

Galileo 03 Ltd.

Mynydd Ty-talwyn Energy Park - Environmental Statement Volume III

Appendix 1.1: EIA Scoping Report

Project Reference: 663870

NOVEMBER 2025

GALILEO



MYNYDD TY-TALWYN ENERGY PARK

INFORMATION TO SUPPORT A SCOPING OPINION REQUEST

DNS-CAS-03018-G7G6H7

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Wind Solar Battery

RSK GENERAL NOTES

Project No.: 663844

Title: Information to support a Scoping Opinion request

Client: Galileo

Date: November 2023

Office: Cardiff

Status: ISSUE

Author	RSK Environment Pegasus Group Wind Power Aviation Consultants Pager Power	**Technical reviewer**	Daniel Patterson
Date	November 2023	**Date**	November 2023

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1 INTRODUCTION

1.1 Background

1.1.1 Galileo (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 Direction from Planning and Environment Decisions Wales (PEDW) (prepared on behalf of Welsh Minister) for the proposed Mynydd Ty-talwyn 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 or operate an onshore wind development with a capacity over 10 mega-watts (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 10 wind turbines, ground mounted solar photovoltaic (PV) modules, Battery Energy Storage Systems (BESS), Project Substation, permanent anemometer mast, ancillary infrastructure works, habitat management, and, works to facilitate vehicular access to the Site. 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 The Applicant

1.2.1 Founded in 2020, Galileo is a fast-growing European, multi-technology, renewable energy developer, owner, and operator with a mission to significantly contribute to achieving global emission reduction targets. Galileo are aiming to do this by developing smart, efficient, high quality and integrated green energy projects, such that renewable energy becomes the primary source of electricity for all energy consumers in Europe.

1.2.2 Galileo currently has a project development portfolio of over 7GW across multiple European countries, including the UK, Sweden, Spain, Italy, Germany, France and Poland. With an office in Cardiff, the Proposed Development is one of a pipeline of our new renewable energy projects in development across Wales.

1.2.3 It is expected that the planning application will be submitted by a Special Purpose Vehicle (SPV), Galileo 03, which is a wholly owned subsidiary of Galileo.

1.3 Definition of an EIA

1.3.1 The term EIA describes a procedure that must be followed for certain types of project before it 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.

1.4 Requirement for EIA

1.4.1 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).

1.4.2 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);"

1.4.3 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.

1.5 Purpose of the report

1.5.1 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).

1.5.2 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.

1.5.3 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.

1.5.4 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.

1.5.5 Paragraph 3.14 and 3.15 of PEDW's 'Developments of National Significance: Procedural Guidance' (Appendix 3: EIA) sets out what should be provided within the EIA 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 EIA 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 within this EIA Scoping Report.

Table 1-1: Information required to accompany a request for a Scoping Direction

Information Required	Location within EIA Scoping Report
EIA Regulations (Regulation 33(2))	
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**
DNS Procedural Guidance (Appendix 3)	
An outline of the main alternatives considered and the reasons for selecting a preferred option.	**Chapter 3**

Information Required	Location within EIA Scoping Report
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.	**Chapter 6**
Any mitigation proposed and the extent to which these are likely to reduce impacts.	**Chapter 4**
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).	**Chapters 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.	**Chapters 2** and **6**
Key topics covered as part of applicants' scoping exercise.	**Chapters 4, 5** and **6**
An outline of the structure of the proposed ES.	**Appendix J**

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

1.6 References

- 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 (legislation.gov.uk)
- Planning and Environment Decisions Wales. (June 2019). Development of National Significance Procedural Guidance: Appendix 3 – Environmental Impact Assessment. Available at: https://www.gov.wales/developments-national-significance-dns-procedural-guide

2 DESCRIPTION OF THE NATURE AND PURPOSE 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 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 the appointed 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 (Draft – currently under consultation); and
- Scottish Natural Heritage (2017) Siting and Designing Wind Farms in the Landscape (Version 3).

2.2 The application site

2.2.1 **Appendix A** identifies the location of the Site. The Site boundary shown on **Appendix A** is the area (approximately 814 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 this EIA Scoping Report.

2.3 The Site and surrounding area

2.3.1 The Site is located within South Wales, its boundary extends within the administrative boundaries of Bridgend County Borough Council (BCBC) and Neath Port Talbot County Borough Council (NPTCBC).

2.3.2 The Site lies across an area of elevated land approximately 7km north of the Welsh coast. The lower valley areas and those which lie between the Site and the coast are generally well-populated and include numerous small settlements connected by a strong road network which includes local, A and B roads, and the M4 Motorway.

2.3.3 The topography of the Site falls in multiple directions from localised high points. Mynydd Baeden is a high point located in the southern extent of the site, at a level of approximately 250m above ordnance datum (AOD). Mynydd Ty-talwyn is the second localised high point on-site, located within the centre of the site at a level of approximately 232m AOD.

2.3.4 The Site currently comprises rough grassland and agricultural land with hedgerows, scattered trees and patches of woodland. Several farmsteads are dispersed across the site. A section of the Site comprises an area of commercial forestry managed by Natural Resources Wales (NRW) known as Graig yr Aber. Graig yr Aber is approximately 172ha in size and is largely located within the Site boundary.

2.3.5 The Site is not located within a nationally or regionally designated landscape. The Bannau Brycheiniog (Brecon Beacons) National Park (BBNP) boundary lies approximately 21.5km to the north of the Site. The BBNP has recognised dark sky status. The Gower Area of Outstanding Natural Beauty (AONB) lies approximately 22 km to the west of the site. An area of Heritage Coast lies approximately 7.5 km to the south of the site. The Site is located within the Western Uplands Special Landscape Area (SLA) as set out in the Bridgend Local Plan (2006-2021) and Margam SLA, as set out within the Neath Port Talbot Local Plan (2011-2026).

2.3.6 The nearest Registered Park and Garden is that of Margam Park, located approximately 2.5km from the Site. To the east are Coytrahen House and Bryngarw Country Park, located approximately 3km and 1.2km from the Site, respectively. To the south, Glanrhyd Hospital and Court Colman are located approximately 3.5km from the site.

2.3.7 The nearest large settlements are Bridgend, approximately 4km to the south east, and Port Talbot, approximately 8km to the west. Other outlying settlements to Bridgend include Sarn, Aberkenfig, Tondu and Brynmenyn which extend northwards of the M4. Smaller settlements are frequent within the valleys and coastal areas. The City of Swansea is located approximately 17 km to the west-north-west.

2.3.8 Access to the Site is via a C-Class Road known as Ffordd-y-Gyfraith which roughly dissects the Site in a south-east to north-west direction. There are a number of Public Rights of Way (PRoW) within the Site boundary that allow movement across the Site for walkers. Some of these paths are routes that are actively promoted to encourage use of these paths for leisure opportunities, including the Ogwr Ridgeway Walk, which runs in an east to west direction across the Site.

2.3.9 The largest watercourse on the Site is known as Nant Craigyraber, located towards the western extent of the Site within an area of ancient woodland. It conveys flow south and has numerous tributary watercourses on the Site, the most significant being Nant Fadog which discharges to Nant Craigyraber's downstream extent. Towards the north of the Site, there is a watercourse known as Nant y Gadlys, which conveys flow north and is a tributary of Afon Llynfi.

2.3.10 There are four Scheduled Monuments located within the Site boundary; Earthwork & Platform Houses N of Nant Fadog; Mynydd Ty Talwyn Ancient Farms (West); Mynydd Ty Talwyn Ancient Farms (East); and British Fortified Residence. There are a number of other designated historic assets located within 10km of the Site, including 557 Listed Buildings and 19 conservation areas.

2.3.11 Based on the Predictive Agricultural Land Classification (ALC) mapping (DataMapWales, 2019), a majority of the Site is classed as Grade 4 (poor quality agricultural land), and is therefore not considered Best and Most Versatile (BMV) agricultural land.

2.3.12 There are two National Grid overhead lines (OHL) which cross the Site towards the north and west. There are three operational farm-scale (less than 50m to tip height) wind turbines at the Site. There are two telecommunications masts (up to 30m in height) which can be found towards the east of the Site.

2.4 Description of Proposed Development

SUMMARY OF KEY COMPONENTS

2.4.1 The main elements of the Proposed Development will comprise:

- Up to 10 wind turbines and associated infrastructure, including; transformers, foundations, crane pads, and laydown/storage areas;
- Ground mounted solar photovoltaic (PV) generating station. The generating station will include solar PV modules and mounting structures;
- Balance of Solar System (BoSS) which comprises; inverters, transformers, switchgear;
- A Project Substation compound, which will include; substation, switching and control equipment, office / control / welfare buildings, storage areas, and provisions for vehicular parking and material laydown;
- Battery Energy Storage System (BESS) compound and associated inverters, transformers, switchgear and ancillary equipment and their containers, enclosures, monitoring systems, air conditioning, electrical cables and fire safety infrastructure;
- Permanent anemometer masts for monitoring wind speeds and wind turbine performance;
- Works to facilitate vehicular access to the Site;
- Landscaping, habitat management, biodiversity enhancement and amenity improvements;

- Ancillary infrastructure works including; underground cables, boundary treatments, security equipment (including CCTV and fencing), lighting, landscaping, access tracks, earthworks, surface water management, and any other works identified as necessary to enable the development;
- One or more temporary construction and storage compounds;
- Where possible, borrow pit(s) to source stone and aggregate required for construction proposes.

WIND TURBINES

2.4.2 Based on known environmental and technical constraints, the Site can accommodate up to 10 wind turbines; refer to **Appendix B** for an indicative turbine layout.

2.4.3 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.

2.4.4 This EIA Scoping Report has been prepared based upon a maximum tip height for wind turbines of 230m, 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	149m	162m	287803	185501
Turbine 2	149m	162m	287452	185877
Turbine 3	149m	162m	286816	185938
Turbine 4	149m	162m	286425	186338
Turbine 5	149m	162m	285776	185960
Turbine 6	149m	162m	285755	186455
Turbine 7	149m	162m	285718	186950
Turbine 8	149m	162m	284325	186384
Turbine 9	149m	162m	285251	186840
Turbine 10	149m	162m	284545	186820

2.4.5 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.

2.4.6 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.

2.4.7 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 an appropriate micro-siting allowance.

Aviation lighting

2.4.8 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).

2.4.9 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 150m 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.

2.4.10 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).

GROUND MOUNTED SOLAR PV GENERATING STATION

2.4.11 Based on the site selection work completed by the Project Team (further detail provided in **Chapter 3**), the potential areas within the Site considered suitable for the solar PV generating station are presented in **Appendix B**.

Solar PV Modules

2.4.12 Solar PV modules convert sunlight into electrical current (as direct current (DC)). Solar PV modules are made up of individual solar cells. They are typically 2m long and up to 1m wide and consist of a series of photovoltaic cells beneath a layer of toughened glass. The frame is typically built from anodised aluminium or steel.

2.4.13 The solar PV modules are fixed to a mounting structure in groups known as 'strings'. Various factors will help inform the number and arrangement of the solar PV modules in each string, and it is likely some flexibility will be required to accommodate for future technology developments.

Mounting Structure

2.4.14 Each string of solar PV modules will be mounted on a metal rack, known as a mounting structure. The mounting structures are usually supported by galvanized steel poles, mounted into the ground. There is also an option for some structure legs to be supported by concrete footings to reduce piling depths, if required due to the ground conditions or to reduce impacts on areas of archaeological sensitivity.

2.4.15 The mounting structure carrying the solar PV modules are likely to be designed to face southwards on a single-axis tracker or on a tracking platform. The solar PV modules would be angled at a slope of 10 to 30 degrees from horizontal to optimise daylight absorption.

2.4.16 Once attached to the mounting structure, the minimum height of the lowest part of the solar PV modules will be approximately 60cm above ground level (AGL) and the maximum height of the solar PV modules will be approximately 3-4m AGL. The height for each solar PV module can be influenced by several design factors including; local topography, visual receptors, land use practices, and the solar PV module type and configuration.

BALANCE OF SOLAR SYSTEM (BOSS)

2.4.17 The Balance of Solar System (BoSS) refers to the components and equipment that convert the direct current (DC) electricity collected by the solar PV modules into alternating current (AC). Primarily, this includes; inverters, transformers, and switchgear. As the design of the Proposed Development evolves, the configuration of the BoSS will be defined. The BoSS will be located within the fields identified as suitable for the ground mounted solar PV generating station.

2.4.18 This section also sets out the different configuration options available for the Proposed Development.

Inverters

2.4.19 Inverters are required to convert the DC electricity collected by the PV modules into AC, which allows the electricity generated to be exported to the National Grid. Inverters are sized to cope with the characteristics of the DC electricity that is output from the solar PV modules.

2.4.20 It is currently expected that either string or central inverters would be used. String inverters are small enough to be mounted underneath the modules. Alternatively, centralised inverters may be used, which would be sited at regular intervals amongst the solar PV modules. Centralised inverters would be housed indoors (i.e. enclosed in a container).

Transformers

2.4.21 Transformers are required to step up the voltage of the electricity generated across the Site before it reaches the Project Substation. Transformers could be located outdoors or housed indoors, alongside the inverters and switchgear within a container.

Switchgears

2.4.22 Switchgears are the combination of electrical disconnect switches, fuses or circuit breakers to control, protect and isolate electrical equipment. Switchgear is used both to de-energise equipment to allow work to be done and to clear faults downstream. Switchgears are typically housed indoors within a container or can be located independently outdoors, adjacent to the outdoor transformer.

PROJECT SUBSTATION

2.4.23 The Project Substation will consist of electrical infrastructure such as the transformers, switchgear and metering equipment. The Project Substation compound will include a control building. The control building will include office space, material storage and welfare facilities, as well as operational monitoring and maintenance equipment.

2.4.24 The dimensions and the location of the Project Substation is not yet finalised, but it will be sited within the Site boundary. The location of the substation would be influenced by factors such as the distance to the point of grid connection, access during the operation of the Proposed Development, and environmental constraints, all of which will be considered further throughout the iterative design process.

2.4.25 It is considered likely that the BESS (see below) will be located within the same compound as the Project Substation.

BATTERY ENERGY STORAGE SYSTEM (BESS)

2.4.26 The BESS will be included in the DNS Application if it is deemed a viable option at the Site, following the completion of further technical studies.

2.4.27 The BESS is designed to provide peak generation and grid balancing services to the electricity grid. It will do this primarily by allowing excess electricity generated from the wind turbines and solar PV generating station to be stored in batteries and dispatched when required. As a secondary function, it may also import surplus energy from the electricity grid when energy available to the grid exceeds demand.

2.4.28 The BESS units each comprise of an enclosure for BESS electro-chemical components and associated equipment including transformers, inverters, switchgear, power conversion systems, monitoring and control system, Heating, Ventilation and Air Conditioning (HVAC) systems, electrical cables and fire infrastructure including water storage tanks and a shut off valve.

2.4.29 The BESS typically comprises a number of shipping container units, although they could be either individual enclosures or housed within a large building, that are usually single stacked.

2.4.30 The BESS will require heating, ventilation and cooling systems to ensure the efficiency of the technology. These features are integrated into the units they are housed in. The BESS will comprise DC/AC converters to control the charge of the batteries from the wind turbines and solar PV array output and/or AC/DC inverters to control the charge of the batteries when drawing energy from the grid.

2.4.31 There are different design options for the batteries that will be explored through the design process.

2.4.32 A switchgear / control room operates, isolates and controls the exported power from the BESS. This would comprise a building of similar dimensions to one of the containers and would be located adjacent to the BESS within the same compound. A down lighting will be provided within the BESS to be used only in the event of it being required for maintenance and security purposes.

PERMANENT ANEMOMETER MAST

2.4.33 A permanent steel tower anemometer mast may be required to provide ongoing monitoring of the wind conditions after commissioning of the Proposed Development. The height of any anemometer mast would align with the chosen wind turbine model. Further detail on the location and size of any anemometer mast will be provided in the ES.

WORKS TO FACILITATE VEHICULAR ACCESS TO THE SITE

2.4.34 The size and/or weight of the turbine components and transformers require specialist vehicles to carry them to site – these are classed as Abnormal Indivisible Loads (AIL). It is anticipated that AIL vehicles will travel to the Site from the Port of Swansea. The route from port to Site is likely to be via the M4 heading eastwards out of Swansea, before either joining the A4229/A48 through Pyle or the A4063 at Sarn. The route will be formalised through the EIA process.

2.4.35 The Applicant will 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).

2.4.36 The Proposed Development will include a new network of on-site access tracks to enable construction and maintenance, once operational. 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), and, where feasible, look to make use of existing tracks in order to minimise the amount of new tracks needed.

LANDSCAPING, HABITAT MANAGEMENT, BIODIVERSITY ENHANCEMENT AND AMENITY IMPROVEMENTS

2.4.37 The Proposed Development will include landscaping, habitat management, biodiversity enhancement, and amenity improvements, which will be explored as the design progresses. This will be sensitivity designed to retain and enhance ecological and recreational connectivity.

ANCILLARY INFRASTRUCTURE WORKS

On-Site Cabling

2.4.38 High voltage (typically around 33kV) and low voltage (typically 0.6-1.8kV cables) will be required as part of the Proposed Development to connect the energy generating stations (and supporting electrical infrastructure) with the Project Substation.

2.4.39 Where possible, on-site cabling will be laid underground. The dimensions of the trenches will vary depending on the number of ducts they contain and are assumed to be up to approximately 3m in width and up to approximately 2m in depth.

2.4.40 Cabling between solar PV modules and the inverters will typically be required to be above ground level (along a row of racks), fixed to the mounting structure, and then underground (between racks and the inverter input).

2.4.41 Open-cut trenching methods would be used for a majority of the cable routing. However, subject to on-going engagement with utility providers and other stakeholders, there may be a requirement for specialist trenchless techniques (e.g. Horizontal Directional Drilling) for crossings of roads, environmental receptors, and other existing infrastructure.

Fencing and security

2.4.42 Security fencing will enclose the operational areas of the ground mounted solar PV generating station, BESS compound, and Project Substation compound.

2.4.43 The fields encompassing the solar PV modules and supporting infrastructure will likely be fenced using ‘deer fence’ with wooden post supports which would typically have a maximum height of 2.5m. Permanent palisade steel fencing (up to 3m high) will be installed around the perimeter of the BESS compound and Project Substation compound.

2.4.44 Pole mounted facing close circuit television (CCTV) systems, which typically have a maximum height of 5m, are assumed to be deployed around the perimeter of the ground mounted solar PV generating station, BESS compound, and Project Substation compound.

2.4.45 The BESS compound and Project Substation compound will include lighting, in accordance with relevant standards, but will not be permanently lit.

CONSTRUCTION PHASE

Construction Programme and Activities

2.4.46 It is expected that the construction of the Proposed Development will be completed over a period of approximately 12–18 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/vegetation clearance (if required).
- 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.

Borrow Pits

2.4.47 The Proposed Development will require crushed stone to construct the new access tracks, turbine foundations, crane pads and laydown areas. Suitable stone would 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.

Construction Environmental Management Plan (CEMP)

2.4.48 An Outline 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.

2.4.49 The details and implementation of the final CEMP will be secured by a planning condition.

Construction Traffic Management Plan (CTMP)

2.4.50 A CTMP will be submitted in support of the DNS application which will propose measures to control the delivery of materials and staff onto the Site during the construction phase. 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 taken into account in its development.

Abnormal Indivisible Load (AIL) Management Plan

2.4.51 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

2.4.52 The Proposed Development is likely to be operational for a limited period of 50 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

2.4.53 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.

2.4.54 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.

GRID CONNECTION

2.4.55 The route and specification of the grid connection to the Proposed Development is still subject to optioneering, consultation, survey, assessment and design by the District Network Operator (DNO).

2.4.56 The connection of the Project Substation to the grid would be the subject of a separate consent application and will not form part of the DNS application.

3 REASONABLE ALTERNATIVES CONSIDERED

3.1 Introduction and approach

3.1.1 Regulation 17(3)(d) 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 ES. 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 therefore 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.

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 renewable energy development. The overall approach to site selection is to identify areas of land where the siting of an energy park 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 (national and local);
- Geographical Information System (GIS) constraints analysis; and
- A review of suitable site access points and related transportation issues.

3.2.2 A feasibility study for onshore wind development at the Site was undertaken in 2022. The aim of the study was to help understand the planning and environmental considerations relevant for developing an onshore wind development 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 approach[1]), 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.

GIS constraints analysis

3.2.7 GIS constraints analysis involves identifying and mapping environmental, technical, and engineering constraints. 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, local landscape designations, and Registered Parks and Gardens.
- 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, topography, and land use: With buffers provided around residential properties and settlements, avoidance of steep gradients (not suitable for energy infrastructure), and publicly accessible areas/routes.
- Existing infrastructure: Including utilities, buildings, roads, wind turbines, and masts.

Suitable access considerations

3.2.8 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.

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://www.gov.wales/future-wales-national-plan-2040-0

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;
- Climate;
- Cultural Heritage;
- Population;
- Human health;
- Land and soil (factors combined for the purposes of reporting);
- Landscape and visual;
- Material assets; and
- Water.

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;
- Glint and glare;
- Heat and radiation;
- Major accidents and disasters;
- Noise and vibration;
- Shadow flicker;
- Telecommunication and utilities; and
- Traffic and transport.

4.1.5 The proposed structure of the Environmental Statement is set out in **Appendix J**.

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):

- Bridgend County Borough Council (BCBC);
- Neath Port Talbot County Borough Council (NPTCBC);
- Llangynwyd Middle Community Council;
- Llangynwyd Lower Community Council;
- Margam Community Council;
- Welsh Government (WG);
- Natural Resources Wales (NRW);
- Cadw;
- Glamorgan Gwent Archaeological Trust (GGAT);
- South East Wales Trunk Road Agency (SEWTRA);
- Public Health Wales (PHW);
- Cardiff Airport;
- Royal Society for the Protection of Birds (RSPB); and
- Bannau Brycheiniog National Park Authority (BBNPA) (*formerly Brecon Beacons*).

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 (PAC) Report to accompany the DNS application, detailing the consultation undertaken and any changes made to the Proposed Development 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. 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 and surrounding area. 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 2021 and 2024. 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 factor 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: Measures taken to avoid creating impacts from the outset.
- Minimisation: Measures 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.
- Offset: Measures taken to compensate for any residual impacts.

4.7.2 The IEMA guidance 'Environmental Impact Assessment Guide to Shaping Quality Development' refers to three distinct forms of mitigation:

- Primary: An intrinsic part of the project design
- Secondary: Typically described within the environmental 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, the Draft ES and the Final ES, embedded 'primary' mitigation measures will form part of the Proposed Development for which development consent is sought. **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.

4.7.4 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 Measures' 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
Biodiversity Land and soils Landscape and visual Noise Water	The indicative layout presented in **Appendix B** has considered/avoided the following features: **Locating turbines to avoid sensitive environmental receptors** • Residential properties (at least 800m from properties which are not financially involved). • At least 50m from watercourses and avoidance of flood zones. • At least 50m from Scheduled Monuments located on the Site. • Avoidance of areas of forestry identified on the Ancient Woodland Inventory (AWI) located within the Site boundary. • Avoidance of areas of woodland, heathland, scrubland, wetland, and waterbodies. **Locating solar PV modules and BESS to avoid sensitive environmental receptors** • Avoidance of field boundaries (with a 10m buffer). • Public Rights of Way (with a 10m buffer). • Residential properties (at least 200m from properties which are not financially involved). • At least 10m from watercourses and avoidance of flood zones.

Environmental Factor to which the Embedded Environmental Mitigation Measure Relates	Embedded Environmental Mitigation Measure and Associated Benefit
Telecommunications Land and soils	**Locating turbines, solar PV modules, and BESS to avoid existing infrastructure, engineering constraints, and land use features** The indicative layout presented in **Appendix B** has considered/avoided the following features: • Existing telecommunications mast (and associated telemetry/fixed links). • National Grid OHL (plus topple distance buffer). • Slopes of greater than 10 degrees.
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, 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-relationships 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 A summary of effect tables that summarise the likely significant effects associated with each of the environmental factors will be provided in the ES 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 protecting and enhancing the natural environment

4.9.1 Working closely with Bridgend County Borough Council, Neath Port Talbot Council, and other environmental stakeholders, the Applicant is committed to exploring opportunities for environmental enhancement[2] (including biodiversity net gain) as part of the Proposed Development.

4.9.2 The Proposed Development will be designed in line with the Step-Wise Approach outlined in Planning Policy Wales (PPW). A Green Infrastructure Statement will be prepared in support of the DNS Application to demonstrate the approach to firstly, protecting the natural environment, and secondly, delivering positive enhancement measures at the Site.

4.9.3 It is important to note that any identified enhancement measures included as part of the Proposed Development will not be taken into account when determining the significance of effects from the Proposed Development.

4.10 References

- Institute of Environmental Management and Assessment (IEMA). (2015). Environmental Impact Assessment Guide to Shaping Quality Development.
- 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

[2] Enhancement is defined as '*a measure that is over and above what is required to mitigate the adverse effects of a project*' (Ministry of Housing, Communities and Local Government, 2021).

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 Given the nature of the Proposed Development, any potential impacts on air quality are only likely to occur during the construction and decommissioning phases. It is anticipated that any emissions, associated with site activities and off-site traffic during the construction phase, would be minimal. Localised dust and traffic emissions would be controlled by the adoption of construction best practices, with all relevant procedures to be documented in the CEMP that will be submitted in support the DNS application.

5.2.2 Section 83 of the Environment Act 1995 requires local planning authorities to designate an air quality management area (AQMA) when a national air quality objective is not being achieved, or is not likely to be achieved. There are no AQMAs within 2km of the Site boundary, although there is one along the proposed off-site access route for any AIL deliveries - the 'Neath Port Talbot AQMA Taibach / Margam', an area covering the majority of land and properties between the Corus Steel Works and the M4 Motorway.

5.2.3 Whilst AIL vehicles associated with the Proposed Development will use the M4 Motorway to access the Site, the number of vehicles using this highway will be very small in comparison to the volumes of traffic which use the highway on a daily basis. The AIL vehicles will be escorted and will respect any highway laws, particularly in relation to restricted speeds. As such, the AIL vehicle movements are unlikely to contribute in any significant way to any emissions along this route. Therefore, no significant air quality impacts as a result of the Proposed Development are predicted on the Neath Port Talbot AQMA Taibach / Margam.

5.2.4 No significant air quality impacts associated with the Proposed Development are predicted, therefore, air quality is proposed to 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. The following considerations were identified:

- The Site is located 28km to the north-west of Cardiff Airport and also 28km to the east of Swansea Airport.
- The Site is located under Class G unregulated airspace and 6km to the west of the boundary of the Cardiff Control Area (CTA), Class D regulated airspace.
- The closest civil air traffic control radar is at Cardiff Airport, 28km north-west of the Site.
- Early radar modelling shows that none of the National Air Traffic Services En Route Ltd (NERL) radars or other communications, surveillance or navigation systems will be affected.
- Civil Aviation Authority (CAA) Non-radar Equipped Licensed Aerodromes: The closest is at Swansea, over 28km to the west, and will not be affected by the Proposed Development.
- UK Met Office Weather Radars: The closest is at Crugg y Goryllwynn, over 80km to the west of the Site, and therefore well beyond the Met Office safeguarding distance of 20km.
- In military terms, there are no radar equipped military airfields in the area.
- The site is located within an area designated 'Green' by the Ministry of Defence (MoD) which is defined as 'An area with no military low flying concerns'.
- Unlicensed Aerodromes, Gliding Sites and Microlight Sites: The closest is at Old Park Farm, 4km to the south-west of the site. Consultation is not required and operations from the airstrip will not be affected.

5.3.2 Further consultation with relevant stakeholders, including Cardiff Airport, 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.

5.3.3 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 6.0**.

5.3.4 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 radar at Cardiff Airport and the requirement for aviation lighting as part of the Proposed Development.

5.4 Forestry

5.4.1 A section of the Site comprises an area of commercial forestry managed by Natural Resources Wales (NRW) known as Graig yr Aber. Graig yr Aber is approximately 172ha in size. The current design of the Proposed Development includes two wind turbines within Graig yr Aber.

5.4.2 If the final design of the Proposed Development includes any infrastructure within Graig yr Aber, a Forestry Assessment will be undertaken and submitted as a standalone report in support of the DNS application. The changes to the forest structure resulting from the incorporation of the Proposed Development will be assessed. This will include the changes to, for example, the woodland composition and felling programmes. 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.

5.4.3 Consultation with relevant interested parties, including both local authorities 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.

5.4.4 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 Glint and Glare

5.5.1 As described in Section 2, the Applicant is considering a ground mounted solar PV generating station as part of the Proposed Development. Therefore, the potential for glint and glare from the solar PV modules will need to be considered.

5.5.2 Solar PV modules are specifically designed to absorb light rather than reflect it. Light reflecting from solar PV modules results in the loss of energy output. Solar PV modules are dark in colour due to their anti-reflective coatings and are manufactured with low-iron, ultra-clear glass with specialised coatings and textures to enable maximum absorption. The combination of these factors significantly increases electrical energy production of the panels and at the same time significantly reduces reflected rays.

5.5.3 A detailed standalone glint and glare assessment will be undertaken and submitted in support of the DNS Application, considering ground-based (residential dwellings and road) receptors. There are no guidelines setting out a particular methodology to delivering a glint and glare assessment, however, detailed geometric analysis will be undertaken using a bespoke glint and glare model for all receptors potentially affected by the Proposed Development.

5.5.4 A description of any relevant mitigation measures and safety considerations of the Proposed Development will be included within the Description of the Proposed Development chapter of the ES.

5.6 Heat and radiation

5.6.1 The requirement to consider heat and radiation in UK EIA practice was introduced via the EIA Regulations 2017. 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.'

5.6.2 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.

5.7 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 A description of relevant safety features of the Proposed Development will be included in the ES within the description of the Proposed Development. As described in **Chapter 2**, 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. In addition, 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.). Route maintenance of the BESS facilities would be undertaken during the operational phase of the Proposed Development.

5.7.4 It is not therefore considered necessary to include a separate assessment of major accidents and/or disasters within the ES and major accidents and disasters is 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 results 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 and human health

Socio-economics

5.9.1 Potential socioeconomic 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 these 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 socioeconomic effects of the proposed development are anticipated to benefit the local and wider community.

Land Use and Public Access

5.9.5 The Site largely comprises grassland, moorland and agricultural land which are widespread in Wales.

5.9.6 The nature of the agricultural holdings across the Site boundary varies and there will inevitably be land taken out of agricultural production. There may be businesses / tenants / occupiers currently undertaking agricultural operations across the Site boundary who may cease to do so for the duration of the operational phase of the development. The loss of these agricultural operations is not expected to lead to a significant effect in relation to employment in the local area.

5.9.7 There are a number of PRoW within the Site boundary that allow movement across the Site for walkers, cyclists and horse riders. Some of these paths are routes that are actively promoted to encourage use of these paths for leisure opportunities, including the Ogwr Ridgeway Walk.

5.9.8 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 BCBC and NPTCBC, 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.

5.9.9 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 and therefore it is proposed to scope this matter out of further assessment.

Human Health

5.9.10 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, as follows

- Landscape and visual;
- Land, soils, and water (in relation to potential mining works and contamination);
- Noise and vibration; and
- Traffic and transport.

5.9.11 Each of these chapters within the EIA Scoping Report and subsequent ES will consider the potential effects to human health within their own assessments. Outside of the EIA process, a glint and glare assessment will be undertaken (see Section 5.5), which will consider the potential human health effects from glint and glare.

5.9.12 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 therefore excluded from the scope of the EIA.

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. 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.

5.10.5 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. 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.

5.10.6 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 Arqiva, BT, Joint Radio Company (JRC), Mobile Broadcast Network Limited (MBNL), Virgin Media O2, and Vodafone. A number of potential microwave / telemetry links were identified close to / running across the Site, particularly towards the eastern end of the Site where there is an existing telecommunications mast.

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 Water

Introduction

5.12.1 This section considers the potential impacts arising from the construction, operation and decommissioning of the Proposed Development on water receptors. In particular, it considers the potential impacts of the Proposed Development on flood risk, surface water, and private water supplies (PWS).

5.12.2 It should be noted that groundwater has been considered within the Land and Soils Assessment, please refer to **Section 6.5**.

Baseline environment

5.12.3 The largest watercourse on the Site is known as Nant Craigyraber, located towards the western extent of the Site within an area of woodland. It conveys flow south and has numerous tributary watercourses on the Site, the most significant being Nant Fadog which discharges to Nant Craigyraber's downstream extent. Towards the north of the Site, there is a watercourse known as Nant y Gadlys, which conveys flow north and is a tributary of Afon Llynfi. There are two small watercourses in the southern extent of the site: Nant-y-gedd and an unnamed watercourse which both convey flow south.

5.12.4 According to NRW's online mapping, Nant Craigyraber and Afon Llynfi are designated as Moderate Overall waterbodies under the Water Framework Directive / River Basin Management Plan (Cycle 3 – 2021).

5.12.5 According to NRW's online Development Advice Map, the majority of the site lies within Zone A which is "*considered to be at little or no risk of fluvial or coastal/tidal flooding*". However, there is a small area designated as Zone C2, localised along the downstream reach of Nant Craigyraber in the south-western extent of the Site. Zone C2 is defined as "*areas of the floodplain without significant flood defence infrastructure*". Please refer to **Appendix C**.

5.12.6 In accordance with NRW's online Flood Map for Planning, which considers the fluvial flood risk, the Site is predominantly located within Flood Zone 1, with a small section of Flood Zones 2 and 3, coinciding with the downstream extent of Nant Craigyraber and partly along the route of Nant Fadog. These Flood Zones are mainly contained within the immediate vicinity of the watercourses themselves.

5.12.7 In reference to pluvial risk from surface water and small watercourses, the NRW mapping shows there are multiple areas of Flood Zones 2 and 3 which coincide with the watercourses on-site. The areas within these Flood Zones are contained within the mapped watercourses and topographic low/valley features and are notably mainly within wooded areas. The remainder of the Site is located within pluvial Flood Zone 1.

