting a receptor; and
 - Inter-project cumulative effects – the combined residual (post-mitigation) effects of the Proposed Development and other projects on a single receptor / resource, considering the deviation from the baseline conditions at common sensitive receptors / resources as a result of changes brought about as a result of the Proposed Development in combination with one or more other approved (committed) developments.

Intra-project combined effects

- 7.1.6 The approach to the assessment of interactions of environmental effects will consider the changes in baseline conditions at common sensitive receptors (i.e. those receptors that have been identified as experiencing likely significant effects by more than one environmental factor) due to the Proposed Development.
- 7.1.7 The assessment will be based upon residual (post-additional mitigation) effects of 'slight / minor' or greater significance only. The study area for the assessment will be informed by the study areas for the individual factor assessments.
- 7.1.8 The assessment of the intra-project combined effects will be undertaken using a two-stage approach:

Stage 1 - Screening

- 7.1.9 Screening will be undertaken to determine whether a sensitive receptor is exposed to more than one type of residual (post-additional mitigation) effect during the construction, operational and / or decommissioning (where considered appropriate) phases of the Proposed Development. Those common sensitive receptors exposed to two or more types of residual (post-additional mitigation) effects, with significance of 'slight / minor' or greater, will be taken forward to Stage 2 of the assessment.
- 7.1.10 If there is only one type of effect on a sensitive receptor (i.e. only one technical chapter has identified effects on that sensitive receptor), then it will be considered that there are no potential intra-project combined effects and the sensitive receptor will not be taken forward to Stage 2 of the assessment.

Stage 2 – Assessment of intra-project combined effects

- 7.1.11 A quantitative assessment of the overall significance of the cumulative effects on common sensitive receptors identified at Stage 1 will be undertaken based on technical information provided in the technical chapters and supporting appendices as well as professional judgement. Given that the types of effects may be very different in some cases, a quantitative assessment may not be possible, and it may be necessary to apply professional judgement in determining the significance of each individual effect.
- 7.1.12 The evaluation at the receptor level will consider: the magnitude of change at the common receptor; previously identified sensitivity; duration and reversibility of interaction. The focus will be on determining a change in the level of effect likely to be experienced and whether this is significant or not.

Inter-project cumulative effects

- 7.1.13 The approach to the assessment of inter-project effects will consider the deviation from the baseline conditions at common sensitive receptors as a result of changes brought about as a result of the Proposed Development in combination with one or more other approved (committed) developments.

- 7.1.14 The assessment of the inter-project effects will be based upon the residual (post-additional mitigation) effects that have been identified in the various factor assessments for the Proposed Development, as well as available environmental information for the approved (committed) developments.
- 7.1.15 In accordance with Advice Note Seventeen, two clear stages will be taken in identifying the list of approved (committed) developments which will be included within the inter-project cumulative effects assessment:
- **Stage 1:** Establish a long list of approved (committed) developments based on appropriate spatial and temporal limits.
 - **Stage 2:** Apply a clear rationale to establish a short list of approved (committed) developments which, in combination with the Proposed Development, have the potential to result in a significant cumulative effect for inclusion within the assessment.

Stage 1: Long list methodology

- 7.1.16 The following criteria will be used to establish the 'long list' of approved (committed) developments, as at the time of submitting the planning application for the Proposed Development:
- Schemes that are under construction but that will not be completed prior to the Proposed Development commencing (*N.B. consideration will be afforded on a case by case basis to whether schemes that are under construction form part of the existing baseline or not, to avoid double counting*);
 - Schemes with planning permission within the last five years¹⁰, but not yet implemented;
 - Submitted applications but not yet determined;
 - Refusals subject to appeal procedures not yet determined; and
 - EIA development not yet submitted but subject of EIA scoping request.
- 7.1.17 Development projects that are at EIA screening stage at the time of submitting the planning application for the Proposed Development will not be considered, as they are not considered 'approved'.
- 7.1.18 Where an approved (committed) development meets one of the criteria presented in paragraph 7.1.16, it will be taken forward for further consideration against the following spatial (and where appropriate, scale) limits in order to develop a refined list of approved (committed) development:
- NSIP or DNS developments¹¹: Must lie within the Zone of Influence (Zol) of the Proposed Development.

¹⁰ A five-year period is considered a reasonable time period to capture all approved developments that still have the potential to be built. Developments with planning permission older than five years will likely have been built or will not likely be built at all.

¹¹ As defined by the Planning Act 2008 (as amended) and the Planning (Wales) Act 2015 and the Developments of National Significance (Wales) Regulations 2016 (as amended).

- Onshore wind developments (not classed as a DNS) (where the wind turbines are greater than 50m to tip height and more than one wind turbine proposed): Must lie within the 20km of the Proposed Development.
- Other energy infrastructure developments must lie within 10km of the Proposed Development.
- Employment developments: Must lie within 10km of the Proposed Development.
- Residential developments: Must comprise 10+ dwellings and lie within 10km of the Proposed Development.
- Minerals and waste applications: Must lie within 10km of the Proposed Development.
- Transport infrastructure developments¹²: Must lie within 10km of the Proposed Development.

7.1.19 The Zol is defined here as the study area for each environmental factor considered in the EIA for the Proposed Development. The environmental factor-specific study areas, and appropriate justifications for these study areas, will be provided in the Environmental Statement. The search area for forming the long list of approved (committed) developments will be based on the greatest Zol in terms of distance.

7.1.20 A planning application search will be conducted to identify approved (committed) developments using relevant planning portals. However, it is recognised that Powys County Council as the local planning authority may be aware of additional proposals not yet fully in the public domain and hence comment is sought on any further developments that should, in the authority's opinion, be included in the cumulative effects assessment process.

7.1.21 Only if the approved (committed) developments meet the Stage 1 criteria will they then been taken forward to Stage 2.

Stage 2: Short list methodology

7.1.22 Following the formation of the long list, the eligible approved (committed) developments identified require further assessment (Stage 2) to establish a short list of approved (committed) developments which, in combination with the Proposed Development, have the potential to result in significant cumulative effects.

7.1.23 The criteria used to determine whether to include or exclude an approved (committed) development on the short list will reflect the process established by Advice Note Seventeen and have regard to relevant policy and guidance documents and consultation with the appropriate statutory consultation bodies (particularly the local planning authority).

¹² Trunk roads only, as smaller transport infrastructure proposals would not likely have a significant cumulative effect.

7.1.24 Advice Note Seventeen states that the criteria should address the following:

- **“Temporal scope:** *The applicant may wish to consider the relative construction, operation and decommissioning programmes of the ‘other existing development and / or approved development’ identified in the ZOI together with the [project] programme, to establish whether there is overlap and any potential for interaction.*
- **Scale and nature of development:** *The applicant may wish to consider whether the scale and nature of the ‘other existing development and / or approved development’ identified in the ZOI are likely to interact with the proposed [project]. Statutory definitions of major development and EIA screening thresholds may be of assistance when considering issues of scale.*
- **Other factors:** *The applicant should consider whether there are any other factors, such as the nature and / or capacity of the receiving environment that would make a significant cumulative effect with ‘other existing development and / or approved development’ more or less likely and may consider utilising a source-pathway-receptor approach to inform the assessment.*
- **Documentation:** *The CEA shortlisting process may be documented using Matrix 1 (Appendix 1). The reasons for excluding any development from further consideration should be clearly recorded. This will provide decision makers, consultation bodies and members of the public with a clear record of ‘other existing development and / or approved development’ considered and the applicant’s decision making process with respect to the need for further assessment.”*

7.1.25 Advice Note Seventeen suggests that professional judgement may also be used to supplement the threshold criteria and in order to avoid excluding ‘other existing development and / or approved development’ that is:

- *“Below the threshold criteria limits but has characteristics likely to give rise to a significant effect; or*
- *Below the threshold criteria limits but could give rise to a cumulative effect by virtue of its proximity to the proposed [project].”*

7.1.26 Taking the above into consideration, the approved (committed) developments on the long list will be reviewed against the following criteria to form the short list of approved (committed) developments, as at the time of submitting the planning application for the Proposed Development:

- **Criteria 1:** The approved (committed) development has a construction, operational and / or demolition phase that is concurrent with the Proposed Development.
- **Criteria 2:** The approved (committed) development and the Proposed Development share common sensitive receptors / resources which are assessed and described in the supporting environmental documentation, and have the potential to be significantly affected by the combination of the approved (committed) development and the Proposed Development.

