Contents

9. Ornithology

9.1 Introduction

9.1.1 This chapter presents the preliminary assessment of the likely significant effects of the Proposed Development with respect to ornithology, including breeding and non-breeding birds. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the description provided in **Chapter 4: Description of the Proposed Development** and with respect to relevant parts of **Chapter 8: Biodiversity.**

9.1.2 This chapter describes:

- the legislation, policy and technical guidance that has informed the assessment (**Section 9.2**);
- consultation and engagement that has been undertaken and how comments from consultees relating to ornithology have been addressed (**Section 9.3**);
- the methods used for baseline data gathering (**Section 9.4**);
- the overall baseline (**Section 9.5**);
- embedded measures relevant to ornithology (**Section 9.6**);
- the scope of the assessment for ornithology (**Section 9.7**);
- the methods used for the assessment (**Section 9.8**);
- the preliminary assessment of ornithology effects (**Section 9.9 – 9.12**)
- preliminary assessment of cumulative (inter-project) effects (**Section 9.13**);
- a summary of the preliminary significance conclusions (**Section 9.14**);
- additional measures proposed (**Section 9.15**); and
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 9.16**).

Limitations and assumptions

9.1.3 The information provided in this Draft ES is preliminary, the final assessment of likely significant effects will be reported in the ES. The Draft ES has been produced to fulfil Pennant Walters's consultation duties and enable consultees to develop an informed view of the likely significant effects of the Project.

9.1.4 The breeding bird survey was completed in 2020 and based on an earlier iteration of the Proposed Development Site, encompassing the proposed Wind Farm. This has meant that a portion of the Site, located on the western edge of the Proposed Development has not been subject to coverage, however, this part of the site is proposed for access only and passes through similar habitats to those observed throughout the Site. Therefore, given that the proposed access route utilises existing tracks through pasture and the likely presence of a similar breeding bird assemblage to that which is present in other comparable habitat on site the current baseline is considered suitable for assessment.

9.1.5 Vantage point surveys utilised two observation locations which were located in the middle of the survey area, these observation points were chosen as they provided the best

observation points for the Site and surrounding area. Best practice for these surveys recommends that observation points are located outside or at the edge of your survey area as observers within the site may influence flight behaviour of some species. However, the topography of Site limited the choices for vantage point locations and the only viable observation locations were located in the centre of the site. Measures were taken to reduce the risk of disturbance by surveyors with surveyors remaining seated throughout observation periods and the use of landscape features to screen locations. Birds were not observed as being impacted by the presence of surveyors within the survey area. The survey approach was presented to key consultees (RCT county ecologist) without concerns raised regarding this approach.

Weather conditions

9.1.6 Ornithology surveys aim to avoid inclement weather, including strong and / or cold winds, heavy continuous rain, dense fog and freezing conditions as far as practicable. Surveys are therefore scheduled where practicable within suitably stable weather windows. Due to the positioning and height of the Site above sea level, micro-climate weather systems were seen to occur during some survey periods, requiring surveys to be paused and resumed or abandoned entirely in periods of prolonged rain / snow. Full survey timings can be found in **Appendix 9A**.

9.1.7 Non-breeding bird surveys carried out between October 2020 and March 2021 were impacted with sub-optimal conditions during surveys completed in January and February. These surveys took place after a period of snowfall; the resulting snow cover limited the availability of suitable habitat for target species.

9.1.8 Inclement weather was encountered periodically during vantage point (VP) surveys. Where prolonged periods of poor weather impacted the ability to complete requisite hours at each VP, each month, additional hours of survey were undertaken at the next opportunity to fulfil survey schedules within each survey period where practicable. A summary of the total number of hours completed at each VP is provided in **Appendix 9A, Section 3.2**.

Consultation limitations

9.1.9 A request for consultation with Natural Resources Wales (NRW) through their Discretionary Advice Service was made but could not be provided with the response noting this was due to staffing limitations within the NRW team. A second year of VP Surveys was therefore undertaken in accordance with Scottish Natural Heritage guidance / best practice. NRW did not highlight any concerns regarding the choice of guidance or approach to surveys at scoping stage but requested provision of full details at application. The approach adopted is considered standard practice in Wales with no specific Welsh guidance to follow.

9.2 Relevant legislation, planning policy and technical guidance

9.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to Ornithology. Further information on policies relevant to the Project is provided in **Chapter 5: Legislation and policy overview**.

Legislation

9.2.2 A summary of the relevant legislation is given in **Table 9.1**.

Table 9.1 Legislation relevant to the ornithology assessment

Legislation	Legislative context
The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[1]	The Habitat Regulations transpose the Habitats Directive[2] into English and Welsh law. The regulations provide for the designation and protection of European sites, the protection of certain species (referred to as European Protected Species or EPS) and the adaptation of planning and other controls for the protection of European sites
Wild Birds Directive (Council Directive 79/409/ EED on the conservation of wild birds)[3]	The Wild Birds Directive provides wide ranging protection for Europe's wild birds. It identifies 194 species and sub-species of wild birds that are endangered or at risk and therefore requiring additional conservation measures and consideration. The provision of the Wild Birds Directive are transposed into UK law by means of Part I of the Wildlife and Countryside Act 1981[4] (as amended) and also under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[1].
The Environment (Wales) Act 2016[5]	The Act makes provisions within Wales for the planning and managing of natural resources at national and local level. Section 6 of the Act introduces the biodiversity and resilience of ecosystems duty whereby public authorities are required to seek to maintain and enhance biodiversity so far as it is consistent with the proper exercise of those functions. Section 7 of the Act introduces a list of living organisms and types of habitat in Wales, known as Species or Habitats of Principal Importance, which in Wales are considered of key significance to sustain and improve biodiversity.
The Wildlife and Countryside Act 1981 (as amended) (WACA)[4]	This act consolidates and amends existing national legislation to implement the Bern Convention[6] . This piece of legislation remains the primary UK mechanism for statutory site designations (e.g. Sites of Special Scientific Interest, SSSI) and the protection of individual species listed under Schedules 1, 5 and 8 of the Act, each subject to varying levels of protection.
Countryside & Rights of Way Act 2000[7]	This act details further measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation

[1] UK Government (2019). The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. (Online) Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111176573 (Accessed April 2022).
[2] European Commission (1992). Council Directive 92/43/EEC on the Conservation of natural habitats and wild flora and fauna. (Online) Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31992L0043&from=EN (Accessed April 2022).
[3] European Commission (1979). Council Directive 79/409/ EED on the conservation of wild birds. (Online) Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31979L0409&from=EN (Accessed April 2022).
[4] UK Government (1981). Wildlife and Countryside Act 1981. (Online) Available at: https://www.legislation.gov.uk/ukpga/1981/69 (Accessed April 2022).
[5] UK Government (2016). The Environment (Wales) Act 2016. (Online) Available at: https://www.legislation.gov.uk/anaw/2016/3/contents (Accessed April 2022).
[6] Council of Europe (1979). The Convention on the Conservation of European Wildlife and Natural Habitats. (Online) Available at: https://rm.coe.int/1680078aff (Accessed April 2022).
[7] UK Government (2000). Countryside & Rights of Way Act 2000. (Online) Available at: https://www.legislation.gov.uk/ukpga/2000/37/contents (Accessed April 2022).

Planning policy

9.2.3 A summary of the relevant national and local planning policy is given in **Table 9.2**.

Table 9.2 Planning policy relevant to the ornithology assessment

Policy	Policy context
National planning policy	
Future Wales: The National Plan[8]	The Welsh national development framework sets the direction for development in Wales to 2040 and includes a Habitats Regulations Assessment. Policy 9 – Resilient Ecological Networks and Green Infrastructure outlines measures to ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure. The enhancement of biodiversity will be considered through embedded environmental measures and mitigation measures.
Planning Policy Wales[9] **– Chapter 6 Distinctive and Natural Places (11th Ed.; 2021)**	Chapter 6 of Planning Policy Wales (PPW) sets out the Welsh Government's objectives for Distinctive and Natural Places theme of planning policy topics covers historic environment, landscape, biodiversity and habitats, coastal characteristics, air quality, soundscape, water services, flooding and other environmental (surface and sub-surface) risks. In particular, the Biodiversity and Resilience of Ecosystems section puts emphasis on planning authorities to have regard for the State of Natural Resources Report (SoNaRR) and Area Statements published by Natural Resources Wales.
Technical Advice Note 5 (TAN5) Nature Conservation and Planning (2009)[10]	Welsh Governments (WG) policy on positive planning for nature conservation and developments affecting designated sites and habitats, along with protected priority habitats and species. The ES will consider the effects of the proposed development on designated sites and habitats, priority habitats and priority species. This Chapter will identify any designated sites of ornithological importance and assess the potential impact of the proposed development.
Local planning policy	
Rhondda Cynon Taf Local Development Plan (LDP) 2011	The LDP is a land use document which sets out how the County Borough will be developed over 15 years (covering years 2006-2011). The LDP provides a framework for decisions on developments and how land is used within the County Boundary. The overall aim of the document is to provide a focus for sustainable regeneration and high-quality development and contribute to achieving progress and benefits for residents. One of the aims of the LDP is to protect the rich biodiversity and landscape of Rhondda Cynon Taf.
Action for Nature Local Biodiversity Action Plan for Rhondda Cynon Taff 2008	The national strategy for biodiversity is delivered at local level via Local Biodiversity Action Plans (LBAP). Rhondda Cynon Taff's LBAP is the driver to conserve and enhance the biodiversity resource, by setting out objectives, targets and actions for the conservation of biodiversity within Rhondda Cynon Taff.