5.12.8 NRW's flood maps also indicate the site is not at risk from tidal sources or from reservoir flooding.

5.12.9 The Cwm Risca Meadows SSSI is located towards the south of the Site, partly within the boundary and the remainder off-site. Cwm Risca Meadows SSSI is designated for Old wet acidic meadow on Coal measure rocks supporting over 80 species of herbaceous plants and supporting a colony of Marsh Fritillary butterfly *(Euphydryas aurina)*. The two watercourses to the south of Site (Nant-y-gedd and the unnamed watercourse) are located along the eastern and western boundary of the SSSI. It is possible that Cwm Risca Meadows SSSI is hydrologically linked to the Proposed Development, however, because the designation is for herbaceous plants and Marsh Fritillary butterfly, potential impacts on the designated site will be assessed within the Terrestrial Ecology Chapter of the ES (please refer to **Section 6.2**). The assessment on the SSSI is therefore proposed to be scoped out of the Water Chapter.

Private Water Supplies

5.12.10 A data request was submitted to BCBC and NPTCBC in August 2023 requesting any information held on the presence of water abstractions for Private Water Supply use within the Site boundary.

5.12.11 BCBC confirmed they have no record of Private Water Supplies within Site boundary.

5.12.12 NPTCBC have been unable to provide a definitive response regarding any records of PWS within the Site boundary.

Mitigation

Mitigation during construction

5.12.13 Mitigation will follow well established principles of industry good practice in order to prevent and minimise effects on the water environment. Appropriate mitigation will be secured through the production of a CEMP, which will identify good working practices in line with appropriate standards. It is anticipated that the CEMP will be agreed with BCBC, NPTCBC, and NRW. Mitigation measures will include the use of appropriate measures as outlined in the Pollution Prevention Guidelines. Whilst it is noted that these Guidelines were withdrawn in 2015, they still contain detailed information on good working practices and principles.

5.12.14 An Outline CEMP will be submitted in support of the DNS Application, including an Outline Pollution Prevention Plan and an Outline Drainage Management Plan. The below details examples of mitigation measures for key areas where pollution is able to be controlled:

- On-site working e.g. installation of cut-off ditches/geotextile silt fences, collecting run-off from hardstanding area in a sump, utilisation of wheel wash facilities.
- Safe storage and use of concrete and cement, concrete and cement mixing and washing areas e.g. dispose of contained water either to foul sewer or tanker offsite, designated areas for washing down or equipment cleaning located 10m from any watercourse/waterbody.
- Safe storage and use of oils and chemicals e.g. production of a spillage plan, designated locations for oils and hydrocarbons with specific measures to prevent leakage.
- Vehicle and wheel washing on-site e.g. designated washing bays designed so that runoff is isolated and collected for reuse or disposal or discharged to public foul sewer.
- Uncontrolled (and particulate) runoff from construction areas and access tracks e.g. excess flows to be stored in an attenuation feature, compounds should utilise a wide geotextile strip covered by stone to form the compound (the stone should not include a high percentage of fines).

5.12.15 As noted in Section 4.7, a 50m buffer will be applied to all watercourses and flood zones within the Site boundary to protect them from any potential pollution as a result of the Proposed Development.

Mitigation during operation

5.12.16 The design of the Proposed Development will include SuDS features which will ensure that any potential impacts on water quantity, water quality, amenity, and biodiversity are adequately mitigated. It is anticipated that the design of the SuDS features will be agreed with the BCBC and NPTCBC during the detailed design stage. There is the potential for the requirement of watercourse crossings, which would pass over the on-site watercourses. The crossings will be designed in accordance with the required standards and best practice, with an inclusion for climate change and will be kept to a minimum.

Mitigation during decommissioning

5.12.17 The potential effects on water receptors during decommissioning will be similar to those expected during the construction phase, with the mitigation being achieved using the same processes and measures.

Potential effects during construction

Increase in Flood Risk

5.12.18 Construction activities have the potential to result in increased localised flood risk due to earthworks and excavation activities, which are likely to change overland run-off routes and have the potential to harm construction workers on-site, existing residents surrounding the site and future site users. The low risk pluvial areas are contained within the riparian corridors on-site and should not be altered by construction activities.

5.12.19 The primary source of flood risk at the Site is associated with surface water / pluvial flooding, however this is designated as low risk as it is contained within the riparian corridors on-site. The flood risk to the Site typically ranges from very low to low with respect to fluvial and surface water risk (as outlined above). The full extent of both fluvial and surface water flood risk, along with risk of groundwater flooding and flooding from sewers / artificial sources, will be fully assessed within a Flood Consequences Assessment (FCA) which will support the DNS Application.

5.12.20 Changes in flood risk from the construction of the Proposed Development will be managed by the good practice principles which will be outlined in the CEMP. It is also anticipated that a temporary drainage system will be implemented during construction.

5.12.21 When considering the design of the Proposed Development and the mitigation measures proposed, increases in flood risk to and from the Proposed Development during construction are not expected to lead to significant environmental effects. Therefore, it is proposed to exclude flood risk during construction from the scope of the EIA.

Watercourse pollution as a result of silt / soil laden runoff from construction activities

5.12.22 Construction activities (e.g. soil stripping activities on-site) have the potential to result in silt laden runoff, resulting in the sedimentation and pollution of watercourses.

5.12.23 It is anticipated that silt / soil laden runoff produced during construction activities would be controlled through the implementation of a CEMP and the provision of a construction drainage management plan.

5.12.24 The mitigation measures which will be agreed and implemented through the CEMP are considered an integral part of the Proposed Development. Therefore, the potential for watercourse pollution as a result of silt laden runoff from construction activities are not expected to lead to significant environmental effects and is excluded from the scope of the EIA.

Watercourse pollution as a result of cements and concretes used during construction activities being mobilised in surface water runoff

5.12.25 Construction activities have the potential to result in cement and concrete dusts being mobilised in surface water runoff, resulting in the pollution of local watercourses.

5.12.26 It is anticipated that particle laden runoff which could occur during construction activities would be controlled through the implementation of a CEMP. In addition, appropriate dust management / control measures will also through the implementation of a CEMP.

5.12.27 The mitigation measures which will be agreed and implemented through the CEMP are considered an integral part of the Proposed Development. Therefore, the potential for watercourse pollution as a result of cements and concretes being mobilised in surface water runoff from construction activities are not expected to lead to significant environmental effects and is excluded from the scope of the EIA.

Description of likely significant effects during operation

Increase in Flood Risk during operation

5.12.28 The development and utilisation of the Site has the potential to result in increased localised flood risk due to the minor increases in impermeable area and an associated reduction in the natural infiltration of water into the ground. There is also the potential for alterations to the surface water regime and overland flow routes due to the placement of built development, which could potentially result in increased surface water runoff, which will require to be managed as not to increase the surface water flood risk for off-site residents.

5.12.29 The temporal risk associated with flooding is greater during the operational phase than the construction phase with the anticipated lifetime of the Proposed Development.

5.12.30 There are multiple minor flow paths located on-site associated with pluvial flooding. These flow paths are associated with the existing watercourses and are contained within the routes of these watercourses, mainly within wooded areas and between field boundaries and should have no impact upon the Proposed Development.

5.12.31 The Proposed Development will include a surface water drainage network which will be designed in line with local and national policy (e.g. TAN15 and PPW and local guidance) and in agreement with relevant stakeholders (i.e. NRW, BCBC, and NPTCBC). The network where possible, will seek to reduce the surface water runoff from the Site to agreed rates which will ensure there is no increase in flood risk downstream as a result of the Proposed Development.

5.12.32 When considering the design of the Proposed Development and the mitigation measures proposed, increases in flood risk to and from the Proposed Development during operation is not likely to give rise to potentially significant environmental effects and is therefore scoped out of the EIA.

Watercourse pollution as a result of operational site pollution / diffuse pollution entering surface water runoff / local water features

5.12.33 Activities at the Site during the operational phase have the potential to result in accidental spillages (operational chemicals) and potential contaminants (diffuse highway pollution i.e. hydrocarbons) entering the surface water run-off from the Site, resulting in the pollution of local watercourses.

5.12.34 The Proposed Development will include a surface water drainage network which will be designed in line with local and national policy whilst considering the existing drainage network at the site. Appropriate surface water treatment will be inherent in the drainage design through the incorporation of SuDS features and pollution prevention measures (e.g. interceptors) where possible.

5.12.35 The potential magnitude of accidental spillages (operational chemicals) is also very low, with failsafe measures inherent within the design of the proposed development and health and safety protocol standard practice within the operational working structure of the Proposed Development.

5.12.36 Therefore, water pollution as a result of general pollution / diffuse pollution entering local watercourses / water features during operation of the proposed development is not considered is not likely to give rise to potentially significant environmental effects and is therefore scoped out of the EIA.

Description of likely significant effects during decommissioning

5.12.37 The potential effects during the decommissioning phases will be similar to those expected during the construction phase, with the mitigation being achieved using the same processes and measures. As a result, it is anticipated that there will not be any significant effects on water receptors as a result of the decommissioning works.

Conclusion

5.12.38 Based on the assessment provided in this report, it is proposed to scope out the water topic from the EIA. Further consultation with NRW, BCBC, and NPTCBC will ensure that the design of Proposed Development and any proposed mitigation measures can be agreed in advance of the DNS submission.

5.12.39 The potential for flood risk will be considered within an FCA which will be submitted in support of the DNS application. The FCA will focus on the following:

- Obtaining and reviewing relevant data and background information from NRW and other relevant authorities, including modelled flood level and flow data for any nearby watercourses, details of historical flood events and any other pertinent information;
- Contacting the relevant Local Authority to obtain the findings of any Strategic Flood Consequence Assessment, Preliminary Flood Risk Assessment and Local Flood Risk Management Plan commissioned by them;
- Contacting the local sewerage company (Dwr Cymru/Welsh Water) for details of any existing drainage apparatus in the site area;
- Assess the feasibility of SuDS that could potentially be incorporated into the development and the drainage design. The design has the opportunity to utilise SuDS which offer ecological benefits and help improve water quality;
- Provide an assessment of the flood risk to the proposed development and any flood risk impacts arising from the proposed development, and identify any mitigation requirements to reduce these risks to an acceptable level; and,
- Preparation of a detailed FCA report and outline surface water drainage strategy principles (where relevant) will be carried out to address the management of surface water run-off from the proposed development, such that flood risk to the surrounding area is not increased and with due consideration of flows to the local drainage system.

References

- Welsh Assembly Government (2021) Planning Policy Wales Edition 11
- Welsh Assembly Government (2004), Planning Policy Wales Technical Advice Note 15: Development, flooding and coastal erosion
- Natural Resources Wales online 'Development Advice Map', available at: https://naturalresources.wales/flooding/flood-map-for-planning-development-advice-map/?lang=en
- Natural Resources Wales online 'Flood Map for Planning' available at: https://naturalresources.wales/flooding/flood-map-for-planning-development-advice-map/?lang=en
- British Geological Survey online mapping, available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html?location=&gobBtn=go
- Natural Resources Wales 'Data Map Wales' online mapping, available at: https://datamap.gov.wales/maps/new?layer=inspire-nrw:NRW_Source_Protection_Zones#/
- MagicMap online mapping, available at: https://magic.defra.gov.uk/magicmap.aspx

6 ENVIRONMENTAL FACTORS 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 Biodiversity

6.2.1 Consultation

No pre-scoping consultation has yet been carried out with relevant stakeholders. An ornithology scoping letter was submitted to NRW in November 2022, but no response has been received.

Post-scoping consultation will be undertaken with NRW, BCBC, and NPTCBC to provide them with a detailed baseline to inform comments on the proposed assessment methodologies and mitigation.

If required, NRW will also be consulted to agree a suitable licensing and mitigation strategy for protected species and/or important habitats, including whether existing data will be sufficient to inform a licence application or modification.

6.2.2 Study area

The assessment will use the findings of surveys undertaken at and surrounding the Site. The study area that has been used varies per receptor as described below.

A Preliminary ecological appraisal (PEA) of the proposed construction works area and a surrounding 250m corridor has been undertaken to identify broad habitat types, the potential for protected species to be present, and to inform further survey requirements.

The PEA results will be used to target a National Vegetation Classification (NVC) survey of important or priority habitats within the proposed construction works area and surrounding 250m to provide further information for condition assessments and species lists for habitats of principal importance as listed under Section 7 the Environment (Wales) Act 2016.

A survey area for the preliminary layout design plus 500m has been used for great crested newts (GCN) (*Triturus cristatus*) to identify suitable terrestrial habitats and potential breeding ponds. A 500m buffer is widely accepted as the maximum distance that GCN can travel up to from a breeding pond (providing suitable connectivity is present) during the terrestrial phase of their lifecycle. It is the typical survey radius for large scale projects involving permanent habitat loss (English Nature, 2001), however, where appropriate, this may be reduced to 250m where barriers to the movement of GCN are present, for example.

An assessment of habitats suitable for reptiles has been undertaken within the proposed construction works area and surrounding 250m. The potential for any impacts on habitats suitable for supporting reptiles would be included within any further assessment as part of a reptile mitigation strategy.

An assessment of habitats suitable for dormouse has been undertaken within the proposed construction works area and surrounding 250m. The potential for any impacts on habitats suitable for supporting dormice would be included within any further assessment as part of a dormouse mitigation strategy.

Ornithological surveys have been undertaken to determine the use of the Site by birds during non-breeding (November 2021 to March 2022 and October 2022 to March 2023) and breeding seasons (March to August 2022 and 2023). The site boundary has changed since the design of the ornithology surveys; however, the area covered by these surveys is considered sufficient to cover the alterations. This included flight activity surveys using vantage points and minimum of 36 hours (as recommended by NatureScot (NS) Guidance (Scottish Natural Heritage (SNH) 2017) to record the location and quantity flight paths across the Site, as well as surveys to identify breeding waders (adapted from Brown & Shepard and Calladine et al. 2009), breeding raptors (Hardey et al. 2013) and breeding nightjar (Gilbert et al. 1998). The surveys targeted those species which are particularly vulnerable to wind farm developments, and if any Schedule 1 listed species and/or species of conservation importance are present which may require a larger buffer distance than more common species to prevent disturbance during the breeding season.

Badger (*Meles meles*) surveys within the proposed construction works area plus the surrounding 30m were undertaken to record field activity and the presence of badger setts. A 30m buffer is typically recommended to protect a badger sett during construction (NRW, 2018; English Nature, 2002). Any setts within this distance may therefore be affected by the Proposed Development and will need to be considered in the assessment.

The preliminary roost assessment (PRA) for bats will include all trees and buildings within the works area (i.e., if any trees are predicted to be felled) and up to 200m from turbine locations plus rotor radius to identify important roost sites, such as maternity roosts, significant hibernation and/or swarming sites (NatureScot, 2016). Further surveys will focus on these possible important roosts and/or swarming sites following stakeholder consultation and once design plans have been finalised.

Bat activity surveys will focus on proposed wind turbine locations using static detectors to identify the species assemblage that may be affected by the Proposed Development. Surveys started in April 2023 and will continue until June 2024 following NatureScot (2016) and Colins (2016) guidelines.

Water vole (Arvicola amphibius) surveys commenced in 2023 of all watercourses to be impacted by the Proposed Development, plus up to 100m upstream and downstream (where accessible) with a second survey visit programmed. A distance of 100m upstream and downstream has been used as works are unlikely to directly impact watercourses on a permanent basis. This survey buffer would account for any local water vole population that could commute further along the watercourse and into the Site boundary (Dean et al., 2016).

Otter (*Lutra lutra*) surveys were carried out alongside the water vole surveys for all watercourses and waterbodies in, and adjacent to, the site boundary. The surveys initially assessed the suitability of the watercourses and waterbodies to support otters and to determine the presence or absence of the species and their places of shelter/rest.

Habitat assessments for brown hare, polecat and hedgehog were also undertaken to identify areas of suitable habitat within the works area and surrounding 250m. Suitable habitat likely to be impacted has the potential to support these species and therefore would be included within any further assessment.

As part of the PEA, a background data search (BDS) for information relating to ecology (e.g., statutory and non-statutory designated sites and protected species records) was undertaken. This included a search for international (10km) and national statutory designated sites (2km) such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites and Sites of Special Scientific Interest (SSSI) on the Site and surrounding area.

Protected species records obtained from the local record centre for the Site and extended to 2km beyond the Site boundary. The BDS was also made for non-statutory designated sites (often important in a local context) on the Site and within 2km of the Site boundary as well as ancient woodlands within the Site boundary and within 1km of the Site boundary.

Therefore, the Site and 2km surrounding it is considered to be the Zone of Influence (ZoI) for the majority of biodiversity receptors; extending to 10km to consider statutory sites for birds and bats. The ZoI is the area encompassing all predicted ecological effects from the Proposed Development, including all ancillary, associated temporary and permanent works.

6.2.3 Data sources to inform the EIA baseline characterisation

The proposed assessment scope has been based on:

- A background data search from Aderyn records centre which included a search for designated sites and protected species records within 2km of the Site, extended to 10km for SPAs, SACs, Ramsar sites and SSSIs.
- The Multi-Agency Geographic Information website (MAGIC) to view statutory designated nature conservation sites.
- DataMapWales: https://datamap.gov.wales/
- Designations and legal protection of noteworthy species: Joint Nature Conservation Committee (JNCC) website
- Details of species and habitats listed on the Neath Port Talbot Local Nature Recovery Action Plan: NPT Nature Partnership website https://www.npt.gov.uk/5405
- Details of species and habitats listed on the Bridgend Local Biodiversity Action Plan. Website https://www.bridgend.gov.uk/residents/nature-and-environment/nature-recovery-plan/#:~:text=The%20'Bridgend%20County%20Borough%20Local,makes%20suggestions%20for%20conserving%20them.

The assessment (post-scoping) will also be based on surveys undertaken by the Project Team in 2023 and 2024.

6.2.4 Surveys to inform the EIA baseline characterisation

The proposed assessment scope has been informed by the data sources described in **Section 6.2.3** alongside the following surveys undertaken by the Project Team in 2023:

- PEA (May / July 2023, of scoping design layout).
- Reptile habitat assessment (May 2023).
- Ornithological surveys (November 2021 to September 2022, and October 2022 – September 2023: Two years).
- Water vole survey (June 2023, habitat assessment and first survey visit).
- Otter survey (June 2023)
- Badger survey (May 2023)
- Completion of NVC botanical surveys (August 2023)
- Brown hare, hedgehog and polecat habitat assessments (August 2023).

Post-scoping will be informed by the following additional surveys, due to be undertaken in 2023/2024:

- GCN surveys of ponds, including habitat suitability index (HSI) and presence/absence surveys (April to June 2024).
- PRA surveys of potential structures (trees and buildings) likely to support bat roosts (April or May 2024).
- Bat roost presence or absence survey (if required, May to September 2024).

6.2.5 Baseline conditions

Introduction

The existing ecological baseline is based on both desk and field-based studies as part of the PEA and other surveys undertaken to date.

The Site is dominated by other neutral and modified grassland, many of these fields bordered by hedgerows, with areas of wet, broadleaved, other coniferous and mixed woodland, gorse and bramble scrub and fen marsh and swamp. Areas of modified grassland are actively grazed by both sheep and cows, with areas also being mown for silage. Several tributaries for the Afon Cynffig and Llynfi Rivers cross or border the Site boundary.

The Site is predominantly bordered by further areas of agricultural land to the north, south and east, with the Western border of the Site adjacent to both forested and agricultural areas. The surrounding area is generally made up of agricultural fields sparsely interrupted by forested areas with only small residential areas immediately adjacent to the Site. A review of aerial photographs and Ordnance Survey maps show that there are 45 ponds located on or within 500m of the Site.

Designated sites

There are four statutory designated sites within a 10km radius. These include three internationally designated SAC sites and one nationally designated SSSI sites. Details of these are presented below:

- **Glaswelltiroedd Cefn Cribwr / Cefn Cribwr Grasslands SAC** (located approx. 2km east of the Site): This is one of four sites representing Molinia meadows in south and central Wales, one of the major UK strongholds for this habitat type. At this site, there are extensive stands of M24 Molinia – *Cirsium dissectum* fen-meadow, including the

heathy sub-type with cross-leaved heath *Erica tetralix*, as well as other forms with a stronger representation of grasses, rushes and small sedges. Transitions to stands of more acidic Molinia and Juncus pasture, dry neutral grassland and wet scrub vegetation are well-represented. Uncommon and declining species associated with the Molinia meadows at this site include the nationally rare viper's-grass *Scorzonera humilis and* the nationally scarce soft-leaved sedge *Carex montana*. The site also has Marsh fritillary butterflies (*Euphydryas aurinia*) using the site.

- **Blackmill Woodlands SAC** (located approx. 4.1km east of the Site): Qualifying Annex I habitats include: Fixed dunes with herbaceous vegetation ("grey dunes"), Atlantic salt meadows (*GlaucoPuccinellietalia maritimae*), Dunes with Salix repens ssp. argentea (*Salicion arenariae*), Hard oligomesotrophic waters with benthic vegetation of Chara spp., and Humid dune slacks. Qualifying Annex II habitats include: Fen orchid (*Liparis loeselii*) and Petalwort (*Petalophyllum ralfsii*).
- **Kenfig / Cynffig SAC** (located approx. 5.2km south of the Site): Qualifying features include: Dune grassland. Fixed dunes with herbaceous vegetation ("grey dunes"), Atlantic salt meadows (*Glauco-Puccinellietalia*), Dunes with creeping willow, Salix repens ssp. argentea (*Salicion arenariae*), Calcium-rich nutrient-poor lakes, lochs and pools. Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp., Humid dune slacks, presence of Fen orchid (*Liparis loeselii*), and presence of Petalwort (*Petalophyllum ralfsii)*.
- **Cwm Risca Meadow SSSI** (located partly within the Site boundary): Designated for Old wet acidic meadow on Coal measure rocks supporting over 80 species of herbaceous plants and supporting a colony of Marsh Fritillary butterfly *(Euphydryas aurina)*.

Non-Statutory Designated Sites

There are 30 non-statutory designated sites within the Site boundary, or within 2km of the Site boundary. The 30 non-statutory designated sites are described below and are based on the information available from the BDS, all distances are approximate:

- NPT Watercourses SINC (located within Site boundary): All NPT watercourses are designated as SINCs.
- NPT Ancient Semi-Natural Woodland SINC (located within Site boundary).
- Cwm Nant Gwyn SINC (located within Site boundary): Broad leaved semi natural woodland.
- Nant Cwm-bach SINC (located 178m south-east of the Site): Broad-leaved semi-natural woodland, coniferous plantation, marsh/marshy grassland.
- Giffach Uchaf SINC (located 232m north-west of the Site): Marsh/marshy grassland, semi-improved acid grassland, acid dry dwarf shrub heath, natural acid/neutral rock exposure.
- Coed Tondu SINC (located 254m east of the Site): Broad-leaved semi-natural woodland, unimproved neutral grassland, dry heath/acid grassland mosaic.
- Nant Bryncynan Woods SINC (located 306m north of the Site): Broad-leaved semi-natural woodland.
- Coed Pentwyn SINC (located 534m east of the Site): Broad-leaved semi-natural woodland.
- Cwm Cefnydfa SINC (located 695m north-east of the Site): Broad-leaved semi-natural woodland, dense continuous scrub, man-made rain fed pools.

- Ton Phillip Farm SINC (located 707m south of the Site).
- Waun-y-Gilfach woods SINC (located 902m north of the Site): Broad-leaved semi-natural woodland, marsh/marshy grassland.
- Hafodheulog Wood North Meadow SINC (located 989m south of the Site):Purple moor-grass and rush pastures.
- Aberbaiden Farm Meadows SINC (located 1km south of the Site): Purple moor-grass and rush pastures and breeding lapwing.
- Nant-y-Castell Grasslands SINC (located 1.1km north-west of the Site): Unimproved neutral grassland, dense continuous bracken.
- Parc Slip Nature Park SINC (located 1.1km south of the Site): North of site are three areas of unimproved neutral grassland and marshy grassland. Central part mixed plantation woodland and improved grassland. Small standing water areas in the south of the site.
- Parc Pond SINC (1.1km south of the Site): Pond habitat.
- Aberbainden Farm Small Meadow SINC (located 1.2km from the Site): Purple moor-grass and rush pastures.
- Coed Coytrahen SINC (located 1.2km east of the Site): Broad-leaved semi-natural woodland.
- Hafodheulog Wood East Meadow SINC (located 1.3km south of the Site): Purple moor-grass and rush pasture.
- Nant Mwrth SINC (located 1.3km east of the Site): Broad-leaved semi-natural woodland, semi-improved neutral grassland, unimproved neutral grassland, marsh/marshy grassland, continuous bracken.
- Ty'n-y-Waun SINC (located 1.3km north of the Site): Marsh/marshy grassland, semi-improved neutral grassland, broad-leaved semi-natural woodland along proposed community route.
- Rifle Range Wood SINC (located 1.4km east of the Site): Broad-leaved semi-natural woodland, semi-improved neutral grassland.
- Tylacoch South SINC (located 1.5km north-east of the Site): Rare breeding birds.
- Llywn-y-Brian SINC (located 1.5km north-east of the Site): Broad-leaved semi-natural Woodland.
- Cwm Cerdin SINC (located 1.5km north-east of the Site): Broad-leaved semi-natural woodland, unimproved neutral grassland, tall herb fern interspersed in improved grassland.
- Llan Road Woods SINC (located 1.7km north of the Site): Bracken, dense continuous scrub, marsh/marshy grassland, scattered broad-leaved trees.
- Lletty Brongu SINC (located 1.8km north of the Site): Ancient woodland, wet valley bottom, rare breeding birds.
- Bettws West SINC (located 1.9km north-east of the Site): Semi-improved acid grassland, broad-leaved semi-natural woodland, dense continuous scrub, acid neutral flush.
- Cwm Ffos Farm SINC (located 1.9km south of the Site): Dense Continuous Scrub, Marsh/marshy Grassland, Semi-improved neutral grassland, broad-leaved semi natural woodland.

- Bedford Park SINC (located 1.9km north-east of the Site): Marsh/marshy grassland, semi-improved neutral grassland, cultivates amenity grassland, dense continuous scrub, broad-leaved semi-natural woodland, scattered bracken.

Protected and noteworthy species records

At least 237 noteworthy species are recorded from places within 2km of the Site boundary. Noteworthy species include species of principal importance that are listed under Section 7 of the Environment (Wales) Act 2016. Of these, five are amphibians, 102 are birds, two are fish, 79 are invertebrates, 21 are mammals (of these, 14 are bats) and 18 are plants.

Protected and notable species

Fish

No protected fish were recorded in the BDS, but records of two Section 7 species European eel (*Anguilla anguilla*) and brown trout (*Salmo trutta*) were identified. The watercourses on site are likely to support a diverse assemblage of fish species including European eel and brown trout.

Invertebrates

The background data search returned records of 152 invertebrate species including 63 Section 7 species one of which is also an Annex II species – Marsh Fritillary (Euphydryas aurinia). There are a few small discrete areas of habitats suitable to support invertebrates across the site, though none of them are large enough to support a significant population and none of them included substantial numbers of devil's bit scabious. These are likely to form a corridor for invertebrates between suitable habitat in the surrounding area.

Great crested newts (GCN)

The background data search returned records of all five common amphibian species, including GCN protected under Annex II and are priority species under Section 7 together with common toad (Bufo bufo). There are at least 45 ponds within 500 m of the works area, whilst suitable terrestrial habitat for GCN is present across the vast majority of the Site. There are hibernation opportunities within these habitats as well as remnant stone walls.

Reptiles

The background data search returned records of all four common species of reptile: adder (*Vipera berus*), common lizard (*Zootoca vivipara*), grass snake (*Natrix helvetica*) and slow-worm (*Anguis fragilis*). Common lizards were recorded at several locations during the PEA field survey. The study area contains suitable habitats for reptiles including less intensely grazed areas of neutral grassland and marshy grassland as well as areas of bracken, scrub and remnant stone walls.

Badger

The background data search returned records of badger, including setts, within 2km of the Site. The study area contains suitable habitat for sett building, foraging and commuting including woodland, scrub, hedgerows and grassland. However, no setts nor other badger field signs were identified during the survey.

Bats

The BDS returned records of at least ten species of bat within 2km of the site, including lesser horseshoe bat (Rhinolophus hipposideros) and greater horseshoe bat (*Rhinolophus*

ferrumequinum); both are protected under Annex II and are priority species under Section 7 together with Noctule (*Nyctalus noctula*), Common pipistrelle (*Pipistrellus pipistrellus*), Soprano pipistrelle (*Pipistrellus pygmaeus*) and Brown long-eared bat (*Plecotus auritus*). The Site was assessed as offering moderate suitability habitat for foraging and commuting bats due to abundant woodland together with hedgerows and waterbodies present within the site.

Bat surveys for the development are currently underway and have returned records of common pipistrelle (Pipistrellus pipistrellus), soprano pipistrelle (*Pipistrellus pygmaeus*), Barbastelle (*Barbastella barbastellus*), Brandts (*Myotis brandtii*), Brown-long-eared (*Plecotus auritus*), Daubenton's (*Myotis daubentonii*), Greater Horseshoe (*Rhinolophus ferrumequinum*), Lesser Horseshoe (*Rhinolophus hipposideros*), Leisler's (*Nyctalus leisleri*), Nathusius's pipistrelle, Natterer's (*Myotis nattereri*), Noctule, Serotine (*Eptesicus serotinus*) and Whiskered (*Myotis mystacinus*) bats.

Hazel dormouse

The BDS contained six records of hazel dormouse within 2km of the Site, five of these being located within the woodland to the west of the site. The most recent of which was dated 2020, 1994m south of the site. The majority of the survey area lacks suitable habitat for dormice to be present. Generally, the hedgerows, scrub or broadleaved woodland in and around the pastoral farmland lacked the species diversity, structural integrity and/or connectivity required for dormice to be present. However, the large woodland to the west of the site does provide suitable habitat and has connectivity to hedgerows and additional woodland in the surrounding landscape so could potentially support dormice.

Otter

The background data search returned multiple records of otter within 2km of the Site. The watercourses on the site provided a suitable foraging resource for otters in addition to commuting habitat, especially given the presence of ponds on the Site which are likely to provide a seasonal food source (i.e., amphibians and waterfowl). Areas of woodland and scrub also provide potential for temporary couches and lay-up sites. Surveys in 2023 did not record any presence of otter (e.g., spraint).

Water voles

The background data search returned six records of water vole within 2km of the Site, with the closest record being 1.1km from the Site. The site has numerous watercourses running through its area, many of these only consist of slow running streams but the high level of connectivity these streams have to the wider landscape increase the likelihood of their utilization by water vole.

Ornithology

The Site contains suitable habitats for a wide variety of foraging and breeding birds, including species protected under Schedule 1 and those of conservation importance (priority species) in Wales (Section 7). The BDS returned records of 32 species listed under Schedule 1, of those relevant to the development include barn owl, buzzard, red kite (*Milvus milvus*), goshawk (*Accipiter gentilis*), kestrel, merlin, sparrowhawk and tawny owl.

A confirmed goshawk nest, with chicks present in the woodland to the west of the Site and a red kite nest outside of the Site to the north. No suitable habitat for breeding merlin was identified within the site.

Ornithology surveys carried out between November 2021 and October 2022 (year 1) recorded species that are defined by legal protection and/or conservation status which are vulnerable to impacts from wind turbines. Further detail on targeted species recorded during the surveys can be found in **Appendix E**.

The Site was found to support a narrow assemblage of breeding and wintering bird species. Activity levels for potentially sensitive species were considered typical of the region and habitats. Overall flight activity of target species was low.

Non-breeding surveys have recorded low levels of red kite activity, and the habitats within the Site are considered to offer very limited habitat for potentially sensitive species.

Breeding season surveys identified a goshawk nest in plantation forestry on the Site, a red kite territory, with a probable nest off-site, and up to four pairs of lapwing within suitable habitats on Site.

Overall flight activity was modest or low, perhaps except for the likely pair of red kites.

Habitats within the site are of poor quality, offering negligible value to most bird species on account of the intensive grazing regime across the majority of the site. The habitats present are highly unlikely to attract or support other sensitive species than those already recorded and therefore the surveys undertaken to date are considered to be representative of bird usage of the site.

Year 2 of the bird surveys are currently underway and are scheduled to be completed in October 2023.

6.2.6 Additional (secondary and tertiary) mitigation

Construction

- GCN licence (if required) to provide details of mitigation (unknown at this stage).
- Roosting bats, including a licence (if required) to provide details of mitigation (unknown at this stage).
- Hazel dormice licence (if required) to provide details of mitigation (unknown at this stage).
- Production and implementation of a CEMP to include the safeguard of the following receptors during construction:
  - Priority habitats.
  - Reptiles.
  - Common nesting birds (including ground nesting).
  - Foraging and commuting bats.
  - Priority species including brown hare, polecat and hedgehog.
- Pre-construction badger survey.
- Pre-construction otter survey.

- Production of a Landscape Ecological Management Plan (LEMP) outlining how the Proposed Development will benefit biodiversity.

Operation

- Any mitigation required to protect priority habitats and species, including the passage of breeding and non-breeding birds across the site.
- Implementation and monitoring of a Landscape Ecological Management Plan (LEMP).
- Continued adherence to condition and monitoring requirements for European Protected Species (EPS) licence submissions for GCN, bats and hazel dormice (if required).

6.2.7 Description of likely significant effects

Construction

Impacts to statutory designated sites

There are no statutory designated sites present within the Site, the nearest being Cwm Risca Meadow SSSI. The site is designated for its botanical interest and the presence of Marsh Fritillary butterfly.

It is not considered that the Proposed Development would have any direct impacts on this site, however, there is a possibility of indirect impacts on this protected site from the site access route which cannot be determined until the design is finalised.

Impacts to non-statutory designated sites

There are three SINCs located on the Site (NPT Watercourses SINC, NPT Ancient Semi-Natural Woodland SINC and Cwm Nant Gwyn SINC), the potential impacts to these sites cannot be determined until the design of the Proposed Development has been finalised.

Habitat loss and degradation of priority habitats

The construction of the Proposed Development (the site access tracks, turbine foundations, and construction compound areas) would result in the loss or alteration of habitat during the construction phase of the Proposed Development. The site access tracks will also potentially impact hedgerows and marshy grassland.

The construction of solar panels could cause some limited loss of hedgerows and marshy grassland to allow for access and cabling.

Operation

Birds (passage/migratory): collision risk

Birds are at risk from collision with turbine rotors have been recorded on the site, which will result in death of individuals and leading to potential loss of breeding sites.

Bats (foraging and commuting): collision risk

The construction of a windfarm may impact foraging or commuting bats that occur on the Site, particularly for high-risk species such as noctule (Nyctalus noctula) and Nathusius's pipistrelle (*Pipistrellus nathusii*).