- **Criteria 3:** The approved (committed) development has sufficient environmental assessment information freely and publicly available to inform the inter-project cumulative effects assessment. The assessment of each approved (committed) development on the short list will be proportionate to the environmental assessment information available (N.B: An attempt will not be made to assess the potential environmental effects of any other development to inform the inter-project cumulative effects assessment. If there is an approved (committed) development that it is known will be progressed but has insufficient environmental assessment information, it still may be prudent to consider it in the inter-project cumulative effects assessment. This might take the form of listing the project and why it hasn't been considered in detail, or the potential cumulative effect could be discussed at a high level (qualitatively) using professional judgement).

7.1.27 Where an approved development meets all of the above criteria, it will be taken forward for further consideration in the assessment.

7.2 Determining significant cumulative effects

7.2.1 There is no formal guidance on the criteria for determining significance of cumulative effects. The following principles will be considered when assessing the significance of cumulative effects in relation to both intra-project and inter-project cumulative effects:

- Is there an intra-project and / or inter-project effect on any receptors / resources;
- The nature of the receptors / resources affected;
- How the impacts identified combine to affect the condition of the receptor / resource;
- The probabilities of the impacts occurring in relation to each other in such a way so as to produce a cumulative effect, considering the extent and duration of the impact change;
- The ability of the receptor / resource to absorb further impacts; and
- Is the level of effect different to that considered at the project level and is the in-combination effect significant or not.

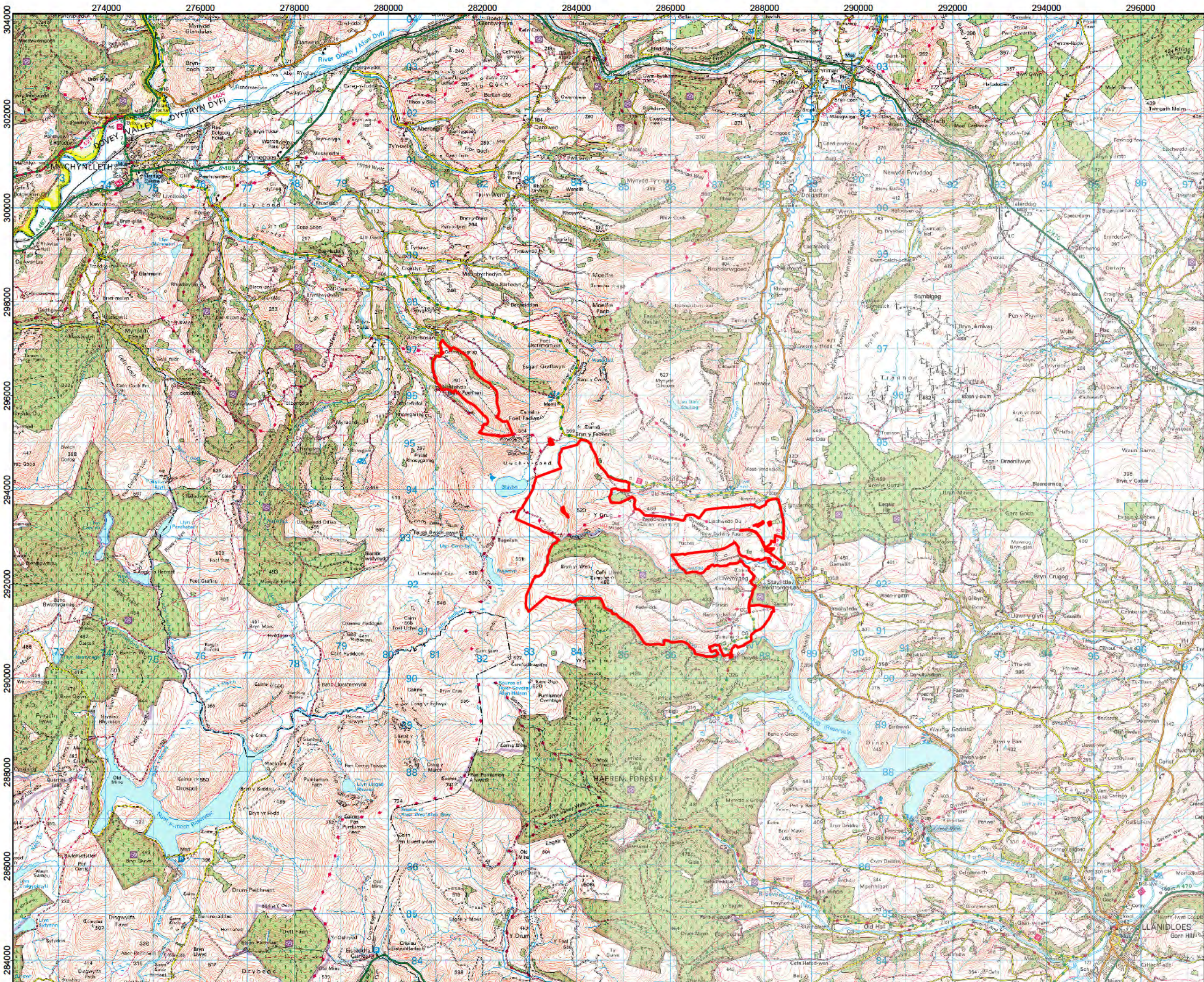
7.3 Difficulties and uncertainties

7.3.1 The assessment of inter-project cumulative effects will be limited to publicly available information obtained from the relevant planning applications on the Powys County Council planning portal. For some of the identified approved developments, relevant information for this assessment may not be available. Where this is the case, the inter-project cumulative effects assessment will be based upon assumptions and professional judgement, and some statements made would rely on the review of mitigation measures proposed as part of the approved (committed) developments rather than the Proposed Development.

7.4 References

- Institute of Environmental Management and Assessment (IEMA). (2011). Special Report on 'The State of Environmental Impact Assessment in the UK'. Available at: <https://s3.eu-west-2.amazonaws.com/iema.net/documents/knowledge/policy/impact-assessment/2011-State-of-EIA-IEMA.pdf>
- Planning Inspectorate. (August 2019). Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects. Available at : <https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/>

APPENDIX A – SITE BOUNDARY PLAN



Legend:

Site Boundary

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Rev	Date	Description	Drm	Chk	App
00	16/11/2023	First Draft	NH	MM	DP

Esgrair Galed Energy Park

RSK

TITLE:

Appendix A:
Site Boundary Plan

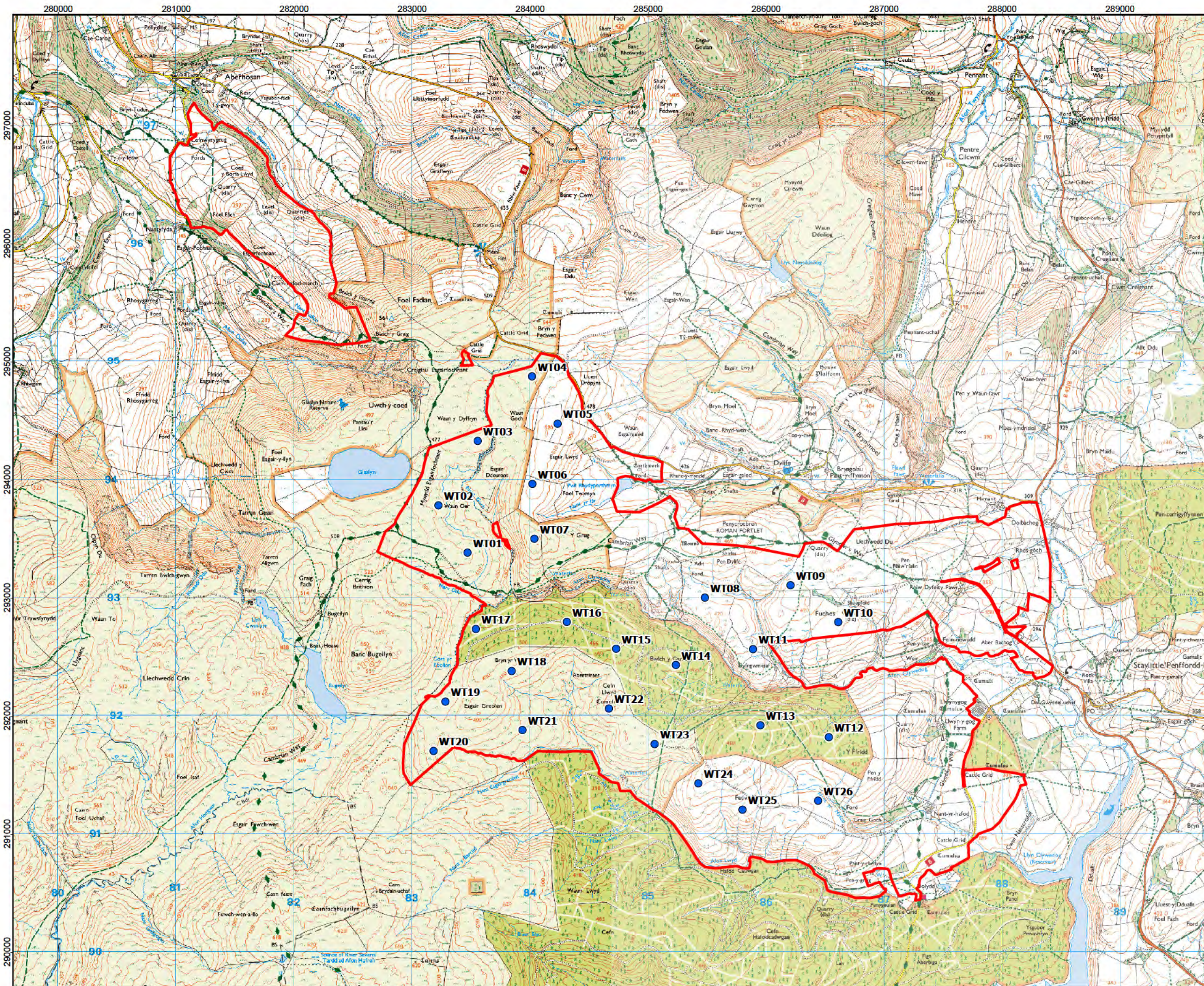
ID:P063933_Scoping_AppA Site Boundary Plan