[8] Welsh Government (2021). Future Wales. The National Plan 2040. (Online) Available at: https://gov.wales/sites/default/files/publications/2021-02/future-wales-the-national-plan-2040.pdf (Accessed April 2022).
[9] Welsh Government (2021). Planning Policy Wales Edition 11. (Online) Available at: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf (Accessed April 2022).
[10] Welsh Assembly Government (2009). Technical Advice Note 5 (TAN5) Nature Conservation and Planning. (Online) Available at: https://gov.wales/sites/default/files/publications/2018-09/tan5-nature-conservation.pdf (Accessed April 2022).

Technical guidance

9.2.4 A summary of the technical guidance for ornithology is given in **Table 9.3**.

Table 9.3 Technical guidance relevant to the ornithology assessment

Technical guidance document	Context
Bird monitoring methods ***Gilbert, G, Gibbons, D.W. & Evans, J. (1998). Bird Monitoring Methods: A manual of techniques for key UK species. RSPB, Bedfordshire.***[11]	This guidance sets out the standard methodologies for bird monitoring, including breeding bird surveys and species-specific surveys, such as nightjar surveys. These methods form the basis of the approach to the ornithology assessment with any deviations discussed within the baseline report.
Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office, Edinburgh.[12]	This guidance outlines the survey techniques that should be employed to successfully survey each of the raptor species regularly occurring in Britain. These methods form the basis of the approach to the breeding raptor assessment and wider ornithology assessment, with any deviations discussed within the baseline report,
Scottish National Heritage Vantage Point Guidance. ***Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms.***[13]	Sets out the industry standard for vantage point survey methodology including standardised size of survey area, frequency of visits and timing of surveys. Following this technical guidance provides robust data which can be widely interpreted and enables collision risk modelling analysis.

9.3 Consultation and engagement

Overview

9.3.1 The assessment has been informed by consultation responses and ongoing stakeholder engagement. An overview of the approach to consultation is provided in **Section 2.4** of **Chapter 2: Approach to Environmental Impact Assessment**.

Scoping Opinion

9.3.2 A Scoping Direction was issued by the Planning Inspectorate, on behalf of the Welsh Ministers, on 01 December 2021. A summary of the relevant responses received in the Scoping Opinion in relation to ornithology and confirmation of how these have been addressed within the assessment to date is presented in **Table 9.4**.

[11] Gilbert, G, Gibbons, D.W. & Evans, J. (1998). Bird Monitoring Methods: A manual of techniques for key UK species. RSPB; Bedfordshire, UK.
[12] Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office; Edinburgh, UK.
[13] Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms.. (Online) Available at: https://www.nature.scot/doc/recommended-bird-survey-methods-inform-impact-assessment-onshore-windfarms (Accessed April 2022).

Table 9.4 Summary of EIA Scoping Direction responses for ornithology

Consultee	Consideration	How scoping response has been addressed in this Draft ES
Rhondda Cynon Taf	In terms of birds, it is good to see that nesting and wintering bird assessment will be undertaken, however, additional species of potential concern will need to be included, including heron (which has heronries in the adjacent Coed Gelliwion forestry plantation), nightjars (which commonly breed in felled plantations in RCT and hunt on adjacent hillsides), and autumn passage movements of swallows and house martins (which funnel down the Rhondda Valley and can take short cut routes over the intervening hillsides).	The programme of ornithology surveys sought to identify those species for which impacts were most likely to occur. Nightjar were considered at the early stage of the planning process for further surveys. Based on initial surveys it was not considered that suitable habitat for this species was present within 500m of the Proposed Development, and therefore no specific surveys were completed. Records of more common species such as grey heron, swallow and house martin were recorded as incidental or secondary species in vantage point surveys with one observation of autumn passage of hirundines.
NRW	8.3.3 of the scoping report states 'There are no Special Protected Areas (SPAs) or Ramsar sites within 20 km of the Site boundary.' The 20km search area buffer used for the Cumulative Landscape and Visual Impact Assessment (Figure 6.5) includes part of the Severn Estuary SPA, this site therefore needs to be scoped in for completeness.	This has been added to the designated site list and considered through this assessment.
NRW	Table 8.4 Summary of proposed baseline survey programme for ornithology. Overall we agree with the proposed survey work and welcome the commitment to two years of data collection for vantage point surveys and raptor surveys. However, we note that this does not appear to be the case for the walk over surveys. We would recommend all surveys are carried out for two years and would seek clarity as to why the walk over surveys are only being represented by one year's worth of data.	A further season of winter walkover surveys was not considered necessary given the outputs of the first year of survey and the nature of the site. Vantage point surveys completed provided higher counts of over wintering waders (predominantly golden plover) with walkover surveys only recording non-breeding or resident passerine species such as redwing, skylark and fieldfare which were not the target of these surveys. Further surveys are anticipated in the non-breeding season in 2022/2023 targeting golden plover. Further details are provided in **Section 9.16.**
NRW	Breeding Raptor Surveys – Goshawk, Red Kite, Peregrine Reference is made to a baseline survey, however, no details of the survey have been presented. As such there is no information as to how these differ from the surveys carried	Vantage point survey effort in the first year of surveys was extended with additional observational effort. This was in part designed to identify potential for migratory species passing over or through the site but also support breeding raptor surveys as it provided additional observational effort for the identification of territories or

Consultee	Consideration	How scoping response has been addressed in this Draft ES
	out for these receptors this year and whether the results will be comparable.	higher levels of activity for species such as red kite and goshawk. In the first year of survey the number of red kite and goshawk observations were very low and did not suggest breeding in close proximity to the Proposed Development. A second year of surveys was undertaken using a more targeted approach searching suitable habitat for specific nest sites, the details of which are provided in the baseline report and summarised within this report.
	Vantage Points We have not assessed the viewsheds of the vantage points, as these do not appear to have been provided. This may be particularly important given that the turbines' placement will be in three discrete groups. We therefore seek clarity on the viewshed of each vantage point and whether each turbine grouping was subject to the same level of survey.	Full details of the viewsheds are presented in the baseline report (**Appendix 9A**) and summarised below.
Planning and Environment Decisions Wales	The SR does not include details of how the Collision Risk Modelling will be prepared. This concerns PEDW as correction factors may need to be applied and the cumulative impacts within this area may be significant. PEDW does not have the expertise to advise on this matter and thus it is recommended that the applicant continues to engage with NRW and	The Collision Risk Modelling approach is presented in **Appendix 9B** and follows best practice guidance from Nature Scot relating to this type of analysis. Attempts to engage NRW at an early stage of the process were not successful (see above) due to the unavailability of resource, however every effort has been made to follow best practice guidance where appropriate and necessary.
	No details of enhancement are available at this stage but the ES should include a detailed ecological management plan, including targets and enhancement objectives specific to the habitats and species present on site. The plan should include monitoring and indicate triggers which would prompt changes in the management of the site. Any net benefits should be clearly identified.	A Collision Monitoring and Management Strategy (to be presented as a separate document) will be prepared for the site relating to the monitoring of breeding raptors and collisions during construction and during the operational phase of the windfarm. In addition, an ecological management plan will be devised that seek to improve habitats throughout the site and result in an overall benefit for breeding and non-breeding birds enhancing habitats for certain species (such as skylark and reed bunting) and also improving potential food resources for a range of different bird species.

Technical engagement

9.3.3 Technical engagement with consultees in relation to ornithology is ongoing. A summary of the technical engagement undertaken to date is outlined in **Table 9.5**.