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
Cwm Risca Meadows SSSI	Construction	There is a possibility of indirect impacts on this protected site from the Proposed Development.
NPT Watercourses SINC / NPT Ancient Semi-natural Woodland SINC / Cwm Nant Gwyn SINC	Construction	There is a possibility of indirect impacts on these protected sites from the Proposed Development.
Woodland	Construction	There is a possibility of direct and indirect impacts on woodland from the Proposed Development.
Birds (passage and migration)	Operation	Target species barn owl, little egret, grey heron, red kite, lapwing, merlin and teal have been identified passing through the Site. Whilst secondary species included nightjar and goshawk. A variety of birds have been recorded foraging and passing-over the Site. The Proposed Development is likely to have a significant effect for certain (vulnerable) species given the risk of collision with rotor blades and the potential displacement of territories. This will be determined though the collision risk assessment.
Bats (foraging and commuting) – Woodland Habitat	Operation	There are collision risks with rotor blades for certain (vulnerable) species of bat. Design plans of the turbine locations will be adjusted away from high quality bat habitat to minimise this risk. Surveys yet to be completed and design plans not yet fixed, therefore there is potential for likely significant impacts effects to occur.

6.2.9 Receptors/elements to be scoped out of the assessment

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

It is considered that the effects of decommission will not be greater than those at construction and operation and therefore the decommissioning phase of the Proposed Development has been scoped out of the assessment.

Receptor/Element	Phase	Justification
Statutory Designations – All sites within 2km (except Cwm Risca Meadows SSSI)	All phases	All statutory designations within 2km of the Site (with the exception of Cwm Risca Meadows SSSI) have been scoped out due to the large intervening distance and lack of ecological pathways.
Non-statutory designations – All sites within 2km (except NPT Watercourses SINC, NPT Ancient Semi-natural Woodland SINC, and Cwm Nant Gwyn SINC)	All phases	All non-statutory designations within 2km of the Site (with the exception of NPT Watercourses SINC, NPT Ancient Semi-natural Woodland SINC, and Cwm Nant Gwyn SINC) have been scoped out due to the large intervening distance and/or lack of ecological pathways.
Hedgerows	All phases	While the majority of hedgerows on the Site are of poor condition, there are some where it is considered necessary to determine their importance under the Hedgerow Regs if they are to be impacted by the Proposed Development. However, this cannot be determined until the design is fixed. Mitigation measures detailed in the CEMP will safeguard hedgerows.
Invertebrates	All phases	There are a few small discrete areas of habitats suitable to support invertebrates across the Site, though none of them are large enough to support a significant population. Surveys conducted to date have recorded only small, isolated areas of habitat suitable to support Marsh Fritillary.
GCN	All phases	The Proposed Development will avoid direct impact on ponds recorded on Site, therefore it would only be small areas of terrestrial habitat that will be impacted. Construction works present a high risk to GCN and an EPS licence may be required which will detail mitigation measures. The CEMP and/ or EPS licence will detail and enshrine the required mitigation as part of the planning permission and therefore there will be no significant effects on GCN.

Hazel dormouse	All phases	Dormice are known to be present within the woodland to the west of the site boundary. Impacts to dormice will be minimised or avoided through strategies in the CEMP. Where impacts are unavoidable, then an EPS licence will be required which will detail mitigation measures. The CEMP and/ or EPS licence will detail and enshrine the required mitigation as part of the planning permission and therefore there will be no significant effects on dormice.
Water vole	All phases	Currently, water voles have not been recorded on the Site, however further surveys in spring 2024 are required to fully confirm absence. Impacts to watercourses are only likely to occur at crossing points for the proposed site access roads. In the unlikely event water voles are found to be present, a mitigation licence will be required, detailing the mitigation. The CEMP and/ or EPS licence will detail and enshrine the required mitigation as part of the planning permission and therefore there will be no significant effects on water vole.
Reptiles	All phases	Common species of reptile are known to occur on Site and have been assumed to be present in all areas of suitable habitat. Mitigation measures detailed in the CEMP will safeguard reptiles from injury or killing during vegetation clearance and site preparation works. The CEMP will detail and enshrine the required mitigation (displacement methodology for vegetation clearance) as part of the planning permission and therefore there will be no significant effects on reptiles.
Badger	All phases	Records of badger were identified within the BDS however no badger activity or setts have been recorded on Site. Pre-construction surveys can be undertaken to confirm the continued absence of setts within and adjacent to work areas for the Proposed Development. Therefore, there will be no significant effects on badgers.

Birds (passage and migration)	Construction	Target species, including barn owl, little egret, grey heron, red kite, lapwing, merlin, and teal have been identified passing through the Site. Whilst secondary species recorded include nightjar and goshawk. A variety of birds have been recorded foraging and passing-over the Site. Strategies as part of the CEMP will minimise fragmentation and lighting impacts during construction. The LEMP will aim to mitigate for any temporary or permanent loss of foraging or commuting habitat.
Birds (nesting)	Construction and operation	The implementation of mitigation strategy detailed in the CEMP will sufficiently safeguard nests during construction. Strategies as part of the CEMP will minimise impacts on ground nesting and mitigation measures will be outlined in the LEMP. Initial results from the completed year 1 surveys indicate that any significant effect on nesting birds are unlikely, however, the full results (following completion of the year 2 surveys) may require species specific mitigation. Strategies as part of the CEMP will minimise impacts to nesting birds and as such no significant effects are envisaged.
Bats (foraging and commuting) – Woodland Habitat	Construction	Strategies as part of the CEMP will minimise fragmentation and lighting impacts during construction. The LEMP will aim to mitigate for any temporary or permanent loss of foraging or commuting habitat.
Bats (foraging and commuting) – Grassland Habitat	All phases	Strategies as part of the CEMP will minimise fragmentation and lighting impacts during construction. The LEMP will aim to mitigate for any temporary or permanent loss of foraging or commuting habitat.
Bats (roosting)	All phases	Trees with potential for roosting bats will be affected during the construction of the turbines and site access tracks. However, it is currently unknown if these trees support roosting bats and the development design hasn't been finalised.

		PRA and presence/absence surveys (if required) are yet to commence to identify important maternity, hibernation or swarming sites within c. 200m of each turbine location. Where possible, the Proposed Development will look to avoid impacts to bat roosts. Where this is unavoidable, then an EPS licence will be required which will detail mitigation measures and as such no significant effects are envisaged.
Fish	Construction and operation	Strategies as part of the CEMP will minimise impacts to watercourses and, as such, no direct or indirect effects on fish are envisaged.
Otter	Construction and operation	No evidence of otter has been recorded on the Site. Pre-construction surveys will be undertaken to confirm the continued absence of holts, couches and lay-ups within and adjacent to work areas for the Proposed Development.
Pine marten	Construction and operation	The BDS returned records of pine martin within 2km of the Site in Margam Forest. The majority of the Site does not provide suitable habitat for pine martin. The areas of woodland present may form part of a larger territory for pine martin. Mitigation measures detailed in the CEMP will safeguard from injury or killing during vegetation clearance and Site preparation works.
Other priority species	Construction and operation	Brown hare, polecat and hedgehog have the potential to occur in the works area due to the presence of suitable habitat. Mitigation measures detailed in the CEMP will safeguard these species from injury or killing during vegetation clearance and Site preparation works.
Invasive non-native species (of plant)	Construction and operation	Himalayan balsam was recorded within the site. Mitigation measures detailed in the CEMP will safeguard these species from spreading during vegetation clearance and Site preparation works.

6.2.10 Opportunities for enhancing the environment

In the first instance, impacts to key receptors where significant effects are anticipated will be explored with the aim of avoiding or reducing impacts. Where this isn't possible, the following compensation and enhancement measures would be explored.

Woodland and hedgerows are listed under the Bridgend Local Biodiversity Action Plan and Neath Port Talbot Local Nature Recovery Action Plan, these are also listed as priority habitats on the Environment (Wales) Act 2016. Where feasible, these priority habitats, particularly the areas of woodland, would be avoided by the development.

Opportunities for restoration and enhancement of priority habitats would be explored and incorporated into the design proposals as part of the objective to deliver a biodiversity gain. This may include, but will not be limited to, reduction in grazing pressures in certain key areas.

The majority of hedgerows in the survey area were either defunct or in poor condition. The planting of new hedgerows and enhancement of existing hedgerows on the Site would deliver a biodiversity benefit.

Areas of scattered and dense scrub provide habitat for a wide variety of birds, mammals, and invertebrates, especially when present alongside other habitat types such as woodland and grasslands. Where the removal of scrub is required consideration would be given to compensation through the planting of additional areas using species native to Wales, of local provenance and be of value to local wildlife.

If protected species are found to be present, then there is considerable scope to provide enhancement and compensation measures through the creation of new habitats, i.e., hedgerow planting for dormice, pond creation for GCN and woodland planting for bats. The requirement and specification for this would be determined by the need for EPS licensing.

Enhancement measures for breeding birds, will first and preferably consider on site options away from turbine locations. Where this isn't feasible or appropriate then off site compensation and enhancement measures will be considered. The Project Team will consult with NRW's ornithological specialists regarding opportunities for on-site and off-site compensation and enhancement measures.

The results of the ecology surveys will influence the site design and layout to ensure that the development provides a net benefit. This will be demonstrated in a net benefit assessment that will deliver substantial gain addressing local and regional biodiversity priorities. An ecosystem resilience assessment will also be completed.

6.2.11 Proposed assessment methodology

For the purpose of this scoping report, the ornithology and other ecology information has been combined. In the ES there will be a standalone ornithology chapter as well as a standalone ecology chapter.

The Ecological Impact Assessment (EcIA) and Ornithological Impact Assessment (OIA) will follow:

- Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland, referred to here as 'the CIEEM Guidelines' (CIEEM, 2018).
- SNH (2016). Assessing Connectivity with Special Protection Areas (SPAs). Version 3.

- SNH (2017). Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms V2. Scottish Natural Heritage, Inverness.

The significance criteria proposed for the biodiversity assessment is presented in **Appendix K**.

6.2.12 Difficulties and uncertainties

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

- As the design has yet to be finalised there is still uncertainty the exact locations of the turbines and solar panels.
- Survey work to date has not extended to the large woodland to the west of the site and so this area cannot currently inform this assessment.

6.2.13 References

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- Scottish Natural Heritage. (2021). Bats and onshore wind turbines: survey, assessment and mitigation. SNH, Inverness.

- Collins, J. (2023), Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th edition). The Bat Conservation Trust, London.
- NatureScot. (2016). Guidance - Assessment and mitigation of impacts of power lines and guyed meteorological masts on birds. Available at: https://www.nature.scot/guidance-assessment-and-mitigation-impacts-power-lines-and-guyed-meteorological-masts-birds, accessed March 2023.
- Scottish Natural Heritage (2016). Guidance - Assessing Connectivity with Special Protection Areas (SPAs), Version 3. Available at: https://www.nature.scot/sites/default/files/2022-12/Assessing%20connectivity%20with%20special%20protection%20areas.pdf, accessed March 2023.
- Scottish Natural Heritage (2017). Recommended Bird Survey Methods to Inform Impact Assessment of Onshore Wind Farms, Version 3. Available at: https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf, accessed March 2023.

6.2.14 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?
- 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 proposed additional (secondary and tertiary) mitigation measures and is this mitigation appropriate?
- Do you agree with the receptors/matters that are proposed to be scoped in and out of the EIA?
- Do you agree with the proposed factor-specific assessment approach?

6.3 Climate

6.3.1 Consultation

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

6.3.2 Study area

The study area is defined as the area within the Site boundary for climate change mitigation (i.e., assessment of greenhouse gas emissions from the Proposed Development).

The GHG Protocol, widely understood as the industry standard GHG reporting protocol, defines GHG emissions into 3 scopes. Scope 1 (direct) emissions will include those emitted directly from all facilities and infrastructure under the operational control of the Proposed Development, and likely within the Site. However, indirect Scope 2 and any relevant Scope 3 emissions will occur outside the proposed Site boundary.

These emissions will be estimated based upon project-specific data that may relate to activities outside the Site boundary (e.g. the embodied carbon within construction materials and solar PV units as a result of the energy used for production).

6.3.3 Data sources to inform the EIA baseline characterisation

The proposed GHG assessment will be in accordance with the IEMA Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022), the GHG Protocol, PAS 2080:2016 Carbon Management in Infrastructure, and Royal Institute of Chartered Surveys (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 (2023).

The assessment will consider BCBC's declarations regarding climate change: with a climate emergency being declared as of June 2020 which was accompanied by a commitment to reduce carbon emissions to net zero, in line with the Welsh public sector target of 2030.

6.3.4 Surveys to inform the EIA baseline characterisation

No surveys have been undertaken to date, and none are expected to be undertaken to inform the climate assessment.

6.3.5 Baseline conditions

The baseline conditions describe the conditions of a business-as-usual scenario whereby the Proposed Development is not undertaken. In the case of GHG emissions, the sensitive receptor is the stability of the global climate.

Current information suggests no significant peat deposits are located in the Site.

A large Natural Resources Wales (NRW) woodland is located at the eastern end of the Site. Given these baseline characteristics, it is likely that the Site presently sequesters carbon.

6.3.6 Additional (secondary and tertiary) mitigation

Construction

The generation of GHG emissions is inevitable due to construction activities. Embodied GHG emissions will also be present due to production of wind turbines and associated infrastructure.

A CEMP will 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:

- Embed carbon reduction practices as a core principle for the design team. Where reduction ideas are suggested, they would be recorded and their potential impact quantified. Early engagement with carbon reduction allows for the greatest returns, as earlier adoption increases the scope of available measures and allows for the implementation of the most beneficial options.
- 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.
- Require main contractors to report on energy usage, 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. Any such measures will be documented in the Landscape and Ecological Management Plan (LEMP).

Decommissioning

The decommissioning process is likely to result in GHG emissions, particularly from waste disposal of any solar PV units, BESS, and the removal or renewal of wind 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.

6.3.7 Description of likely significant effects

The receptor, in this case, 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.

The key means by which a Renewable Energy Park may have effects relating to climate change is in its generation of renewable close-to-zero emissions electricity, in place of emissions-intensive sources derived from fossil fuel. However, emissions reductions of this nature also need to be understood in the context of the carbon emissions associated with the manufacture, construction and decommissioning phases of the Proposed Development, including limiting the sequestration capacity of the land. The ES will therefore include a calculation of net carbon savings from the Development which will be presented in the ES.

For this reason, the overall net effect of the Proposed Development upon the climate is likely to be significantly positive.

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
GHG emissions	Construction	Embodied carbon emissions of wind turbines, solar PV modules and BESS can be relatively high. It is important to include construction-related emissions when considering the overall lifecycle emissions of the Proposed Development, to determine an accurate 'carbon-payback' time of the project.
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 waste disposal of solar PV units, BESS and the removal or renewal of turbines. It is important to include all emissions when considering the overall lifecycle emissions of the Proposed Development, to determine an accurate 'carbon-payback' time of the project.

6.3.9 Receptors/elements to be scoped out of the assessment

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

Receptor/Element	Phase	Justification
Climate resilience	All phases	In Wales, climate change is projected to result in warmer temperatures, decreased summer rainfall but increased winter rainfall and sea level rise. None of these trends are anticipated to impact upon the Proposed Development by virtue of its in-built resilience (with respect to temperature) and the elevated position of turbines (with respect to both rainfall and sea level rise). A further variable with respect to the changing climate is sea level pressure which contributes towards wind speed. Projections relating to sea level pressure show considerable uncertainty. As braking mechanisms on turbines allow for operation only under specific wind speeds, should severe windstorms be experienced, then the turbines would shut down. It is therefore unlikely that significant effects upon the Proposed Development will arise as a result of climate change, and this topic can be scoped out of further assessment.

6.3.10 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.

6.3.11 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 2080:20123 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 onshore windfarms within the UK. The tool provides for the calculation CO_2 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 and ecology 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, the latest version of the carbon calculator tool is V1.7.0 (as of August 2023).

If applicable, the GHG emissions associated with the construction / operation / decommissioning of any solar PV modules and/or BESS will be incorporated into the outputs of the Scottish Government's carbon calculator tool. This will follow the guidance of PAS2080:2013 and ensure a conservative assessment of any possible GHG emissions.

The significance of the effects relating to climate change caused by the proposed development will be assessed using IEMA's Guidance to Assessing GHG Significance (2022).

Given the international urgency of climate change, the sensitivity of the receptor (i.e. global climate) to fluctuations in GHG emissions is considered 'Very High'. Thus, the level of the significance of effects is determined by the magnitude, and timing, of GHG emissions and the likelihood of avoiding severe climate change. The significance criteria proposed for the GHG assessment is presented in **Appendix K**.

6.3.12 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.

6.3.13 References

- BEIS (2022) UK local authority and regional greenhouse gas emissions national statistics: 2005-2020
- 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
- Bridgend County Council (2023) Bridgend 2030 Net Zero Carbon Strategy 10602d-bridgend-2030-net-zero-carbon-strategy-en-0612.pdf
- PAS 2080:2016 (2016) Carbon Management in Infrastructure
- RICS (2017) Royal Institute of Chartered Surveys (RICS) Whole life carbon assessment for the built environment
- 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 November 2022.
- 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
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6.3.14 Scoping questions

- Do you agree with the components proposed to be scoped in (GHG emissions of construction, operation and decommissioning) of the EIA?
- Do you agree with the components proposed to be scoped out (climate resilience of all phases of the project) of the EIA?

6.4 Cultural Heritage

6.4.1 Consultation

On 20th July 2023, contact was initiated by Pegasus Group with Neil Maylan, Senior Historic Environment Planning Officer at Cadw, and Rob Dunning, Archaeological Planning Officer at the Glamorgan-Gwent Archaeological Trust (GGAT), to discuss the scope and methodology of cultural heritage baseline studies required for the EIA.

On 24th July 2023, Mr Dunning responded on behalf of GGAT. He agreed that a Heritage Desk-Based Assessment (HDBA) should be prepared in the first instance. He approved the proposed study areas, recommended consultation of the National Monuments Record (NMR) as an additional data source, and asked that Glamorgan Archives and the Central Register of Aerial Photographs for Wales be specified as the county record office and national repository for aerial photographs respectively. He requested a Written Scheme of Investigation (WSI) for the HDBA prior to commencement.

On 1st August 2023, Mr Maylan responded on behalf of Cadw. He approved the proposed study areas, recommended consultation of the NMR, and queried whether a Site walkover survey would be carried out (this had been phrased as a Site visit in the initial email from Pegasus Group). He indicated that viewpoints could be agreed once a draft setting assessment had been prepared; and stated that the impact on the setting of the Registered Historic Landscape should be assessed using Cadw's setting methodology and that an Assessment of the Significance of the Impact of Development on Historic Landscape (ASIDOHL) is not required.

On 4th August 2023 contact was initiated by Pegasus Group with the Conservation Team at BCBC. A holding response was provided by Moira Lucas, Senior Conservation and Design Officer on 9th August 2023 and separately on the 20th November 2023.

It is understood from Mr Dunning at GGAT (correspondence dated 8th August 2023) that there is currently no Conservation Officer at NPTCBC, but that GGAT does comment on built heritage if appropriate.

6.4.2 Study area

The HDBA will identify all designated historic assets within a minimum 10km-radius study area measured from the Site boundary, and all non-designated historic assets within a 3km-radius study area measured from the Site boundary. Other sources of information, such as historic maps and aerial photographs (see below), are likely to be focussed on the Site and outlying land within a 1km-radius.

The Zone of Theoretical Visibility (ZTV) and Screened Zone of Theoretical Visibility (SZTV: where existing vegetation and built form is taken into account within the modelling) to be prepared as part of the Landscape and Visual Impact Assessment (LVIA) will be used as a tool of assessment. The ZTV will be utilised to 'sieve' out assets which have no theoretical visibility of the Proposed Development.

It is understood, though, that 'setting' is not a purely visual concept, and therefore assets that fall outside of the ZTV will also be assessed to ensure they do not have an historic associative functional relationship with the Site which could be impacted by the Proposed Development despite having no theoretical visibility.

Assets beyond the proposed 10km study area for designated historic assets will be considered with reference to the SZTV. Any assets which may have the potential to experience effects arising from the Proposed Development will be considered within the assessment.

6.4.3 Data sources to inform the EIA baseline characterisation

The following data sources will inform the HDBA:

- Cadw for information regarding designated historic assets;
- The GGAT HER for information relating to previous archaeological investigations, recorded historic assets, historic place names, and Historic Landscape Characterisation data;
- The National Monuments Record of Wales (NMRW) for information relating to previous archaeological investigations, recorded historic assets, and historic place names;
- Previous published and grey literature reports relating to any archaeological investigations previously undertaken;
- Historic maps and other relevant documentary sources held by Glamorgan Archives and available through The Genealogist, National Library of Wales, and Promap websites;
- The Central Register of Aerial Photographs for Wales, available online through the Welsh Government's Aerial Photography Unit website;
- Digital terrain model LiDAR data, available at 1m spatial resolution, from the Environment Agency Open Source Archive; and
- Online resources, including geological data from the British Geological Survey, soil data from the Cranfield Soil and Agrifood Institute, and recent satellite imagery available on Google Earth.

In addition, a walkover survey (comprising a visual inspection only) will be undertaken of the Site. Designated historic assets deemed potentially sensitive to the Proposed Development will be inspected from the Site and accessible public rights of way for the purposes of setting assessment.

Currently only Cadw and HER data has been reviewed; and only selected designated historic assets, namely the Scheduled Monuments within the Site and on high ground to the north-west of the Site, have been visited. The additional sources of information listed above will be reviewed, and further visits undertaken, following scoping.

6.4.4 Surveys to inform the EIA baseline characterisation

The baseline conditions and assessment methodology presented in this chapter are based on the research undertaken to date. The baseline that will be presented in the ES will be informed by the findings of a full HDBA, walkover survey, and site visits as well as any additional, follow-on archaeological surveys and fieldwork that may be requested by statutory heritage consultees.

6.4.5 Baseline conditions

There are four Scheduled Monuments located within the Site, please refer to **Appendix F (Figure F.3)**. These are named:

- Earthwork & Platform Houses N of Nant Fadog;
- Mynydd Ty Talwyn Ancient Farms (West);
- Mynydd Ty Talwyn Ancient Farms (East); and
- British Fortified Residence.

Designated historic assets within the 10km study area of the Site are presented in **Appendix F (Figure F.1)** and can be summarised as follows:

- 104 Scheduled Monuments (including those within the Site);
- 557 Listed Buildings;
- 9 Registered Parks and Gardens – Registered Areas;
- 14 Registered Parks and Gardens – Gardens/Kitchen Gardens; and
- 3 Registered Historic Landscapes; and
- 19 Conservation Areas.

What follows is an initial, high-level discussion of the recorded historic environment within the Site, and within 3km of the Site boundary.

Prehistoric and Roman

A possible Bronze Age standing stone is recorded within the northern part of the Site, c.600m south-west of Maescadlawr. Three other Bronze Age standing stones are recorded within the study area, clustered at Cefn Cribw, c.1.7km south of the Site.

Aerial photographs dated 1946 show cropmarks suggestive of up to 11 Bronze Age burial mounds within the southern-central part of the Site, c.275m-630m north and north-west of Baiden Farm. Four more burial mounds and up to 14 burial ring cairns are recorded to the north-west of Craig y Aber Woods, c.1.5-2.2km north-west of the Site. One mound and one ring cairn are designated as Scheduled Monuments.

Close to the cluster of Bronze Age burial monuments above Craig y Aber Woods are two Iron Age hillforts/defended enclosures: Y Bwlwarcau and Caer Blaen-y-cwm, c.1.3-1.4km north-west of the Site. Three more hillforts are located a short distance to their south, c.1km, c.1.7km and c.2.3km west of the Site: Caer Cwm Philip/Moel Ton Mawr, Cwm Philip West, and Tonmawr East. Other hillforts lie beyond the 3km study area, elsewhere on Margam Mountain.

Medieval

Earlier medieval period remains recorded within the study area include the site of a (now-relocated) 6th-century inscribed stone within the group of Bronze Age ring cairns c.2.2km north-west of the Site; part of a 9th-12th century socketed stone at the 12th-century Church of St Cynwyd at Llangynwyd, c.1km north of the Site; a motte and bailey castle at Llangynwyd, c.1.2km north of the Site; and a holy well to the north of Llangynwyd, c.1.5km north of the Site.

The earthwork and/or buried remains of numerous medieval house platforms, a hollow-way, trackways, and enclosures, and the structural remains of a medieval long hut and a holy well, are recorded in the centre of the Site (either side of the lane that roughly bisects the Site on a north-west/south-east axis). More house platforms are recorded to the south-west of Maescadlawr within the northern part of the Site.

Most of the house platforms on the west side of the lane are grouped into three Scheduled Monuments. The other platforms, the hollow-way and trackways and the structural remains on the west side of the lane, and the platforms on the east side of the lane (called Cwm Nant-gwyn and Mynydd Baedan) and near Maescadlawr, have not been designated.

Another group of (non-designated) medieval house platforms are recorded at Lluest-wen near the aforementioned Iron Age hillfort of Y Bwlwarcau, c.1.2-1.9km north-west of the Site, and within Margam Country Park, c.2.8km west of the Site. Isolated examples are also found near Tondu House Farm c.300m east of the Site and on Garth Hill c.2.3km north of the Site.

Other medieval period remains within the study area include an enclosure, possible hut platform, and site of a monastic grange and associated chapel at Hafodheulog, c.620m south-west of the Site; the churches of Bettws and St Brides Minor, c.2km east and c.1.6km south-east of the Site; a holy well at Tondu, c.830m south-east of the Site; and another monastic grange at Bettws, c.2.5km east of the Site.

Post-Medieval and Modern

The vast majority of historic assets recorded within the study area by the HER are of post-medieval and modern date. They include: the farm buildings of Bryncynan and Maescadlawr, field boundaries and former quarry pits in the northern part of the Site; and the ruinous farm buildings of Llwyn Gwladys and Hafod-decca, a former barn and sheepfold, gravel pits, a boundary stone, and an enclosure within Craig y Aber Woods in the western part of the Site.

Also recorded are the buildings, former buildings and field boundaries of Cefn Parc, Ton Philip and Tynewydd, and the former colliery at Ton Philip, in the southern part of the Site; the buildings of Baiden and Cwmrisga in the south-eastern part of the Site; and a former quarry, bell pit, barn and hedge bank boundary in the southern-central and central parts of the Site.

In the north-eastern part of the Site, the HER identifies a possible deserted settlement and historic field boundary comprising a stone wall surmounting an earth bank; no date is given to the features but it can be assumed they are of medieval or later date. Former stone quarries, trial shafts and levels (for coal mining) are also recorded in the north-eastern part of the Site, between Baiden and Cefn Ydfa.

6.4.6 Additional (secondary and tertiary) mitigation

Additional (secondary and tertiary) mitigation measures that are anticipated to be taken into account within the ES include the undertaking of archaeological fieldwork to provide further information regarding the survival, buried depth (as applicable), character, date, function and significance of historic assets and to preserve by record any assets for which primary mitigation is not possible.

6.4.7 Description of likely significant effects

Construction Phase

Construction of the Proposed Development will include: ground clearance and preparation, creating temporary compounds, laying access tracks, excavation of borrow pits, excavation of foundations for wind turbines and pads for the substation, inverters and transformers, and battery containers, establishing crane pads, piling solar arrays, excavating cable trenches, erecting security fencing, and excavating drainage swales.

These activities could require the demolition or removal of upstanding historic structures and earthworks (although design would seek to avoid such impacts) and/or result in the truncation and/or destruction of buried archaeological remains within the Site. These would be direct (physical) development effects. Increased traffic movements and noise could also adversely affect the setting of historic assets. These would be indirect (non-physical) development effects.

Operational Phase

Indirect (non-physical) development effects caused by change to the setting of historic assets have the potential to arise from the operation of the Proposed Development.

Decommissioning Phase

Decommissioning of the Proposed Development will include: creating temporary compounds, dismantling wind turbines and solar arrays, removing fencing, and transporting all infrastructure including inverters and transformers off-site.

These activities have the potential to truncate buried archaeological remains within the Site. These would be direct (physical) development effects. Increased traffic movements and noise could also adversely affect the setting of historic assets. These would be indirect (non-physical) effects.

6.4.8 Receptors/elements to be scoped into the assessment

The following receptors are to be scoped into the assessment of direct (physical) and/or indirect (non-physical) effects, as it is considered that there is the potential for such effects to be significant.

Receptor/Element	Phase	Justification
Non-designated historic asset: a possible Bronze Age standing stone	Construction	This asset is situated within the northern part of the Site. Other examples of assets of this type in the wider landscape are designated as Scheduled Monuments. Construction activities may directly (physically) impact upon this asset. Because the asset could be considered to have a level of heritage significance commensurate with a Scheduled Monument, these effects could be considered significant.

Non designated historic assets: 11 possible Bronze Age burial mounds	Construction	These assets are situated within the southern-central part of the Site. Other examples of assets of this type in the wider landscape are designated as Scheduled Monuments. Construction activities may directly (physically) impact upon these assets. Because the assets could be considered to have a level of heritage significance commensurate with a Scheduled Monument, these effects could be considered significant.
Non-designated historic assets: medieval house platforms, a hollow-way, trackways, enclosures, a long hut, and a holy well	Construction	These assets are situated within the central and northern parts of the Site, and appear to be related to the four Scheduled Monuments. Construction activities may directly (physically) impact upon these assets. Because the assets could be considered to have a level of heritage significance commensurate with the Scheduled Monuments, these effects could be considered significant.
Scheduled Monument: “Earthwork & Platform Houses N of Nant Fadog”	Operation	This Scheduled Monument is situated within the Site. Operation of the Proposed Development may indirectly (non-physically) impact upon this asset, and these effects could be considered significant.
Scheduled Monument: “Mynydd Ty Talwyn Ancient Farms” (West)	Operation	This Scheduled Monument is situated within the Site. Operation of the Proposed Development may indirectly (non-physically) impact upon this asset, and these effects could be considered significant.
Scheduled Monument: “Mynydd Ty Talwyn Ancient Farms” (East)	Operation	This Scheduled Monument is situated within the Site. Operation of the Proposed Development may indirectly (non-physically) impact upon this asset, and these effects could be considered significant.
Scheduled Monument: “British Fortified Residence”	Operation	This Scheduled Monument is situated within the Site. Operation of the Proposed Development may indirectly (non-physically) impact upon this asset, and these effects could be considered significant.

Scheduled Monument: “Llangynwyd Castle”	Operation	This Scheduled Monument was designed to see and be seen from the surrounding landscape. The SZTV Model suggests that the Proposed Development will be visible from the asset, and this will (further) alter the historic landscape character. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.
Scheduled Monument: “Y Bwlwarcau”	Operation	This Scheduled Monument presents (strategic?) long-ranging views over the wider landscape. The SZTV Model suggests that the Proposed Development will be visible from the asset, and this will (further) alter the historic landscape character. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.
Scheduled Monument: “Roman Camp”	Operation	This Scheduled Monument presents (strategic?) long-ranging views over the wider landscape. The SZTV Model suggests that the Proposed Development will be visible from the asset, and this will (further) alter the historic landscape character. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.
Scheduled Monument: “Camp N of Tonmawr”	Operation	This Scheduled Monument presents (strategic?) long-ranging views over the wider landscape. The SZTV Model suggests that the Proposed Development will be visible from the asset, and this will (further) alter the historic landscape character. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.

Scheduled Monument: “Camp 530m E of Tonmawr”	Operation	This Scheduled Monument presents (strategic?) long-ranging views over the wider landscape. The SZTV Model suggests that the Proposed Development will be visible from the asset, and this will (further) alter the historic landscape character. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.
Scheduled Monument: “Pen-y-Castell Camp”	Operation	This Scheduled Monument presents (strategic?) long-ranging views over the wider landscape. The SZTV Model suggests that the Proposed Development will be visible from the asset, and this will (further) alter the historic landscape character. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.
Registered Historic Landscape of Margam Mountain	Operation	The Registered Landscape is separated from the Site by Craig y Aber Woods. The SZTV Model suggests that the Proposed Development will be visible from approximately one third of the Registered Historic Landscape. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.
Conservation Area of Llangynwyd	Operation	The Conservation Area presents views across the surrounding landscape, including towards the Site. The SZTV Model suggests that the Proposed Development will be visible from the asset, and this will (further) alter the historic landscape character. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.
Grade I Listed Church of St Cynwyd, Llangynwyd	Operation	The Church is a locally prominent and dominant structure, with the potential for new tall structures such as wind turbines to detract from its landmark status. Operation of the Proposed Development may indirectly impact upon this asset, and these effects could be considered significant.

6.4.9 Receptors/elements to be scoped out of the assessment		
The following receptors/elements are proposed to be scoped out.		
Receptor/Element	**Phase**	**Justification**
Scheduled Monument: "Earthwork & Platform Houses N of Nant Fadog"	Construction and Decommissioning	This Scheduled Monument is situated within the Site. It will be safeguarded within the Proposed Development layout and by Construction and Decommissioning Management Plans, to ensure no direct (physical) effects during these phases of the Proposed Development.
Scheduled Monument: "Mynydd Ty Talwyn Ancient Farms" (West)	Construction and Decommissioning	This Scheduled Monument is situated within the Site. It will be safeguarded within the Proposed Development layout and by Construction and Decommissioning Management Plans, to ensure no direct (physical) effects during these phases of the Proposed Development.
Scheduled Monument: "Mynydd Ty Talwyn Ancient Farms" (East)	Construction and Decommissioning	This Scheduled Monument is situated within the Site. It will be safeguarded within the Proposed Development layout and by Construction and Decommissioning Management Plans, to ensure no direct (physical) effects during these phases of the Proposed Development.
Scheduled Monument: "British Fortified Residence"	Construction and Decommissioning	This Scheduled Monument is situated within the Site. It will be safeguarded within the Proposed Development layout and by Construction and Decommissioning Management Plans, to ensure no direct (physical) effects during these phases of the Proposed Development.
Recorded non-designated historic assets: extant farmsteads	Construction and Decommissioning	These assets are situated within the southern part of the Site. Construction (and Decommissioning) activities may directly (physically) impact upon these assets. There is potential for effects to occur, but even in the case of total loss, the effects would not be significant due to the low heritage value of the assets.