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Metres

Scale: 1:75,000 @ A3

REV 00

APPENDIX B – INDICATIVE PROPOSED DEVELOPMENT LAYOUT



Legend:

- Site Boundary
- Proposed Turbine Location

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Rev	Date	Description	Drn	Chk	App
00	16/11/2023	First Draft	NH	MM	DP

Esgair Galed Energy Park

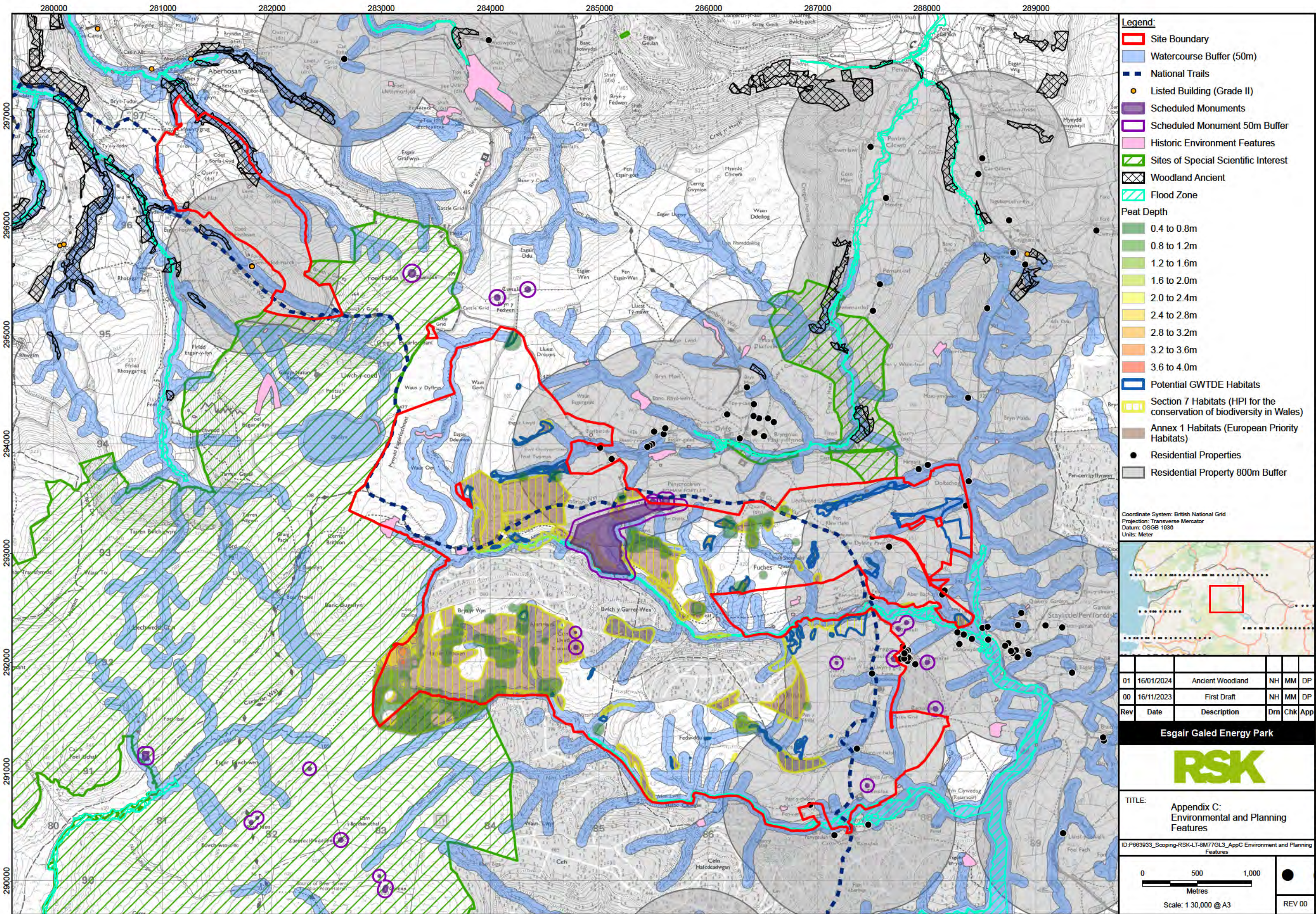
TITLE: Appendix B:
Indicative Proposed
Development Layout

ID:P663933_Scoping_AppB Proposed Development Layout

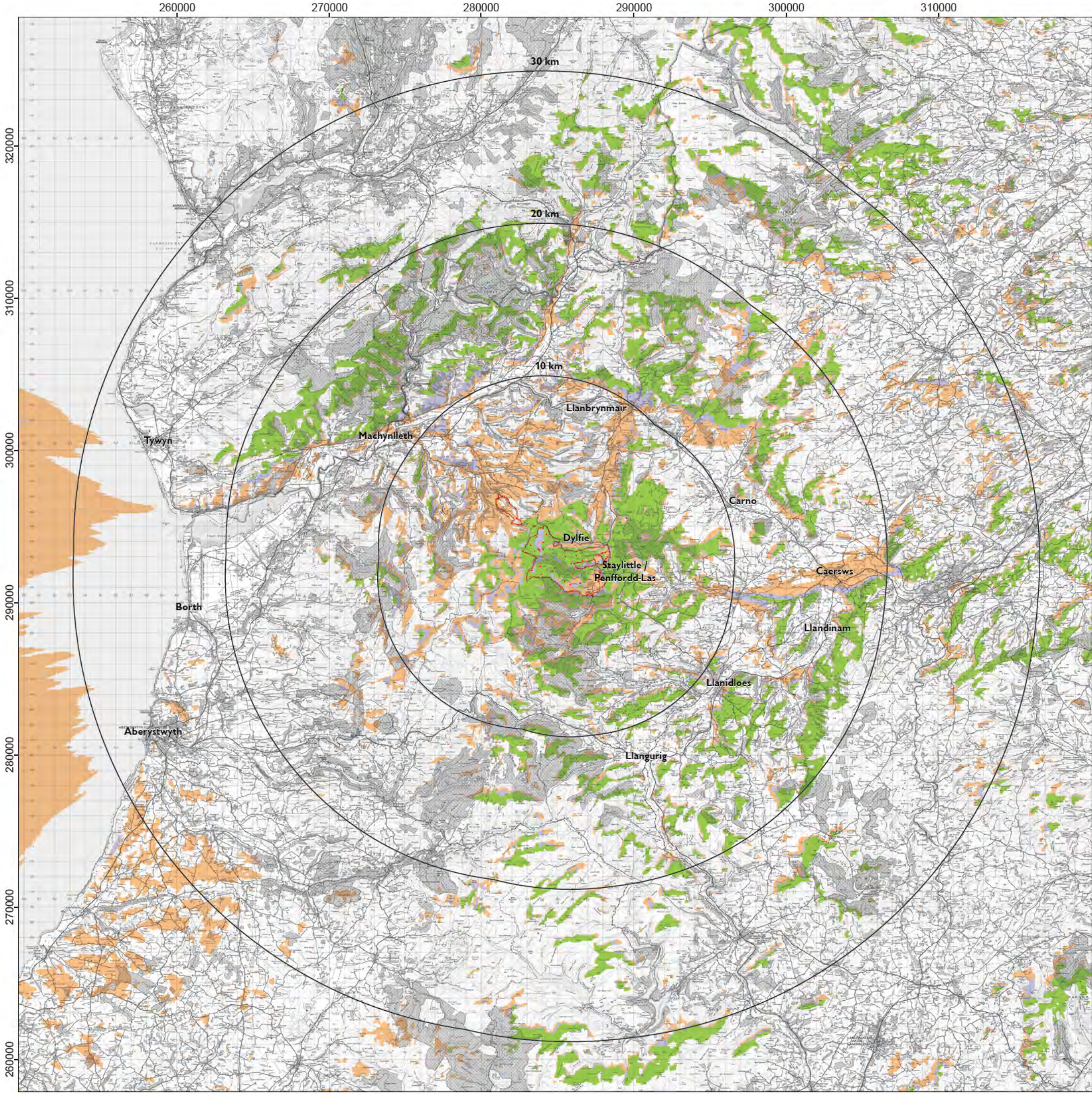
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APPENDIX C - ENVIRONMENTAL AND PLANNING FEATURES