Table 9.5 Technical engagement on the ornithology assessment

Consultee	Consideration	How addressed in this Draft ES
Natural Resources Wales	A Discretionary Advice Service (DAS) request was made to NRW -January 2021. Due to staffing issues at NRW during the coronavirus pandemic, the DAS was unable to be fulfilled.	NRW comments are captured within the scoping opinion and shown in **Table 9.4**. The absence of technical engagement from NRW is not further considered within this assessment.
RCT Ecologist	Wood held a technical meeting with the RCT ecologist on 22 May 2022 with the approach to survey and provisional results presented. This addressed the comments provided by RCT at the scoping stage with general agreement with the approach taken and provisional results.	No specific actions were required, however this Draft ES and supporting documents provide the outputs for all surveys and assessment completed to date.

9.4 Data gathering methodology

Study area

9.4.1 The Study Area for the ornithology assessment can be broadly split into two categories: Desk-based assessment, and survey work.

9.4.2 The Study Area for the desk-based assessment includes the Proposed Development Site plus a 20km search area for internationally designated sites of ornithological importance, full details of the desk-based assessment are found within the Preliminary Ecological Appraisal, provided as **Appendix 8A.**

9.4.3 The Study Area for survey work consists of the Proposed Development Site with an additional two-kilometre buffer. All surveys fall within this Study Area with defined survey areas for specific survey types. Survey areas include:

- Breeding bird survey area – Proposed Development Site plus 100-metre buffer;
- Non-breeding bird survey area – Proposed Development Site plus 500-metre buffer;
- Breeding raptor survey area - Proposed Development Site two-kilometre buffer; and
- Vantage Point survey area - Vantage point location including two-kilometre viewshed that provides coverage of the Proposed Development Site and an additional 500m buffer.

Desk study

9.4.4 Data was obtained via desk study in April 2020 and updated in March 2022 for the following:

- internationally designated statutory sites of ornithological importance (Special Protected Areas (SPA) and Ramsar Sites) within 20km of the Proposed Development Site;
- nationally designated statutory sites of ornithological importance (Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR) within 2km of the Proposed Development Site;
- other statutory and non-statutory sites of ornithological interest within 2km of the Proposed Development Site; and
- protected species listed as Species of Principal Importance (SPI) in Section 7 of The Environment (Wales) Act 2016 and species included on the Red List for Birds of Conservation Concern 5 (Stanbury *et al* 2021)[14] or Red-listed Birds of Conservation Concern 3 Wales (Johnstone and Bladwell, 2016)[15].

9.4.5 A summary of the organisations that have supplied data, together with the nature of that data is outlined in **Table 9.6**. Information provided can be found in full in the **Baseline Ornithology Report (Appendix 9A)** and the **Preliminary Ecological Appraisal (Appendix 8A)**.

Table 9.6 Data sources used to inform the ornithology assessment

Organisation	Data source	Data provided
Natural Resources Wales (NRW)[16]	Designated Site Search	Information on protected site designations for sites of importance to ornithology and protected species information.
Joint nature Conservation Committee (JNCC)[17]	Interactive website	Details of statutory site designations including reasons for designation, condition of designated areas and 'features' of designations.
Multi-Agency Geographic Information for the Countryside (MAGIC)[18]	Interactive website	Spatial information of statutory designated sites within the Study Area
South East Wales Biological Record Centre (SEWBReC)	Biological record centre request	Non-statutory site descriptions and designations, protected habitats of ornithological importance and ornithological species data.

[14] Stanbury, A., Eaton, M., Aebischer, N., Balmer, D., Brown, A., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). The status of our bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain. British Birds 114: 723-747

[15] Johnstone I. & Bladwell S. (2016). Birds of Conservation Concern in Wales 3: the population status of birds in Wales. Birds in Wales, 13: 3-31

[16] Natural Resources Wales (2022). Find protected areas of land and sea. (Online) Available at: https://naturalresources.wales/guidance-and-advice/environmental-topics/wildlife-and-biodiversity/protected-areas-of-land-and-seas/find-protected-areas-of-land-and-sea/?lang=en (Accessed 28 April 2020)

[17] Joint Nature Conservation Committee (2022). Homepage. (Online) Available at: https://jncc.gov.uk/ (Accessed April 2022).

[18] Defra. Magic (Online). Available at: https://magic.defra.gov.uk/ (Accessed 7 April 2020)

Survey work

9.4.6 The ornithological field survey programme has been designed to provide sufficient information on all legally protected species, SPI, and all other conservation notable species likely to be affected by the Proposed Development. The following section outlines surveys undertaken within the ornithological survey programme and the rationale and scope for each survey type.

Breeding Bird Survey

9.4.7 A breeding bird survey was carried out between March 2020 and June 2020 following an adapted method based on the British Trust for Ornithology's (BTO's) Common Bird Census (CBC) methodology (Gilbert et al. 1998)[11] The survey area for the breeding bird assessment was the Proposed Development Site plus a 100-metre buffer. The breeding bird surveys were undertaken in 2020 against an earlier iteration of the Proposed Development Site; full survey details including survey areas can be found within the baseline ornithology report, **Figure 2.2**, **Appendix 9A** shows the survey area.

9.4.8 The breeding bird survey area, including the 100m buffer, provides coverage of the main development area including all turbine locations and construction areas The additional area to the west features proposed access routes. Whilst this area has not been subject to direct survey an assumed breeding bird assemblage, based on the findings in other similar habitat is considered to be sufficiently precautionary given the anticipated impact in these areas.

9.4.9 The breeding bird survey was undertaken to gather baseline information on species presence, breeding status and overall abundance of species. This information enables the assessment of likely significant effects to be proportionately assessed, including any effects of protected species.

Breeding Raptor Survey

9.4.10 Following the identification of Schedule 1 breeding birds within / in proximity to the Proposed Development Site during the breeding bird assessment in summer 2020 (identified through additional vantage point survey effort and review of suitable habitat), a breeding raptor Survey was undertaken between March 2021 and July 2021 to record the breeding status of any Schedule 1 birds of prey within / in proximity to the Proposed Development Site.

9.4.11 The breeding raptor survey area extends to 2km from the Proposed Development Site for red kite and peregrine, with a 1km buffer applied for goshawk. The survey was licenced by NRW under licence S089175-1 / S089175-2 and focused on areas of suitable breeding habitat including all areas of woodland, moorland and grassland. An initial search for suitable nesting habitat for peregrine did not identify any suitable natural nesting locations (such as crags) though checks of nearby overhead lines for nests was undertaken.

9.4.12 The results from this survey inform the baseline site conditions and have been used to assess potential effects of the development on legally protected species.

Non-breeding Bird Survey

9.4.13 Non-breeding bird surveys were undertaken monthly between October 2020 and March 2021 to record species present within the Proposed Development Site and within a 500m buffer (where appropriate) outside of the breeding season. The survey followed two transects of similar length and focused on open areas including all areas of moorland,

grassland, pasture and early-stage woodland re-growth. **Figure 2.4, Appendix 9A** shows the non-breeding bird survey transects.

9.4.14 These surveys were undertaken to record approximate locations, number and behaviour of any notable species as follows: all wildfowl and waders, all Section 7 species (as listed on the Environment (Wales) Act 2016), all Schedule 1 listed species, species listed as "Red List" in Birds of Conservation Concern 4 (2015)[19] (noting that this list was current at the time of survey) and aggregations of 20+ birds of any species.

9.4.15 The results from this survey inform the baseline site conditions and have been used to assess potential effects of the Proposed Development on notable and / or important non-breeding bird assemblages.

Vantage Point Surveys

9.4.16 Vantage Point (VP) surveys were conducted in accordance with Scottish Natural Heritage (SNH) (2017)[13] guidance and were undertaken over two consecutive years (2020-21 and 2021-22).

9.4.17 Following the SNH methodology VPs were chosen to achieve maximum visibility from the minimum number of locations, such that all parts of the survey area are within 2km of a VP location. Two vantage points were identified to cover the survey area the locations of each VP and VP view-sheds are shown in **Figure 2.1, Appendix 9A**.

9.4.18 Surveys covered the core breeding season (April to June), post-breeding / migration season (July to October) and non-breeding season (November to February).

9.4.19 During 2020-2021 additional survey effort above the minimum requirements was conducted, with a minimum of 36 hours of monitoring undertaken from each VP per survey season. This additional effort was included to capture post-dispersal flights of goshawk (identified as a breeding species on Site) and to capture any migratory flights of other target species (such as honey buzzard or osprey) which had potential to pass through the Site.