Recorded non-designated historic assets: evidence of post-medieval and modern agricultural and industrial activity comprising field boundaries, quarry pits, and colliery remains	Construction and Decommissioning	These assets are situated within the southern and north-eastern parts of the Site. Construction (and Decommissioning) activities may directly (physically) impact upon these assets. There is potential for effects to occur, but even in the case of total loss, the effects would not be significant due to the low heritage value of the assets.
Currently-unknown non-designated historic assets apart from those listed in 6.4.8 and above	Construction and Decommissioning	The Site may contain currently-unrecorded buried archaeological remains, which could be impacted by Construction (and Decommissioning) activities. There is potential for direct (physical) effects to occur, but these would *only* be significant for non-designated historic assets considered to have a level of heritage significance commensurate a Scheduled Monument.
Grade II Listed Gilfach-ganol Farmhouse	Operation	The Farmhouse may have designed views over its historic agricultural landholding, which may include the Site. If so, the character of the views would be changed by the Proposed Development. However such effects are unlikely to be significant.
All other Listed Buildings apart from those listed in 6.4.8 and above	All	No direct (physical) effects to any Listed Buildings are anticipated. Certain activities during Construction and Decommissioning (namely off-Site HGV movements) may result in temporary indirect (non-physical) effects) but these would not be significant. In addition, no important historical or visual associations have been identified between the Site and any Listed Building apart from those listed in 6.4.8 and above. Operation of the Proposed Development may alter the setting of certain Listed Buildings, but such effects are not anticipated to be significant.

All other Scheduled Monuments apart from those listed in 6.4.8 and above	All	No direct (physical) effects to any Scheduled Monuments are anticipated. Certain activities during Construction and Decommissioning (namely off-Site HGV movements) may result in temporary indirect (non-physical) effects) but these would not be significant. In addition, no important historical or visual associations have been identified between the Site and any Scheduled Monuments apart from those listed in 6.4.8 and above. Operation of the Proposed Development may alter the setting of certain Scheduled Monuments, but such effects are not anticipated to be significant.
All other Conservation Areas apart from those listed in 6.4.8	All	No direct (physical) effects to any Conservation Areas are anticipated. Certain activities during Construction and Decommissioning (namely off-Site HGV movements) may result in temporary indirect (non-physical) effects) but these would not be significant. In addition, no important historical or visual associations have been identified between the Site and any Conservation Areas apart from those listed in 6.4.8 and above. Operation of the Proposed Development may alter the setting of certain Conservation Areas but such effects are not anticipated to be significant.

6.4.10 Opportunities for enhancing the environment

Opportunities for enhancement in relation to cultural heritage include:

- Assessing the survival and condition of historic assets, which may allow for suitable management strategies to be identified and implemented by heritage bodies and/or landowners in the future; and
- Disseminating information regarding known and previously-unknown historic assets to members of the public by way of enhanced HER, release of publications, community / outreach activities and/or on-site interpretation boards as appropriate.

6.4.11 Proposed assessment methodology

The HDBA will be undertaken by Pegasus Group in accordance with all relevant heritage industry guidance and best practice (see Section 6.4.13).

The ES Chapter will consider the following in respect of each identified historic environment receptor (asset): The asset's significance, the anticipated level of harm to that significance (comparable to 'magnitude'); and Whether that level of harm would comprise a significant effect. Determination of each of the above will be undertaken in accordance with a robust methodology, formulated within the context of recent case law, the relevant statute and policy provisions, and professional guidance. The rationale for each is set out in **Appendix K**.

6.4.12 Difficulties and uncertainties

The conclusions presented within the ES Chapter will be based upon the baseline conditions derived in large part from the data held and supplied by GGAT and the Royal Commission on the Ancient and Historical Monuments of Wales. In establishing the baseline conditions, both the accuracy and currency of this data must be assumed.

In relation to the assessment of the Proposed Development's effects on the settings of historic assets, only the Site and publicly accessible locations will be accessed. This may limit the ability to make observations and draw conclusions regarding the likely intervisibility of certain assets and the Site/the Proposed Development.

6.4.13 References

- Chartered Institute for Archaeologists (CIfA), 2014, Standard and Guidance for Historic Environment Desk-Based Assessment.
- Cadw, 2011, Conservation Principles for the Sustainable Management of the Historic Environment in Wales.
- Cadw, 2017a, Heritage Impact Assessment in Wales.
- Cadw, 2017b, Setting of Historic Assets in Wales.
- Cadw, 2017c, Managing Conservation Areas in Wales.
- Glamorgan Gwent Archaeological Trust, 2018. Guidance for the Submission of Data to the Welsh Historic Environment Records.
- UK Public General Acts, 1979, Ancient Monuments and Archaeological Areas Act.
- UK Public General Acts, Planning (Listed Buildings and Conservation Areas) Act 1990.
- Welsh Government, 2016, Historic Environment (Wales) Act.
- Welsh Government, 2017. Technical Advice Note 24: The Historic Environment.
- Welsh Government, 2021. Planning Policy Wales Edition 11.

6.4.14 Scoping questions

- 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 not identified that you would like to see included in the EIA?
- Do you agree with the receptors that are proposed to be scoped in and out of the EIA?

6.5 Land and Soils

6.5.1 Consultation

No consultation regarding land and soils has been undertaken to date. NRW, the Welsh Government Soils Unit, British Geological Survey (BGS), CCBC, and NPTCBC, will be consulted as part of the land and soils assessment.

6.5.2 Study area

For the purposes of the land and soils assessment, the Site plus a 1km buffer have been considered with regard to identifying land and soil related receptors that could be impacted by the construction, operation, and decommissioning of the Proposed Development.

The land and soils assessment will consider the potential impacts of the Proposed Development on groundwater receptors.

6.5.3 Data sources to inform the EIA baseline characterisation

The baseline conditions of the study area have been informed using a number of different sources, including:

- Geological maps (bedrock and superficial geology).
- Hydrogeological and groundwater vulnerability maps.
- Soil survey maps.
- Abstraction and discharge records relating to groundwater, plus aquifer designation and source protection zones.
- NRW, local authority and BGS data on the location of waste sites, pollution incidents and potentially contaminated sites.
- Mineral sterilisation and geological conservation review sites.
- Historical mapping for the Site.

A significant amount of site-specific information has been obtained from an Envirocheck Report (environmental database search) covering the Site. The Envirocheck Report incorporates records from bodies such as local authorities, NRW and BGS.

A Preliminary Risk Assessment (PRA) report has been prepared to provide a desk-based analysis of the Site based on the information contained within the Envirocheck Report. Due to its size, this report is available upon request.

A site-specific Coal Authority Consultants Report (CACR) has been obtained for the section of the Site where wind turbines are intended to be located, and publicly available coal mining data has been reviewed for the other sections of the Site. The CACR and a subsequent site visit have been used to inform a Coal Mining Risk Assessment (CMRA). Due to its size, the CMRA is available upon request.

6.5.4 Surveys to inform the EIA baseline characterisation

A walkover survey of the Site and surrounding area, focussed on known mining and geological interests, has been undertaken as part of the baseline assessment (13 July 2023).

No further surveys are currently proposed in support of the land and soils assessment.

6.5.5 Baseline conditions

Designated geological sites

There are no recorded geological conservation review sites close to the Site. The nearest regionally important geological and geomorphological site (RIGS) to the Site is over 1km to the south/ south-west.

Mineral extraction sites and mineral safeguarding

Historical mineral extraction has been widespread across the Site, including extraction of sandstone bedrock from quarries and coal mining. There are currently no operational mineral extraction sites within the Site boundary.

There are areas within the Site that are classified as “Development High Risk Areas” by the Coal Authority. These are associated with an area of past deep underground coal workings and a number of recorded mine shafts and mine adits (approximately 27 mine entries are present within the Site). Recorded underground coal mines are all greater than 240m below ground level, which means the workings are at sufficient depth not to affect above-ground development works. For this assessment, only the mine entries have the potential to affect the Proposed Development, not the deep areas of worked coal seams.

Geology

The bedrock geology across the majority of the Site comprises the Pennant Sandstone Formation (sandstone with thin mudstone and siltstone layers and coal seams that are mainly fairly thin) and the South Wales Coal Measures Group (coal-bearing mudstones and siltstones with minor sandstone layers).

The Pen-y-Castell geological fault is located towards the northern boundary of Site, running approximately north to south.

Published mapping indicates the Site to have no recorded superficial deposits. Made ground is anticipated to be localised to historical structures and roads (on- and off-site). The Site would be expected to be covered by a limited thickness of topsoil and subsoil. Although some peat deposits are evident on published geological mapping in areas of forestry to the north west of the Site, there are no mapped areas of peat within the Site boundary.

BGS borehole records were assessed, and primarily show the bedrock to comprise sandstone, mudstone and siltstone horizons with coal seams.

Soils

Publicly available soils mapping shows the majority of the Site to be covered by soils within Soilscape 13, which are defined as freely draining acid loam soils over rock. These are categorised as having low fertility and are generally present in areas of grassland / rough grazing. The area along the southern boundary of the Site is covered by soils within Soilscape 19, which are defined as slowly permeable very acid upland soils with a peaty surface. These are also categorised as having low fertility and are generally present in areas of moor land and forestry.

Overall, the soils on Site are only suited to grass production for grazing.

Publicly available mapping of predictive Agricultural Land Classification (ALC) for the Site indicates that the majority of the Site is Grade 4 – poor quality agricultural land.

Hydrogeology

The bedrock deposits underlying the Site form a secondary A aquifer of high vulnerability.

A secondary A aquifer is defined as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

Depth to groundwater is unconfirmed. It is anticipated that the regional direction of groundwater flow is in line with local topography and towards surface watercourses. Due to the elevation of the Site, it is anticipated that groundwater would be located at depth, but expected to be shallower in areas of low-lying ground.

The Site is not located in a Source Protection Zone (SPZ) with respect to a groundwater abstraction source.

The environmental database search did not identify any other groundwater abstractions within the Site.

Discharge consents

There are a number of recorded discharge consents within the study area, two of which are associated with sewage discharge and trade discharge (located toward the northern boundary of the Site).

Historical Site usage

Since earliest historical mapping (1876), the Site has undergone little significant change and comprised mainly fields, heathland, grassland and woodland, with a number of roads, streams and farm buildings. Much of the heathland and grassland has been gradually replaced by agricultural fields.

Maps show numerous locations where quarries, gravel pits and old coal levels have been present over the years. Former collieries (e.g. Ton Phillip Colliery and Ty-Talwyn Colliery) and associated shafts and tramways have been noted within the north-east and south-west corners of the Site.

The only other structures present within the Site are a limited number of farm buildings. There are some electrical overhead cables passing over the Site and a gas mains route.

Landfill sites and waste transfer sites

Licensed waste management facilities and landfill sites have been identified within the Site. These are associated with farm businesses (e.g. Baiden Farm; Ffordd Y Gyfraith Farm; Cwm Risca Farm) and the former Llynfi Power Station.

The majority of the landfills are recorded as accepting inert and non-biodegradable wastes, with these licences having expired. It appears that all landfills identified on Site are inactive, although the last reported status for local authority recorded landfill sites at Baiden Farm and Cwm Risca Farm are unknown.

Land contamination

The Site history indicates that land use has been predominantly agricultural, with some areas of forested land, although mineral extraction (sandstone and coal) has also occurred in many locations. Contamination may be present associated with agriculture, and with the machinery used in excavating sandstone, sand and gravel, and coal. Made ground is likely to be present within infilled pits and quarries (unconfirmed if these have been backfilled), and along tracks and close to buildings or structures located within the Site. There is also potentially made ground and contamination associated with former tramways that were located in the north-east and south-west corners of the Site, associated with coal mines.

No significant pollution incidents on or close to the Site have been recorded in the last 20 years.

Natural geological hazards

There is the potential for low to moderate risks from geological hazards within the Site. In addition, steep gradients are present on some areas of the Site.

6.5.6 Additional (secondary and tertiary) mitigation

Construction

The following measures will be incorporated into a CEMP and Soil Management Plan (SMP, to be provided alongside the ES), to ensure that impacts to land, soils, and groundwater can be minimised during the construction phase:

- Soil management during works will incorporate guidelines for soil handling, to include replacement of soil in temporary laydown areas;
- During construction works, the drainage system would be designed to include measures such as sediment traps, settlement ponds and buffer strips as necessary which will serve the dual purpose of attenuating peak flows, by slowing the flow of runoff through the drainage system and allowing sediment to settle before water is discharged from the drainage system. Any contaminated water would be treated and discharged in accordance with industry standards and consents; and
- Concrete mixing would be undertaken in designated areas to minimise the potential for impact on watercourses.

Operation and decommissioning

On-site welfare facilities will be adequately designed and maintained to ensure all sewage is disposed of appropriately.

During the decommissioning works the same measures will be adhered to as are required for the construction phase. No further mitigation measures would be expected to be required during operational or decommissioning phases beyond the embedded mitigation incorporated into the design of the Proposed Development.

6.5.7 Description of likely significant effects

Issues relating to coal mining infrastructure would be investigated to ensure that there are no risks to the Proposed Development from mine entries.

Mineral safeguarding issues will require consideration, given the historical mineral extraction that has occurred at the Site, to ensure future mineral extraction requirements are not affected.

Due to the Site topography, there may be some areas where slope stability issues could be exacerbated by the Proposed Development.

There may be contamination issues present across the Site, including in areas of historical landfill, where made ground is present and any areas of contamination associated with coal mining or other mineral extraction.

6.5.8 Receptors/elements to be scoped into the assessment

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

Receptor/Element	Phase	Justification
Land (mining)	Construction	Historically, coal mining has occurred at the Site and there are numerous mine entries present. Consultation with the Coal Authority will be necessary in order to address risks associated with coal mining.
Land (mineral safeguarding)	Construction	Mineral safeguarding will be considered for the Site as there has historically been quarrying for sandstone and underground coal mining carried out in the area.
Land (slope stability)	Construction	Due to the Site topography, there are some areas which may not be suitable for siting of aspects of the Proposed Development due to steep slopes, and this issue will require further assessment.
Land (potential contamination)	Construction	Land contamination is possible at the Site in connection with recorded areas of landfill, historical coal mining and mineral extraction areas, and possible areas of unknown backfill material in quarries or pits.

6.5.9 Receptors/elements to be scoped out of the assessment		
The following receptors/elements are proposed to be scoped out.		
Receptor/Element	**Phase**	**Justification**
Land (geological units)	Construction, operation and decommissioning	There are no sensitive geological units identified within the study area. Geology comprises bedrock units of sandstone with mudstone, siltstone and coal, and limited superficial units.
Land (peat within areas of forestry)	Construction, operation and decommissioning	Peat deposits have not been identified within the forestry areas of the Site based on a review of available soil and geology mapping, and information provided by ecological surveys of the Site. Although it is possible that unrecorded peat deposits may be present within areas of forestry, these would not be expected to be extensive.
Land (peat outside forestry areas)	Construction, operation and decommissioning	Peat deposits have not been identified within the areas of the Site that are not forested, based on a review of available soil and geological mapping, and the Site walkover survey and ecological assessment. As peat is not expected to be present in significant quantities, it is not considered to be necessary to scope this in.
Land (mining)	Operation and decommissioning	Any issues relating to coal mining will need to be addressed as part of the construction phase of the Proposed Development. There will be no residual hazards associated within mining during operational or decommissioning phases.
Land (mineral safeguarding)	Operation and decommissioning	Any issues relating to mineral safeguarding will be addressed within the construction phase of the Proposed Development. There will be no further concerns for this factor during operation or decommissioning of the Proposed Development.
Land (slope stability)	Operation and decommissioning	As above, any issues relating to slope stability will be addressed within the construction phase of the Proposed Development. There will be no further concerns for this factor during operation or decommissioning of the Proposed Development.

Land (potential contamination)	Operation and decommissioning	Potential contamination from existing known or unknown pollution will be addressed during the construction phase of the Proposed Development, which has been scoped in. Any issues during operation or decommissioning would relate to contamination resulting from project activities, and these will be controlled by the requirements of the CEMP (e.g. issues relating to storage and use of fuels).
Groundwater	Construction, operation and decommissioning	The groundwater is categorised as a secondary aquifer. The quality of groundwater will be appropriately protected by mitigation measures implemented via the CEMP. This will include items such as implementation of a surface water management plan, bunded fuel storage tanks and control measures when refuelling. A piling risk assessment will be a requirement at a later stage in the project, prior to construction commencing. This will ensure potential risks to groundwater from piling operations are managed appropriated (information to be collected during the site investigation will be required to feed into this risk assessment). It is possible that changes to the surface water regime could have a negative impact on the Site groundwater. However, adhering to industry best practice with respect to protection of surface water will ensure that any adverse effects to surface water are minimised, reducing the potential for corresponding changes within the groundwater.
Soils	Construction, operation, and decommissioning	The baseline assessment has indicated that there are no BMV soils within the Site area, and soil resources are not considered to be of high sensitivity. Soils would be handled and stored to allow for their sustainable re-use in line with good practice guidance and any impacts to soils as a result of changes in groundwater, would be minimised by the CEMP and SMP. No significant impacts on soils are anticipated during the operational and decommissioning phases of the Proposed Development.

Agricultural land	Construction, operation, and decommissioning	Although some of the land within the Site boundary is used for agricultural purposes (for grazing livestock), the general quality of land is not considered to be of high sensitivity. As above, damage will be minimised by the CEMP and SMP. No significant impacts on agricultural land are anticipated during the operational and decommissioning phases of the Proposed Development. During decommissioning, it is anticipated that agricultural land will be returned to its original use.

6.5.10 Opportunities for enhancing the environment

No opportunities for environmental enhancement have been identified as part of the preparation of the Scoping Report for Land and Soils issues.

6.5.11 Proposed assessment methodology

The following documents are relevant to the preparation of the land and soils assessment:

- Part IIA, Environmental Protection Act, 1990 (relevant in terms of assessment of contaminated land).
- The Environmental Permitting Regulations (England & Wales) 2016 (last revised March 2020) (relevant with respect to environmental permits).
- Environment (Wales) Act, 2016 (providing a framework for planning and managing national resources with a sustainable and comprehensive approach) .
- Planning Policy Wales: The Welsh Government's national planning policy and guidance on various aspects of planning are set out in the document 'Planning Policy Wales' (edition 11, February 2021).
- Overarching National Policy Statement for Energy (NPS EN-1) (latest revision March 2023) incorporates principles relating to geological conservation, land use and resource and waste management.
- Land Contamination Risk Management (LCRM), October 2020.
- Welsh Assembly Government Technical Advice Note 6: Planning for Sustainable Rural Communities, July 2010.
- Natural England Technical Information Note TIN049: Agricultural Land Classification: protecting the best and most versatile land, 2nd edition (2012).

A desk-based PRA Report will be provided as part of the ES, which assesses the potential risks on the existing land, soil and groundwater baseline, including contamination issues. The PRA report conclusions and results of ground investigations will determine necessary mitigation measures to ensure that the construction, operation and decommissioning of the Proposed Development do not result in significant effects on the receiving land and soil environment.

A Coal Mining Risk Assessment (CMRA) will be prepared as part of the ES to provide an assessment of risks relating to coal mining issues, and this is the first step in determining further actions required to ensure that hazards relating to mine entries and other mining issues are fully considered and addressed.

The assessment of baseline data will include a review of the information obtained for the Site for the matters that are to be scoped in, and each will be considered using professional judgement to determine whether the level of available information is acceptable (for example a large landfill site that is off-site and separated by a physical barrier such as a valley or stream may not require additional consideration, but a smaller contamination incident closer to the Site may be considered relevant).

Significance of potential impacts is assigned based on a set of definitions, as provided in **Appendix K**. There are no published guidelines or criteria for assessing and evaluating effects on geology, hydrogeology or soils within the context of an EIA. The assessment has therefore been based on a methodology derived from the Institute of Environmental Management and Assessment (IEMA) guidance.

The assessment will consider the potential short-term environmental effects during construction. It is proposed to scope out the operational and decommissioning phases from this assessment.

Due to the static nature of geology and soils, and the mitigation measures that will be embedded to protect land, soils and groundwater, it is not considered likely that cumulative effects associated with this factor would be significant.

6.5.12 Difficulties and uncertainties

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

- Data on site history have been obtained from historical maps, and there may be developments that occurred between map editions that are not evident.
- No intrusive site survey data was available at this stage of the EIA process.

6.5.13 References

- Environment Agency (2020), Land contamination risk management, https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm, April 2021.
- Site-specific Envirocheck Report (2023)
- Site-specific Coal Authority Consultants Report (2023)
- Natural Resources Wales Details of Permitted Waste Sites (2023) https://naturalresourceswales.gov.uk/evidence-and-data/maps/find-details-of-permitted-waste-sites/?lang=en
- DataMapWales (2023) https://datamap.gov.wales
- SoilScapes (2023) https://landis.org.uk

6.5.14 Scoping questions

- Do you agree with the proposed study area?
- Do you agree that the data sources listed to inform the EIA baseline characterisation are appropriate?
- Are any receptors or 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?
- Do you agree with the receptors/matters that are proposed to be scoped in and out of the EIA?

6.6 Landscape and Visual

6.6.1 Consultation

No formal consultation in relation to landscape or visual aspects of the Proposed Development has been undertaken to date. This does not preclude any such opportunities to engage with relative consultees during or following the scoping stage.

6.6.2 Study area

A key principle of the European Landscape Convention is that all landscapes matter and should be managed appropriately. It is also acknowledged that landscapes provide the surroundings for people's daily lives and often contribute positively to the quality of life and economic performance of an area. It is therefore proposed that a Landscape and Visual Impact Assessment (LVIA) is undertaken as part of the EIA and an LVIA chapter included in the ES.

It is proposed that the LVIA will consider the potential effects of the Proposed Development upon; individual landscape features and elements, landscape character, and visual amenity and the people who view the landscape.

In order to assist with defining the Study Area, a digital Zone of Theoretical Visibility (ZTV) model was created as a starting point to illustrate the geographical area within which views of development on the site are theoretically possible.

This was based on a 'bare-earth' scenario, whereby the screening effect of areas of existing vegetation or built features in the landscape are not taken into account. The ZTV was modelled to blade tip height using the currently proposed maximum turbine blade tip height of 230m and is presented at **Appendix H (Figure H.1)**.

Having reviewed the ZTV, it is proposed that the LVIA will consider an initial 35km radius Study Area. Detailed assessment will then be provided for a 20km radius Study Area, which it is considered represents a proportionate extent of the Study Area and the limit within which any potential significant effects might occur.

For the cumulative assessment, consideration was initially given to a 35km radius from the site, as recommended by NatureScot best practice guidance. Following this review, it is proposed that a 20km detailed Study Area be adopted to consider cumulative effects, which is considered represents a proportionate extent of the Study Area and the limit within which any potential significant cumulative effects might occur.

6.6.3 Data sources to inform the EIA baseline characterisation

The following data sources have been used to inform the scope of the LVIA:

- Future Wales. The National Plan 2040 (February 2021): Policy 17 and 18;
- BCBC and NPTCBC landscape policy.
- Bridgend Landscape Character Assessment (July 2013).
- Neath Port Talbot Landscape Assessment (December 2004).

- Bannau Brycheiniog National Park Authority. LDP Supplementary Planning Guidance: Landscape Character. Draft (2012).
- Natural Resources Wales (NRW) LANDMAP Information System.
- Gower AONB Management Plan (2017).
- Cadw for information regarding designated historic assets.
- Digital Terrain Model (DTM) at 5m spatial resolution.
- Ordnance survey mapping at 1:25,000 scale.
- Aerial and street view imagery available on Google Earth.

Landscape architects have visited the site and its local and wider landscape to assist in their understanding of the site's context and spatial and visual relationships with its wider setting. A review has also been undertaken of submissions made in relation to other large scale wind development in the defined study areas to assist and inform landscape and visual considerations which may also be applicable to the site and proposed development within it.

The above, initial, appraisal work has been considered and balanced against professional experience and judgement in relation to proposing a scope which will focus upon determining potential significant effects of the proposal.

In preparing the ES, a detailed review of the above data will be undertaken and further visits made to the site area and to publicly accessible locations within the wider landscape.

6.6.4 Surveys to inform the EIA baseline characterisation

The baseline conditions and assessment methodology presented in this scoping report are based on the initial research undertaken to date. The landscape and visual baseline that will be presented in the ES will be informed by the findings of a full LVIA. This will also respond to any additional requests made by statutory consultees such that these concern landscape or visual matters.

6.6.5 Baseline conditions

Site Context

The Site is located within the South Wales region and its boundary extends within the administrative boundaries of BCBC and NPTCBC.

The site lies across an area of elevated land approximately 7km from the Welsh coast. The lower valley areas and those which lie between the site and the coast are generally well-populated and include numerous small settlements connected by a strong road network which includes local, A and B roads and the M4 Motorway. The nearest large settlements are Bridgend, approximately 5km to the south-east and Port Talbot, approximately 8km to the west. Other outlying settlements to Bridgend include Sarn, Aberkenfig, Tondu and Brynmenyn which extend northwards of the M4. Smaller settlements are frequent within the valleys and coastal areas. The City of Swansea is located approximately 17km to the west-north-west.

Landscape Character

Natural Resources Wales (NRW) published a series of National Character Area descriptions in 2013/2014. The site lies at the southern edge of the National Landscape Character Area 37 (NLCA): South Wales Valleys and borders NLCA36: Vale of Glamorgan to the south east and NLCA38: Swansea Bay to the south and west.

The key characteristics of LCA37 are summarised by NRW as follows:

- Extensive Upland plateau.
- Numerous steep-sided valleys.
- Ribbon urban and industrial areas in valleys.
- Extensive remains of heavy industry.
- Contrast of urban valley activity next to quiet uplands.
- Large blocks of coniferous plantation and deciduous woodland fringes.
- Heather, rough grassland and steep bracken slopes.
- Improved pastures on some lower valley sides.
- Field boundaries – Dry stone walls mark areas of common land, with dense hawthorn hedges on lower slopes.
- Transport routes restricted to valleys.
- Iconic cultural identity.

LANDMAP is the formally adopted five-tiered landscape evaluation baseline tool developed by NRW. It comprises five nationally consistent spatial datasets, referred to as Aspect Layers:

- Geological Landscape;
- Landscape Habitats;
- Visual and Sensory;
- Historic Landscape; and
- Cultural Landscape Services.

These five aspect layers are divided into Aspect Areas that have been assessed by a NRW assessor. The Overall Evaluation of the Aspect Area is key to understanding its value in terms of sensitivity, rarity or importance.

The Bridgend part of the Site lies within Landscape Character Area 1 – Llangynwyd Rolling Uplands and Forestry within the Bridgend Landscape Character Assessment. This LCA is located along the north-western fringes of the County Borough, to the west of Maesteg and Bridgend.

The Neath Port Talbot part of the Site is located in Character Area 7 Mynydd Margam within the Neath Port Talbot Landscape Assessment. All of the landscape is defined as ‘Upland’ in LANDMAP’s Visual & Sensory aspect (Level 2). The following landscape sensitivities are identified in the Bridgend Landscape Character Assessment as being particularly sensitive to change: ‘High levels of tranquillity’, ‘Panoramic Views’. Reference is given to the views of the local landmark of Llangynwyd church tower.

Landscape Designations

The Site is not located within a nationally or regionally designated landscape.

The Bannau Brycheiniog (Brecon Beacons) National Park (BBNP) boundary lies approximately 21.5km to the north of the site. The BBNP has recognised dark sky status. The Gower Area of Outstanding Natural Beauty (AONB) lies approximately 22 km to the west of the site. An area of Heritage Coast lies approximately 7.5 km to the south of the site.

The Site is located within the Western Uplands Special Landscape Area (SLA) as set out in the Bridgend Local Plan (2006-2021) and Margam SLA, as set out within the Neath Port Talbot Local Plan (2011-2026). A number of other locally designated SLAs include land within the wider landscape.

The nearest Registered Park and Garden is that of Margam Park, located approximately 2.5km from the site and which falls within a wider Landscape of Historic Interest. To the east are Coytrahen House and Bryngarw Country Park approximately 3 km and 1.2km from the site respectively. To the south Glanrhyd Hospital and Court Colman located approximately 3.5 km from the site. There are a number of other Registered Parks and Gardens and Landscape of Historic Interest beyond 5 km and which are also shown on the Landscape Designations **Appendix H (Figure H.2)**.

Visual Baseline

Important visual receptors are likely to include those users of the Ogwr Ridgeway Walk which passes through the Site, users of the nearby A4063, those within the coastal landscape to the south-west, extending between Bridgend and Port Talbot and the settled areas in proximity to the Site.

6.6.6 Additional (secondary and tertiary) mitigation

It is accepted that the effects of wind turbines of the scale proposed are difficult to mitigate, however the design process will seek to consider and review the visual effects of wind turbines and seek to make adjustments where possible. For instance, to reduce effects and improve the appearance of wind turbines, the project team will need to consider designing the wind turbines so that appearances of blade clash or stacking are minimised and that the array appears balanced and coherent.

Landscape and visual effects of solar PV and BESS development can more readily be achieved through the incorporation of landscaping which can often be effective in screening these types of development. Such an approach will be considered as the development proposals become refined and through further detailed consideration of the landscape and visual baseline.

6.6.7 Description of likely significant effects

It is acknowledged from the outset that, in common with almost all commercial wind energy developments, some landscape and visual effects would occur as a result of the proposals, including some significant effects.

Effects during the construction phase are considered to be temporary and would have a short duration. Effects associated with the operational phase of the Proposed Development are considered to be long term, reversible effects.

Construction

Construction of the Proposed Development will include ground clearance and preparation, creating temporary compounds, laying access tracks, laying concrete pads for wind turbines, inverters and transformers, erecting wind turbines, piling solar arrays, excavating cable trenches and erecting security fencing.

These elements would require the loss of some landscape features within the Site. These temporary aspects of the Proposed Development would not be anticipated to bring about significant landscape or visual effects over and above any identified in relation to the operation of the Proposed Development.

Operation

It is recognised that the Proposed Development would give rise to some localised significant effects on landscape character and visual amenity. These effects would arise primarily as a result of the introduction of the wind turbines into the landscape.

The ground level components of the Proposed Development would be sited to respond to local topography and landscape features which can assist the mitigation and limit the potential for significant effects. However, the relative low-lying nature of these elements would be anticipated to constrain effects in locations close to, or within the Site. It is not considered that these components of the Proposed Development would give rise to any significant effects, in their own right, on landscape character or visual amenity.

The Proposed Development would, overall, have direct effects upon the local landscape character and visual amenity, and it is anticipated that effects would be significant in proximity to the Proposed Development. The LVIA would consider further the nature of effects and relationship of the wider landscape and visual context in order to assess the extent across which any such effects might be significant. Viewpoints and visual receptors located within the Site and at closer proximity to the Proposed Development are inevitably going to be locations from where receptors are more likely to experience significant effects.

6.6.8 Receptors/elements to be scoped into the assessment

The following landscape and visual receptors are proposed to be scoped into the assessment and assessed for both the long-term effects relating to the operational lifetime and the short-term temporary effects associated with the construction of the development. Further detail on the method and approach to the LVIA and CLVIA are provided in **Section 6.6.11**.

Receptor/Element	Phase	Justification
Landscape features within the Site	Construction and operation	Due to potential direct effects of the Proposed Development.
Landscape character within 20km detailed study area	Construction and operation	It is anticipated that potential for significant effects upon landscape character will occur within 20km.

Visual amenity within 20km detailed study area	Construction and operation	It is anticipated that potential for significant effects upon visual amenity will occur within 20km.
Landscape designations	Construction and operation	It is anticipated that potential for significant effects upon landscape designation will occur within 20km.
Aviation lighting (Effects upon Visual Amenity)	Operation	The assessment of turbine lighting will consider the additional visual effects introduced by the lights based upon a ZTV of the lit turbines out to 20km.
Cumulative effects	All phases	**Chapter 7** sets out the methodology for identification of development which will be included within the Cumulative Landscape and Visual Impact Assessment (CLVIA). Where an approved development does meet all of the criteria, it will be taken forward for further consideration in the CLVIA.

6.6.9 Receptors/elements to be scoped out of the assessment

Based on the desk study, field work, the professional judgement of the LVIA team and experience of delivering other onshore wind energy projects, the following elements are proposed to be scoped out of detailed assessment.

Receptor/Element	Phase	Justification
Effects on receptors located outside of the zone of theoretical visibility (ZTV)	All phases	There would be no effects from the development where the ZTV indicates no theoretical visibility.
Potential effects during the decommissioning phase of the Proposed Development	Decommissioning phase	Effects of decommissioning the wind farm at the end of its operational life as effects would be very similar in nature to those experienced during the construction, except in reverse.

Effects on LANDMAP aspect areas outside of the study areas as defined in LANDMAP Guidance Note 46 (NRW, 2023), where it is judged that potential significant effects are unlikely to occur	All phases	At locations beyond the study area there would be no potential for significant effects upon landscape character due to distance and the resulting variety of intervening landscape between the site and these areas.
Aviation lighting (effects upon landscape character)	Operation	The wind farm is not located within or in close proximity to a designated dark sky area, or remote from existing sources of visible lighting, such as residential areas, commercial or industrial sites, or major roads. The character of the landscape during low natural light levels is already in part characterised by the presence of artificial lighting. Therefore, the addition of visible turbine lighting would not have the potential to bring about a fundamental change to the characteristics of the landscape.
Cumulative developments	All phases	**Chapter 7** sets out the methodology for identification of development which will be included within the Cumulative Landscape and Visual Impact Assessment (CLVIA). Where an approved development does not meet all of the criteria, it will not be taken forward for further consideration in the CLVIA.
Seascape Character Effects	All phases	The site is set back from the coast and set within a coastal context which includes settlement and industrial and existing wind development, to which it would add. It is not anticipated that the seascape characteristics would be so altered by the development that a significant effect would be concluded.

6.6.10 Opportunities for enhancing the environment

As discussed in best practice guidance for EIA, mitigation measures may include:

- Avoidance of effects;
- Reduction in magnitude of effects; and
- Compensation for effects (which may include enhancements to offset any adverse effects).

The primary mitigation adopted in relation to landscape and visual matters is likely to be embedded within the design of the proposed development and will comprise the consideration given to avoiding and minimising landscape and visual effects during the evolution of the proposed development layout. This will be set out within the Design Iteration chapter of the EIA Report, which will also address other forms of embedded mitigation such as mitigation of visible turbine lighting.

For the solar and BESS elements it is often possible for landscape mitigation to comprise aspects which strengthen existing landscape characteristics, repair landscape elements which may have been eroded over time and to improve the habitat and ecological diversity of the landscape.

6.6.11 Proposed assessment methodology

Approach to LVIA

The LVIA shall be undertaken in accordance with the principles of best practice, as outlined in published guidance documents, notably the Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition (Landscape Institute and the Institute for Environmental Management and Assessment, 2013).