APPENDIX D – LANDSCAPE AND VISUAL FIGURES



Project:

Esgair Galed Energy Park,
Powys

Title:

Figure 6.2.1: Zone of Theoretical Visibility (ZTV)
Maximum Blade Tip Height

Key

Site Boundary

Turbine Locations

Study Area, Distance Set from Outermost Turbines

20 - 26 Turbines Theoretically Visible at Blade Tip Height

14 - 19 Turbines Theoretically Visible at Blade Tip Height

7 - 13 Turbines Theoretically Visible at Blade Tip Height

1 - 6 Turbines Theoretically Visible at Blade Tip Height

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Scale @ A3

Coordinate System: British National Grid

01020 km

Date: November 2023

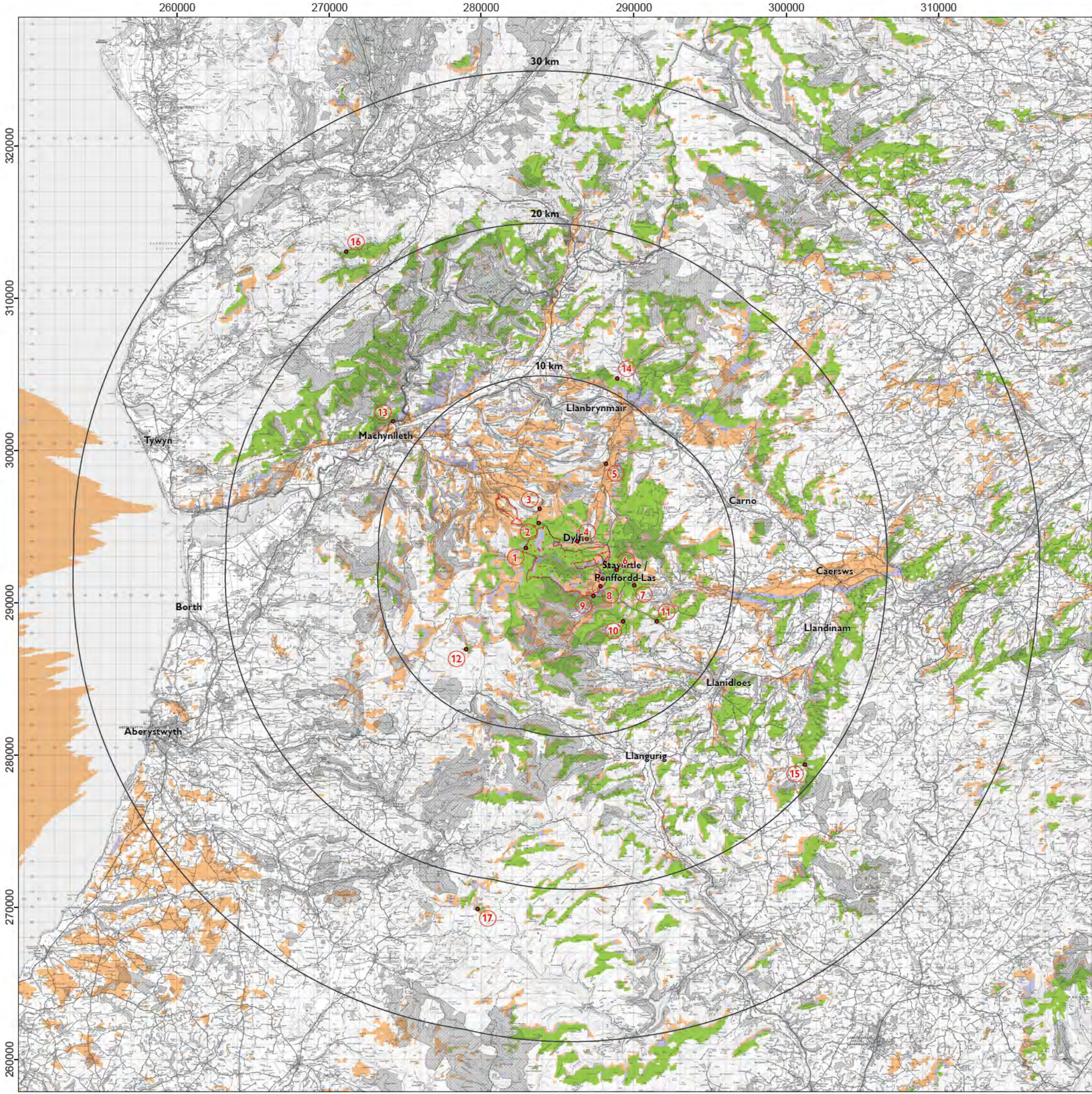
Prepared by: SM

Checked by: RC

Ref: 2387501_SBC_Figure-6.2.1

Drawing by:

Soltys Brewster Consulting
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Stanwell Road
Penarth
Vale of Glamorgan
CF64 2AA



Project:
**Esgair Galed Energy Park,
Powys**

Title:
Figure 6.2.2: Viewpoint Locations

Key

Site Boundary

Turbine Locations

Study Area, Distance Set from Outermost Turbines

Viewpoint Location

Name	Easting	Northing
1 Waun Linau / Cambrian Way & Glyndŵr's Way, South of Glaslyn	282884	293597
2 Minor road, Waun Esgairgaled	283725	295233
3 Minor road near Foel Fadian	283788	296166
4 Dylfie	286260	294050
5 Minor road, near Pennant	288157	299126
6 Staylittle / Penffordd-Las	288847	292172
7 Minor road, north of Llyn Clywedog	290001	291154
8 Scenic route to Llyn Clywedog	287775	291089
9 Hafren Forst Hideaway	287307	290458
10 Llyn Clywedog	289274	288783
11 Parking Area, overlooking Llyn Clywedog	291478	288761
12 Pen Pumulumon Fawr	278970	286946
13 Machynlleth	274146	301904
14 Glyndŵr's Way, North of Llanbrynmair	288882	304726
15 Glyndŵr's Way, lower slopes of Crugyn Llwyd	301213	279408
16 Cadair Idris	271104	313029
17 Teifi Pools, Waun Linau / Cambrian Way	279732	269908