9.4.20 Following the 2020-21 survey season, the survey programme was revised for 2021-22; full details of the survey programme including timings and results can be found within the baseline report provided in full in **Appendix 9A**.

9.4.21 Vantage point surveys were undertaken to record the baseline conditions within the survey area and to enable collision risk modelling (CRM) and analysis which have informed the impact assessment and the post construction collision monitoring plan.

9.5 Overall baseline

Current baseline

Internationally designated statutory sites of ornithological importance

9.5.1 There are two internationally designated site within 20km of the Site which are designated for ornithological features; the Severn Estuary Special Protection Area and Severn Estuary Ramsar Site. These overlapping sites are designated for a range of overwintering and passage wildfowl and waders.

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

9.5.2 **Table 3.1, Appendix 9A** provides a summary of the designated features associated with these European sites.

9.5.3 There are no other internationally designated sites within 20km of the Site with ornithological features.

Nationally designated statutory sites of ornithological importance

9.5.4 There are no national statutory designated sites (i.e. SSSIs or NNRs) that list ornithological features within 2km of the Site. Details of sites identified within 2km are detailed in **Appendix 8A**.

Non-statutory sites of ornithological importance

9.5.5 There are no non-statutory sites (i.e. Local Wildlife Sites or Local Nature Reserves) that list ornithological features within 2km of the Site. Details of sites identified within 2km are detailed in **Appendix 8A**.

Notable species summary

9.5.6 Ornithological records pertaining legally protected/important conservation bird species[20] within 2km of the Site were obtained from the South East Wales Biodiversity Record Centre (SEWBREC). Recent records are considered to be those gathered within the past ten years and are summarised in **Table 3.2, Appendix 9A.**

Baseline Survey summary

9.5.7 The breeding bird surveys recorded a total of 62 occurring within the breeding bird survey area, with 31 recorded as breeding within the Site, see **Appendix 9A** for further details.

9.5.8 The following notable species were recorded within the breeding bird survey area (considering all survey types):

- on species listed on Schedule 1 of the *Wildlife & Countryside Act* (1981)[4] was recorded as breeding or holding territory: goshawk;
- nine species listed on Section 7 of the *Environment (Wales) Act* (2006) were recorded breeding or holding territory: cuckoo, dunnock, house sparrow, lesser redpoll, linnet, reed bunting, skylark, song thrush and tree pipit; and
- five species listed on the *Birds of Conservation Concern in Wales 3* Red list (2016) were recorded breeding or holding territory: Cuckoo, linnet, skylark, whitethroat, and willow warbler. Three species that are listed on the *Birds of Conservation Concern 4* (UK wide) Red list are also recorded as breeding or holding territory: Mistle thrush, skylark and tree pipit.

9.5.9 A total of 52 species have been recorded within the Proposed Development Site during non-breeding bird surveys, vantage point surveys and other ad-hoc ecology surveys. With the exception of regular occurrence of golden plover (detailed separately below), non-breeding bird surveys did not record any significant use of the site by over wintering or passage migrants with the majority of target species records consisting of notable

[20] Notable species includes all species included on the EU Birds Directive (Annex 1), Wildlife and Countryside Act 1981 (as amended) – Schedule 1, The Environment (Wales) Act – Section 7, Birds of Conservation Concern 5 – Red List and Red-listed Birds of Conservation Concern Wales 3.

residential species such as common crossbill, goshawk, reed bunting, dunnock and song thrush.

9.5.10 The breeding raptor survey undertaken in 2021 gathered further evidence with respect to notable species targeting goshawk, red kite and peregrine.

Goshawk

9.5.11 Goshawk is a protected species, listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Wales is important for goshawk, with an estimated 44-123 pairs estimated in 2017 (Hughes 2017)[21]. The population is currently increasing, with recent range expansions due to an increase in available habitat[14]**Error! Bookmark not defined.**.

9.5.12 The desk study produced only one record of goshawk within 2km of the Proposed Development Site between 2000 and 2020, the most recent record was in 2010 from a site >2km from the Site.

9.5.13 Goshawk were recorded infrequently throughout the ornithological survey, with few observations in the first year of survey. However, flights were observed during February and March in both 2021 and 2022. Full details can be found within **Appendix 9A**.

9.5.14 Goshawk were recorded breeding within the breeding raptor survey area and are considered further within the impact assessment. For the purposes of assessment it is assumed that there is potential for a maximum of one breeding pair within the woodland immediately adjacent to the Site, based on typical territory size for this species (Hardey *et al* 2013)[12] and the availability of mature trees suitable for nesting within the areas of plantation woodland.

Red kite

9.5.15 Red kite is a protected species, listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Wales is important for red kite, with an estimated 2,500 breeding pairs22. The population is currently increasing, with a 368% increase between 1996 and 2016; increases are thought to be as a result of increased available habitat, reduced persecution and following the success of re-introduction projects.

9.5.16 The desk study produced seven records of red kite between 1km and 2.5km of the Proposed Development Site between 2000 and 2020, the most recent record was in 2016.

9.5.17 Red kite were regularly recorded throughout the ornithological surveys, with observations during all survey types. Full details can be found within the Appendix 9A.

9.5.18 There was no evidence of breeding found during the survey work and for the purposes of assessment it is assumed that there are no breeding pairs of red kite within 2km of the Site. However regular observations of birds foraging within the Proposed Development Site require further consideration within the impact assessment as breeding and non-breeding red kite may forage over extensive areas.

Golden Plover

9.5.19 Golden plover is listed on Annex I of the Birds Directive and is a priority species listed in Section 7 of the Environment (Wales) Act 2016. The species is also red-listed (in Wales) due to a rapid (>50%) decline in the Welsh breeding population over the past 25 years

[21] Hughes, J. (2017). Welsh Bird Report. Wales Ornithological Society; Wales.
[22] Welsh Kite Trust (2019). How Many Kites are there in Wales? (Online). Available at: http://welshkitetrust.wales/how-many-kites-are-there-in-wales (Accessed April 2022).

(Johnstone & Bladwell, 2016)[15] with only 70–90 pairs remaining, nearly half of which are on moorland within the Cambrian Mountains . The wintering population of golden plover was estimated to be 400,000 birds in Britain in 2006/07 (Musgrove et al., 2013)[23], and the five-year peak mean count from WeBS sites located entirely (or partly) in Wales for 2015/16 – 2019/20 was 15,723 birds. This compares to co-ordinated counts across Wales totalling 18,000 birds in January 1977 (Lovegrove et al., 1994)[24].

9.5.20 Golden Plover only occurred during the non-breeding period on Site and was recorded in all months between September and March in 2020/2021 and 2021/2022. A peak flock size of 322 was recorded, and there were thirty-one records of flocks more than one hundred birds. Golden plover flocks were regularly disturbed and often flew for extended periods within the Proposed Development site.

9.5.21 For the purposes of assessment, golden plover are assumed to be a regular, wintering visitor to the Site occurring in numbers ranging between 200-350 individuals.

Breeding Bird Assemblage

9.5.22 The breeding bird survey covered all habitats within the Proposed Development Site, plus a 100-metre buffer. During the breeding bird assessment undertaken in 2020, 31 species were recorded as breeding within the breeding bird survey area. For the purposes of assessment the overall assemblage has been divided into the following groups:

- notable grassland and moorland species assemblage (including all Section 7, BoCC Wales 3 Red List and BoCC 5 Red List Species);
- notable woodland assemblage (including all Section 7, BoCC Wales 3 Red List and BoCC 5 Red List Species); and
- widespread Breeding Bird Assemblage (including common and widespread species).

9.5.23 Sixteen species were recorded as breeding within the open grassland and moorland habitats (including small areas of adjacent scrub and boundary features) on the Site, of which four are Section 7 species, two are BoCCW3 red-listed and two are BoCC5 red-listed. **Table 9.7** provides a summary of the species recorded, the number of territories identified and a summary of their regional, legal and conservation status.

Table 9.7 Summary of breeding bird territories recorded within the grassland and moorland habitats during the breeding bird survey 2020.