The methodology and assessment criteria proposed for the assessment has been developed in accordance with the principles established in this best practice document. It should be acknowledged that GLVIA establishes guidelines, not a specific methodology. The preface to GLVIA states:

"*This edition concentrates on principles and processes. It does not provide a detailed or formulaic 'recipe' that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand*."

The approach has therefore been developed specifically for this assessment to ensure that the methodology is fit for purpose.

As part of the development of the proposed methodology, consideration has also been given to the following documents:

- NatureScot (September 2020), General pre-application and scoping advice for developer of onshore wind farms;
- Natural Resources Wales: LANDMAP Guidance Notes 1, 4, 5 and 46;
- SNH (August 2017), Siting and Design of Wind farms in the Landscape, Version 3a;
- SNH (February 2017), Visual Representation of Wind farms, Guidance Version 2.2;
- Landscape Institute (September 2017), Technical Guidance Note 06/19 Visual representation of development proposals;
- Landscape Institute (March 2019), Technical Guidance Note 02/19 Residential Visual Amenity Assessment (RVAA);

- NatureScot (March 2021), Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments; and
- Natural Resources Wales (August 2022), Landscape Sensitivity Assessment Guidance for Wales.

Full details of the methodology will be provided within an appendix to the LVIA chapter of the EIA Report.

Assessment of Environmental Impacts and their Significance

Distinction between Landscape and Visual Effects

In accordance with the published guidance, landscape and visual effects shall be assessed separately, although the procedure for assessing each of these is closely linked. A clear distinction has been drawn between landscape and visual effects as described below:

Landscape effects relate to the effects of the Proposed Development on the physical and perceptual characteristics of the landscape and its resulting character and quality; and

Visual effects relate to the effects on specific views experienced by visual receptors and on visual amenity more generally.

Types of Effects Considered

It is proposed that the LVIA will consider the potential effects of the Proposed Development upon:

- Individual landscape features and elements;
- Landscape character; and
- Visual amenity and the people who view the landscape.

The LVIA will considers the effects during construction of the Proposed Development and during the operational lifetime of the Proposed Development. Effects during the construction phase are considered to be temporary and would have a short duration. Effects associated with the operational phase of the Proposed Development are considered to be long term, reversible effects.

Following the judgement of the sensitivity of the landscape or visual receptor, the LVIA will provide a judgement as to the magnitude of change and the level of the effect experienced by each receptor, along with a statement to clarify whether the effect resulting from the Proposed Development is significant or not.

This includes the wind turbines and their associated visible aviation lighting, ground mounted solar photovoltaic (PV) modules and Battery Energy Storage Systems (BESS), along with the ancillary elements such as crane hardstandings, access tracks, underground cables, electricity substation and permanent anemometer mast.

These elements will be considered throughout the LVIA where necessary.

Proposed Scope of Assessment

It is proposed that the main objectives of the LVIA will be as follows:

- To identify, evaluate and describe the current landscape character of the site and its surroundings, and also any notable individual or groups of landscape features within the site;
- To determine the sensitivity of the landscape to the type of development proposed;

- To identify potential visual receptors (i.e. people that would be able to see the Proposed Development) and evaluate their sensitivity to the type of changes proposed;
- To identify and describe any impacts of the Proposed Development in so far as they affect the landscape and/or views of it and evaluate the magnitude of change due to these impacts;
- To identify and describe any mitigation measures (including mitigation which is inherent in the design and layout of the Proposed Development) that have been adopted to avoid, reduce and compensate for landscape and visual effects;
- To identify and assess any cumulative landscape and visual effects;
- To evaluate the level of residual landscape and visual effects; and
- To make a professional judgement about which effects, if any, are significant.

Visual Receptors

A detailed consideration of the potential for effects to the visual amenity of receptors in the landscape surrounding the site will be set out in the LVIA. This visual assessment will be informed by a selection of representative assessment viewpoints, which are listed below, each of which will be illustrated with visualisations prepared in line with NatureScot best practice guidance.

Typically, a detailed consideration with regard to the visual amenity of the nearest residential properties to the site is given within in the LVIA (excluding those with a financial involvement in the project from detailed assessment). Therefore, for any residential properties located within 2km of the Proposed Development, a separate standalone Residential Visual Amenity Study (RVAS) will be prepared as part of the LVIA. This assessment will incorporate a wireline from the properties, aerial mapping showing the distance and angle of turbines from them, along with assessment text. In instances where a significant effect is identified, an overall judgement will then be reached about whether the residents of the property would experience such an overbearing effect on visual amenity that the property would become an unattractive place in which to live.

In addition, the LVIA will consider the potential effects of the development on different receptor groups, comprising settlements, footpath users, recognised tourist routes, long distance walking routes, cycle routes and centres for tourism. National Trails and Sustrans cycle routes within 35 km of the site are also shown on **Appendix H (Figure H.2)**.

Proposed LVIA Viewpoint Locations

It is proposed that the 15 viewpoint locations set out below are included as viewpoints in the LVIA. The locations which are illustrated on **Appendix H (Figure H.1)** represent visual receptors and character types at a range of distances and directions from the site. The viewpoints have been selected with regard to those locations which may be common with other wind development (either operational, consented or at planning/pre-planning stage).

The proposed viewpoint locations are located at a range of distances and directions from the proposed development, are at varying elevations and cover a variety of different Aspect Areas and types. Some of the viewpoints are intended to be representative of the visual experience in a general location whereas other viewpoints illustrate the view from a specific or important vantage point.

Each of the representative viewpoints will be visited to evaluate the sensitivity of views. In addition, the Study Area will also be extensively visited to consider visibility of the proposed development as receptors move through the landscape.

The viewpoints will be used as the basis for determining the effects on visual receptors within the Study Area. The sensitivity of different receptor groups will be set out in the LVIA methodology.

The level of effect experienced by different visual receptor groups will be determined by considering in tandem their sensitivity and view with the magnitude of impact.

For each of the below viewpoints, daytime visualisations will be prepared in line with the Visual Representation of Wind farms, Version 2.2 (SNH, February 2017).

Visual Receptor	*Distance to nearest proposed turbine*	*Grid reference*	*Justification / Key Receptors*
1. Margam Park (Access Road)	4,260m	280106, 185792	Tourists. Special Landscape Area. Registered Park and Garden. Historic Landscape
2. Margam Park Deer Park / Ogwr Ridgeway Long Distance Walk	2,937m	281388, 186388	Walkers on promoted footpath. Special Landscape Area, Registered Park and Garden. Historic Landscape
3. Ogwr Ridgeway Walk	1,295m	283628, 187735	Walkers on promoted footpath. Special Landscape Area. Historic Landscape.
4. Llangynwyd Conservation Area	1,896m	285722, 1888064	Residents and visitors to cemetery. Special Landscape Area.
5. Heol Gelli Lenor, Maesteg	3,484m	284760, 1190299	Residents
6. Heol Dewi Sant, Bettws	2,802m	289915, 187343	Residents
7. Footpath East of Coytrahen House	1,990m	289754, 185111	Walkers and representative of views from Coytrahan House (Registered Park and Garden).
8. Bridgend Circular Walk	4,283m	291189, 182879	Walkers

9. Heol Shon, Cefn Cribwr	3,237m	285174, 182779	Residents
10. Kenfig Burrows	6,967m	279807, 181080	Tourists, Wales Coast Path, Historic Landscape. Special Landscape Area.
11. Wales Coast Path at Ogmore-by-Sea	10,055m	286114, 175589	Tourists, Wales Coast Path. Heritage Coast.
12. Ogwr Ridgeway Walk at Waun Wen	6,661m	294450, 185929	Promoted recreational walk, Special Landscape Area
13. Pen y Foel Trig Point	5,763m	291900, 189554	Promoted recreational walk. Special Landscape Area
14. Mumbles Hill, Swansea	21,567m	262784, 187445	Tourists, Wales Coast Path. Gower AONB.
15. Ogof-Ffynnon-Ddu	29,135m	287456, 216033	Tourists. Promoted recreational walk. National Park

Assessment of Turbine Lighting

The Proposed Development will incorporate turbines greater than 150m, which under Civil Aviation Authority (CAA) Regulations (Civil Aviation Authority (2017), Lighting of Onshore Wind Turbine Generators in the United Kingdom with a maximum blade tip height at or in excess of 150m Above Ground Level), will require to be lit with visible aviation lighting. A 2,000 candela steady state red aviation light will be required on the nacelle and three 32 candela steady state red aviation lights on the towers indicating half the nacelle height on all turbines greater than 150m.

It is recognised that in some circumstances, it may be possible for turbine lighting to result in a significant effect on the character of the surrounding landscape. For example, if a project is located within or in close proximity to a designated dark sky area, or is remote from existing sources of visible lighting, such as residential areas, commercial or industrial sites, or major roads.

For projects which include onshore wind turbines which are not located in such areas, it is considered that there would be no potential for significant effects on landscape character to arise from visible turbine lighting of the type proposed. This is because in these areas the character of the landscape during low natural light levels is already in part characterised by the presence of artificial lighting. Therefore, the addition of visible turbine lighting would not have the potential to bring about a fundamental change to the characteristics of the landscape.

The assessment of turbine lighting will consider the additional visual effects introduced by the lights.

In accordance with the General Pre-Application and Scoping Advice for Onshore Wind Farms (NatureScot September 2020), the LVIA will assess the additional visual effects of the aviation lighting in the main body of the LVIA chapter. The additional change introduced by the aviation lighting will form a component of the magnitude of change.

The Proposed Development is located approximately 21.5km from the Bannau Brycheiniog (Brecon Beacons) National Park which has recognised dark sky status. As such, the potential for character effects on the surrounding landscape during the night-time period shall be considered as part of the assessment.

This consideration will be informed by a ZTV of the lit turbines and night-time visualisations from selected viewpoints, illustrating the proposed lighting effects. In line with NatureScot Visualisation Guidance, the viewpoints selected represent locations from where people are most likely to experience the wind farm at night.

It is proposed that the following night-time visualisations will therefore be produced:

- VP4 - Llangynwyd Conservation Area;
- VP11 – Wales Coast Path at Ogmore-by-Sea; and
- VP14 - Mumbles Hill, Swansea.

The viewpoints will be used as a starting point to inform consideration of the potential visual effects on key visual receptors in settlements, and users of the local roads and rights of way network.

Photographic examples of existing aviation lighting in similar light conditions will be presented in a separate appendix as a 'control mechanism'.

Assessment of Cumulative Effects

The CLVIA will consider the potential for any cumulative effects to arise. Further detail on the approach to the cumulative assessment of the Proposed Development is provided in **Chapter 7** of this report.

The CLVIA will be prepared in accordance with current best practice guidance for cumulative impact assessment - *Assessing the Cumulative Landscape and Visual Impact of Onshore Wind Energy Developments, (NatureScot, 2021)*.

6.6.12 Difficulties and uncertainties

In relation to the assessment of the Proposed Development's effects on landscape and visual amenity, only the Site, publicly accessible locations or residences where permission has been given to the assessor (for example within the RVAS) will be accessed.

6.6.13 References

- Future Wales. The National Plan 2040 (February 2021);
- Welsh Government, 2021. Planning Policy Wales Edition 11;
- Natural Resources Wales (NRW) National Landscape Character Areas (NLCA);
- Natural Resources Wales (NRW) LANDMAP Aspect Areas;
- Bridgend Landscape Character Assessment (July 2013); and

- Neath Port Talbot Landscape Assessment (December 2004).

6.6.14 Scoping questions

- Do you agree with the proposed Study Areas?
- Do you agree with the proposed viewpoint locations?
- Do you agree that the proposed scope of the assessment is appropriate?
- Are there any other wind farms you are aware of within the 20km cumulative study area to be included the cumulative assessment?

6.7 Noise and Vibration

6.7.1 Consultation

No consultation has taken place to date. However, consultation will be undertaken with BCBC Environmental Health Department and NPTCBC Environmental Health Department to discuss the assessment methodology (including baseline noise monitoring locations) following submission of the EIA Scoping Report.

6.7.2 Study area

The study area will include the nearest noise sensitive receptors considered to be representative of residential dwellings in the immediate vicinity that may be subject to the effects of noise from construction (and decommissioning) and/or operation of the Proposed Development, selected based on the results of (initial) predictive noise modelling, relevant noise criteria and professional judgement.

However, the 'study area' for the wind farm component should, as a minimum, be the area within which noise levels from the proposed, consented and existing wind turbines may exceed 35 dB LA90 at up to 10 m/s standardised wind speed (i.e. any area which as a direct component of the proposed wind farm, or as a cumulative result of the operation of the proposal and other neighbouring wind farms will exceed 35 dB(A)).

An indicative wind farm study area is presented in **Appendix I**. The study area has been identified based on initial predictive noise modelling. This is subject to change as part of the EIA and will depend on the final turbine selection and layout.

At this stage, insufficient information is available to determine a study area appropriate for the solar and BESS elements of the Proposed Development. There is an indicative area for the solar PV area, however a more detailed design is required to determine the study area for the noise impact assessment. Receptors would be selected based on proximity and sensitivity to the noise producing elements of the Proposed Development.

6.7.3 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).

6.7.4 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 in advance with BCBC and NPTCBC. 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.

Representative baseline noise survey locations for assessment of the wind farm element will be selected by identifying those residential dwellings which may exceed 35 dB LA90 at up to 10 m/s wind speed in noise level from the proposed, consented and existing wind turbines (i.e. on its own or cumulatively). A noise contour plot of the development site will be prepared based on data taken from the candidate turbine at a standardised 10m/s wind speed. For the purposes of this report, an indicative wind farm study area is presented in **Appendix I**.

Representative baseline noise survey locations for the BESS / solar PV infrastructure will be based on the nearest noise sensitive receptors.

Wind data, including wind speed and direction, will be obtained to inform the baseline noise survey, at a location representative of the Site.

6.7.5 Baseline conditions

The Site is located approximately 2.5km north-west of Bridgend. The immediate surrounding area consists of farmland with various farm building/steadings and small groupings of residential properties.

The background noise environment is likely characterised by noise sources such as wind-swept vegetation, birdsong, watercourses, farm animals and traffic from local roads, which vary in influence according to weather conditions and time of day. Two 225kW turbines with a tip height of 45m are located to the north east of the Site.

Survey locations would be selected where background sound levels are not influenced by existing turbines (assuming these cannot be turned off during the survey).

It is acknowledged that there are three small-scale turbines (<50kW) located with the Site. Due to the size and scale of these turbines, they do not need to be considered as part of the noise impact assessment.

6.7.6 Additional (secondary and tertiary) mitigation

Construction

Noise on construction sites is controlled by 'best practical means' to minimise noise from construction activities and, if required, the introduction of additional (secondary and tertiary) mitigation, such as temporary noise barriers, during certain activities to reduce noise levels further will be considered.

Operation

The operational phase would be subject to noise limits in the form of a planning condition. Noise limits would be determined based on the outcome of the baseline noise survey conducted at the nearest residential receptors in line with ETSU. If deemed necessary following the outcome of the operational phase assessment (in accordance with ETSU and the IOA Good Practice Guide), noise control measures in the form of turbine curtailment, to meet the noise conditions, may be required.

6.7.7 Description of likely significant effects

Construction

Noise and vibration effects arising due to construction related activities and traffic have the potential to impact nearby sensitive receptors. Noise arising during the construction phase will be for a limited duration and can be suitably controlled through means of best practice and standard noise limits.

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, if identified at the time of assessment.

Noise arising due to the operation of the solar PV and BESS elements of the Proposed Development have the potential to lead to significant effects at the nearest residential receptors.

Noise impacts associated with each element would be assessed in detail to ensure the Proposed Development can operate within the appropriate and relevant noise limits.

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
Noise and vibration from construction activities (solar PV and BESS infrastructure)	Construction and decommissioning	Noise and vibration due to construction activities and associated construction traffic has the potential to impact sensitive receptors surrounding the Site.

Noise associated with the operation of the wind farm	Operation	Noise arising from the operation of the wind farm has the potential to impact sensitive receptors surrounding the proposed site and must comply with set noise limits as agreed in consultation with BCBC and NPTCBC.
Noise associated with the operation of the solar PV and BESS infrastructure	Operation	Noise arising from the operation of inverters, transformers, HVAC, and other ancillary electrical infrastructure required for the solar PV / BESS infrastructure has the potential to impact sensitive receptors surrounding these elements of the Proposed Development.

6.7.9 Receptors/elements to be scoped out of the assessment

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

Receptor/Element	Phase	Justification
Blasting at borrow pits	Construction	At this stage it is not known if blasting will be required. If blasting is to occur, a blast management plan would be submitted and implemented.
Noise and vibration from construction activities associated with the wind farm infrastructure	Construction and decommissioning	Construction activities associated with the wind turbine infrastructure will have a significant set-back distance from receptors, reducing the potential noise and vibration impact at receptors. All construction activities will follow best practice and be subject to a construction management plan.
Vibration effects associated with the operation of the wind farm infrastructure	Operation	Levels of vibration will typically be imperceptible over the distance ranges between the wind turbines and the nearest residential dwelling.
Infrasound and Low Frequency noise resulting from the operation of the wind turbines	Operation	A 2010 study performed on behalf of the UK Government on 'Wind Turbines and Human Health' found no evidence for health effects from infrasound or low frequency noise stemming from wind turbines.

Amplitude Modulation associated with the operation of the wind turbines	Operation	Renewable UK research (2013) has concluded that amplitude modulation (AM) is a rare and unlikely occurrence at operational wind farms. The study found AM was the potential issue at 4 out of 133 sites included, with conditions associated with AM only occurring between 7-15% of the time. Further to this, investigation and assessment of AM can only be undertaken once the turbine is operational. Presently, there is no methodology to reliably predict the likelihood or magnitude of AM occurring. Therefore, an AM assessment should be scoped out of the noise impact assessment.
Vibration effects associated with the operation of the solar PV and BESS infrastructure)	Operation	Levels of vibration associated with the solar PV and BESS will be imperceptible over the distance ranges between the plant and the nearest residential dwelling.

6.7.10 Opportunities for enhancing the environment

No opportunities to enhance the environment from a noise and vibration perspective are envisaged at present.

6.7.11 Proposed assessment methodology

Construction

An assessment of construction noise levels associated with the onsite works for solar and BESS will be undertaken using the assessment methodology and significance criteria set out in BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites: Noise'. The assessment will consider the primary phases of works. The assessment will determine if exceedances of the defined acoustic criteria are predicted to occur and will identify potential mitigation measures to minimise adverse effects.

Where considered applicable based on the proximity of sensitive receptors from the works, a construction vibration assessment will be undertaken using the assessment methodology and significance criteria set out in BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites: Vibration'.

Operation

Assessment of operational noise from wind farms as recommended in planning guidance is that included in ETSU-R-97. 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, obtained through the baseline survey;
- Specify a candidate turbine which noise emission characteristics 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.

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.

Where third-party wind farms fall within 3km of the proposed site, a detailed cumulative operational assessment will be conducted. Those identified at the Scoping stage are discussed in Section 6.7.5 - Baseline Conditions. A review of operational, consented, and in planning wind farms would be conducted at the time of assessment.

Propagation Model

Noise emissions associated with the wind turbines are predicted in accordance with ISO 9613: Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation (1996) and again considering guidance contained within IOA document A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise.

This is a noise prediction standard that considers noise attenuation offered, amongst others, by distance, ground absorption, directivity and atmospheric absorption. Noise predictions and contours are typically prepared for various wind speeds and the predicted levels are compared against the relevant noise criterion curve to demonstrate compliance with the guidelines.

Additional Infrastructure

An operational phase assessment of the other noise emitting infrastructure associated with the Proposed Development (substation transformers, solar PV inverters and BESS) will be undertaken to the requirements of BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'. The assessment will be conducted at the nearest residential receptors to each Project element.

Noise predictions of the proposed infrastructure will be derived from computer noise modelling or spreadsheet calculations as appropriate and will be compared with the measured prevailing background sound level (LA90) at the nearest or most exposed receptors to determine the magnitude of impacts and significance of effects.

6.7.12 Difficulties and uncertainties

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

- 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, we would look to provide a 2 dB uncertainty correction 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
- Misidentification and/or missed identification of residential dwellings within study area. 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).

6.7.13 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.
- 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.
- International Organisation for Standardisation (1996) ISO 9613: Acoustics – Attenuation of sound outdoors, Part 2: General method of calculation.
- Renewables UK (2013) Report for Summary of Research into Amplitude Modulation of Aerodynamic Noise from Wind Turbines.

6.7.14 Scoping questions

- Do the consultees agree that an assessment of vibration and low frequency noise due to the operation of the wind farm can be scoped out of further assessment?
- Do the consultees agree that an assessment of construction noise associated with the wind farm can be suitably controlled by a planning condition and be scoped out of further assessment?
- Do the consultees agree that 6 monitoring locations is sufficient to characterise the study area?
- Do the consultees agree with the proposed cumulative wind farm search area of 3km?

- Do the consultees agree with the proposed approach to the noise assessment? Are there additional elements to be included for consideration?

6.8 Traffic and Transport

6.8.1 Consultation

No consultation to inform the traffic and transport assessment has been undertaken to date.

The key consultees will be Local Highway Authorities (LHA) and planning authorities which may be impacted during the construction phase of the Proposed Development. Anticipated consultees are:

- BCBC and NPTCBC (Local Planning Authorities);
- South East Wales Trunk Road Agency (SEWTRA); and
- Welsh Government.

Agreement of a study area for construction traffic is required, along with traffic distribution. Additionally, consultees will be asked to:

- Specify aspects of the environment and issues relating to those that should be considered and addressed in the Transport Assessment and Environmental Statement (with emphasis on any issues local to the site);
- Comment on the proposed approach to the Transport Assessment and EIA;
- Comment on or recommend, where appropriate, assessment methodologies; and
- Highlight other relevant bodies or organisations that may have a vested interest in the scheme or be able to provide relevant information.

6.8.2 Study area

The proposed Port of Entry (PoE) for turbine components is Swansea. It is anticipated that the proposed access route to Site for the Abnormal Indivisible Loads (AILs) is as follows:

- Loads would depart from the port and access the A483 Fabian Way (Eastbound) using a contraflow manoeuvre;
- Loads would proceed eastbound and would join the M4 at Junction 42;
- Loads would continue southeast along the M4; and
- On leaving the M4, loads will use local roads in approaching the site from the south. Loads will either join the A4229/A48 through Pyle or the A4063 at Sarn. The route will be finalised as further studies are completed.

6.8.3 Data sources to inform the EIA baseline characterisation

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

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:

- 10553 (A483)

- 78520 (A483)
- 77074 (A483)
- 77075 (M4)
- 40503 (M4)
- 84065 (M4)
- 73149 (M4)
- 502 (M4)
- 647 (A4229)
- 73148 (A48)
- 811758 (New Road)
- 20502 (M4)
- 99579 (A4063)
- 99578 (A4063)
- 91272 (A4063)

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.

6.8.4 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 15 DfT count). Data for more local roads is less evident, therefore depending on the chosen access routes and points, additional surveys may be required. This requirement would be refined through the project development and scoping dialogue. Open-source aerial imagery and mapping may also be required.

6.8.5 Baseline conditions

The Port of Swansea is one of South Wales's major ports, well connected to the M4, offering excellent connectivity to the strategic road network (SRN). It is less than 5 kilometres to junction 42 of the M4.

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

The adopted highway routes leading to the site vary in standard, with those nearer the red line boundary site being single-track rural lanes.

6.8.6 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. This will include mitigation developed to permit the safe transport of the wind turbine components from the Port of Entry (PoE) to site, as will be detailed in an Abnormal Indivisible Load (AIL) Management Plan.

Mitigation will also include the production of a draft Construction Traffic Management Plan (CTMP) as part of the EIA chapter. The CTMP will include a framework for managing any cumulative impacts. The CTMP will also provide comfort to stakeholders that there is a commitment to mitigating any impacts.

6.8.7 Description of likely significant effects

Construction

Turbine components will be transported by sea to the PoE at Swansea from where components would be brought to Site by abnormal load vehicles via an agreed route.

General construction material, including solar PV and BESS components, 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 time, and this will need to be considered across the construction programme. Additionally, a small number of trips will also be generated by personnel travelling to Site.

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
A-Road A483 Fabian Way	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, 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).
M4 Motorway	Construction	
Local roads providing access to the Site from the M4 (to be confirmed through the EIA process)	Construction	

6.8.9 Receptors/elements to be scoped out of the assessment

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

Receptor/Element	Phase	Justification
All	Operation	Once operational, the effect on the local road network will be minimal. Access will be required from time to time for routine maintenance, 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	Decommissioning	The levels of traffic associated with decommissioning are anticipated to be lower than those required during the construction phase, therefore will have a reduced 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.

6.8.10 Opportunities for enhancing the environment

No opportunities for enhancement in relation to traffic and transport have been identified at this stage.

6.8.11 Proposed assessment methodology

TEMPro software would be used to forecast the baseline traffic flows to a future year baseline for use in the traffic and transport assessment.

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
- Hazardous/large loads

The traffic and transport assessment will also be based on a set of standards on environmental assessment 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 Environmental Statement will record judgements about the likely significance of effects arising from the Proposed Development.

A cumulative assessment of traffic, transport and access effects would 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 (see **Chapter 7** for further information).

An Abnormal Load Route Assessment (ALRA) would also be undertaken to investigate the proposed routing of the anticipated turbine components and identify mitigation that may be required to accommodate specific loads along with associated management measures.

6.8.12 Difficulties and uncertainties

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

- The overview of baseline conditions is based on desk-based studies only at scoping stage and is based on data available at the time of writing;
- The cumulative assessment would be based on the availability of information on cumulative schemes; and
- 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.

6.8.13 References

- Guidelines for the Environmental Assessment of Traffic and Movement (Institute of Environmental Assessment, 2023)
- LA104, Environmental assessment and monitoring, Design Manual for Roads and Bridges (DMRB) (Standards for Highways, 2020)

6.8.14 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?
- 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 proposed additional (secondary and tertiary) mitigation measures and is this mitigation appropriate?
- Do you agree with the receptors/matters 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 Proposed assessment methodology

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 it 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, decommissioning, and/or operational 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 years[3], 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 developments[4]: Must lie within the Zone of Influence (ZoI) of the Proposed Development.

[3] 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.

[4] 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 developments[5]: Must lie within 10km of the Proposed Development

7.1.19 The ZoI 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 ZoI 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 Bridgend County Borough Council and Neath Port Talbot County Borough Council, as the local planning authorities, 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 authorities).

[5] 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 as 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.

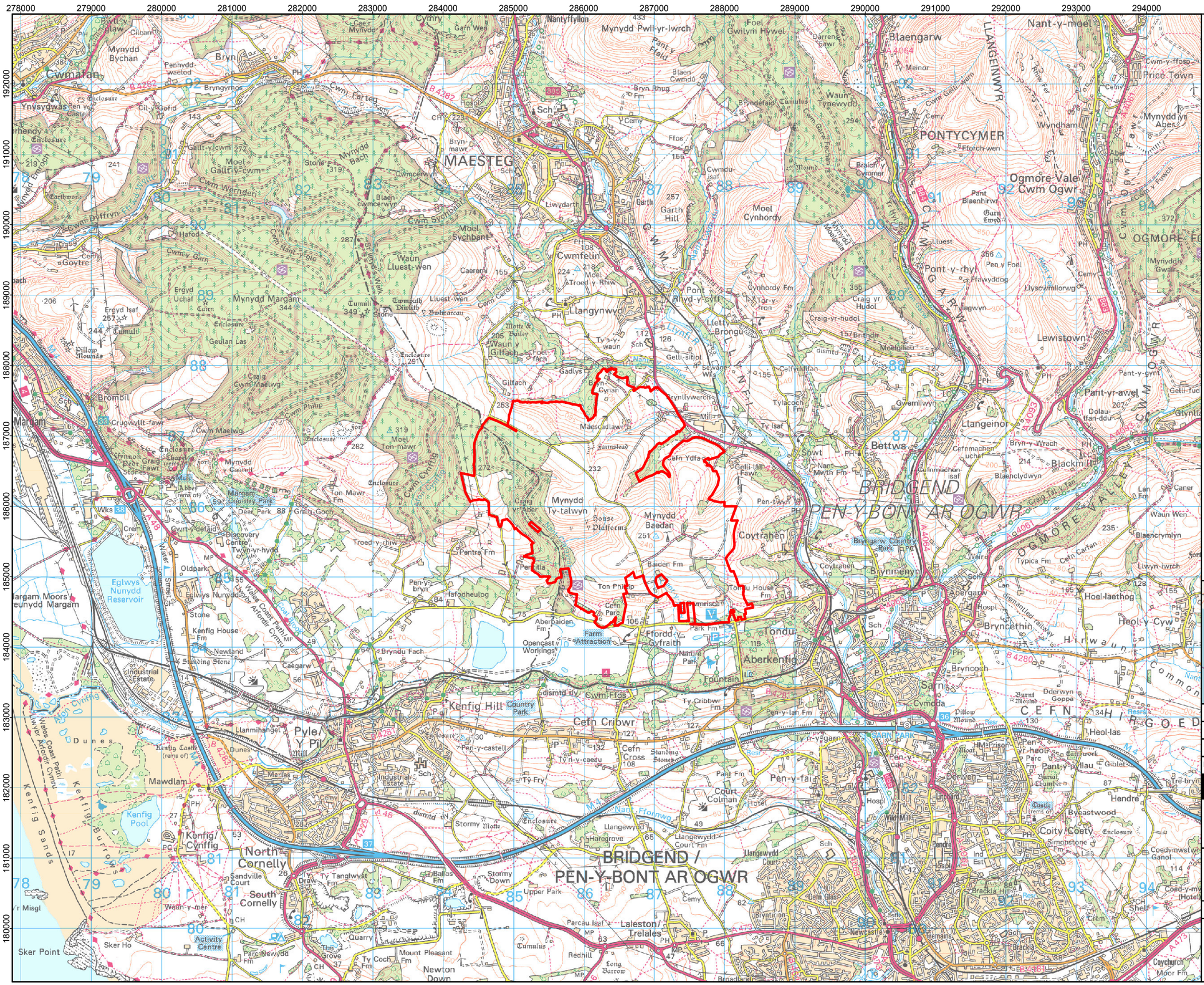
7.3 Difficulties and uncertainties

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 BCBC and NPTCBC planning portals. 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	Drn	Chk	App
02	02/11/2023	Boundary update	NH	DP	DP
01	18/10/2023	Boundary update	NH	DP	DP
00	14/07/2023	First Draft	TM	NH	DP

Mynydd Ty-talwyn Energy Park

RSK

TITLE:

Appendix A
Site Boundary Plan

ID:663870 Mynydd ty Talwyn Maps_Appendix A - Site Boundary Plan

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Kilometres

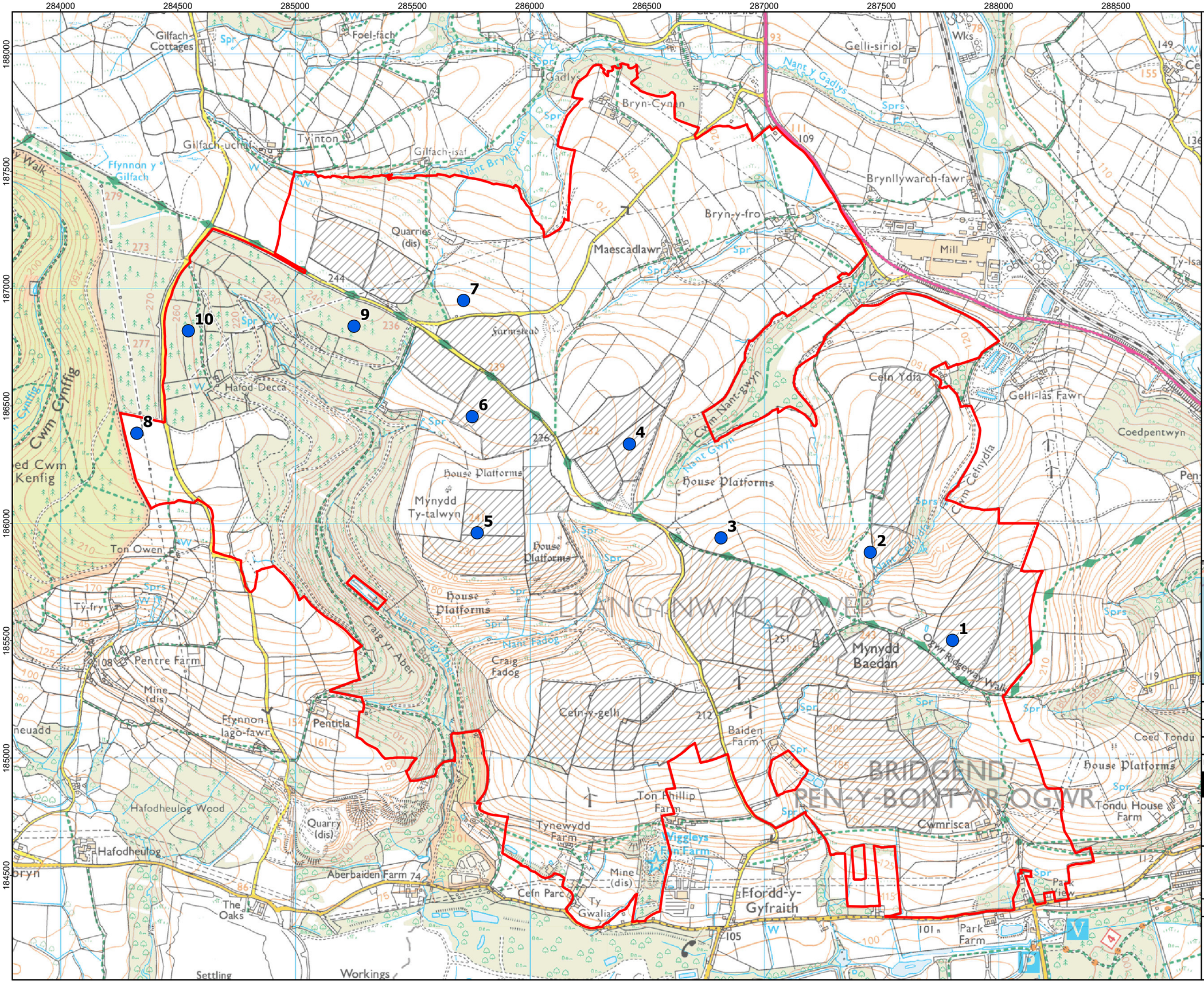
Scale: 1:50,000 @ A3

REV 02

Path: C:\Users\NHogben\RSK Group\RSK Environment GIS Projects - 663870 Mynydd ty-Talwyn Energy Park\01 - GIS\663870 Mynydd ty Talwyn Maps.aprx\Site Boundary