20 - 26 Turbines Theoretically Visible at Blade Tip Height

14 - 19 Turbines Theoretically Visible at Blade Tip Height

7 - 13 Turbines Theoretically Visible at Blade Tip Height

1 - 6 Turbines Theoretically Visible at Blade Tip Height

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Scale @ A3

Coordinate System: British National Grid

01020 km

Date: November 2023

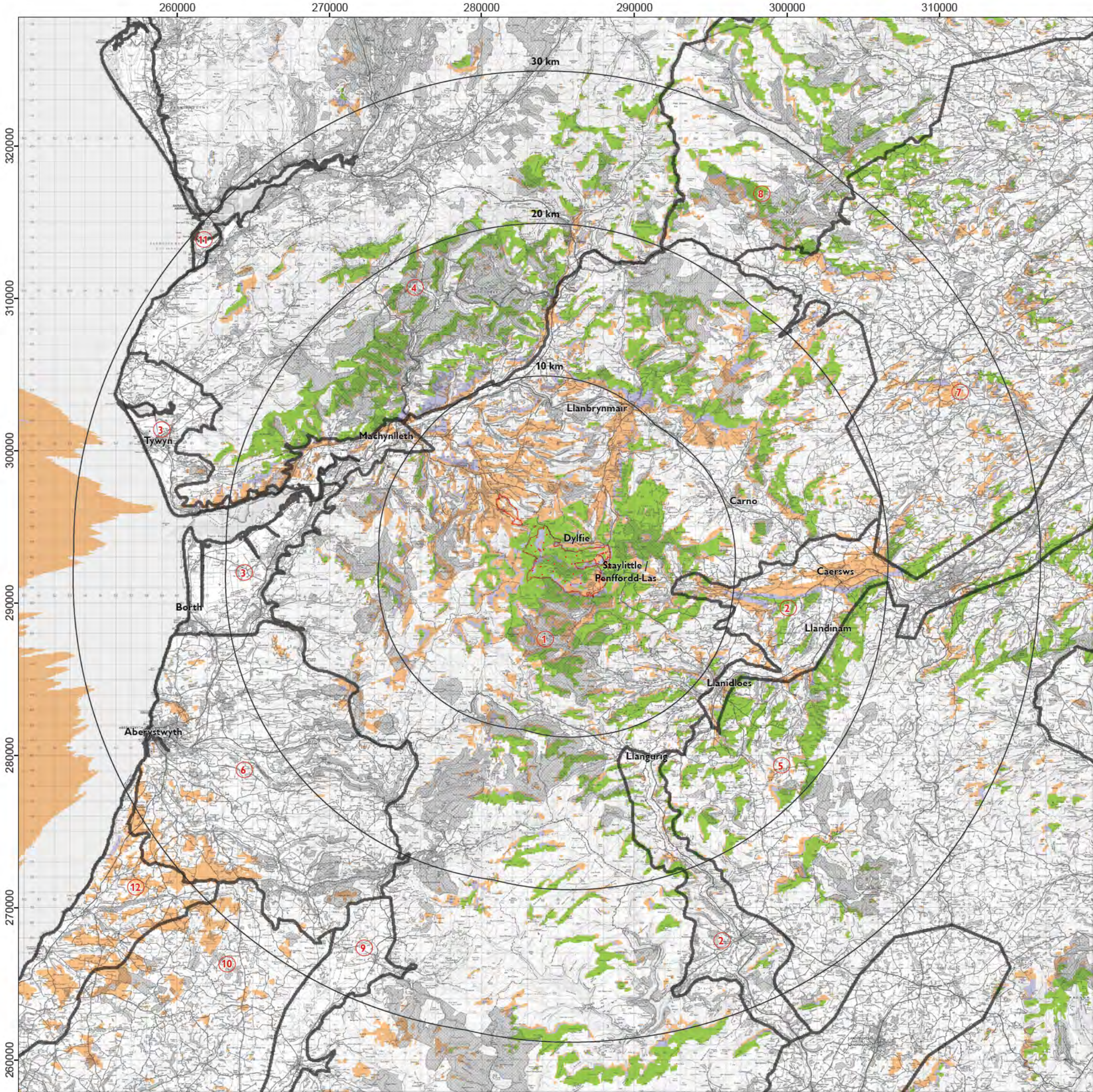
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Project:

Esgair Galed Energy Park,
Powys

Title:

Figure 6.2.3: National Landscape Character Areas

Key

Site Boundary

Turbine Locations

Study Area, Distance Set from Outermost Turbines

National Landscape Character Area

1

Bryniau'r Canolbarth / Cambrian Mountains

2

Dyffryn Hafren / Severn Valley

3

Glannau Aberdyfi / Aberdovey Coast

4

Eryri / Snowdonia

5

Bryniau Sir Faesyfed / Radnorshire Hills

6

Bryniau a dyffrynnoedd Rheidol ac Ystwyth / Rheidol and Ystwyth Hills and Valleys

7

Bryniau a Dyffrynnoedd Trefaldwyn / Montgomeryshire Hills and Vales

8

Y Berwyn / Berwyn

9

Dyffryn Tefi / Teifi Valley

10

Bro Ceredigion / Ceredigion

11

Bae Tremadog / Tremadoc Bay

12

Arfordir Ceredigion / Ceredigion Coast

20 - 26 Turbines Theoretically Visible at Blade Tip Height

14 - 19 Turbines Theoretically Visible at Blade Tip Height

7 - 13 Turbines Theoretically Visible at Blade Tip Height

1 - 6 Turbines Theoretically Visible at Blade Tip Height

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Scale @ A3

Coordinate System: British National Grid

0

10

20 km

N

Date: November 2023

Prepared by: SM

Checked by: RC

Ref: 2387501_SBC_Figure-6.2.3

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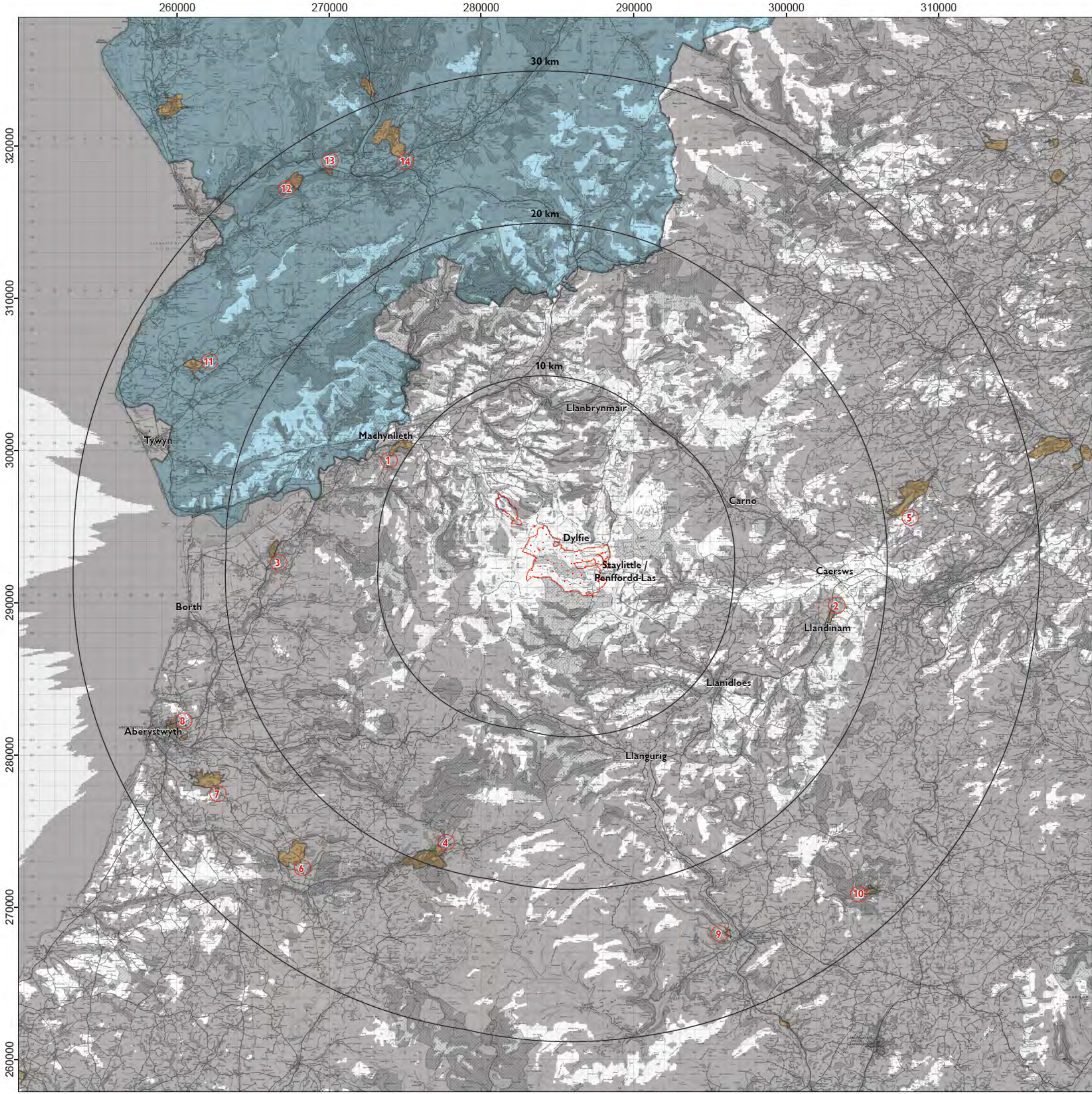
Penarth