BTO code	Species*	Number of territories within grassland and moorland habitat	Legal and / or conservation Status	Welsh/County status
B.	Blackbird	4	BoCCW3 Green-list; BoCC5 Green-list	Abundant
BT	Blue Tit	2	BoCCW3 Green-list; BoCC5 Green-list	Abundant
C.	Carrion Crow	1	BoCCW3 Green-list; BoCC5 Green-list	Common

[23] Musgrove, A., Aebischer, N., Eaton, M., Hearn, R., Newson, S., Noble, D., Parsons, M., Risely, K. and Stroud, S. (2013). Population estimates of birds in Great Britain and the United Kingdom. British Birds, 106, pp 88-89.
[24] Lovegrove, R., Williams, G & Williams, I. (1994). Birds in Wales. T & AD Poyser, London

BTO code	Species*	Number of territories within grassland and moorland habitat	Legal and / or conservation Status	Welsh/County status
CH	Chaffinch		BoCCW3 Green-list; BoCC5 Green-list	Common
D.	**Dunnock**	**6**	**S.7; BoCCW3 Green-list; BoCC5 Amber-list**	**Abundant**
GO	Goldfinch	5	BoCCW3 Green-list; BoCC5 Green-list	Abundant
LI	**Linnet**	**6**	**S.7; BoCCW3 Red-list; BoCC5 Red-list**	**Common**
MP	Meadow pipit	54	BoCCW3 Amber-list; BoCC5 Amber-list	Common
R.	Robin	7	BoCCW3 Green-list; BoCC5 Green-list	Abundant
RB	**Reed bunting**	**9**	**S.7; BoCCW3 Amber-list; BoCC5 Amber-list**	**Fairly Common**
S.	**Skylark**	**90**	**S.7; BoCCW3 Amber-list; BoCC5 Red-list**	**Common**
SC	Stonechat	13	BoCCW3 Green-list; BoCC5 Green-list	Common
W.	Wheatear	4	BoCCW3 Green-list; BoCC5 Amber-list	Fairly Common
WH	**Whitethroat**	**6**	**BoCCW3 Red-list; BoCC5 Amber-list**	**Common**
WR	Wren	17	BoCCW3 Green-list; BoCC5 Amber-list	Abundant
WW	**Willow warbler**	**15**	**BoCCW3 Red-list; BoCC5 Amber-list-list**	**Common**

Legal and / or conservation status: S.7 – Section 7 of the Environment (Wales) Act 2016; BoCCW3 – Birds of Conservation Concern Wales 3; BoCC5 – Birds of Conservation Concern 5.
Regional status is taken from the East Glamorgan Bird Report (2021)[25]: **Very rare** – Five or fewer County records; **Rare** – Less than annual (many years may pass between records); **Very scarce** – Less than annual (typically recorded every two or three years); **Scarce** – recorded in very small numbers in most years; **Uncommon** – recorded in low numbers each year; **Fairly common** – occurs in reasonable numbers in suitable habitat(s); **Common** – occurs in good numbers in most suitable habitat(s); **Abundant** – occurs in large numbers in all suitable habitat(s).

*** Notable species are highlighted in bold.**

[25] Glamorgan Bird Club (2021) Eastern Glamorgan Bird Report No.59, 2020.

9.5.24 Twenty-eight species were recorded as breeding within the woodland and adjacent scrub habitats on the Site, of which seven are Section 7 listed species, four are BoCCW3 red-listed and seven are BoCC5 red-listed. **Table 9.8** provides a summary of the species recorded, the number of territories identified and a summary of their regional, legal and conservation status.

Table 9.8 Summary of breeding bird territories recorded within the woodland habitats during the breeding bird survey 2020

BTO code	Species	Number of territories within woodland habitat	Legal and / or conservation Status	Regional status
B.	Blackbird	3	BoCCW3 Green-list; BoCC5 Green-list	Abundant
BC	Blackcap	2	BoCCW3 Green-list; BoCC5 Green-list	Common
BZ	Buzzard	1	BoCCW3 Green-list; BoCC5 Green-list	Common
CC	Chiffchaff	3	BoCCW3 Green-list; BoCC5 Green-list	Common
CH	Chaffinch	4	BoCCW3 Green-list; BoCC5 Green-list	Abundant
CK	**Cuckoo**	**1**	**S.7; BoCCW3 Red-list; BoCC5 Red-list**	**Common**
CT	Coal tit	3	BoCCW3 Green-list; BoCC5 Green-list	Common
D.	**Dunnock**	**7**	**S.7; BoCCW3 Green-list; BoCC5 Amber-list**	**Abundant**
GC	Goldcrest	2	BoCCW3 Amber-list; BoCC5 Green-list	Common
GO	Goldfinch	5	BoCCW3 Green-list; BoCC5 Green-list	Common
GR	**Greenfinch**	**1**	**BoCCW3 Amber, BoCC5 Red list**	**Common**
GS	Great spotted woodpecker	1	BoCCW3 Green-list; BoCC5 Green-list	Common
LI	**Linnet**	**2**	**S.7; BoCCW3 Red-list; BoCC5 Red-list**	**Common**
LR	**Lesser redpoll**	**12**	**S.7; BoCCW3 Amber-list; BoCC5 Red-list;**	**Uncommon**
M.	**Mistle thrush**	**13**	**BoCCW3 Amber-list; BoCC5 Red-list**	**Common**

BTO code	Species	Number of territories within woodland habitat	Legal and / or conservation Status	Regional status
MP	Meadow Pipit	3	BoCCW3 Amber-list; BoCC5 Amber-list	Common
NH	Nuthatch	1	BoCCW3 Green-list; BoCC5 Green-list	Common
R.	Robin	12	BoCCW3 Green-list; BoCC5 Green-list	Abundant
RB	**Reed Bunting**	**1**	**S.7; BoCCW3 Amber-list; BoCC5 Amber-list**	**Fairly Common**
RT	Redstart	2	BoCCW3 Green-list; BoCC5 Amber-list	Common
SC	Stonechat	2	BoCCW3 Green-list; BoCC5 Green-list	Common
SK	Siskin	3	BoCCW3 Green-list; BoCC5 Green-list	Fairly Common
ST	**Song thrush**	**2**	**S.7; BoCCW3 Amber-list; BoCC5 Amber-list**	**Common**
TP	**Tree pipit**	**2**	**S.7; BoCCW3 Amber-list; BoCC5 Red-list**	**Common**
WP	Woodpigeon	1	BoCCW3 Green-list; BoCC5 Amber-list	Abundant
WH	**Whitethroat**	**1**	**BoCCW3 Red-list; BoCC5 Amber-list**	**Common**
WR	Wren	12	BoCCW3 Green-list; BoCC5 Amber-list	Abundant
WW	**Willow warbler**	**12**	**BoCCW3 Red-list; BoCC5 Amber-list**	**Common**

Legal and / or conservation status: Sch.1 – Schedule 1 listed species on Wildlife and Countryside Act 1981 (as amended); S.7 – Section 7 of the Environment (Wales) Act 2016; BoCCW3 – Birds of Conservation Concern Wales 3; BoCC5 – Birds of Conservation Concern 5.
Regional status is taken from the East Glamorgan Bird Report (2021)[25]: **Very rare** – Five or fewer County records; **Rare** – Less than annual (many years may pass between records); **Very scarce** – Less than annual (typically recorded every two or three years); **Scarce** – recorded in very small numbers in most years; **Uncommon** – recorded in low numbers each year; **Fairly common** – occurs in reasonable numbers in suitable habitat(s); **Common** – occurs in good numbers in most suitable habitat(s); **Abundant** – occurs in large numbers in all suitable habitat(s).

Future baseline

9.5.25 The current baseline outlines species presence and abundance typical of the location and the habitats present within the Proposed Development Site. It is considered that changes

to the baseline condition in the absence of the Proposed Development by the time it is operational would be minimal.

9.5.26 If current baseline conditions remain, an increase in the number of red kite and goshawk utilising the site for foraging and / or nesting could occur in the surrounding area by the time the Proposed Development is operational. This is in accordance with the regional and national expansions of these species.

9.5.27 The woodland and forestry habitats that are present on the slopes of the hill side are managed by the Woodland Trust and Forestry Commission. This includes the plantations at Mynydd Gelliwion present to the east of the Proposed Development Site. Ongoing commercial management of such woodland has the potential to reduce the suitability of areas of woodland to support specialist species, such as goshawk. However, the approach to retention of mature trees and rotational harvesting which is typically adopted by the Forestry Commission should ensure that suitable nesting locations are present at all times but may result in this species moving closer to the Proposed Development. Proposed embedded measures below will ensure that appropriate mitigation and monitoring takes account of this potential for changes in distribution.

9.6 Embedded measures

9.6.1 A range of environmental measures have been embedded into the Proposed Development as outlined in **Chapter 4, Section 4.9**. **Table 9.9** outlines how these embedded measures will influence the ornithology assessment.