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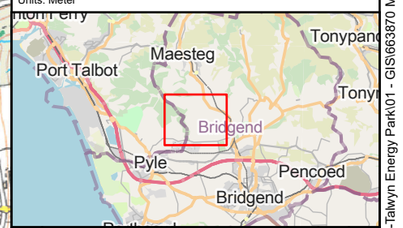
APPENDIX B - INDICATIVE PROPOSED DEVELOPMENT LAYOUT



Legend:

- Site Boundary
- Indicative Solar PV Area
- Proposed Turbine Location

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



Rev	Date	Description	Drn	Chk	App
04	02/11/2023	Boundary update	NH	DP	DP
03	17/10/2023	Solar Fields Symbology and Legends Updated	TM	DP	DP
02	14/07/2023	Solar Fields Added	TM	DP	DP
01	13/07/2023	Symbology, Inset and Title updates	TM	NH	DP

Mynydd Ty-talwyn Energy Park

TITLE: Appendix B
Indicative Proposed Development Layout

ID:663870 Mynydd ty Talwyn Maps_Appendix B - Indicative Proposed Development

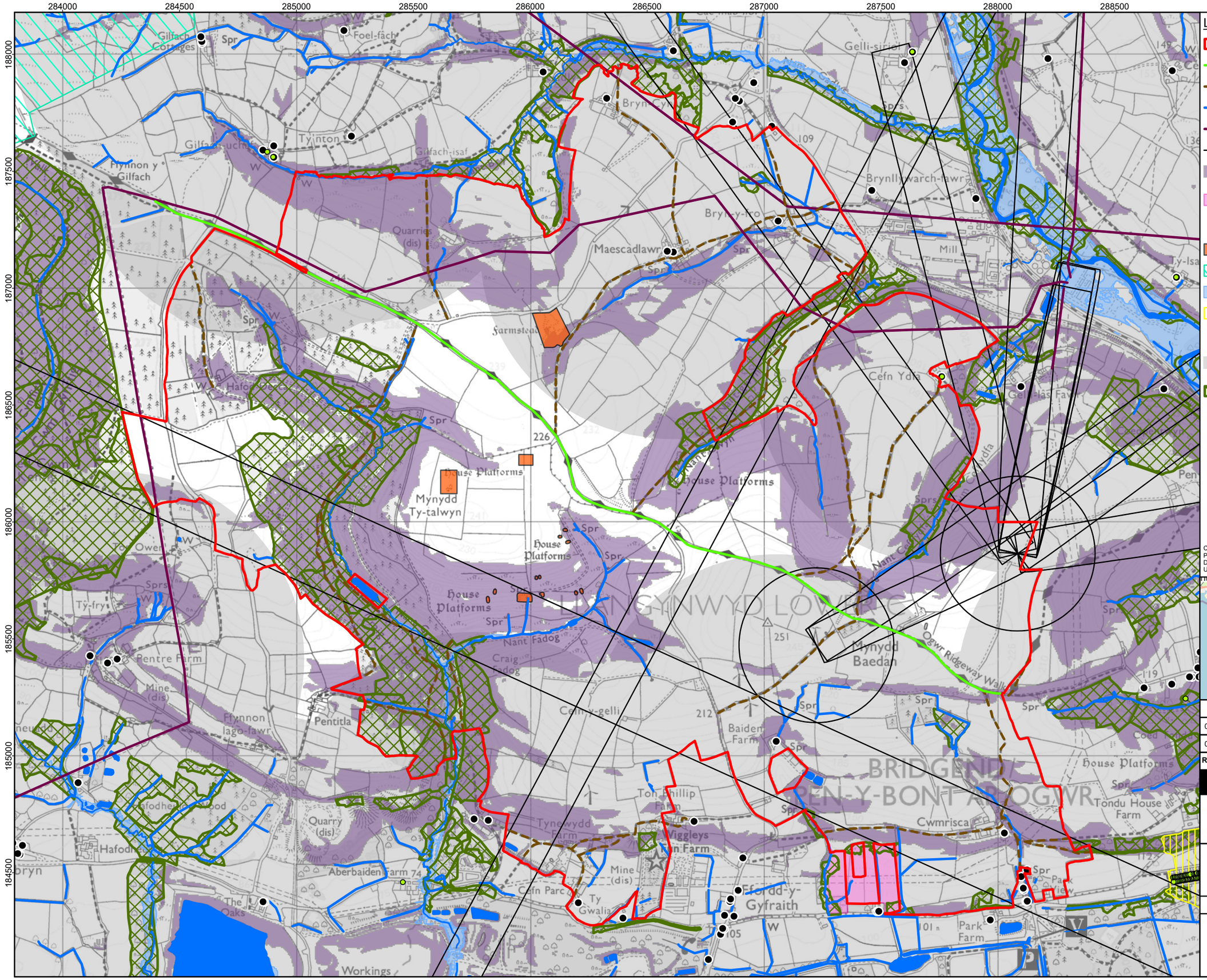
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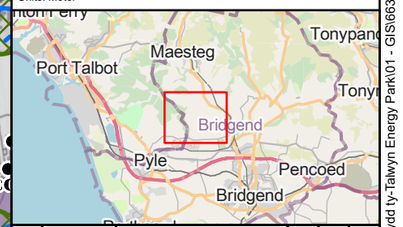
APPENDIX C - ENVIRONMENTAL AND PLANNING FEATURES



Legend:

- Site Boundary
- Long Distance Walking Trail
- Public Right of Way
- Watercourse
- Overhead Line
- Protected Microwave Links
- Slope ≥ 10°
- Site of Special Scientific Interest
- Listed Building (Grade 2)
- Scheduled Monument
- Historic Landscapes
- Flood Zones
- Conservation Areas
- Residential Properties
- Residential Property Buffer (800m)
- Ancient Woodland

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



Rev	Date	Description	Drn	Chk	App
01	02/11/2023	Updated Site Bdy & styles	NH	DP	DP
00	02/11/2023	First Draft	TM	DP	DP

Mynydd Ty-talwyn Energy Park

RSK

TITLE: Appendix C
Environmental and Planning Features

ID:663870 Mynydd ty Talwyn Maps_Appendix C - Environmental and Planning Features

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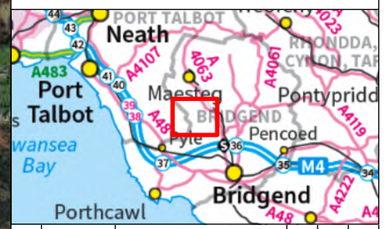
APPENDIX D - UKHAB HABITATS PLAN

Legend:

- Site Boundary

Broad UKHab Habitats

- Cropland
- Grassland
- Heathland and Shrub
- Rivers and Lakes
- Urban
- Wetland
- Woodland and Forest
- To be Surveyed in 2024
- Built Linear Feature
- Fence
- Hedgerow
- Line of Trees
- Other Rivers and Streams
- Target Note
- Himalayan Balsam (TN1)



Rev	Date	Description	Drn	Chk	App
00	01/11/2023	2485114	TG	SP	NP

Mynydd ty-Talwyn Energy Park

RSK biocensus
EXPERTS IN ECOLOGY

TITLE: Appendix D:

UKHab Habitat Plan

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Metres
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N W E S

REV 00

Document Path: C:\OneDrive\RSK Group\RSK Biocensus - 06 GIS - 2485114 - Mynydd ty-Talwyn Energy Park Port Talbot\03 - APRX\2485114 - Mynydd ty-Talwyn Energy Park Port Talbot - Figure 2 - Broad Scale Habitat Survey Plan.aprx

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APPENDIX E - YEAR 1 ORNITHOLOGY REPORT

Mynydd-Ty-Talwyn Wind Farm
Galileo Green Energy Wales Ltd.
Technical Appendix: Ornithology



avianecology

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Annex 1: Bird Species Summary

Annex 2: Ornithology Field Survey Effort

Annex 3: VP Flight Activity Survey: Target Species Flights

1 INTRODUCTION

1.1.1 This Report has been prepared for the proposed Mynydd-Ty-Talwyn Wind Farm (hereafter 'Proposed Development').

1.1.2 It presents detailed methodologies and results of desk study and field surveys completed to establish baseline ornithological conditions and should be read with reference to the following figures:

- **Figure 1**: Ornithological Statutory Designated Sites.
- **Figure 2a&b**: VP Flight Activity Survey Plans.
- **Figure 3**: Breeding Bird Survey Plan.
- **Figure 4a**: Target Species Flight Activity (Year 1).
- **Figure 4b**: Target Species Flight Activity (Year 2).
- **Figure 5a**: MBBS Results (Year 1).
- **Figure 5b**: MBBS Results (Year 2).
- **Figure 5c**: Other Species Records during MBBS (Year 1; Visit 2).
- **Figure 5d**: Other Species Records during MBBS (Year 1; Visit 3).
- **Figure 5e**: Other Species Records during MBBS (Year 2; Visit 1).
- **Figure 5f**: Other Species Records during MBBS (Year 2; Visit 2).
- **Figure 5g**: Other Species Records during MBBS (Year 2; Visit 3).
- **Figure 5h**: Other Species Records during MBBS (Year 2; Visit 4).
- **Figure 6**: Nightjar Survey Results (Year 2).
- **Confidential Figure C.1**: Breeding Raptor Survey Results (Year 1).
- **Confidential Figure C.2**: Breeding Raptor Survey Results (Year 2).

1.1.3 Information considered sensitive is presented in **Confidential Figures C.1 and C.2.** Such information will not be made publicly available but will be provided to Natural Resources Wales (NRW) and relevant Local Planning Authorities.

1.1.4 Only common species names are used throughout this report. Scientific names for all species referenced (and the conservation status as relevant) are provided in **Annex 1**.

1.2 Key Guidance

1.2.1 Ornithology survey methodologies and subsequent interpretation of results has made reference to the following key industry standard guidance:

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

- NatureScot (SNH, 2017) *Recommended bird survey methods to inform impact assessment of onshore wind farms.* Version 2. March 2017.

- Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. and Thompson, D. (2013) *Raptors: a field guide to survey and monitoring.* Third Edition. The Stationary Office, Edinburgh.

- Gilbert, G., Gibbons, D.W. and Evans, J. (1998) *Bird monitoring methods.* A manual of techniques for key UK species. RSPB, Sandy, Bedfordshire.

- Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. & Taylor, R.C. (2022) Birds of Conservation Concern Wales 4: The Population Status of Birds in Wales.

- NatureScot (SNH, 2000) *Windfarms and Birds - Calculating a theoretical collision risk assuming no avoiding action*. SNH Guidance Note.

- NatureScot (SNH, 2018) *Assessing significance of impacts from onshore wind farm outwith designated areas.* Guidance. Version 2 – February 2018.

- NatureScot (SNH, 2016) *Assessing connectivity with Special Protection Areas (SPAs)*. Guidance. Version 3 – June 2016.

1.2.2 In the absence of Welsh-specific guidance, baseline information gathering has been undertaken in accordance with NatureScot guidance (as listed above).

1.3 Target Species

1.3.1 Target species for survey were identified through desk study, the basis of their known or likely presence, their likely sensitivity to the Proposed Development and those which are afforded a higher level of legislative protection, which is in accordance with current NatureScot guidance (SNH, 2017 and 2018). Primarily, target species included those species listed on/as:

- Annex I of the EC Birds Directive (2009/147/EC);

- Schedule 1 of the Wildlife and Countryside Act 1981 (as amended);

- Species on Section 7 of the Environment (Wales) Act 2016; and

- Red-listed Birds of Conservation Concern (BoCC) (Johnstone *et al.* 2022).

1.3.2 This has ensured inclusion of "*Priority bird species for assessment when considering the development of onshore wind farms in Scotland*" as per NatureScot guidance (SNH, 2018).

2 METHODOLOGY

2.1 Desk Study and Consultation

2.1.1 In accordance with NatureScot guidance (SNH, 2017), an initial desk study was undertaken to ascertain the presence of statutory designated sites in proximity to the Proposed Development, in order to identify possible target species to inform the requirements for survey.

2.1.2 The desk study included a review of the following key sources summarised in **Table 2.1.**

Table 2.1: Initial Desk study key sources and information sought.

Key Source	Date of Consultation	Information Sought	Study Area
Natural Resources Wales website https://naturalresources.wales/?lang=en	November 2022	Proximity to statutory designated sites.	Within 10km of the Site; extended to 20km for internationally designated sites with qualifying migratory waterfowl features (see **Figure 1**).
'MAGIC' website https://magic.defra.gov.uk/magicmap.aspx	November 2022	Proximity to statutory designated sites.	Within 10km of the Site; extended to 20km for internationally designated sites with qualifying migratory waterfowl features (see **Figure 1**).

2.2 Field Surveys

2.2.1 Detailed knowledge of bird populations, distributions and flight activity in order to assess the potential effects of the Proposed Development upon ornithological features, has been derived from field surveys undertaken between 2021 and 2023.

2.2.2 The scope of surveys undertaken was informed through proximity to designated sites, existing knowledge of sensitive species, and with reference to NatureScot guidance (SNH, 2017 and 2018).

2.2.3 The following ornithological field surveys were completed:

- Vantage Point (VP) flight activity surveys November 2021 to October 2022, and November 2022 to October 2023);
- Moorland breeding bird surveys (MBBS) (2022 and 2023);
- Annex 1/Schedule 1 breeding raptor and owl searches (2022 and 2023); and
- Nightjar surveys (2023).

VP Flight Activity Surveys

2.2.4 VP flight activity surveys were undertaken between November 2021 and October 2022, and November 2022 and October 2023 within the Site.

VP Locations and Viewsheds

2.2.5 Three VP locations (VP1, VP2/2a and VP3/3b) were used to provide a comprehensive visual coverage of the required VP survey area required for the Proposed Development in accordance with current NatureScot guidance (2017). During Year 1 surveys (November 2021 to October 2022) and for the first two survey months of Year 2 surveys (November and December 2022) VPs 1-3 were used, as illustrated

in **Figure 2a&b.** From, and including, January/February 2023 to November 2023, VP2a and VP3b were used to respectively replace VP2 and VP3 due to access restrictions. Information into the VPs used are detailed within **Table 2.2.**

Table 2.2: VP locations.

VP	Grid Reference	Orientation	Period Used
1	SS 88091 85072	West	Nov 2021 – Oct 2023
2	SS 84653 86206	North-north-east	Nov 2021 – Dec 2022
2a	SS 84488 86223	North-north-east	Jan – Oct 2023
3	SS 86829 86664	South-east	Nov 2021 – Oct 2023
3b	SS 86438 86038	South-east	Feb - Oct 2023

VP Survey Effort

2.2.6 The total survey effort (hours) completed at each VP location between 2021 and 2023 is summarised in **Table 2.3**.

2.2.7 Full details of all survey times and weather conditions are presented in **Annex 2**.

Table 2.3: VP flight activity survey effort – 2021 to 2023.

VP	2021		2022										Total (Year 1)
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
1	3	6	3	12	12	6	6	3	6	9	6	6	78
2	3	6	6	9	12	9	9	3	9	0	6	6	78
3	3	9	3	9	12	6	6	3	15	9	6	6	87
VP	**2022**		**2023**										**Total (Year 2)**
	Nov	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	
1	6	6	6	6	6	9	6	6	9	9	6	6	81
2/2a	0	6	12	6	6	9	6	6	9	9	6	6	81
3/3b	6	6	6	6	6	9	6	6	9	9	6	6	81

2.2.8 Survey effort in Year 1 (2021-2022) and Year 2 (2022-2023) exceeded the minimum recommended survey effort outlined within NatureScot guidance (SNH, 2017) i.e. a minimum of 72 hours per VP location divided between breeding and non-breeding seasons.

2.2.9 Survey times were dispersed throughout the day and were also completed in a range of weather conditions, but always conductive to survey and safe access.

2.2.10 In accordance with NatureScot guidance (SNH, 2017), flight lines were mapped for all target species passing through the VP survey area. Details of species, number of birds, flight height in bands, duration and direction were noted on standardised recording forms and field plans.

2.2.11 The following height bands (HT) were used in the field from November 2021 to March 2023 to record target species activity at, below or above collision risk height for subsequent use in the calculation of collision mortality risks.

- HT1: 0-60m;

- HT2: 61-90m;
- HT3: 91-180m;
- HT4: 181-200m; and
- HT5: >200.

2.2.12 Note the following height bands were used from April 2023 until October 2023 to account for potentially higher turbine tips.

- HT1: 0-40m;
- HT2: 41-90m;
- HT3: 91-180m;
- HT4: 181-200m;
- HT5: 201-280m;
- HT6: >280m.

Target Species

2.2.13 Target species for recording included all Annex 1/Schedule 1 raptors (plus kestrel from part-way through Year 1 following the species moving onto the BoCC Red List in Wales; Johnstone *et al.* (2002)), waders, swans, geese, ducks (excl. mallard and feral species) as observed during VP watches.

Secondary Species

2.2.14 Secondary species were also noted in approximately fifteen-minute summary intervals, with the number of birds present and general behaviour recorded in order to build an overall picture of activity. Fifteen-minute periods were considered appropriate to ensure surveyors were fully alert to target species activity, which took priority during survey.

2.2.15 Secondary species are defined here as commoner raptors (e.g. buzzard and sparrowhawk), all gulls, feral species, mallard, and raven along with any large concentrations of Schedule 1 or Red-listed passerines as observed during survey.

Moorland Breeding Bird Surveys

2.2.16 Moorland breeding bird surveys (MBBSs) were undertaken in 2022 and 2023.

2.2.17 The MBBS survey area in both survey years has comprised coverage of the Site and accessible areas of open habitats within 500m, as shown in **Figure 3.**

2.2.18 The methodology employed followed an adapted Brown and Shepherd (1993) method for censusing upland breeding waders, based upon the recommendations set out in Calladine *et al*. (2009) and as recommended in NatureScot guidance (SNH, 2017). The methodology is suitable for moorland and open country species including, waders, gulls, red grouse and some wildfowl species however,

incidental observations of any raptors, owls or notable passerines (i.e. Schedule 1, BoCC red-listed and Section 7 species[1,2]) were also recorded.

2.2.19 A series of four staggered visits were completed during each survey year, between April and July each year.

2.2.20 During each survey visit a pre-determined route was walked through the survey area, with all birds seen or heard, and their behaviours (e.g. displaying, carrying food etc.) were mapped in the field.

2.2.21 All surveys were undertaken during daylight hours and in fine conditions conducive to survey. Surveys were typically timed to capture the main period optimal for MBBS (08:30-18:00hrs), in accordance with standard guidance (NatureScot, 2017). This ensured that the time when target species (described above) are most active was appropriately covered by the survey period. Survey effort is summarised in **Table 2.4**. Surveys were sometimes undertaken over 2-3 days given the extent of the MBBS survey area. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2.**

Table 2.4: Moorland breeding bird survey effort.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2022 (Year 1)	1	14/04/2022 15/04/2022	16:00 13:10	19:40 18:15
	2	31/05/2022	05:30	10:00
	3	26/06/2022	06:10	13:50
	4	06/07/2022	06:00	13:10
2023 (Year 2)	1	03/04/2023 15/04/2023	06:45 06:45	13:05 12:45
	2	02/05/2023 17/05/2023	06:30 07:30	12:40 12:55
	3	05/06/2023 19/06/2023	06:45 06:30	12:10 11:55
	4	03/07/2023 17/07/2023 25/07/2023	06:00 07:15 10:15	09:00 13:10 12:30

Annex 1/ Schedule 1 Breeding Raptor and Owl Searches

2.2.22 Breeding raptor and owl searches were undertaken in 2022 and 2023 with reference to species-specific methodologies outlined in Hardey *et al.* (2013), as per NatureScot guidance (SNH, 2017).

2.2.23 A series of search visits were made during each survey year, staggered across the core breeding season (March to July).

2.2.24 The breeding raptor and owl survey area in both survey years has comprised coverage of the Site and accessible areas within 2km, as shown in **Figure C1-2.**

2.2.25 All surveys were undertaken during daylight hours and in fine conditions conducive to survey. Some surveys were timed to include times close to dusk to capture any evidence of owls. Survey effort is

[1] Environment (Wales) Act 2016.
[2] Extended in Year 2 to include all passerines (see *Limitations* section for further information).

summarised in **Table 2.5**. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2.**

Table 2.5: Breeding raptor and owl search effort summary.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2022(Year 1)	1	17/04/2022	09:40	16:10
	2	19/04/2022	08:00	15:40
	3	09/05/2022	10:00	16:30
	4	14/05/2022	11:00	16:30
	5	20/06/2022	10:00	14:00
	6	21/06/2022	10:30	15:00
2023 (Year 2)	1	27/03/2023	13:50	20:00
	2	30/03/2023	14:00	20:20
	3	10/04/2023	13:30	20:35
	4	07/05/2023	14:45	21:00
	5	19/05/2023	15:15	21:00
	6	13/06/2023	15:30	21:15
	7	26/06/2023	15:30	21:50
	8	12/07/2023	14:45	21:00

Nightjar Survey

2.2.26 Nightjar surveys were carried out with reference to species-specific methodologies outlined in Gilbert *et al.* (1998) and comprised two survey visits (one at dusk and one at dawn) in 2023, in favourable conditions.

2.2.27 The nightjar survey area has comprised coverage of the Site and accessible areas of suitable habitat (including clear-fell and regenerating plantation) within 500m, where accessible, as shown in **Figure 6.** Habitats within the survey area considered most suitable for nightjar were surveyed, and comprised any clear-felled areas within forestry, and young forestry typically less than 15 years old and open rides.

2.2.28 The survey was undertaken along a pre-determined transect through the survey area and stopping at listening points adjacent to suitable breeding habitats, where singing ('churring') males were listened for. The survey was targeted in those forestry habitats within, and adjoining, the west of the Site.

2.2.29 Survey effort is summarised in **Table 2.6**. Full details of all survey times, field surveyors and weather conditions are presented in **Annex 2.**

Table 2.6: Nightjar survey effort summary.

Year	Visit	Date	Start Time (24hrs)	End Time (24hrs)
2023 (Year 2)	1	28/06/2023	21:30	00:30
	2	30/06/2023	01:30	04:45

Field Survey Personnel

2.2.30 All field surveys have been completed by experienced and professional ornithologists named in **Annex 2**; all of whom are all fully conversant in recognised bird survey methodologies for proposed wind turbine developments.

Other Surveys

2.2.31 No further field surveys were undertaken. In accordance with standard NatureScot guidance (SNH, 2017) winter walkover surveys were not carried out, given the Site is not within 20km of any designated site with qualifying migratory goose interests. Furthermore, the ornithology surveys (VP flight activity surveys) were undertaken during the winter period which would have recorded any such bird use of the Site.

Field Survey Limitations

2.2.32 VP2 had to be relocated to VP2a, and VP3 to VP3b due to access restrictions in January 2023 and February 2023 respectively, during Year 2. The movement of VP2 to VP2a and VP3 to VP3b were modest alterations, with only slight changes to the viewsheds. These are not considered limitations given the VP viewshed coverage remained sufficient of the proposed layout at the time of survey.

2.2.33 For the Year 2 breeding season, different height bands were used, from those used in Year 1, given evolving turbine specification considerations.

2.2.34 Survey hours between some of the VPs did not match, although annual hours at each VP exceeded 72hours (and spread across the breeding and non-breeding seasons) which is the minimum requirement as per NatureScot guidance (SNH, 2017). No limitation in relation to VP hours is thus considered.

2.2.35 During the Year 1 MBBS only ground-nesting wetland species were recorded (although extended to include Red list passerines). During the Year 2 MBBS, the target species was extended to include all species, and included ground-nesting wetland species and all passerines. Considering all passerines is highly precautionary as passerines are not considered to be sensitive to wind farm developments, so the omission of these bird species during Year 1 MBBS is not considered a limitation.

2.2.36 Nightjar surveys were only undertaken in Year 2 (and not Year 1). Given the survey results obtained, one year of surveys is considered to have appropriately identified those habitats, within the survey area, most suitable for, and supporting, breeding nightjar.

2.2.37 Preliminary digital elevation models (DEM) of the VP viewshed coverage from the VPs were created using a 20m above the ground altitudinal cut off. The viewshed coverage at each VP location was ground-truthed onsite by surveyors, to ensure the viewshed coverage modelled was representative of the actual coverage, after factoring in the location of trees and hedgerows. The VP viewshed coverage was accordingly amended. The viewshed coverage shows that the vast majority of the VP survey area is visible with only very limited “blind spots” (which is typical due to undulating topography and trees). These are very minor in extent and flight activity of target species around these turbines would still have been observed.

2.2.38 All habitats within the Site were accessible for survey. Access to and observations of most areas outside the Site (including out to 2km for breeding raptor and owl searches) was possible from suitable locations within the site or public rights of way (PRoWs), scanning areas with the use of optics (telescope and binoculars). Given the good visibility across the survey area from within the Site and the PRoWs this is not considered a limitation to the results obtained.

2.2.39 A settling-in period was applied prior to the start of VP flight activity surveys to minimise the likelihood for surveyor presence to influence bird activity. Furthermore, VPs were located where viewshed visibility could be maximised, while keeping as inconspicuous to birds as possible (both VPs were positioned by field boundaries to avoid influencing bird activity).

2.2.40 Overall, no limitations to the dataset in establishing an accurate reflection of the levels of target species activity within proximity to the Proposed Development, and respective survey areas.

3 RESULTS

3.1 Desk Study

3.1.1 This section provides details of existing ornithological information and existing records of protected and notable bird species identified within and in proximity to the Site from desk study sources listed in **Table 3.1.**

Statutory Designated Sites for Nature Conservation

3.1.2 This section should be read with reference to **Figure 1**.

3.1.3 A review of the 'MAGIC' and NRW websites identifies that the Site does not form part of any statutory designated site for nature conservation with qualifying ornithological qualifying features.

3.1.4 **Table 3.1** summarises statutory designated sites with ornithological qualifying features. Distances specified within **Table 3.1** are taken from the Site boundary to the designation boundary at its nearest point.

3.1.5 There are no internationally designated sites with qualifying migratory waterfowl features located within 20km of the Site.

Table 3.1: Designated sites for nature conservation.
SSSI – Site of Special Scientific Interest.

Designated Site	Distance and Direction from the Site	Ornithological Qualifying Features
Eglwys Nunydd Reservoir SSSI	6.5km west	Reservoir supporting wintering wildfowl and passage migrants.
Margam Moors SSSI	8km west	Reservoir supporting wintering wildfowl and passage migrants.

3.2 Field Surveys

This section presents the results of baseline field surveys, including an overview of birds present within adopted survey areas and their distribution.

VP Flight Activity Surveys

Target Species

3.2.1 Target species flight activity recorded during the entire VP survey period (November 2021 to October 2022, and November 2022 to October 2023) from all VPs combined is summarised in **Table 3.2**. The

total number of flights, total number of birds and total flight duration recorded (across all height bands) is presented. This includes some flights which were detected outside of the VP survey area and which are not at-risk of collision from the Proposed Development. The most regularly recorded species was red kite (224 flights, including a displaying pair), lapwing (31 flights, including displaying birds) and grey heron (15 flights), with other target species recorded in modest numbers (≤6 flights).

3.2.2 Detailed flight records are presented in **Annex 3**, with flight lines illustrated in **Figures 4a-d.**

Table 3.2: Target species flight activity summary (all flights) across two years of survey.

Species	Total. no. of flights	Total. no. of birds	Total flight time (secs)[3]
Teal	4	30	1,980
Barn owl	1	1	75
Little egret	1	1	30
Golden plover	1	4	120
Grey heron	15	15	927
Kestrel[4]	4	5	705
Lapwing	31	206	13,294
Red kite	224	334	44,371
Merlin	6	6	180
Cormorant	1	1	60
Peregrine	1	1	45
Hen harrier	1	1	160

Secondary Species

3.2.3 The following secondary species were also recorded:

- Lesser black-backed gull;
- Great black-backed gull;
- Herring gull;
- Common gull;
- Black-headed gull;
- Buzzard;
- Sparrowhawk; and
- Raven.

Moorland Breeding Bird Surveys

3.2.4 In summary, the MBBS survey area supported a very narrow assemblage of breeding species considered typical of the locale and habitats present. The only ground-nesting wader recorded as breeding was lapwing, with four breeding pairs in both Year 1 and Year 2, with the location of the breeding lapwing pairs shown in **Figures 5a-b**. Of these, conclusive evidence of breeding (nest site

[3] Time multiplied by the number of birds.

[4] Note, kestrel was treated as target species part way through Year 1 (from September 2022) and throughout Year 2, given its move from the Amber List to Red List in Wales (Johnstone *et al.* (2022)). Eleven kestrel flights were recorded prior to September 2022 when it was treated as a secondary species.

and/or young recorded) was identified for two and one lapwing pair respectively in Year 1 and Year 2. All apart from one of the breeding pairs were within the Site boundary. All other breeding species recorded, were passerines, such as skylark and meadow pipit (which in accordance with NatureScot guidance (SNH, 2017) are not considered sensitive to wind farm developments). Records of other species recorded during the MBBS is provided in **Table 3.3**, and BoCC Amber and Red list species[5] records (those listed in **bold** in **Table 3.3**) are shown in **Figures 5c-5h**. Of those species recorded during the MBBS, all of those listed in **Table 3.3** are during Year 2, with only spotted flycatcher recorded in Year 1 (but see *Limitations* section).

Table 3.3: Other Species recorded during MBBS.

Species	Considered Breeding in Survey Area	No. territories Y1	No. territories/pairs Y2
Cuckoo	**Yes**	**-**	**4**
Stock dove	**Yes**	**-**	**2**
Wood pigeon	**Yes**	**-**	**1**
Snipe	**No**	**-**	**-**
Great spotted woodpecker	Yes	-	-
Green woodpecker	**Yes**	**-**	**2**
Grey heron	**No**	**-**	**-**
Jay	Yes	-	-
Carrion crow	Yes	-	-
Raven	Yes	-	-
Coal tit	**Yes**	**-**	**3**
Blue tit	Yes	-	-
Great tit	Yes	-	-
Skylark	**Yes**	**-**	**43**
Swallow	No	-	-
Willow warbler	**Yes**	**-**	**18**
Chiffchaff	Yes	-	-
Blackcap	Yes	-	-
Whitethroat	**Yes**	**-**	**6**
Goldcrest	**Yes**	**-**	**6**
Wren	**Yes**	**-**	**18**
Nuthatch	Yes	-	-
Treecreeper	Yes	-	-
Starling	**Yes**	**-**	**1**
Song thrush	**Yes**	**-**	**9**

[5] Regards Amber or Red listed species in the BoCC 5 for the UK, and BoCC 4 for Wales.

Species	Considered Breeding in Survey Area	No. territories Y1	No. territories/pairs Y2
Mistle thrush	**Yes**	**-**	**5**
Blackbird	Yes	-	-
Spotted flycatcher	**Yes**	**1**	**-**
Robin	Yes	-	-
Stonechat	Yes	-	-
Wheatear	**No**	**-**	**-**
House sparrow	**Yes**	**-**	**2**
Dunnock	**Yes**	**-**	**6**
Pied wagtail	Yes	-	-
Meadow pipit	**Yes**	**-**	**19**
Tree pipit	**Yes**	**-**	**1**
Chaffinch	Yes	-	-
Bullfinch	**Yes**	**-**	**1**
Linnet	**Yes**	**-**	**5**
Goldfinch	Yes	-	-

Annex 1 / Schedule 1 Breeding Raptor and Owl Searches

3.2.5 In Year 1 (2022) the survey area was found to support a goshawk breeding territory, with nest site located within the Site, red kite breeding territory (with suspected nest site in woodland habitat adjacent to the Site) and two possible barn owl nest/roost sites within 2km of the Site (with one close to the Site boundary). These records are provided in **Confidential Figure C1**. Other records in Year 1 consisted of a male merlin and hunting kestrel (and another kestrel perched in a conifer), although there was no evidence of breeding of these two species within the survey area.

3.2.6 In Year 2 (2023) the survey area was found to support a red kite breeding territory (with nest site within the Site). This record is provided in **Confidential Figure C2**. Other records in Year 2 consisted of an over-flying kestrel, although there was no evidence of breeding within the survey area.

Nightjar Survey

3.2.7 Nightjar surveys in 2023 recorded six churring male nightjars within forestry within the survey area. Furthermore, five nightjar flights and two female nightjars were also recorded in habitat associated with the churring males. The records from the surveys are provided in **Figure 6**.

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ANNEX 1: BIRD SPECIES SUMMARY

Table A1-1 provides a list of bird species referred to within this report. Both common and species names are presented along with a summary of each species relevant conservation status using the following abbreviations:

- Annex 1 - species listed on Annex 1 of the Birds Directive;
- S1, S1A, SA1 - species listed on Schedule 1, Schedule 1A or Schedule A1 respectively of the 1981 Wildlife and Countryside Act;
- BoCC - BoCCs as listed by leading bird conservation organisations in the UK, including the RSPB and BTO. Red and Amber categories are given (Stanbury *et al*., 2021)[6];
- S7 - species listed in Section 7 of the Environment (Wales) Act 2016; and
- LBAP – species with action plans prepared as part of the Bridgend LBAP, 2002[7,8].

Table A1-1: Summary of bird species.

Common Name	Species Name	Conservation Status
Mallard	*Anas platyrhynchos*	BoCC – Amber (Green)
Teal	*Anas crecca*	BoCC - Amber
Grey heron	*Ardea cinerea*	BoCC – Green (Amber)
Little egret	*Egretta garzetta*	Annex 1
Nightjar	*Caprimulgus europaeus*	Annex 1, BoCC- Amber (Green), S7
Red grouse	*Lagopus lagopus*	BoCC – Green (Red), S7
Lapwing	*Vanellus vanellus*	BoCC- Red, S7, LBAP
Golden plover	*Pluvialis apricaria*	Annex 1, BoCC – Green (Red), S7
Black-headed gull	*Chroicocephalus ridibundus*	BoCC – Amber (Red), S7
Common gull	*Larus canus*	BoCC – Amber
Great black-backed gull	*Larus marinus*	BoCC - Amber
Lesser black-backed gull	*Larus fuscus*	BoCC – Amber (Red)
Herring gull	*Larus argentatus*	BoCC – Red, S7
Cormorant	*Phalacrocorax carbo*	-
Barn owl	*Tyto alba*	S1
Hen harrier	*Circus cyaneus*	S1, BoCC – Red
Sparrowhawk	*Accipiter nisus*	BoCC – Amber (Green)
Goshawk	*Accipiter gentilis*	BoCC – Green (Amber), S1

[6] Where the BoCC 4 Wales classification (from Johnstone *et al.* 2022) differs from the UK-wide list, the Welsh list classification is presented in brackets.
[7] www.bridgend.gov.uk/media/8721/bridgendlbapandes_v2-1.pdf (Accessed 01/09/2023).
[8] Note, although there are no specific Local Biodiversity Action Plans for species, the Neath Port Talbot Nature Partnership aims to protect and enhance species and habitats listed on Section 7 of the Environment (Wales) Act 2016 and/or European or UK legally protected species (see https://www.npt.gov.uk/5405 Accessed 01/09/2023).