Vale of Glamorgan

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soltysbrewster

Bute Energy



Project:
**Esgair Galed Energy Park,
Powys**

Title:
Figure 6.2.4: Statutory Landscape Designations

Key

Site Boundary

Turbine Locations

Study Area, Distance Set from Outermost Turbines

ZTV Shadow, No Theoretical Visibility

National Parks
Eryri / Snowdonia

Registered Parks and Gardens of Special Historic Interest

1

Plas Machynlleth, Machynlleth and Cadfarch

2

Plas Dinam, Llandinam

3

Lodge Park, Llangynfelyn

4

Hafod, Ysbyty Ystwyth, Pontarfynach

5

Gregynog, Tregynon

6

Trawsgoed, Trawsgoed

7

Nanteos, Llanfarian

8

University of Wales, Aberystwyth: Plas Penglais, Aberystwyth

9

The Dderw, Rhayader

10

The Hall, Abbey Cwmhir

11

Peniarth, Brynchrug

12

Abergwynant, Arthog

13

Penmaenuchaf, Ar hog

14

Nannau, Gwynedd

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Scale @ A3

Coordinate System: British National Grid

0

10

20 km

Date: November 2023

Prepared by: SM

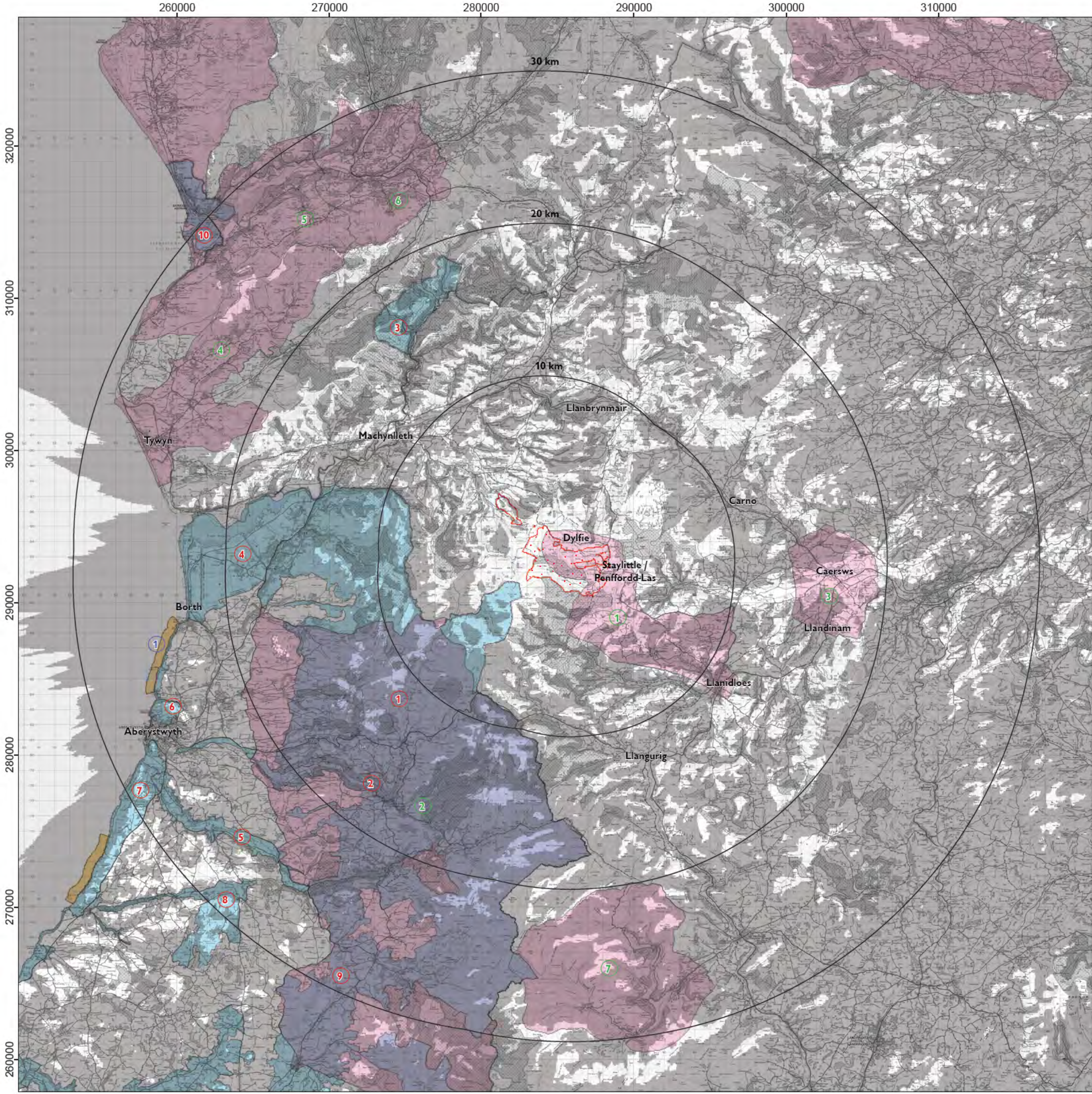
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Ref: 2387501_SBC_Figure-6.2.4

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**Bute
Energy**



Project:
**Esgair Galed Energy Park,
Powys**

Title:
Figure 6.2.5: Non-Statutory Landscape Designations

Key
 Site Boundary
 Turbine Locations
 Study Area, Distance Set from Outermost Turbines
 ZTV Shadow, No Theoretical Visibility
 Special Landscape Areas (SLAs)

1

South Ceredigion Uplands, Ceredigion

2

Rheidol Valley, Ceredigion

3

Corris, Gwynedd & Ynys Mor

4

Dyfi Estuary and Valley, Ceredigion

5

Ystwy h Valley, Ceredigion

6

Ceredigion Coast - Aberystwyth-Borth, Ceredigion

7

Ceredigion Coast - Llanrhystud o Aberswyth, Ceredigion

8

Afon Wyre, Ceredigion

9

Teifi Valley, Ceredigion

10

Barmouth, Gwynedd & Ynys Mor

Heritage Coasts

1

Ceredigion Coast

Landscapes of Outstanding / Special Historic Interest in Wales

1

Clywedog Valley - Special

2

Upland Ceredigion - Outstanding

3

Caersws Basin - Special

4

Dysynni Valley - Special

5

Mawddach - Outstanding

6

Vale of Dolgellau - Outstanding

7

Elan Valley - Special

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Scale @ A3
Coordinate System: British National Grid