Table 9.9 Summary of the embedded environmental measures

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Construction			
Goshawk, (and any other Schedule 1 breeding birds)	Production of aural or visual disturbance that has the potential to disturb or displace birds resulting in breeding failure and impacts on the local population.	Construction methods and programme will consider the location of identified nest sites with the timing and duration of works managed to avoid direct conflict. Where works cannot be scheduled to avoid the main breeding season, additional measures such as the employment of “no-disturbance buffers” around nest sites or the use of sound buffers would be considered.	Construction Environmental Management Plan (CEMP) secured via DNS condition
Breeding Bird Assemblage (grassland and moorland species – includes Skylark, Linnet, Reed Bunting)	Permanent or temporary land-take/changes to habitats to facilitate construction could displace birds from existing habitat and result in direct injury or damage to nest sites.	Measures to prevent impacts on breeding birds will be included in final construction methodologies. This will include steps such as: - Clearance of construction and other working areas outside of the breeding bird season - The use of dedicated working areas and construction access routes - Where works cannot be completed outside of the breeding bird season the construction methodology will include employment of Ecological Clerk of Works to carry out pre-works checks and monitoring of construction areas to identify potential bird nests - Any active bird nests in or immediately adjacent to working areas would be identified and suitable “no working” buffers established around nest sites.	CEMP secured via DNS condition Construction Method Statement secured via DNS condition

Receptor	Potential changes and effects	Embedded measures	Compliance mechanism
Operation			
All birds	Installation of seven turbines would result in physical changes to the spatial environment resulting in potential for collision for birds, in particular breeding and non-breeding raptors.	The positioning and number of turbines effects the potential risk for collision with specific species.	A Collision Mitigation Monitoring Strategy will be developed for the final ES to support operation that will record the number and frequency of collisions for all bird species and include identification of sensitive birds breeding immediately adjacent to the Site.
Goshawk, (and any other Schedule 1 breeding birds)	Production of aural or visual disturbance during routine and emergency maintenance that has the potential to disturb or displace birds resulting in breeding failure and impacts on the local population.	Routine and emergency maintenance of turbines may require the use of heavy plant or machinery and substantial levels of noise or human activity on Site. Measures to ensure that routine maintenance of turbines within potential disturbance distance would be included as part of ongoing working practices for the Site. As part of collision monitoring, site operations would be encouraged to maintain ongoing monitoring of breeding Schedule 1 bird species to identify the presence and location of nest sites that could result in a constraint. This would enable planning of works to avoid sensitive periods for species such as Goshawk and Barn Owl and ensure that measures, similar to those adopted during the construction phase are included in maintenance methodologies.	Collision Mitigation Monitoring Strategy

9.7 Scope of the assessment

Overview

9.7.1 The CIEEM guidelines recognise that an appropriate EcIA cannot consider in detail every individual species or habitat that may potentially be present at a Site or affected by a development. The EcIA process therefore aims to focus the assessment on those ecological or ornithological features that could be 'significantly' affected by the Proposed Development (i.e. where the effects on the ecological features are of sufficient concern that they could influence the decision about whether or not planning permission should be granted), or for which the development could result in the contravention of relevant legislation. The EcIA process therefore includes a 'scoping' stage (which excludes those ecological features that cannot be 'significantly' affected), and a 'detailed assessment' stage, which examines more closely the potential effects of the scheme on those features that could be subject to 'significant' effects. Detailed assessments may also be undertaken where it is considered appropriate to examine the predicted effects on a feature in more detail, for example due to consultee comments. This section summarises the approach to and outcomes of the EcIA scoping stage.

The Proposed Development

9.7.2 The Proposed Development is a wind farm consisting of a maximum of seven wind turbines, each with a three-bladed rotor with a diameter of up to 136m, a hub height of up to 97.5m and maximum height to blade tip of 155m.

9.7.3 The application also comprises associated infrastructure including internal wind farm tracks off the main access corridor, crane pads at each turbine location, turbine foundations, laydown and storage areas, underground power cables linking the turbines and the on-site substation, temporary construction compounds, and grid connection infrastructure, including an on-site substation and control building together with construction enabling works.

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

Grid Connection

9.7.5 The applicant has received an offer of a grid connection from Western Power Distribution (WPD) as the Distribution Network Operator (DNO). The connection is planned between the on-site substation and the electricity grid at Upper Boat. This connection will be comprised of two components, the first of which is an overhead line to the south-eastern boundary of the Site towards Upper Boat, subsequently the line will be undergrounded to the connection point. The underground cable will be delivered by WPD, whilst the overhead line will be consented as part of this DNS process.

9.7.6 **Figure 4.3 (Chapter 4)** illustrates the corridor within which the proposed connection would be routed, between the Site and a point which intersects with the existing national grid overhead line network, near the proposed access to the Site. The connection is likely to be approximately 8.5km in length.

9.7.7 The desk-based assessment of potential effects from the grid connection presented in this Draft ES is based on the installation of a 33kV overhead line on wooden poles for 1.4km and undergrounded 33kV cable following the highway up to the connection point (7.1km).

Spatial scope

9.7.8 The spatial scope of the assessment of ornithology effects covers the area of the Proposed Development contained within the Proposed Development Site, together with the Zones of Influence (ZoIs) that have formed the basis of the study area described in **Section 9.4**.

9.7.9 Through an understanding of the activities associated with the Proposed Development and the resulting environmental change, it is possible to identify ornithological features that cannot be subject to potentially significant effects due to an absence of effect pathways, or certainty that incorporated measures will be entirely successful in preventing a significant effect occurring. In order to identify such ornithological features, all the activities and consequent environmental changes associated with the construction, operation and decommissioning of the Proposed Development have therefore been considered.

9.7.10 The construction, operation and decommissioning of the wind farm may result in the following environmental changes, which have the potential to cause significant effects on ornithological features at or near the Site. Many of these aspects will operate additively or synergistically to affect ecological features.

- construction:
  - permanent or temporary land-take / changes to habitats; and
  - production of aural and visual stimuli and vibration.
- operation:
  - physical changes to the spatial environment resulting in collision; and
  - physical changes to the spatial environment resulting in displacement.
- decommissioning:
  - as per construction stage.

9.7.11 Given these environmental changes the spatial scope of the ornithological assessment covers the area of the Proposed Development, together with the ZoIs that have formed the basis of the study area described in **Section 9.4**. However, ZoIs differ depending on the type of environmental change (i.e. the change from the existing baseline) as a result of the Proposed Development and the ecological or ornithological features being considered.

9.7.12 The most straightforward ZoI to define is the area affected by land-take and direct land-cover changes associated with the Proposed Development. This ZoI is the same for all affected ecological or ornithological features.

9.7.13 By contrast, for each environmental change that can extend beyond the area affected by land-take and land-cover change (e.g. increased noise associated with construction activities within the land-take area), the ZoI may vary between ecological features, dependent upon their sensitivity to the change and the precise nature of the change. For example, a badger might only be disturbed by noise generated very close to its sett, while nesting goshawk might be disturbed by noise generated at a much greater distance; other species (e.g. many invertebrates) may be unaffected by changes in noise. In view of these complexities, the definition of the ZoIs that extend beyond the land-take area was based

upon professional judgement informed as far as possible by a review of published evidence (e.g. disturbance criteria for various species) and discussions with the technical specialists who are working on other chapters of the ES.

9.7.14 The spatial extent of the assessment therefore reflects the area occupied by the ecological feature that is being assessed and the ZoI of the changes that are likely to affect it. Where part of a designated site which is considered as an ecological feature for the purposes of this assessment is located within the ecological ZoI relating to a particular biophysical change as a result of the Proposed Development, an assessment would be made of the effects on the designated site as a whole. A similar approach has been taken for areas of notable habitat. For species that occur within the ZoI, the assessment has considered the total area that is used by the affected individuals or the local population of the species (e.g. for foraging or as breeding territories).

9.7.15 It should be noted that the avoidance of potential effects through design are implicitly taken into account through the consideration of each ZoI.

9.7.16 The spatial scope for consideration during the survey work, based on ZoI of species known to occur within the Proposed Development Site, and following the Scoping Direction was set as the Proposed Development Site, plus 2km.

9.7.17 The breeding bird survey undertaken in 2020 was based on an early iteration of the Proposed Development Site. The breeding bird survey area was based on the Proposed Development Site (as in March 2020) plus 100 metres. Following revisions to the extent of the Proposed Development Site in 2021 the ZoI did not change significantly to require additional breeding bird survey. Additional data collected as part of vantage point surveys during the breeding season in 2021 also recorded notable bird species that were likely to be resident or breeding within the site.