Common Name	Species Name	Conservation Status
Red kite	*Milvus milvus*	Annex 1, S1, S1A
Buzzard	*Buteo buteo*	-
Kestrel	*Falco tinnunculus*	BoCC – Amber (Red), S7
Merlin	*Falco columbarius*	Annex 1, S1, BoCC – Red
Peregrine	*Falco peregrinus*	S1
Raven	*Corvus corax*	-
Skylark	*Alauda arvensis*	BoCC- Red (Amber), S7, LBAP
Meadow pipit	*Anthus pratensis*	BoCC – Amber (Red)
Cuckoo	*Cuculus canorus*	BoCC – Red, S7
Stock dove	*Columba oenas*	BoCC – Amber (Green)
Wood pigeon	*Columba palumbus*	BoCC – Amber (Green)
Snipe	*Gallinago gallinago*	BoCC – Amber
Great spotted woodpecker	*Dendrocopos major*	-
Green woodpecker	*Picus viridis*	BoCC – Green (Amber)
Grey heron	*Ardea cinerea*	BoCC – Green (Amber)
Jay	*Garrulus glandarius*	-
Carrion crow	*Corvus corone*	-
Coal tit	*Periparus ater*	BoCC – Green (Amber)
Blue tit	*Cyanistes caeruleus*	-
Great tit	*Parus major*	-
Swallow	*Hirundo rustica*	-
Willow warbler	*Phylloscopus trochilus*	BoCC – Amber (Red)
Chiffchaff	*Phylloscopus collybita*	-
Blackcap	*Sylvia atricapilla*	-
Whitethroat	*Curruca communis*	BoCC – Amber (Red)
Goldcrest	*Regulus regulus*	BoCC – Green (Red)
Wren	*Troglodytes troglodytes*	BoCC – Green (Amber)
Nuthatch	*Sitta europaea*	-
Treecreeper	*Certhia familaris*	-
Starling	*Sturnus vulagris*	BoCC – Red, S7
Song thrush	*Turdus philomelos*	BoCC – Amber (Green), S7
Mistle thrush	*Turdus viscivorus*	BoCC – Red (Amber)
Blackbird	*Turdus merula*	-
Spotted flycatcher	*Muscicapa striata*	BoCC – Red, S7, LBAP
Robin	*Erithacus rubecula*	-
Stonechat	*Saxicola rubicola*	-

Common Name	Species Name	Conservation Status
Wheatear	*Oenanthe oenanthe*	BoCC – Amber
House sparrow	*Passer domesticus*	BoCC – Red (Amber), S7
Dunnock	*Prunella modularis*	BoCC – Amber, S7
Pied wagtail	*Motacilla alba*	-
Tree pipit	*Anthus trivialis*	BoCC – Red, S7
Chaffinch	*Fringilla coelebs*	-
Bullfinch	*Pyrrhula pyrrhula*	BoCC – Amber, S7
Linnet	*Linaria cannabina*	BoCC – Red, S7
Goldfinch	*Carduelis carduelis*	-

ANNEX 2: ORNITHOLOGY FIELD SURVEY EFFORT

The following codes are used to record weather conditions within **Tables A2-1** to **A2-6**:

Wind Speed		**Wind Direction**		**Cloud Height**	
Calm	0	16 point compass		<150m	0
Light air	1			150-500m	1
Light breeze	2	**Rain**		>500m	2
Gentle breeze	3	None	0		
Moderate breeze	4	Drizzle/mist	1	**Frost**	
Fresh breeze	5	Light showers	2	None	0
Strong breeze	6	Heavy showers	3	Ground	1
Moderate gale	7	Heavy rain	4	All day	2
Fresh gale	8				
Strong gale	9	**Visibility**		**Snow**	
Whole gale	10	Poor	0	None	0
Storm	11	<1km	1	On site	1
		>1km	2	High ground	2
				Cloud cover	
				0-8 scale (with '0' no cloud & '8' 100% cloud)	

Field surveys were undertaken by the following named surveyors:

D. Rouse (DR), S. Viles (SV), S. Shutt (SS) and M. Hogan (MH).

Table A2-1: VP flight activity survey effort (November 2021 to October 2022, and November 2022 to June 2023).

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
29/11/2021	1	DR	08:45	11:45	3	0/0/0	NE/NE/NE	0/0/0	2/2/2	2/1/1	2/2/2	2/2/2	0/0/0
29/11/2021	2	DR	12:00	15:00	3	1/3/6	NE/NE/NE	0/0/2	4/6/8	1/1/0	2/2/0	1/2/2	0/0/0
30/11/2021	3	DR	08:00	11:00	3	4/4/4	NNE/NNE/NNE	0/0/0	7/7/7	2/1/1	2/2/2	2/2/2	0/0/0
09/12/2021	2	DR	08:30	11:30	3	2/3/4	WNW/WNW/WNW	0/0/0	8/7/7	1/1/1	2/2/2	2/2/2	0/0/0
09/12/2021	3	DR	11:45	14:45	3	6/8/9	ESE/ESE/ESE	1/2/4	8/8/8	1/0/0	1/0/0	2/2/1	0/0/0
14/12/2021	1	DR	09:00	12:00	3	6/6/7	NE/NE/NE	2/2/3	7/8/8	0/1/1	1/1/1	0/0/0	0/0/0
14/12/2021	2	DR	12:30	15:30	3	7/7/7	NE/NE/NE	3/3/4	8/8/8	0/0/0	1/1/0	0/0/0	0/0/0
15/12/2021	3	DR	09:00	12:00	3	2/2/2	NNE/NNE/NNE	0/0/0	8/8/8	0/0/0	0/0/0	0/0/0	0/0/0
20/12/2021	1	DR	09:10	12:10	3	3/3/4	NNE/NNE/NNE	1/1/2	3/4/5	1/1/1	1/1/1	0/0/0	0/0/0
20/12/2021	3	DR	12:30	15:30	3	4/4/4	NNE/NNE/NNE	2/2/2	5/5/5	1/1/1	1/1/1	0/0/0	0/0/0
19/01/2022	3	DR	09:00	12:00	3	2/3/3	S/S/S	2/2/2	8/8/8	1/1/1	2/2/1	0/0/0	0/0/0
19/01/2022	2	DR	12:15	15:15	3	4/4/8	E/E/E	0/0/0	6/6/7	2/2/2	2/1/1	0/0/0	0/0/0
27/01/2022	1	DR	07:45	10:45	3	2/2/2	NE/NE/NE	0/0/0	6/5/5	1/1/1	2/2/2	0/0/0	0/0/0
27/01/2022	2	DR	11:00	14:00	3	3/3/2	NE/NE/NE	0/0/0	7/7/6	1/2/2	2/2/2	0/0/0	0/0/0
03/02/2022	2	DR	11:15	14:15	3	2/2/2	S/S/S	0/0/1	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
03/02/2022	1	DR	07:45	10:45	3	4/4/4	S/S/S	0/1/0	8/8/8	0/1/1	1/1/1	0/0/0	0/0/0
07/02/2022	1	DR	08:00	11:00	3	0/0/0	SE/SE/SE	0/0/0	4/4/4	2/2/2	2/2/2	0/0/0	0/0/0
07/02/2022	3	DR	11:30	14:30	3	0/0/0	SE/SE/SE	0/0/1	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
16/02/2022	3	DR	14:30	17:30	3	5/6/6	S/S/S	3/3/4	8/8/8	1/1/0	1/1/0	0/0/0	0/0/0
16/02/2022	1	DR	07:30	10:30	3	4/4/4	S/S/S	2/2/2	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
16/02/2022	2	DR	11:00	14:00	3	4/4/5	S/S/S	2/2/3	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
17/02/2022	3	DR	14:10	17:10	3	5/5/6	SE/SE/SE	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
17/02/2022	1	DR	07:10	10:10	3	5/5/6	SE/SE/SE	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
17/02/2022	2	DR	10:40	13:40	3	6/6/6	S/S/SE	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
08/03/2022	1	DR	07:30	10:30	3	0/0/0	NNE/NNE/NNE	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
08/03/2022	2	DR	11:00	14:00	3	1/1/1	NNE/NNE/NNE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
08/03/2022	3	DR	14:30	17:30	3	2/1/1	NE/NE/NE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
15/03/2022	1	DR	07:00	10:00	3	1/1/1	NE/NE/NE	0/00	7/7/7	1/1/2	2/2/2	0/0/0	0/0/0
15/03/2022	2	DR	10:30	13:30	3	1/1/2	NE/NE/NE	0/01	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
15/03/2022	3	DR	14:00	17:00	3	1/1/1	NE/NNE/NNE	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
29/03/2022	2	DR	14:30	17:30	3	0/0/0	SE/SE/SE	0/0/0	6/6/7	2/2/2	2/2/2	0/0/0	0/0/0
30/03/2022	1	DR	09:00	12:00	3	0/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
29/03/2022	1	DR	11:00	14:00	3	0/0/0	SE/SE/SE	0/0/0	6/6/6	2/2/2	2/2/2	0/0/0	0/0/0
30/03/2022	2	DR	12:30	15:30	2	1/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
30/03/2022	3	DR	16:00	19:30	3	0/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/0	0/0/0	0/0/0
31/03/2022	3	DR	11:00	14:00	3	1/0/0	S/S/S	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
16/04/2022	3	SV	11:00	14:00	3	0/1/1	/-/NW/NW	0/0/0	3/2/2	2/2/2	2/2/2	0/0/0	0/0/0
16/04/2022	2	SV	14:30	17:30	3	1/1/1	NW/NW/NW	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
25/04/2022	2	DR	14:00	17:00	2	0/0/0	NE/NE/NE	0/0/0	2/2/1	2/2/2	2/2/2	0/0/0	0/00
27/04/2022	1	DR	14:00	17:00	3	1/1/1	NE/NE/NE	0/0/0	4/3/3	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2022	3	DR	08:00	11:00	3	3/3/2	N/N/N	0/0/0	7/7/5	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2022	2	DR	11:40	14:40	3	3/2/2	N/N/N	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2022	1	DR	15:15	18:15	3	2/2/2	NE/NE/NE	0/0/0	2/2/2	2/2/2	2/2/2	0/0/0	0/0/0
01/05/2022	2	DR	10:00	13:00	3	2/2/2	N/N/N	1/1/2	8/8/8	2/2/1	2/2/1	0/0/0	0/0/0
03/05/2022	2	DR	15:00	18:00	3	0/1/1	NE/NE/NE	0/0/0	2/2/6	2/2/2	2/2/2	0/0/0	0/0/0
03/05/2022	3	DR	11:30	14:30	3	0/0/0	NE/NE/NE	0/0/0	4/2/2	2/2/2	2/2/2	0/0/0	0/0/0
03/05/2022	1	DR	8:00	11:00	3	0/0/0	NE/NE/NE	0/0/0	5/5/4	2/2/2	2/2/2	0/0/0	0/0/0
19/05/2022	3	DR	10:00	13:00	3	0/0/0	N/N/N	0/0/0	8/6/6	2/2/2	2/2/2	0/0/0	0/0/0
10/05/2022	2	DR	12:30	15:30	3	2/2/2	SE/SE/SE	1/1/1	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
10/05/2022	1	DR	9:00	12:00	3	2/2/2	SE/SE/SE	1/1/2	6/7/8	2/2/1	2/2/2	0/0/0	0/0/0
22/06/2022	3	DR	13:00	16:00	3	1/1/1	SE/SE/SE	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0
22/06/2022	1	DR	9:30	12:30	3	1/1/1	S/S/S	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0
23/06/2022	2	DR	9:30	11:30	3	1/1/1	N/N/N	0/0/0	7/5/5	2/2/2	2/2/2	0/0/0	0/0/0
01/07/2022	3	DR	15:00	18:00	3	4/4/4	S/S/S	1/1/1	3/3/4	1/1/1	2/2/2	0/0/0	0/0/0
02/07/2022	1	DR	15:00	18:00	3	3/3/3	SE/SE/SE	1/1/1	5/4/4	2/2/2	0/0/0	0/0/0	0/0/0
02/07/2022	2	DR	08:00	11:00	3	2/2/2	SE/SE/SE	2/2/2	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
02/07/2022	3	DR	11:30	14:30	3	2/3/3	SE/SE/SE	2/2/1	7/7/5	1/1/2	2/2/2	0/0/0	0/0/0
07/07/2022	2	DR	11:00	14:00	3	0/0/0	SE/SE/SE	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0
07/07/2022	3	DR	14:30	17:30	3	0/0/0	SE/SE/SE	0/0/0	0/0/0	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/07/2022	2	DR	11:00	14:00	3	0/1/1	S/S/S	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2022	3	DR	14:30	17:30	3	1/1/2	S/SSW/SSW	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
20/07/2022	1	DR	13:45	16:45	3	2/2/3	W/W/W	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
20/07/2022	3	DR	10:15	13:15	3	2/2/2	W/W/W	0/0/0	7/7/8	2/2/2	2/2/2	0/0/0	0/0/0
23/08/2022	3	DR	10:00	13:00	3	0/0/0	N/N/N	0/0/0	7/5/5	2/2/2	2/2/2	0/0/0	0/0/0
30/08/2022	1	DR	10:30	13:30	3	3/3/2	SE/SE/SE	0/1/1	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
30/08/2022	1	DR	14:30	17:30	3	3/3/4	SE/SE/SE	2/2/4	8/8/8	2/2/1	2/2/0	0/0/0	0/0/0
31/08/2022	1	DR	11:00	14:00	3	1/1/1	SE/S/S	0/0/0	1/1/0	2/2/2	2/2/2	0/0/0	0/0/0
28/08/2022	3	SV	10:30	13:30	3	2/1/1	W/W/W	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
28/08/2022	3	SV	14:00	17:00	3	2/0/0	W/-/-	0/0/0	6/5/6	2/2/2	2/2/2	0/0/0	0/0/0
21/09/2022	2	SS	12:30	15:30	3	2/2/2	SW/SW/SW	0/0/0	3/3/3	2/2/2	2/2/2	0/0/0	0/0/0
21/09/2022	2	SS	16:00	19:00	3	2/1/1	SW/SW/SW	0/0/0	3/2/2	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2022	1	SS	12:00	15:00	3	3/4/4	SW/SW/SW	0/0/0	7/7/8	2/2/2	2/2/2	0/0/0	0/0/0
22/09/2022	1	SS	15:30	18:30	3	4/4/4	WSW/WSW/WSW	2/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
29/09/2022	3	SS	10:30	13:30	3	4/4/4	NNE/NNE/NNE	0/0/0	4/6/7	2/2/2	2/2/2	0/0/0	0/0/0
29/09/2022	3	SS	14:00	17:00	3	4/4/3	NNE/NNE/NNE	0/0/0	4/4/6	2/2/2	2/2/2	0/0/0	0/0/0
20/10/2022	1	SS	07:30	10:30	3	1/1/1	SE/SE/SE	0/0/0	8/8/7	2/1/2	1/1/2	0/0/0	0/0/0
20/10/2022	1	SS	11:00	14:00	3	2/2/1	SSE/SSE/SEE	0/0/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2022	2	SS	07:30	10:30	3	4/4/4	WSW/WSW/WSW	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2022	2	SS	11:00	14:00	3	4/4/4	WSW/WSW/WSW	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
27/10/2022	3	SS	08:30	11:30	3	3/3/3	SE/SE/SSE	0/0/0	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
27/10/2022	3	SS	12:00	15:00	3	2/2/2	S/S/S	0/0/0	7/8/8	2/2/2	2/2/2	0/0/0	0/0/0
29/11/2022	1	SS	08:00	11:00	3	2/2/2	NE/ENE/E	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
29/11/2022	1	SS	11:30	14:30	3	2/2/2	ESE/ESE/ESE	0/0/0	7/7/5	2/2/2	2/2/2	0/0/0	0/0/0
12/12/2022	2	SS	08:15	11:15	3	1/2/2	ENE/ENE/E	0/0/0	1/6/3	2/2/2	2/2/2	1/1/1	0/0/0
12/12/2022	2	SS	11:45	14:45	3	3/3/2	E/E/E	0/0/0	8/8/8	2/2/2	2/1/2	2/2/2	0/0/0
30/11/2022	3	SS	08:00	11:00	3	3/3/3	E/E/E	0/0/0	8/8/7	1/1/2	1/1/2	0/0/0	0/0/0
30/11/2022	3	SS	11:30	14:30	3	3/4/4	E/E/E	0/0/0	6/4/6	2/2/2	2/2/2	0/0/0	0/0/0
15/12/2022	1	SS	09:30	12:30	3	1/1/1	NE/NE/NNE	0/0/0	1/1/1	2/2/2	2/2/2	1/1/1	0/0/0
15/12/2022	1	SS	13:00	16:00	3	1/1/1	N/NE/NE	0/0/0	1/1/1	2/2/2	2/2/2	1/1/1	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
02/01/2023	2a	SS	09:30	12:30	3	2/2/2	WNW/W/W	0/0/0	5/3/4	2/2/2	2/2/2	0/0/0	0/0/0
02/01/2023	2a	SS	13:00	16:00	3	3/2/2	WSW/WSW/WSW	0/0/0	4/3/2	2/2/2	2/2/2	0/0/0	0/0/0
27/12/2022	3	SS	09:30	12:30	3	4/5/5	SSW/SSW/SSW	1/0/1	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
30/12/2022	3	SS	13:00	16:00	3	5/4/4	SSW/WSW/WSW	1/0/0	8/8/8	1/2/2	1/2/2	0/0/0	0/0/0
09/01/2023	1	SS	08:30	11:30	3	4/4/4	WNW/WNW/WNW	0/0/0	4/3/3	2/2/2	2/2/2	0/0/0	0/0/0
09/01/2023	1	SS	12:00	15:00	3	5/4/4	W/W/W	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
18/01/2023	2a	SS	08:30	11:30	3	2/2/2	WNW/NW/NW	0/0/0	7/5/8	2/2/2	2/2/2	1/1/1	1/1/1
18/01/2023	2a	SS	12:00	15:00	3	1/2/2	NW/NW/NW	0/0/0	7/6/4	2/2/2	2/2/2	1/1/1	1/1/1
16/01/2023	3	SS	08:30	11:30	3	2/3/3	NW/NW/NW	0/0/0	3/3/2	2/2/2	2/2/2	0/0/0	0/0/0
16/01/2023	3	SS	12:00	15:00	3	3/3/2	NW/NNW/NNW	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
08/02/2023	3b	SS	10:30	13:30	3	2/2/2	SE/S/S	0/0/0	2/2/2	2/2/2	2/2/2	1/0/0	0/0/0
08/02/2023	3b	SS	14:00	17:00	3	2/2/2	SW/SW/SW	0/0/0	2/4/7	2/2/2	2/2/2	0/0/0	0/0/0
23/02/2023	1	SS	11:00	14:00	3	3/3/3	NE/NE/NE	0/0/0	3/4/2	2/2/2	2/2/2	0/0/0	0/0/0
23/02/2023	1	SS	14:30	17:30	3	2/2/2	NE/NE/NNE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
13/02/2023	2a	SS	10:30	13:30	3	3/3/3	ESE/SE/ESE	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
13/02/2023	2a	SS	14:00	17:00	3	3/4/3	ESE/ESE/ESE	0/0/0	2/1/1	2/2/2	2/2/2	0/0/0	0/0/0
14/03/2023	3	SS	06:30	09:30	3	3/3/2	NNW/NNW/N	0/0/0	2/3/4	2/2/2	2/2/2	0/0/0	0/0/0
14/03/2023	3	SS	10:00	13:00	3	3/3/3	NW/NW/NW	0/0/0	4/4/3	2/2/2	2/2/2	0/0/0	0/0/0
17/03/2023	2a	SS	06:45	09:45	3	2/2/2	SE/SE/SSE	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
17/03/2023	2a	SS	10:15	13:15	3	2/2/2	SSE/SE/SSE	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
22/03/2023	1	SS	06:30	09:30	3	3/3/3	WSW/WSW/SW	0/0/0	8/7/7	2/2/2	1/1/1	0/0/0	0/0/0
22/03/2023	1	SS	10:00	13:00	3	3/4/3	SW/SW/SW	0/0/0	6/6/8	2/2/2	1/2/2	0/0/0	0/0/0
17/04/2023	1	SS	13:30	16:30	3	1/1/1	E/E/ESE	0/1/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
17/04/2023	1	SS	17:00	18:00	3	1/1/1	ESE/ENE/NE	0/0/0	8/7/7	2/2/2	2/2/2	0/0/0	0/0/0
29/04/2023	1	SS	17:30	20:30	3	3/3/2	S/S/S	0/0/0	4/6/6	2/2/2	2/2/2	0/0/0	0/0/0
19/04/2023	2a	SS	10:00	13:00	3	4/4/4	ENE/ENE/E	0/0/0	6/7/3	2/2/2	2/2/2	0/0/0	0/0/0
20/04/2023	2a	SS	13:30	16:30	3	4/4/4	E/E/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
20/04/2023	2a	SS	17:00	20:00	3	4/4/3	ENE/ENE/NE	0/0/0	3/2/1	2/2/2	2/2/2	0/0/0	0/0/0
04/04/2023	3b	SS	13:00	16:00	3	3/2/2	SE/SSE/S	0/0/0	2/3/2	2/2/2	2/2/2	0/0/0	0/0/0
04/04/2023	3b	SS	16:30	19:30	3	2/2/2	S/SSE/SE	0/0/0	4/4/6	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
19/04/2023	3b	SS	06:30	09:30	3	3/3/3	ENE/ENE/ENE	0/0/0	3/6/7	2/2/2	2/2/2	0/0/0	0/0/0
16/05/2023	1	SS	05:30	08:30	3	2/2/1	N/NNE/N	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
16/05/2023	1	SS	09:00	12:00	3	2/2/2	NW/WNW/WNW	0/0/0	1/6/6	2/2/2	2/2/2	0/0/0	0/0/0
10/05/2023	2a	SS	06:30	09:30	3	2/2/2	WNW/WNW/W	0/2/2	8/8/8	1/1/1	1/1/1	0/0/0	0/0/0
10/05/2023	2a	SS	10:00	13:00	3	3/3/3	W/WSW/WSW	2/0/0	8/7/6	1/1/2	1/1/2	0/0/0	0/0/0
01/05/2023	3b	SS	06:00	09:00	3	2/2/1	ENE/WNW/WNW	0/0/0	8/8/7	1/2/2	1/2/2	0/0/0	0/0/0
01/05/2023	3b	SS	09:30	12:30	3	1/2/2	WNW/WNW/WNW	0/0-2/2	7/5/6	2/2/2	2/2/2	0/0/0	0/0/0
14/06/2023	1	SS	14:45	17:45	3	2/2/2	SE/SW/WSW	0/0/0	1/1/2	2/2/2	2/2/2	0/0/0	0/0/0
14/06/2023	1	SS	18:45	21:15	3	2/2/2	W/WNW/NW	0/0/0	2/3/3	2/2/2	2/2/2	0/0/0	0/0/0
07/06/2023	2a	SS	14:30	17:30	3	3/3/3	E/ESE/ESE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
07/06/2023	2a	SS	18:00	21:00	3	3/2/2	E/E/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
02/06/2023	3b	SS	14:30	17:30	3	3/3/3	ENE/ENE/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
02/06/2023	3b	SS	18:00	21:00	3	3/3/3	ENE/ENE/ENE	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
05/07/2023	3b	SS	07:00	10:00	3	3/3/3	W/W/W	0/0/0	6/4/4	2/2/2	2/2/2	0/0/0	0/0/0
05/07/2023	3b	SS	10:30	13:30	3	3/4/4	W/W/W	0/0/0	7/7/6	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2023	1	SS	06:00	09:00	3	2/2/3	NW/NW/WNW	0/0/0	4/2/7	2/2/2	2/2/2	0/0/0	0/0/0
19/07/2023	1	SS	09:30	12:30	3	3/3/3	WNW/WNW/WNW	0/0/0	5/5/6	2/2/2	2/2/2	0/0/0	0/0/0
21/07/2023	2a	SS	06:00	09:00	3	3/3/3	NW/WNW/WNW	0/0/0	5/5/5	2/2/2	2/2/2	0/0/0	0/0/0
21/07/2023	2a	SS	09:30	12:30	3	2/2/3	WNW/WNW/W	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
26/07/2023	1	SS	07:00	10:00	3	1/1/2	SW/SW/SSW	0/0/0	3/4/6	2/2/2	2/2/2	0/0/0	0/0/0
28/07/2023	2	SS	07:00	10:00	3	4/4/4	WNW/WNW/SW	0/0/1	7/8/6	2/2/2	2/2/2	0/0/0	0/0/0
28/07/2023	3b	SS	10:30	13:30	3	3/3/4	WSW/WSW/SW	0/0/0	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
09/08/2023	2a	SS	06:00	09:00	3	2/2/1	SE/S/SSW	0/0/0	3/7/7	2/2/2	2/2/2	0/0/0	0/0/0
09/08/2023	2a	SS	09:30	12:30	3	1/1/1	SSW/SSW/SW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
15/08/2023	2a	SS	17:30	20:30	3	1/2/1	S/WSW/SSE	0/0/0	2/1/1	2/2/2	2/2/2	0/0/0	0/0/0
15/08/2023	3b	SS	14:00	17:00	3	2/3/2	SE/S/S	0/0/0	5/3/3	2/2/2	2/2/2	0/0/0	0/0/0
17/08/2023	1	SS	06:30	09:30	3	3/3/3	ENE/E/E	0/0/0	2/3/3	2/2/2	2/2/2	0/0/0	0/0/0
17/08/2023	1	SS	10:00	13:00	3	3/3/3	E/E/ESE	0/0/0	4/6/7	2/2/2	2/2/2	0/0/0	0/0/0
21/08/2023	1	SS	16:00	19:00	3	4/4/4	WSW/WSW/WSW	0/0/2	8/8/8	2/2/2	2/2/2	0/0/0	0/0/0
24/08/2023	3b	SS	12:30	15:30	3	2/2/2	W/WNW/WNW	0/0/0	7/6/7	2/2/2	2/2/2	0/0/0	0/0/0

Date	VP	Surveyor	Start Time (24h)	Finish Time (24h)	VP Hours	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
24/08/2023	3b	SS	15:45	18:45	3	3/3/3	WNW/WNW/NW	0/0/0	4/5/3	2/2/2	2/2/2	0/0/0	0/0/0
04/09/2023	3b	SS	06:30	09:30	3	2/3/3	ENE/E/E	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
04/09/2023	3b	SS	10:00	13:00	3	3/4/4	E/E/E	0/0/0	1/1/1	2/2/2	2/2/2	0/0/0	0/0/0
15/09/2023	1	SS	07:15	10:15	3	2/2/2	ESE/ESE/ESE	0/0/0	6/6/7	2/2/2	2/2/2	0/0/0	0/0/0
15/09/2023	1	SS	10:45	13:45	3	3/2/2	ESE/SE/ESE	0/0/0	4/4/6	2/2/2	2/2/2	0/0/0	0/0/0
26/09/2023	2a	SS	12:00	15:00	3	4/4/4	SW/SW/SW	0/0/0	7/6/7	2/2/2	2/2/2	0/0/0	0/0/0
26/09/2023	2a	SS	15:30	18:30	3	4/4/4	SW/WSW/SW	0/0/0	6/7/7	2/2/2	2/2/2	0/0/0	0/0/0
04/10/2023	3b	SS	12:00	15:00	3	5/5/4	WSW/WSW/WSW	0/0/0	7/6/6	2/2/2	2/2/2	0/0/0	0/0/0
04/10/2023	3b	SS	15:30	18:30	3	5/4/4	WSW/WSW/WSW	0/0/0	5/6/7	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2023	1	SS	12:00	15:00	3	4/4/4	WSW/WSW/WSW	0/0/0	8/8/7	2/2/2	2/2/2	0/0/0	0/0/0
06/10/2023	1	SS	15:30	18:30	3	4/3/3	WSW/WSW/WSW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
10/10/2023	2a	SS	12:00	15:00	3	4/3/3	WSW/WSW/WSW	0/0/0	7/7/7	2/2/2	2/2/2	0/0/0	0/0/0
10/10/2023	2a	SS	15:30	18:30	3	4/4/4	WSW/WSW/WSW	0/0/0	5/5/7	2/2/2	2/2/2	0/0/0	0/0/0

Table A2-2: MBBS effort – 2022 (Year 1).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
14/04/2022	SV	16:00	19:40	0	N/A	0	2	2	2	0	0
15/04/2022	SV	13:10	18:15	1	N	0	7	2	2	0	0
31/05/2022	SV	05:30	10:00	1	E	0	4	2	2	0	0
26/06/2022	SV	06:10	13:50	6	NE	0	5	2	2	0	0
06/07/2022	SV	06:00	13:10	2	SE	0	0	N/A	2	0	0

Table A2-3: MBBS effort – 2023 (Year 2).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
03/04/2023	SS	06:45	13:05	4	E	0	3	2	2	0	0
15/04/2023	SS	06:45	12:45	1	N	0	1	2	2	0	0
02/05/2023	SS	06:30	12:40	2	ENE	0	6	2	2	0	0
17/05/2023	SS	07:30	12:55	1	ENE	0	1	2	2	0	0
05/06/2023	SS	06:45	12:10	3	ENE	0	1	2	2	0	0
19/06/2023	SS	06:30	11:55	2	SW	0	8	2	2	0	0

Table A2-4: Annex 1/Schedule 1 Raptor and Owl Search effort – 2022 (Year 1).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
17/04/2022	SV	09:40	16:10	1	NW	0	2	2	2	0	0
19/04/2022	SV	08:00	15:40	1	NW	0	4	2	2	0	0
09/05/2022	DR	10:00	16:30	2	NE	0	4	2	2	0	0
14/05/2022	DR	11:00	16:30	0	SW	0	0	2	2	0	0
20/06/2022	DR	10:00	14:00	1	N	0	0	2	2	0	0
21/06/2022	DR	10:30	15:00	0	N	0	0	2	2	0	0

Table A2-5: Annex 1/Schedule 1 Raptor and Owl Search effort – 2023 (Year 2).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
27/03/2023	SS	13:50	20:00	2	SE	0	6	2	2	0	0
30/03/2023	SS	14:00	20:20	4	WSW	0	7	2	2	0	0
10/04/2023	SS	13:30	20:35	4	WSW	0	7	2	2	0	0
07/05/2023	SS	14:45	21:00	2	WSW	0	7	2	2	0	0
19/05/2023	SS	15:15	21:00	2	NE	0	7	2	2	0	0
13/06/2023	SS	15:30	21:15	2	SE	0	0	0	2	0	0
26/06/2023	SS	15:30	21:50	3	SW	0	6	2	2	0	0

Table A2-6: Nightjar search effort – 2023 (Year 2).

Date	Surveyor	Start Time (24h)	Finish Time (24h)	Wind Speed	Wind Direction	Rain	Cloud Cover	Cloud Height	Visibility	Frost	Snow
28/06/2023	SS & MH	21:30	00:30	2	NW	0	7/8	2	1	0	0
30/06/2023	SH & MH	01:30	04:55	2	WNW	1	7/8	2	0	0	0

ANNEX 3: VP FLIGHT ACTIVITY SURVEY - TARGET SPECIES FLIGHTS

Table A4-1 presents details of target species flight lines recorded during VP flight activity surveys November 2021 to October 2022, and November 2022 to March 2023.

Table A4-1: Target species flights (Year 1 & Nov-22 to Mar-23 in Year 2).