01020 km

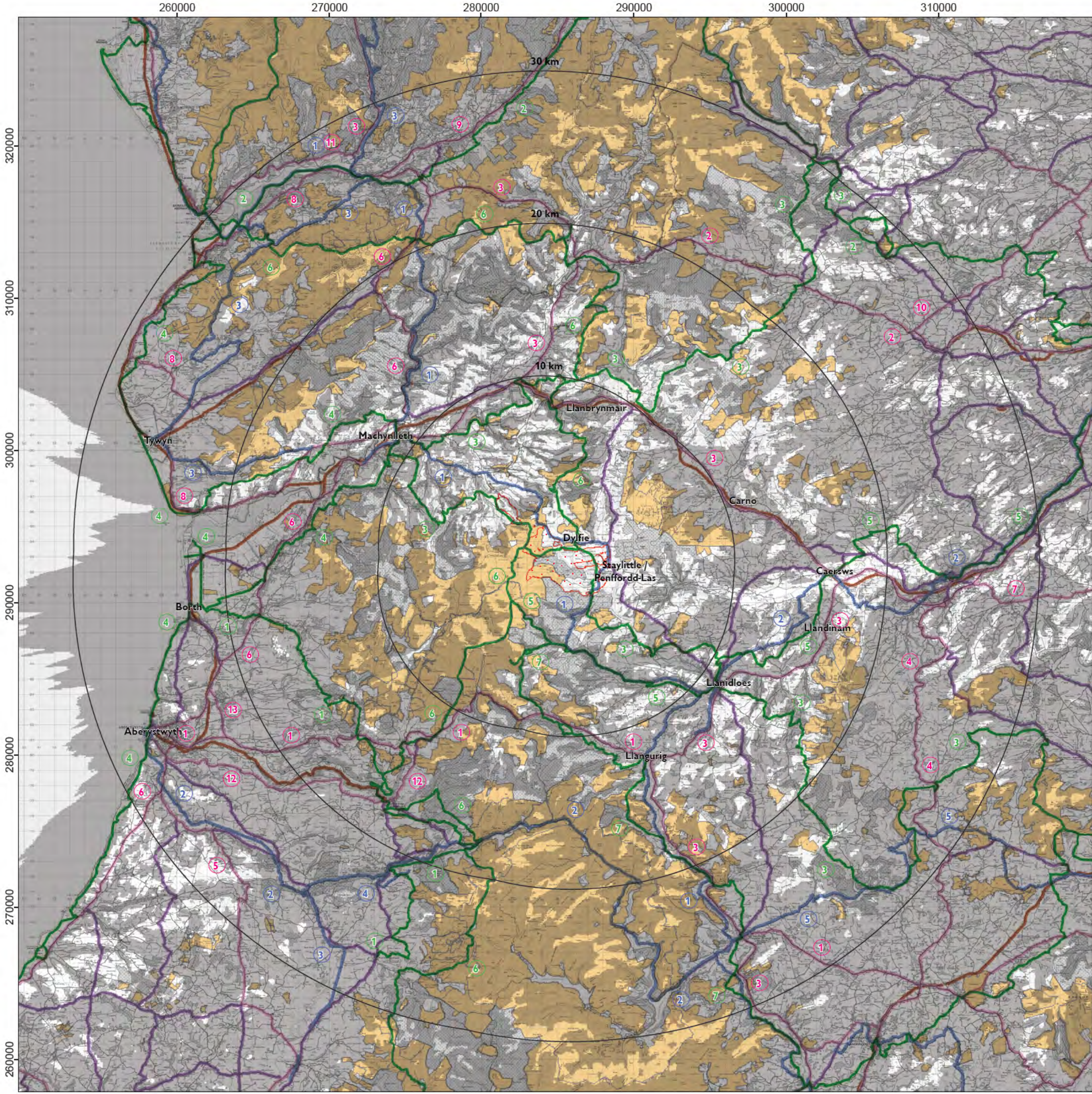
Date: November 2023

Prepared by: SM

Checked by: RC

Ref: 2387501_SBC_Figure-6.2.5

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Project:
**Esgair Galed Energy Park,
Powys**

Title:
Figure 6.2.6: Transport, Movement and Access

Key

- Site Boundary
- Turbine Locations
- Study Area, Distance Set from Outermost Turbines
- ZTV Shadow, No Theoretical Visibility
- CRoW Act Open Access Land
- Long Distance Trails
 - 1 Borth to Devil's Bridge to Pontrhydfendigaid Trail
 - 2 Cross Britain Way
 - 3 Glyndŵr's Way
 - 4 Llwybr Arfordir Cymru / Wales Coast Path
 - 5 Severn Way
 - 6 Waun Linau / Cambrian Way
 - 7 Wye Valley Walk
- National Cycle Network Routes (NCR)
 - 1 NCR 8 - Lôn Las Cymru, between Cardiff and Hollyhead
 - 2 NCR 81 - in sections between Aberystwyth and Wolverhampton
 - 3 NCR 82 - in sections between Bangor and Fishguard
 - 4 NCR 820 - proposed route connecting NCR 81 & NCR 82
 - 5 NCR 825 - makes up most of the Radnor Ring
- Primary Roads / A Roads
 - 1 A44
 - 2 A458
 - 3 A470
 - 4 A483
 - 5 A485
 - 6 A487
 - 7 A489
 - 8 A493
 - 9 A494
 - 10 A495
 - 11 A496
 - 12 A4120
 - 13 A4159
- Secondary Roads / B Roads
- Rail

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Scale @ A3

Coordinate System: British National Grid



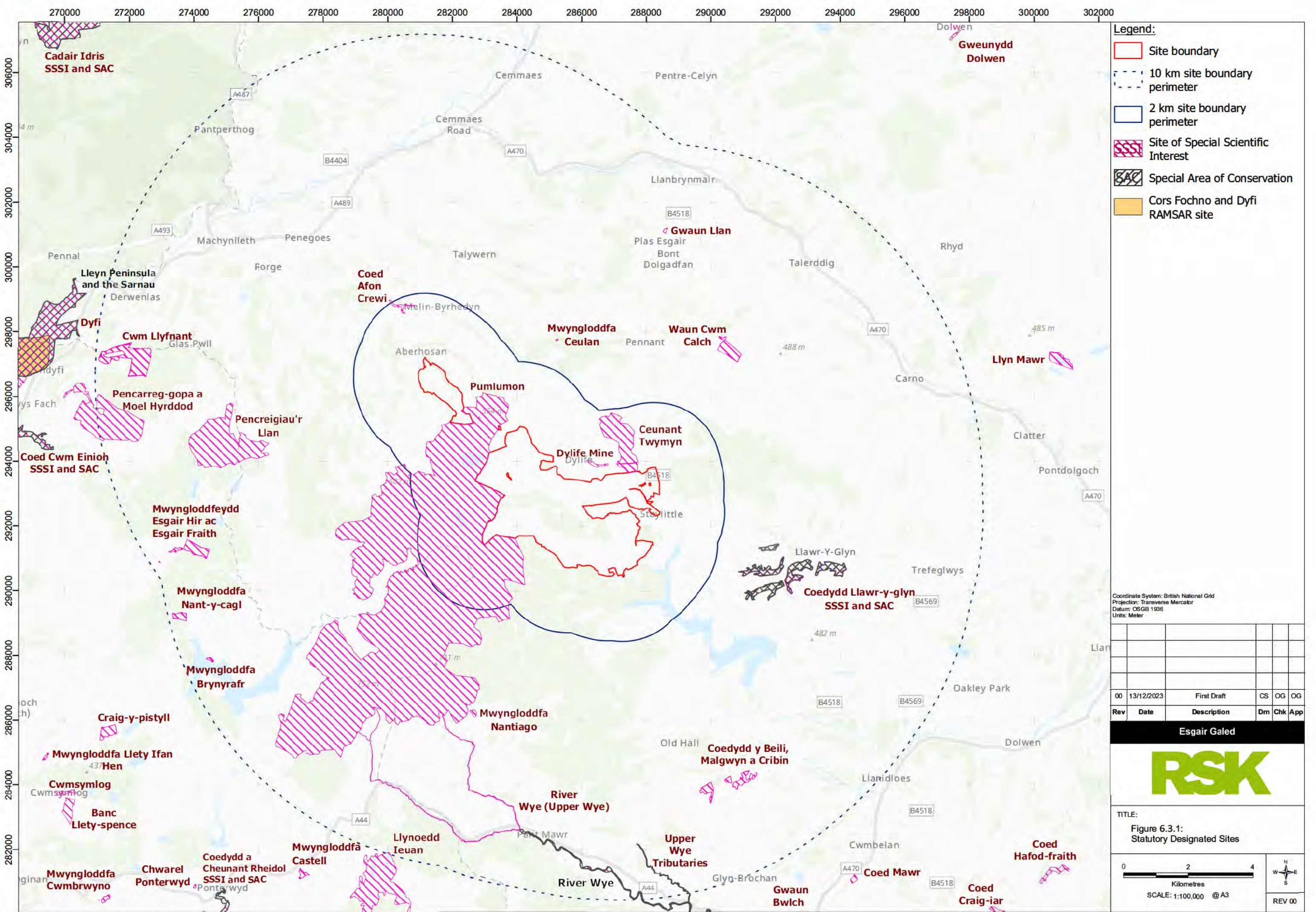
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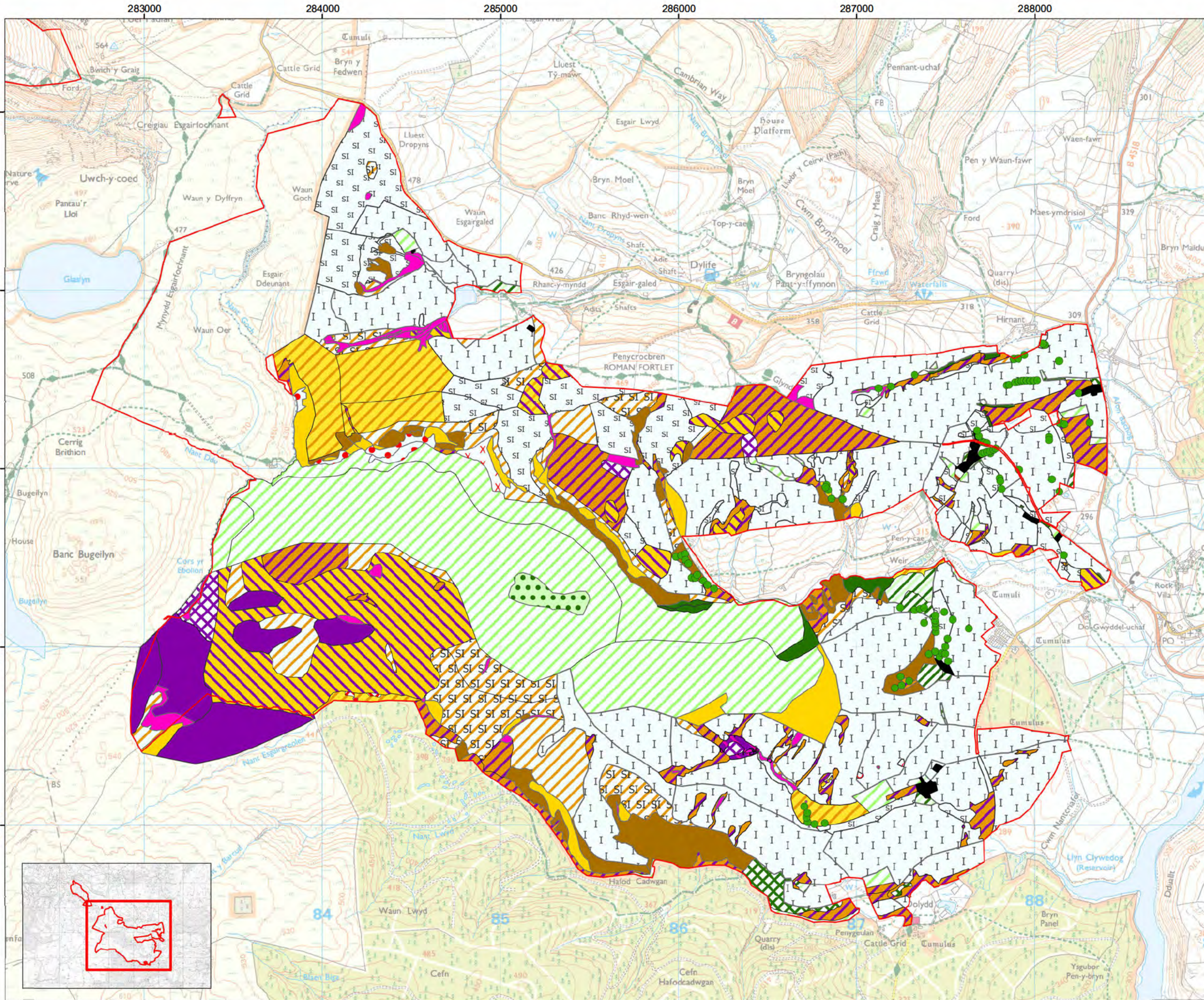
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Vale of Glamorgan
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APPENDIX E – TERRESTRIAL ECOLOGY FIGURES