9.7.18 Vantage points were chosen to achieve maximum visibility from the minimum number of locations, such that all parts of the Proposed Development Site are captured within the 2km viewshed of the VP locations. SNH guidance sets out the recommended viewshed of 2km; data gathered within this distance / ZoI is deemed proportionate for the ornithology assessment.

9.7.19 Breeding raptor surveys were undertaken in 2021, following the scoping and results of the breeding bird survey 2020. The potential ZoI for disturbance of raptors is set at Proposed Development Site, plus two kilometres for red kite and peregrine, with a one kilometre buffer for goshawk. This is based on species specific guidance (Hardey et al 2013)[12] and reflects both the species likely to be present within / in proximity to the Proposed Development Site as breeding species and typical territory sizes for the species identified.

Temporal scope

9.7.20 The temporal scope of the assessment of effects on ornithology is consistent with the period over which the Proposed Development would be carried out, as defined in **Chapter 4**, and therefore covers the construction and operational periods. Effects during decommissioning are considered to be similar or no worse than during construction and have therefore not been separately considered. Furthermore, given the timescales involved (24-months construction period plus 30 years operation) it is considered that an accurate assessment of decommissioning effects cannot be undertaken at this stage.

Potential receptors

9.7.21 The starting point for defining which ornithological features[26] were to be taken forward to the detailed assessment stage was to use the baseline data collected through the desk study and field surveys to determine which of the identified features are 'important' at the level of the project. Following CIEEM (2019)[27] guidance, the importance of ecological features was determined using a geographic scale and described in relation to UK legislation and policy, and with regard to the extent of habitat or size of population that may be affected by the Proposed Development.

9.7.22 The importance of ecological features can therefore differ from that which would be conferred solely by legislative protection or identification as a conservation notable species. For example, house sparrow, on account of its classification as both a Section 7 species and listed on the Red List under both the UK and Wales Birds of Conservation Concern lists would be identified as being of "National" importance based on legislation. However, whilst the population of this species has reduced significantly, recent estimates show that the national population is still in excess of five million individuals. Therefore, if a project has potential to have an impact on a small number of house sparrows (<20) then it would be unlikely to be considered to have greater than 'local' importance on the project scale when taking into consideration regional or county estimates.

9.7.23 Wherever possible, information regarding the extent and population size, population trends and distribution of the ornithological features has been used to inform the categorisation informed by the different levels described in **Table 9.10** and determine importance at the project level. Where detailed criteria or contextual data are not available, professional judgement has been used to determine importance. A justification of all determinations of importance are provided in **Table 9.11** for ornithological features.

Table 9.10 Criteria for determining importance for ornithological features with respect to the Proposed Development

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

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

[27] CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine Version 1.1. Chartered Institute of Ecology and Environmental Management; Winchester, UK.

Geographic context of importance	Description
	• Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory and ancient and veteran trees.
Wales National / UK Regional	• Regularly occurring Section 7 habitats or populations of Section 7 species, Red listed and legally protected species may be of regional (Wales) importance in the context of published information on population size and distribution.
County (Rhondda Cynon Taf)[28]	• LNRs and Non-Statutory Designated sites including: SINCs of County Importance. • Areas which based on field data collected to inform the EcIA meet the published selection criteria for those sites listed above (for habitats or species, including those listed in relevant Local Biodiversity Action Plans) but which are not themselves designated.
Local	• Section 7 habitats and species, Red listed and legally protected species that based on their extent, population size, quality etc are determined to be at a lesser level of importance than the geographic contexts above. • Common and widespread semi-natural habitats occurring within the study area in proportions greater than may be expected in the local context. • Common and widespread native species occurring within the study area in numbers greater than may be expected in the local context.
Negligible	• Common and widespread semi-natural habitats and species that do not occur in levels elevated above those of the surrounding area. • Areas of heavily modified or managed land uses (e.g. hard standing used for car parking, as roads etc.)

Table 9.11 Summary of ornithological features and their "importance"

Ornithological Features	Importance – Legislation	Importance – Project Level	Justification	Scoped in/out
Severn Estuary SPA/Ramsar	International	International	The Severn Estuary SPA/Ramsar sites are approximately 19.5km to the south of the Proposed Development. Species for which these sites are designated (as listed in **Table 3.1, Appendix 9A**) were not recorded using the Site. Given the distance between the Proposed Development and the two European Sites and the absence of any notified species, it is concluded that the Proposed Development does not provide "Functional Habitat" for any of the notified species and that there would be no observable impacts on the SPA or Ramsar site.	Scoped out

[28] County estimates for breeding and wintering birds specific to Rhondda Cynon Taf were largely unavailable with reports (Glamorgan Bird Club 2021) referring to the wider "East Glamorgan" area which covers the former preserved county of Glamorgan. Where estimates and assessment refer to the wider Glamorgan area, this has been made clear as part of the assessment.

Ornithological Features	Importance – Legislation	Importance – Project Level	Justification	Scoped in/out
Goshawk (resident species)	National	Wales National / UK Regional	Goshawks are a Schedule 1 breeding species with a population in Wales estimated at 25% of the overall UK population (280 – 430 breeding pairs)[Error! Bookmark not defined.]. The Welsh population is therefore estimated between 70 and 108 pairs. Desk study records and the ornithology assessment has identified one pair of goshawk breeding within 2km of the Proposed Development Site, this population represents between 0.92% and 1.42% of the Welsh breeding population. Goshawks are therefore scoped in to the assessment at a national level within Wales (equivalent to UK regional level). An accurate estimate for the wider Glamorgan population is not available – however Glamorgan Bird Report for 2020 (Glamorgan Bird Club 2021)[25] identified four confirmed nest locations. A single territory is therefore also likely to contribute significantly to the county population for Goshawk.	Scoped in
Red Kite (resident species)	National	County	Red kite are a Schedule 1 breeding species with a population in Wales estimated at 2,500 pairs[22]. Red kite observations have been frequent throughout the assessment period with regular flights during the vantage point surveys. There have been no red kite breeding attempts recorded within 2km of the Proposed Development Site and it is not anticipated that there is available habitat that will be impacted as a result of the Proposed Development. The peak count of red kite utilising the Site was five birds. The peak count represents 0.1% of the Welsh population of red kite, estimated at 5,000 birds during the breeding season[22]. Given the increasing population trend shown by red kite within Wales over the last decade, it is proportionate to assess the impact of the Proposed Development at a county level. The observed breeding population of red	Scoped in

Ornithological Features	Importance – Legislation	Importance – Project Level	Justification	Scoped in/out
			kite within the wider Glamorgan area was estimated at 1 – 3 pairs in 2020[25] though the number of actual breeding pairs is likely to be higher than this. Red Kite are considered a common resident and rare breeding bird.	
Golden Plover (Non-breeding)	International	County	Golden plover is listed on Annex I of the Birds Directive and is a priority species listed in Section 7 of the Environment (Wales) Act 2016. The species is also red-listed (in Wales) due to a rapid (>50%) decline in the Welsh breeding population over the past 25 years (Johnstone & Bladwell, 2016)[15] with only 70–90 pairs remaining. In East Glamorgan, the golden plover is described as a fairly common passage migrant and winter visitor, again, mainly along the coast, with Sker Point being the main site, supporting 280-300 birds in 2020 (Glamorgan Bird Club 2021)[25]. This report also highlights counts of 57 and 95 birds from Barry Sidings CP and are likely to include the birds recorded during surveys completed between 2020 and 2021. Estimates of non-breeding golden plover typically focus on counts made in coastal areas where low tide counts are completed. Flocks of birds which winter on suitable habitat away from coasts are likely to be unaccounted for in estimates. The birds recorded using the Proposed Development during the non-breeding period are likely to represent a significant proportion of the County population.	Scoped in
Notable Breeding Bird Assemblage (Woodland)	National	County	The breeding bird assemblage utilises wooded habitats adjacent to the Proposed Development Site. Records from surveys and desk study information has shown that the Site supports notable woodland species including crossbill, lesser redpoll and mistle thrush.	Scoped in