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
29/11/2021	1	Grey heron	1	09:22	72	27	45	0	0	0	
29/11/2021	2	Red kite	1	12:31	60	60	0	0	0	0	Circling field.
09/12/2021	2	Barn owl	1	08:35	75	75	0	0	0	0	Adult female hunting in paddocks.
09/12/2021	2	Red kite	1	10:45	90	60	30	0	0	0	Circling above fields.
14/12/2021	1	Grey heron	1	08:10	30	30	0	0	0	0	Flew south-east from Park Slip NR.
14/12/2021	1	Red kite	1	11:00	90	0	0	90	0	0	Circling field.
14/12/2021	1	Teal	9	11:30	60	0	60	0	0	0	
20/12/2021	1	Teal	6	09:20	90	90	0	0	0	0	Mixed gender flock from Park Slip.
20/12/2021	1	Little egret	1	10:10	30	30	0	0	0	0	From Park Slip.
19/01/2022	3	Red kite	2	11:45	105	0	0	0	0	105	Two hovering over fields.
27/01/2022	1	Grey heron	1	07:45	60	0	60	0	0	0	
27/01/2022	1	Teal	6	09:00	60	0	60	0	0	0	
03/02/2022	1	Grey heron	1	08:00	60	0	60	0	0	0	
07/02/2022	3	Red kite	1	13:30	60	0	60	0	0	0	Hunting.
17/02/2022	1	Teal	9	08:00	60	0	60	0	0	0	
17/02/2022	1	Grey heron	1	08:30	90	0	90	0	0	0	
17/02/2022	1	Grey heron	1	09:45	60	0	60	0	0	0	
15/03/2022	1	Grey heron	1	07:45	60	60	0	0	0	0	
15/03/2022	3	Red kite	1	15:00	60	0	15	45	0	0	Circling fields.
30/03/2022	1	Grey heron	1	09:30	60	60	0	0	0	0	
16/04/2022	3	Red kite	1	12:30	80	0	50	30	0	0	
16/04/2022	3	Red kite	1	13:10	40	40	0	0	0	0	Very distant. View obscured.
16/04/2022	3	Red kite	1	13:20	50	50	0	0	0	0	Landed out of view in field.
16/04/2022	2	Red kite	1	14:35	40	10	30	0	0	0	Distant, then dropped into valley

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
16/04/2022	2	Red kite	1	14:45	170	110	60	0	0	0	
16/04/2022	2	Red kite	1	15:00	35	0	0	0	0	35	Circled high out of view.
16/04/2022	2	Merlin	1	15:40	20	20	0	0	0	0	Flew in from behind and landed on post. Female.
16/04/2022	2	Merlin	1	15:45	10	10	0	0	0	0	Same bird flew to dead tree and flushed by corvids at 15:52hr and flew into valley.
16/04/2022	2	Red kite	2	16:05	20	0	0	0	20	0	Distantly circling over valley and then lost from view.
16/04/2022	2	Red kite	1	16:55	10	0	10	0	0	0	Lost to view behind Mynydd-Ty-Talwyn.
25/04/2022	2	Red kite	2	16:00	60	0	0	60	0	0	Near woodland.
27/04/2022	1	Red kite	2	16:00	60	0	60	0	0	0	Two still active.
29/04/2022	2	Red kite	2	11:50	60	60	0	0	0	0	Two low near woods.
29/04/2022	3	Red kite	2	10:30	60	0	60	0	0	0	
01/05/2022	2	Merlin	1	11:00	30	30	0	0	0	0	Male.
01/05/2022	2	Red kite	1	11:15	60	0	60	0	0	0	
03/05/2022	2	Red kite	2	15:30	30	0	30	0	0	0	Two over woodland.
03/05/2022	1	Grey heron	1	08:45	60	30	30	0	0	0	
03/05/2022	1	Red kite	2	09:00	45	45	0	0	0	0	Over woodland.
10/05/2022	2	Lapwing	3	10:48	60	60	0	0	0	0	Over fields.
10/05/2022	1	Red kite	2	09:15	60	15	45	0	0	0	Two circling.
22/06/2022	1	Red kite	4	09:40	60	0	60	0	0	0	Four over fields, possible young.
23/06/2022	2	Lapwing	4	10:00	60	60	0	0	0	0	
23/06/2022	2	Red kite	2	10:30	30	0	30	0	0	0	
01/07/2022	3	Red kite	2	15:30	30	0	30	0	0	0	
01/07/2022	3	Lapwing	4	16:00	60	60	0	0	0	0	
02/07/2022	1	Grey heron	1	15:30	60	0	60	0	0	0	
02/07/2022	2	Merlin	1	08:15	30	30	0	0	0	0	Male into woods.
02/07/2022	2	Red kite	2	09:30	60	0	60	0	0	0	Circling over woods.
07/07/2022	2	Red kite	1	11:15	60	60	0	0	0	0	
19/07/2022	2	Red kite	2	14:30	60	0	60	0	0	0	Circling.
19/07/2022	2	Lapwing	3	15:40	30	0	30	0	0	0	
20/07/2022	3	Red kite	2	10:30	60	0	60	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
20/07/2022	3	Grey heron	1	12:00	30	30	0	0	0	0	
23/08/2022	3	Red kite	1	10:30	30	0	30	0	0	0	
31/08/2022	1	Red kite	1	11:30	60	0	60	0	0	0	
28/08/2022	3	Red kite	3	14:05	120	0	75	45	0	0	
28/08/2022	3	Red kite	2	14:20	30	0	30	0	0	0	
28/08/2022	3	Red kite	2	14:30	40	0	40	0	0	0	
28/08/2022	3	Red kite	1	16:40	15	15	0	0	0	0	
28/08/2022	3	Red kite	1	16:45	40	0	40	0	0	0	Quartering.
22/09/2022	1	Red kite	1	12:31	75	45	30	0	0	0	
22/09/2022	1	Red kite	1	13:14	300	15	105	180	0	0	
22/09/2022	1	Red kite	1	13:14	240	30	150	60	0	0	
22/09/2022	1	Red kite	1	14:42	120	0	120	0	0	0	
22/09/2022	1	Red kite	1	14:49	90	90	0	0	0	0	
22/09/2022	1	Red kite	1	17:11	75	75	0	0	0	0	
22/09/2022	1	Red kite	2	17:14	120	0	15	105	0	0	
22/09/2022	1	Red kite	1	17:21	90	90	0	0	0	0	
22/09/2022	1	Red kite	1	17:29	330	300	30	0	0	0	
22/09/2022	1	Red kite	1	17:29	330	300	30	0	0	0	
22/09/2022	1	Red kite	2	17:45	165	165	0	0	0	0	
29/09/2022	3	Red kite	2	12:44	60	60	0	0	0	0	
29/09/2022	3	Red kite	1	13:01	30	30	0	0	0	0	
29/09/2022	3	Red kite	3	13:20	180	180	0	0	0	0	
29/09/2022	3	Red kite	1	14:14	240	195	45	0	0	0	
29/09/2022	3	Red kite	1	14:14	150	150	0	0	0	0	
29/09/2022	3	Red kite	1	14:28	60	0	15	45	0	0	
29/09/2022	3	Red kite	1	14:49	75	15	60	0	0	0	
29/09/2022	3	Red kite	3	15:17	90	0	15	30	45	0	
20/10/2022	1	Grey heron	1	09:40	60	60	0	0	0	0	
06/10/2022	2	Red kite	2	11:46	60	0	0	60	0	0	Circling together.
27/10/2022	3	Red kite	1	08:59	60	0	60	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
27/10/2022	3	Red kite	1	09:54	90	30	60	0	0	0	
27/10/2022	3	Red kite	1	10:08	90	0	90	0	0	0	
27/10/2022	3	Red kite	1	10:19	150	0	150	0	0	0	
27/10/2022	3	Red kite	1	10:54	60	60	0	0	0	0	Flushed by quad bike.
27/10/2022	3	Red kite	1	11:04	210	0	210	0	0	0	
27/10/2022	3	Red kite	2	11:28	150	0	150	0	0	0	
27/10/2022	3	Red kite	1	12:40	30	30	0	0	0	0	
27/10/2022	3	Red kite	1	12:59	30	30	0	0	0	0	
27/10/2022	3	Red kite	1	13:26	360	225	60	75	0	0	
27/10/2022	3	Red kite	1	13:29	180	15	90	75	0	0	
27/10/2022	3	Red kite	1	14:24	90	45	45	0	0	0	
27/10/2022	3	Red kite	1	14:25	30	30	0	0	0	0	
29/11/2022	1	Red kite	1	14:01	30	30	0	0	0	0	Hunting.
30/11/2022	3	Red kite	2	08:00	30	30	0	0	0	0	
30/11/2022	3	Red kite	1	08:02	30	30	0	0	0	0	
30/11/2022	3	Red kite	1	08:31	240	135	105	0	0	0	
30/11/2022	3	Red kite	1	10:30	120	120	0	0	0	0	
30/11/2022	3	Red kite	2	11:32	60	0	60	0	0	0	
30/11/2022	3	Red kite	1	11:51	165	75	90	0	0	0	
30/11/2022	3	Red kite	1	12:03	45	45	0	0	0	0	
30/11/2022	3	Red kite	4	12:14	360	360	0	0	0	0	
30/11/2022	3	Red kite	1	12:29	75	75	0	0	0	0	
30/11/2022	3	Red kite	1	12:42	90	45	45	0	0	0	
30/11/2022	3	Red kite	1	12:51	60	60	0	0	0	0	
30/11/2022	3	Red kite	1	13:01	45	15	30	0	0	0	
30/11/2022	3	Red kite	1	13:21	60	45	15	0	0	0	
30/11/2022	3	Red kite	1	14:02	165	165	0	0	0	0	
30/11/2022	3	Red kite	2	14:19	360	180	180	0	0	0	
15/12/2022	1	Red kite	1	09:30	15	15	0	0	0	0	
15/12/2022	1	Lapwing	34	09:48	60	60	0	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
15/12/2022	1	Lapwing	3	10:02	15	15	0	0	0	0	
15/12/2022	1	Lapwing	10	10:02	15	15	0	0	0	0	
15/12/2022	1	Lapwing	18	10:18	45	45	0	0	0	0	
15/12/2022	1	Golden plover	4	11:07	30	30	0	0	0	0	
15/12/2022	1	Lapwing	11	11:12	45	45	0	0	0	0	
15/12/2022	1	Red kite	1	12:07	45	45	0	0	0	0	
15/12/2022	1	Lapwing	20	12:19	45	45	0	0	0	0	
15/12/2022	1	Lapwing	4	12:27	30	30	0	0	0	0	
15/12/2022	1	Lapwing	5	13:00	45	45	0	0	0	0	
15/12/2022	1	Red kite	1	13:00	240	240	0	0	0	0	
15/12/2022	1	Lapwing	4	13:14	30	30	0	0	0	0	
15/12/2022	1	Lapwing	4	13:28	30	30	0	0	0	0	
15/12/2022	1	Lapwing	8	13:36	30	30	0	0	0	0	
15/12/2022	1	Red kite	1	13:44	225	225	0	0	0	0	
15/12/2022	1	Lapwing	1	13:56	30	30	0	0	0	0	
15/12/2022	1	Lapwing	4	13:58	30	30	0	0	0	0	
15/12/2022	1	Lapwing	4	14:06	30	30	0	0	0	0	
15/12/2022	1	Red kite	1	14:25	180	120	60	0	0	0	
15/12/2022	1	Red kite	1	14:38	45	45	0	0	0	0	
15/12/2022	1	Lapwing	5	14:42	45	45	0	0	0	0	
15/12/2022	1	Lapwing	22	15:14	45	45	0	0	0	0	
15/12/2022	1	Lapwing	12	15:24	15	15	0	0	0	0	
02/01/2023	2a	Kestrel	1	09:43	45	15	30	0	0	0	
02/01/2023	2a	Red kite	2	11:38	330	240	90	0	0	0	
02/01/2023	2a	Red kite	1	11:38	60	60	0	0	0	0	
02/01/2023	2a	Red kite	4	12:01	450	0	30	30	30	360	
27/12/2022	3	Red kite	1	09:30	60	60	0	0	0	0	
27/12/2022	3	Red kite	1	11:44	45	45	0	0	0	0	
27/12/2022	3	Red kite	2	11:52	30	30	0	0	0	0	
30/12/2022	3	Red kite	1	13:39	120	120	0	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
30/12/2022	3	Red kite	3	13:46	180	180	0	0	0	0	Split into two and one.
30/12/2022	3	Red kite	2	13:49	540	540	0	0	0	0	
30/12/2022	3	Red kite	1	14:30	180	180	0	0	0	0	
30/12/2022	3	Red kite	2	15:01	300	45	255	0	0	0	Interacting.
16/01/2023	3	Red kite	2	08:30	45	45	0	0	0	0	
16/01/2023	3	Red kite	1	09:30	150	150	0	0	0	0	
16/01/2023	3	Red kite	2	12:00	45	45	0	0	0	0	
16/01/2023	3	Red kite	2	12:18	540	540	0	0	0	0	
16/01/2023	3	Red kite	1	12:19	180	180	0	0	0	0	
16/01/2023	3	Red kite	1	12:35	300	270	30	0	0	0	
16/01/2023	3	Red kite	1	14:02	520	520	0	0	0	0	
16/01/2023	3	Red kite	4	14:46	150	90	60	0	0	0	Circling together.
08/02/2023	3b	Red kite	3	10:30	270	270	270	0	0	0	Circling together.
08/02/2023	3b	Red kite	2	10:55	360	180	180	0	0	0	Display flight.
08/02/2023	3b	Red kite	2	11:30	660	570	90	0	0	0	Circling together.
08/02/2023	3b	Red kite	1	11:35	240	150	90	0	0	0	
08/02/2023	3b	Red kite	1	12:44	90	30	60	0	0	0	
08/02/2023	3b	Red kite	1	13:02	90	0	90	0	0	0	Circling, mobbed by raven.
08/02/2023	3b	Red kite	1	14:01	225	45	150	30	0	0	
08/02/2023	3b	Red kite	1	14:15	390	390	0	0	0	0	
08/02/2023	3b	Red kite	4	15:54	120	120	0	0	0	0	Flew together.
08/02/2023	3b	Red kite	1	15:54	180	180	0	0	0	0	
23/02/2023	1	Red kite	1	11:40	45	45	0	0	0	0	Hunting.
23/02/2023	1	Red kite	1	12:06	105	105	0	0	0	0	Circling over field to west.
23/02/2023	1	Red kite	1	15:54	30	30	0	0	0	0	Seen briefly over ridge.
23/02/2023	1	Red kite	2	16:05	120	120	0	0	0	0	Display together.
23/02/2023	1	Red kite	1	16:06	30	30	0	0	0	0	
13/02/2023	2a	Red kite	1	10:30	120	120	0	0	0	0	Hovering in the wind.
14/03/2023	3b	Red kite	1	06:41	30	30	0	0	0	0	
14/03/2023	3b	Red kite	1	06:51	180	180	0	0	0	0	

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-60m	61-90m	91-180m	181-200m	>200m	Notes
14/03/2023	3b	Red kite	2	06:51	165	15	150	0	0	0	
14/03/2023	3b	Red kite	1	07:43	30	30	0	0	0	0	Circled over ridge.
14/03/2023	3b	Lapwing	2	08:14	45	45	0	0	0	0	Displaying.
14/03/2023	3b	Red kite	2	09:13	90	90	0	0	0	0	Flying low along ridge.
14/03/2023	3b	Lapwing	4	10:16	45	45	0	0	0	0	Display flight.
14/03/2023	3b	Lapwing	2	11:15	30	30	0	0	0	0	Display flight.
14/03/2023	3b	Merlin	1	11:35	45	45	0	0	0	0	Quartering.
14/03/2023	3b	Red kite	1	12:15	75	75	0	0	0	0	Hunting.
14/03/2023	3b	Red kite	2	12:20	210	45	120	45	0	0	Flying together, display flight.
14/03/2023	3b	Red kite	1	12:44	180	75	105	0	0	0	Flew over, landed, mobbed by corvid.
17/03/2023	2a	Red kite	1	09:14	210	45	90	75	0	0	Flying over and circling.
22/03/2023	1	Red kite	1	07:58	90	90	0	0	0	0	
22/03/2023	1	Red kite	1	10:50	45	0	45	0	0	0	
22/03/2023	1	Red kite	1	11:35	135	30	105	0	0	0	

Table A4-2 presents details of target species flight lines recorded during VP flight activity surveys April 2023 to October 2023 (when height bands were altered).

Table A4-2: Target species flights (Apr-23 to Oct-23 in Year 2).

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
17/04/2023	1	Red kite	1	14:43	45	0	45	0	0	0	0	
17/04/2023	1	Red kite	1	15:20	30	30	0	0	0	0	0	
17/04/2023	1	Red kite	1	15:22	30	30	0	0	0	0	0	
17/04/2023	1	Red kite	1	16:06	60	0	60	0	0	0	0	
17/04/2023	1	Red kite	1	18:29	195	195	0	0	0	0	0	Flew over landed in field to the west.
29/04/2023	1	Red kite	1	17:30	75	15	60	0	0	0	0	Circling, mobbed by corvid.
29/04/2023	1	Red kite	2	17:35	60	0	30	30	0	0	0	Circling together then flew east.
29/04/2023	1	Red kite	1	17:53	30	30	0	0	0	0	0	Flying over ridge to the north.
29/04/2023	1	Red kite	1	18:27	30	30	0	0	0	0	0	In north.
29/04/2023	1	Red kite	1	18:29	210	30	180	0	0	0	0	Flying over slowly to the west.
04/04/2023	3b	Lapwing	2	15:00	2220	0	0	0	0	0	0	Feeding for 37 minutes, then flew off.

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
04/04/2023	3b	Red kite	1	15:37	1	45	0	0	0	0	0	Flying over ridge.
04/04/2023	3b	Lapwing	2	15:37	2	30	0	0	0	0	0	Mobbed red kite as it flew over.
04/04/2023	3b	Lapwing	4	16:30	45	30	15	0	0	0	0	Display flight/calling.
04/04/2023	3b	Red kite	1	17:13	120	0	15	105	0	0	0	Circling high over ridge.
04/04/2023	3b	Red kite	1	17:26	165	0	15	45	105	0	0	In north.
04/04/2023	3b	Lapwing	1	17:38	45	45	0	0	0	0	0	Flying along ridge, calling.
04/04/2023	3b	Lapwing	1	17:50	30	15	15	0	0	0	0	Display flight/calling.
04/04/2023	3b	Lapwing	2	17:55	135	15	120	0	0	0	0	
04/04/2023	3b	Lapwing	3	18:01	105	105	0	0	0	0	0	Flying down ridge.
04/04/2023	3b	Red kite	1	18:40	345	300	45	0	0	0	0	Landed in arable field.
19/04/2023	3b	Red kite	1	06:58	105	105	0	0	0	0	0	Landed in field briefly.
19/04/2023	3b	Red kite	2	07:06	30	30	0	0	0	0	0	Seen briefly, mobbed by corvid.
19/04/2023	3b	Red kite	1	07:12	90	90	0	0	0	0	0	Flying slowly into the wind.
10/05/2023	2a	Red kite	1	11:03	60	60	0	0	0	0	0	Flying slowly over.
10/05/2023	2a	Red kite	1	11:14	180	180	180	0	0	0	0	Quartering.
10/05/2023	2a	Red kite	1	12:27	365	260	75	30	0	0	0	Quartering ground mobbed by corvid close to sheep carcass.
01/05/2023	3b	Grey heron	1	07:48	60	0	60	0	0	0	0	
01/05/2023	3b	Red kite	1	09:58	30	0	0	30	0	0	0	Circling high.
01/05/2023	3b	Red kite	1	10:15	585	210	300	75	0	0	0	Flying along ridge to the east, occasionally being mobbed by corvid.
14/06/2023	1	Red kite	1	15:43	150	60	90	0	0	0	0	Circling slowly.
07/06/2023	2a	Red kite	1	17:16	150	150	0	0	0	0	0	Flying over slowly.
02/06/2023	3b	Red kite	1	15:11	15	15	0	0	0	0	0	Appeared briefly then flew below ridge.
02/06/2023	3b	Red kite	1	15:39	75	30	45	0	0	0	0	Flew towards ridge to north of VP.
02/06/2023	3b	Red kite	1	19:59	165	30	135	0	0	0	0	Flew below ridge to the east of VP.
28/07/2023	3b	Red kite	1	10:33	345	255	90	0	0	0	0	Flying over recently cut hay field
28/07/2023	3b	Red kite	1	11:13	75	75	0	0	0	0	0	Flew below ridge to south
28/07/2023	3b	Red kite	1	11:25	150	150	0	0	0	0	0	Flew below ridge to west
28/07/2023	3b	Red kite	1	13:04	60	60	0	0	0	0	0	Flying out over hay field

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
05/07/2023	3b	Red kite	2	07:11	240	240	0	0	0	0	0	Flying slower over fields, together at first then flew in different directions
05/07/2023	3b	Red kite	1	12:10	45	45	0	0	0	0	0	Flying over recently cut hay field
05/07/2023	3b	Red kite	1	12:17	105	30	75	0	0	0	0	Flying to south of VP location
05/07/2023	3b	Red kite	1	12:36	30	30	0	0	0	0	0	Flying over recently cut hay field
05/07/2023	3b	Red kite	1	13:01	210	105	105	0	0	0	0	Flying over recently cut hay field, mobbed by raven to south of VP location
17/08/2023	1	Red kite	1	08:00	300	195	105	0	0	0	0	Flew in from the west, landed then flew north over wood
21/08/2023	1	Red kite	1	16:16	45	45	0	0	0	0	0	Flying over fields west of VP location
21/08/2023	1	Red kite	1	16:26	15	15	0	0	0	0	0	Landed in field took off
21/08/2023	1	Red kite	1	16:21	45	45	0	0	0	0	0	Landed by 2nd red kite
21/08/2023	1	Red kite	1	16:25	315	45	135	135	0	0	0	Flew south gaining height, circling high over valley to south east of VP location
21/08/2023	1	Red kite	1	16:46	180	0	0	180	0	0	0	Moving gradually east
17/08/2023	1	Red kite	1	10:44	75	75	0	0	0	0	0	Flew behind trees to west
09/08/2023	2a	Red kite	1	09:45	165	165	0	0	0	0	0	Flying over cut hey field
09/08/2023	2a	Red kite	1	10:20	120	120	0	0	0	0	0	Flying over cut hey field
09/08/2023	2a	Red kite	4	10:38	345	15	270	60	0	0	0	Circling together gaining height, one bird split and flew east
09/08/2023	2a	Red kite	1	12:02	240	120	60	60	0	0	0	Circling gaining height
09/08/2023	2a	Red kite	3	07:09	75	75	0	0	0	0	0	Flying over cut hey field. one landed in tree and one landed on pylon
09/08/2023	2a	Red kite	1	07:48	150	150	0	0	0	0	0	Flew over hey field several times joined by second bird from perch in tree.
09/08/2023	2a	Red kite	1	07:48	15	15	0	0	0	0	0	Flew over hey field several times joined by second bird from perch in tree.
09/08/2023	2a	Merlin	1	08:12	45	45	0	0	0	0	0	Flying over
18/08/2023	3b	Red kite	1	14:25	365	145	225	0	0	0	0	Circling slowly over fields
18/08/2023	3b	Red kite	1	15:11	30	30	0	0	0	0	0	Circled over hey field
18/08/2023	3b	Red kite	1	15:20	105	30	70	0	0	0	0	Circling high flew east
24/08/2023	3b	Red kite	1	12:46	585	540	45	0	0	0	0	Flying low over field, landed several times before flying off to east/south east
24/08/2023	3b	Hen harrier	1	14:23	160	160	0	0	0	0	0	Flying low, hunting. Landed in field to south of VP location. Female/juvenile

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
24/08/2023	3b	Red kite	3	16:02	1080	960	120	0	0	0	0	Two birds circling over field to south of VP occasionally dropping onto field, joined by 3rd bird after 9 mins
24/08/2023	3b	Red kite	3	16:26	390	60	210	110	0	0	0	Circling together over fields to south of VP location
24/08/2023	3b	Red kite	1	16:59	75	15	60	0	0	0	0	Flew up from ridge to east
24/08/2023	3b	Red kite	1	17:07	840	840	0	0	0	0	0	Circling over fields to south of VP location, landed several times, flew low over ridge to south
24/08/2023	3b	Red kite	2	17:30	810	810	0	0	0	0	0	Circling over fields to south of VP location, landed several times
24/08/2023	3b	Cormorant	1	18:23	60	60	0	0	0	0	0	Flying over
24/08/2023	3b	Red kite	1	18:27	120	15	105	0	0	0	0	Circling
24/08/2023	3b	Peregrine	1	18:28	45	0	45	0	0	0	0	Flying over
04/09/2023	3b	Red kite	1	07:50	60	60	0	0	0	0	0	Circling over field to north of VP location
04/09/2023	3b	Red kite	1	08:07	700	660	40	0	0	0	0	Hunting over field to west of VP location, being mobbed by sparrowhawk
04/09/2023	3b	Red kite	1	08:31	150	150	0	0	0	0	0	Hunting north of VP location
04/09/2023	3b	Red kite	1	08:44	225	225	0	0	0	0	0	Circling over field to west of VP location
04/09/2023	3b	Red kite	1	10:57	45	45	0	0	0	0	0	Flew below ridge to east of VP location
04/09/2023	3b	Red kite	1	11:07	90	60	30	0	0	0	0	Circling to north of VP location
15/09/2023	1	Red kite	1	13:10	210	30	75	105	0	0	0	Circling to west of VP location climbing then descending
26/09/2023	2a	Grey heron	1	12:34	60	15	45	0	0	0	0	Appeared to land south east of VP location
04/10/2023	3b	Red kite	1	12:20	30	30	0	0	0	0	0	Flying into the wind below ridge to west
04/10/2023	3b	Red kite	2	12:36	150	150	0	0	0	0	0	Flying together into the wind
04/10/2023	3b	Red kite	2	13:02	60	60	0	0	0	0	0	Flying together into the wind
04/10/2023	3b	Red kite	2	13:52	150	15	60	75	0	0	0	Flying together into the wind
04/10/2023	3b	Red kite	1	14:55	210	120	75	15	0	0	0	Flying along ridge to the east, landing several times in sheep field to south east
04/10/2023	3b	Kestrel	1	16:01	300	300	0	0	0	0	0	Hunting
04/10/2023	3b	Red kite	2	16:03	120	120	0	0	0	0	0	Flying together to south east of VP location
04/10/2023	3b	Kestrel	2	16:10	60	60	0	0	0	0	0	Flying together
04/10/2023	3b	Red kite	2	16:19	300	195	105	0	0	0	0	Interacting with kestrel, flying together

Date	VP	Species	No. of Birds	Start Time (24)	Duration (secs)	0-40m	41-90m	91-180m	181-200m	201-280m	>280m	Notes
04/10/2023	3b	Kestrel	1	16:19	300	225	75	0	0	0	0	Flying together with red kite
04/10/2023	3b	Red kite	7	16:34	465	405	60	0	0	0	0	Flying slowly into wind occasionally landing in sheep field to south east of VP location
04/10/2023	3b	Red kite	3	17:04	60	60	0	0	0	0	0	Flying along ridge
04/10/2023	3b	Red kite	3	17:10	420	60	30	330	0	0	0	Circling high together
04/10/2023	3b	Red kite	4	17:10	165	165	0	0	0	0	0	Flying low together over ridge then turned south
06/10/2023	1	Red kite	2	13:52	120	120	0	0	0	0	0	Circling to west of VP location
06/10/2023	1	Red kite	4	14:02	360	255	105	0	0	0	0	Slowly to south
06/10/2023	1	Red kite	1	15:30	45	30	45	0	0	0	0	Circling over ridge to the west
06/10/2023	1	Red kite	5	15:56	120	60	60	0	0	0	0	Circling together then flew below ridge to the west
06/10/2023	1	Red kite	3	16:20	180	180	0	0	0	0	0	Following together
06/10/2023	1	Grey heron	1	16:48	105	30	45	30	0	0	0	Flying over
06/10/2023	1	Red kite	7	16:56	270	270	0	0	0	0	0	Flying over field recently sprayed with slurry and continued west-north west
10/10/2023	2a	Red kite	3	16:21	90	0	0	90	0	0	0	Flying together to west
10/10/2023	2a	Red kite	1	17:10	120	120	0	0	0	0	0	Flying over cut hey field

Legend

Site Boundary

10km Site Buffer

Designated Site

Site of Special Scientific Interest (SSSI)

Eglwys Nunydd Reservoir

Margam Moors

Rev	Date	Description	De	App
00	19/09/2023		MR	MJR

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Units: Metres



MYNYDD-TY-TALWYN

Figure 1: Ornithological Statutory Designated Sites

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 2
kilometres

N W E S

Legend

Site Boundary

Indicative Turbine

Vantage Point (VP)

VP1 - SS8809185072

VP2 - SS8465386206

VP3 - SS8682986664

VP1 Viewshed

VP2 Viewshed

VP3 Viewshed

Rev	Date	Description	De	App
00	19/09/2023		MR	MJR

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Figure 2a: Vantage Point Flight Activity Survey Plan

avianecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 500
metres

N
W E
S

Legend

Site Boundary

Indicative Turbine

Vantage Point (VP)

VP1 - SS8809185072

VP2a - SS8448886223

VP3b - SS8643886038

VP1 Viewshed

VP2 Viewshed

VP3 Viewshed

Rev	Date	Description	De	App
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Figure 2b: Vantage Point Flight Activity Survey Plan

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 500

metres

N W E S

Legend

- Site Boundary
- 500m Moorland Breeding Bird & Nightjar Survey Area
- 2km Breeding Raptor and Owl Survey Area

Rev	Date	Description	De	App
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Figure 3: Breeding Bird Survey Plan

avianecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 1
kilometres

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

BO - Barn owl

KT - Red kite

ML - Merlin

Rev	Date	Description	De	App
00	19/09/2023		MR	MJR

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Figure 4a: Target Species Flight Activity - Raptors & Owls (Year 1)

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 500

metres

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

ET - Little egret

H. - Grey heron

L. - Lapwing

T. - Teal

Rev	Date	Description	De	App
00	06/10/2023		MR	MJR

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Figure 4b: Target Species Flight Activity - Others (Year 1)

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 500

metres

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

K. - Kestrel

KT - Red kite

ML - Merlin

Rev	Date	Description	De	App
00	27/10/2023		MR	MJR

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Figure 4c: Target Species Flight Activity - Raptors & Owls (Year 2)

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 500

meters

N W E S

Legend

Site Boundary

Indicative Turbine

Target Species Flight Activity

CA-Cormorant

GP-Golden plover

H.-Grey heron

L.-Lapwing

Rev	Date	Description	De	App
00	27/10/2023		MR	MJR

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Figure 4d: Target Species Flight Activity - Others (Year 2)

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 500 meters

N W E S

Legend

Site Boundary

500m Buffer

Breeding Pairs Recorded

BF-Bullfinch
D.-Dunnock
G.-Green woodpecker
GC-Goldcrest
M.-Mistle thrush
MP-Meadow pipit
S.-Skylark
SD-Stock dove
WW-Willow warbler

Pair

X Calling Bird

Flying Bird

(X) Singing Bird

Teritorial/Aggressive Interaction Bird

*Only BoCC Amber and Red list species are included in figure (BoCC 4 Wales or BoCC5 GB)

Rev	Date	Description	De	App
00	18/10/2023		MR	MJR

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Figure 5e: Other Species Records During MBBS (Year 2; Visit 1)

avianecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 750
metres

Legend

Site Boundary

500m Buffer

Breeding Pairs Recorded

BF-Bullfinch
CK-Cuckoo
CT-Coal tit
D.-Dunnock
G.-Green woodpecker
GC-Goldcrest
HS-House sparrow
LI-Linnet
M.-Mistle thrush
MP-Meadow pipit
S.-Skylark
SD-Stock dove
ST-Song thrush
TP-Tree pipit
WH-Whitethroat
WP-Woodpigeon
WR-Wren
WW-Willow warbler

Food

Male/Female Pair

X Calling Bird

Flying Bird

(X) Singing Bird

Teritorial/Aggressive Interaction Bird

*Only BoCC Amber and Red list species are included in figure (BoCC 4 Wales or BoCC5 GB)

Rev	Date	Description	De	App
00	18/10/2023		MR	MJR

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Units: Metres



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Figure 5f: Other Species Records During MBBS (Year 2; Visit 2)

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 750
metres

N W E S

Legend

Site Boundary

500m Buffer

Breeding Pairs Recorded

CK-Cuckoo
CT-Coal tit
D.-Dunnock
G.-Green woodpecker
GC-Goldcrest
HS-House sparrow
LI-Linnet
M.-Mistle thrush
MP-Meadow pipit
S.-Skylark
SG-Starling
ST-Song thrush
WH-Whitethroat
WR-Wren
WW-Willow warbler

Food

X Calling Bird

Flying Bird

(X) Singing Bird

Teritorial/Aggressive Interaction Bird

(X)–(X) Same Bird

*Only BoCC Amber and Red list species are included in figure (BoCC 4 Wales or BoCC5 GB)

Rev	Date	Description	De	App
00	18/10/2023		MR	MJR

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Projection: Traverse Mercator
Datum: OSGB 1936
Units: Metres



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Figure 5g: Other Species Records During MBBS (Year 2; Visit 3)

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 750
metres

N W E S

Legend

Site Boundary

500m Buffer

Breeding Pairs Recorded

CT-Coal tit
GC-Goldcrest
HS-House sparrow
LI-Linnet
MP-Meadow pipit
S.-Skylark
SF-Spotted flycatcher
SG-Starling
ST-Song thrush
WH-Whitethroat
WR-Wren
WW-Willow warbler

Family
Food
Juvenile
Pair

X Calling Bird

Flying Bird

(X) Singing Bird

(X)–(X) Same Bird

*Only BoCC Amber and Red list species are included in figure (BoCC 4 Wales or BoCC5 GB)

Rev	Date	Description	De	App
00	18/10/2023		MR	MJR

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Projection: Traverse Mercator
Datum: OSGB 1936
Units: Metres



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Figure 5h: Other Species Records During MBBS (Year 2; Visit 4)

avian ecology

Avian Ecology, Suite 3c Walnut Tree Farm, Northwich Road, Lower Stretton
WA4 4PG
Tel: 0843 506 5116
www.avianecology.co.uk

0 750
metres

Legend

- Site Boundary
- 500m Site Buffer
- 2km Site Buffer

Nightjar (NJ) Field Result

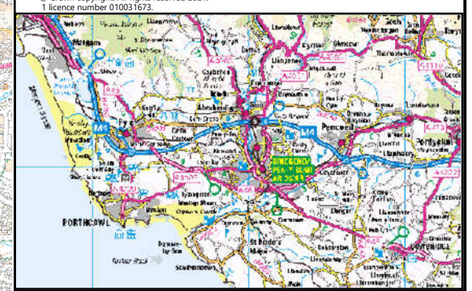
- Churring Male (Visit 1)
- Churring Male (Visit 2)
- Female
- Pair - Wing Clapping
- Male in Flight
- Female in Flight
- Multiple in Flight - NJ(x)

Rev	Date	Description	De	App
00	06/10/2023		MR	MJR

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Co-ordinate System : British National Grid
Projection: Traverse Mercator
Datum: OSGB 1936
Units: Metres



MYNYDD-TY-TALWYN

Figure 6: Nightjar Survey Results (Year 2)

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0 1
kilometres

N W E S

Legend

Site Boundary

500m Buffer

Breeding Pairs Recorded

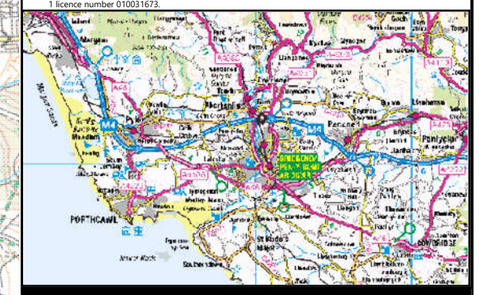
- BF - Bullfinch
- CK - Cuckoo
- CT - Coal tit
- D. - Dunnock
- G. - Green woodpecker
- GC - Goldcrest
- GP - Golden plover
- HS - House sparrow
- LI - Linnet
- M. - Mistle thrush
- MP - Meadow pipit
- S. - Skylark
- SD - Stock dove
- SF - Spotted flycatcher
- SG - Starling
- ST - Song thrush
- TP - Tree pipit
- WH - Whitethroat
- WP - Woodpigeon
- WR - Wren
- WW - Willow warbler

Rev	Date	Description	De	App
00	25/10/2023		MR	MJR

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Figure 7: MBBS Results (Year 2)

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0 750

metres

N W E S

Legend

Site Boundary

500m Buffer

Breeding Pairs Recorded

L. - Lapwing

Rev	Date	Description	De	App
00	19/09/2023		MR	MJR

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Figure 5a: Moorland Breeding Bird Survey Results (Year 1)

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Tel: 0843 506 5116
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0 750

metres

N W E S