- Site boundary
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Coniferous woodland - plantation
- Mixed woodland - semi-natural
- Mixed woodland - plantation
- Scrub - dense/continuous
- Acid grassland - unimproved
- Acid grassland - semi-improved
- Neutral grassland - semi-improved
- Improved grassland
- Marsh/marshy grassland
- Poor semi-improved grassland
- Bracken - continuous
- Other tall herb and fern - ruderal
- Dry dwarf shrub heath - acid
- Wet dwarf shrub heath
- Dry heath/acid grassland
- Wet heath/acid grassland
- Blanket sphagnum bog
- Wet modified bog
- Flush and spring - acid/neutral flush
- Flush and spring - basic flush
- Fen - basin mire
- Inland cliff
- Scree
- Quarry
- Spoil heap
- Buildings
- Bare ground
- Trees

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

00	13/12/2023	First Draft	CS	OG
Rev	Date	Description	Drm	Chk

Esgair Galed



TITLE: Figure 6.3.2:
Phase 1 Habitat Map

00.40.8

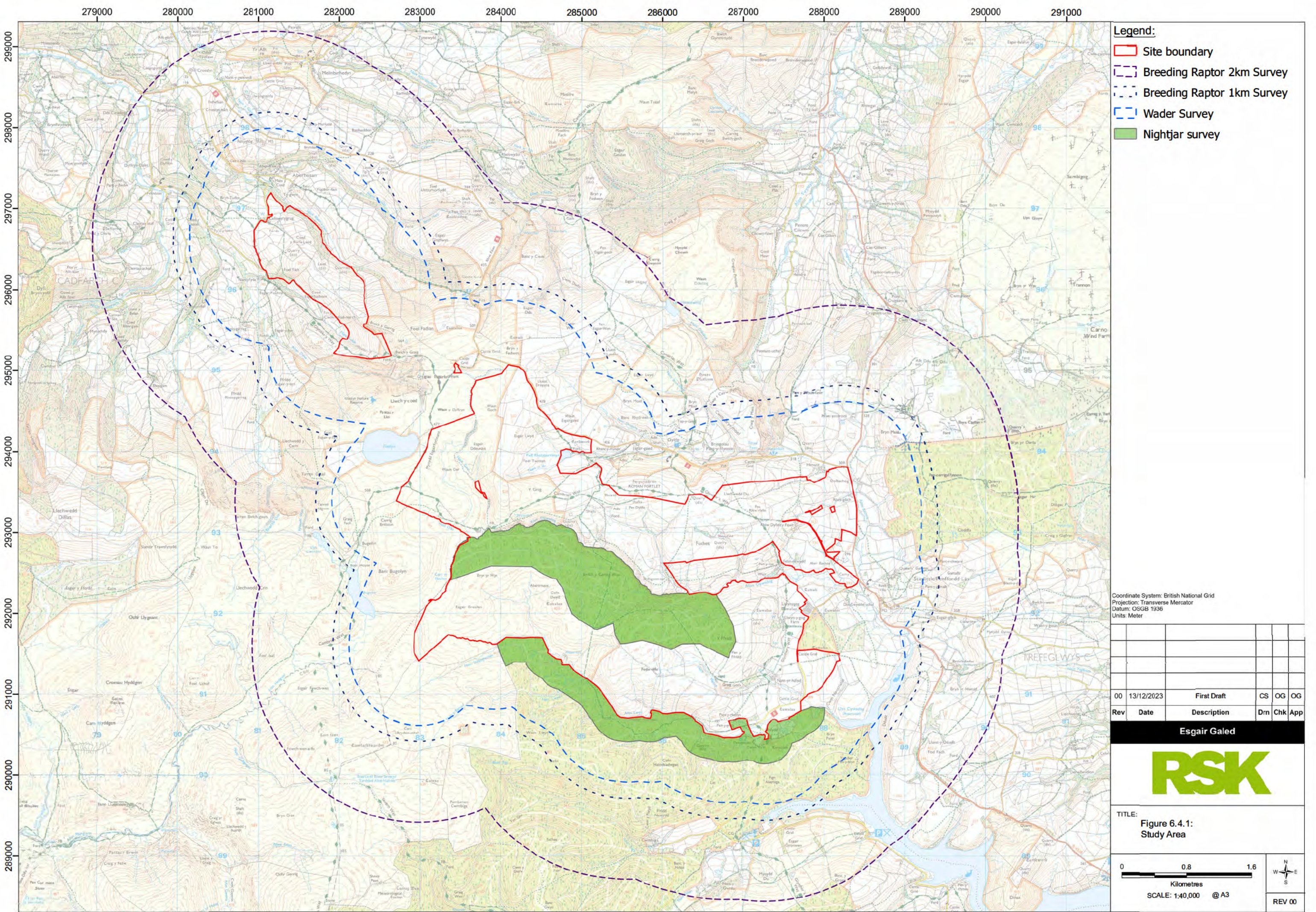
Kilometres

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APPENDIX F – ORNITHOLOGY FIGURES



- Legend:**
- Site boundary
 - Breeding Raptor 2km Survey
 - Breeding Raptor 1km Survey
 - Wader Survey
 - Nightjar survey

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

00	13/12/2023	First Draft	CS	OG	OG
Rev	Date	Description	Drm	Chk	App

Esgair Galed



TITLE: Figure 6.4.1:
Study Area

0

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Kilometres

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