Ornithological Features	Importance – Legislation	Importance – Project Level	Justification	Scoped in/out
			As detailed in **Table 9.8** the woodland assemblage features a number of notable species that are of County importance. Whilst accurate population estimates are not available, the number of territories recorded is likely to represent a significant proportion of the County population when compared to anecdotal evidence provided by County bird reports.	
Notable Breeding Bird Assemblage (Moorland habitats)	National	County	The breeding bird assemblage within the open moorland habitats inside the Proposed Development Site are ubiquitous with habitats within the wider area. Records from surveys and the desk study have shown these habitats to support species including Skylark, Linnet, Reed Bunting and Tree Pipit As detailed in **Table 9.11** the grassland assemblage features a number of notable species that are of County importance. Whilst accurate population estimates are not available, the number of territories recorded is likely to represent a significant proportion of the County population when compared to anecdotal evidence provided by County bird reports for some of the species listed.	Scoped in
Breeding Bird Assemblage – Other Species	County	Local	The breeding bird assessment identified small assemblages of breeding birds ubiquitous with the habitats present within the Site, including common woodland species (such as coal tit, chaffinch and blackbird), grassland/moorland species (such as meadow pipit and stonechat) the built environment, farm, and out-buildings (pied wagtail, swallow). These species are common and widespread and as such any potential impacts would not be observable within the wider population.	Scoped out
Non-breeding bird assemblage	National/Regional	Local	To date, there have not been notable assemblages or numbers of non-breeding birds (with the exception of golden plover, which are considered	Scoped out

Ornithological Features	Importance – Legislation	Importance – Project Level	Justification	Scoped in/out
			separately) recorded utilising the Site. Species present during the non-breeding season were either common and widespread or occurred infrequently in such low numbers that any potential impacts would not be observable within the wider population.	
Migratory and non-breeding birds	National/Regional	Local	Passage migrants and non-breeding birds recorded in low numbers (i.e. individual birds) and infrequently (i.e. fewer than 5 times) includes notable species included hen harrier, merlin, hobby, peregrine, dotterel and lapwing. Given the low frequency and number of records for each of these species any potential impacts would not be observable within the wider population.	Scoped out

Likely significant effects

9.7.24 The following section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant effect.

9.7.25 For each ecological feature presented in **Table 9.11** and scoped in for further assessment the potential environmental changes and effects resulting from the Proposed Development are considered and further scoped in or out from detailed assessment.

9.7.26 **Table 9.12** provides a summary of those effects scoped in for further assessment. Where individual effects have been scoped out, justification is provided in **Appendix 9C**.

Table 9.12 Scoping table detailing ornithological features and likely significant effects scoped in for detailed assessment

Ornithological Feature	Environmental change and likely significant effects	Zone of Influence	Scoped in / out	Justification
Goshawk (breeding resident)	**Construction - Turbines**			
	Production of aural and visual stimuli and vibration during construction resulting in disturbance and displacement of breeding Goshawk	400m from proposed activities (based on disturbance distances described in Ruddock & Whitfield, 2007)[29]	In	Works are proposed within 500m of an identified Goshawk nest, with suitable habitat occurring <400m from Turbine 05. Full consideration of the potential effects of disturbance are provided in **Section 9.9.**
Goshawk (breeding resident)	**Operation – Turbines**			
	Physical changes to the spatial environment that could result in collision, injury or fatality of individual goshawks	Within the footprint of the operational windfarm	In	Goshawk have been infrequently recorded flying within the footprint of the proposed wind farm. Full consideration of the potential effects of collision / fatality are provided in **Section 9.9.**
	Physical changes to the spatial environment that could result in disturbance or displacement of goshawk from existing breeding sites	Within 400m of the operational wind farm	In	Turbines would be within and immediately adjacent to suitable habitat for foraging goshawk, and within 500m of a known nesting site. Full consideration of the potential effects of disturbance / displacement are provided in **Section 9.9.**

[29] Ruddock, M., Whitfield, D.P., (2007). A review of disturbance distances in selected bird species. Report from Natural Research (Projects) Ltd. to Scottish Natural Heritage. Natural Research, Banchory, UK.

Ornithological Feature	Environmental change and likely significant effects	Zone of Influence	Scoped in / out	Justification
Red Kite (non-breeding resident)	**Operation – Turbines**			
	Physical changes to the spatial environment that could result in collision, injury, or fatality of individual red kite.	Within the footprint of the operational windfarm	In	Red kite have been regularly recorded flying within the footprint of the proposed wind farm. Full consideration of the potential effects of collision/fatality are provided in **Section 9.10.**
	Physical changes to the spatial environment that could result in disturbance or displacement of red kite from potential breeding sites	Within 400m of the operational wind farm	In	Turbines would be within suitable habitat for foraging and future breeding efforts by red kite. Full consideration of the potential effects of disturbance/displacement are provided in **Section 9.10.**
Golden Plover (non-breeding season only)	**Construction - Turbines**			
	Production of aural and visual stimuli and vibration during construction resulting in disturbance and displacement of breeding Goshawk	200-300m from proposed activities (based on disturbance distances described in Cutts *et al* 2013)[30]		Works are proposed within 200m of observed roosting and feeding areas for Golden Plover. Full consideration of the potential effects of disturbance are provided in **Section 9.11.**
	Operation – Turbines			
	Physical changes to the spatial environment that could result in collision, injury, or fatality of individual red kite.	Within the footprint of the operational wind farm	In	Golden plover have been regularly recorded flying within the footprint of the proposed wind farm. Full consideration of the potential effects of collision/fatality are provided in **Section 9.11.**

[30] Cutts, N, Hemingway, K and Spencer, J (2013) Waterbird disturbance mitigation toolkit. Informing estuarine planning and construction projects. Produced by the Institute of Estuarine & Coastal Studues (IECS) University of Hull, 2013.

Ornithological Feature	Environmental change and likely significant effects	Zone of Influence	Scoped in / out	Justification
	Physical changes to the spatial environment that could result in disturbance or displacement of red kite from potential breeding sites	Within 400m of the operational wind farm	In	Turbines would be within suitable habitat for roosting and foraging by golden plover. Full consideration of the potential effects of disturbance/displacement are provided in **Section 9.11.**
Notable Breeding Bird Assemblage (grassland and moorland habitats)	**Construction - Turbines**			
	Permanent or temporary land take / changes to habitat resulting in reduction of available nesting, foraging, or resting habitats of breeding moorland assemblages	Within footprint of turbines and associated development working areas	In	Temporary and permanent land take to facilitate the construction of turbines and associated development has the potential to impact the moorland breeding bird population during the construction phase. Full consideration of the effect is given in **Section 9.12.**

9.8 Assessment methodology

9.8.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 2: Approach to Environmental Impact Assessment** and specifically in **Sections 2.5** to **2.8**. However, whilst this has informed the approach that has been used in the ornithology assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this ornithology assessment and align with standard industry guidance provided by CIEEM (2019)[27].

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

9.8.3 For each scoped-in ornithological feature effects will be assessed against the predicted future baseline conditions for that feature during construction and operational.

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

9.8.5 Where part of a non-designated site is located within the ornithological ZoI[31] relating to a particular biophysical change as a result of the Proposed Development, an assessment is made of the effects on the site as a whole.

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

Significance evaluation methodology

Overview

9.8.7 CIEEM (2019)[27] defines a significant effect as one "*that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general*".

9.8.8 When considering potentially significant effects on ecological features, whether these be adverse or beneficial, the following characteristics of environmental change are taken into account[32]:

- extent – the spatial or geographical area over which the environmental change may occur;
- magnitude – the size, amount, intensity or volume of the environmental change;
- duration – the length of time over which the environmental change may occur;
- frequency – the number of times the environmental change may occur;

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

- timing – the periods of the day/year etc. during which an environmental change may occur; and
- reversibility – whether the environmental change can be reversed through restoration actions.

Magnitude of change

9.8.9 Although the characteristics described above are all important in assessing effects by using information about the way in which habitats and species are likely to be affected, a scale for the magnitude of the environmental change, as a result of the Proposed Development, has been described in **Table 9.13** to provide an understanding of the relative change from the baseline position, be that adverse or beneficial changes.

Table 9.13 Guidelines for the Assessment of the Scale of Magnitude

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

Determining Significance - adverse and beneficial effects

9.8.10 Adverse effects are assessed as being significant if the favourable conservation status of an ecological feature would be lost as a result of the Proposed Development. Beneficial

effects are assessed as those where a resulting change from baseline improves the quality of the environment (e.g. increases species diversity, increases the extent of a particular habitat etc., or halts or slows down an existing decline). For a beneficial effect to be considered significant, the conservation status would need to positively increase in line with a magnitude of change of "high" as described in **Table 9.14**.

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

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

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

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

9.9 Preliminary assessment of ornithology effects: Goshawk

9.9.1 Goshawk have been identified as a breeding resident that utilise the forestry immediately adjacent to the Proposed Development. Desk study records are not available to indicate whether this is a well established nesting location, however anecdotal reports from landowners suggest that goshawk are regularly recorded.

9.9.2 Goshawk is listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). In 2017 there was thought to be up to 620 pairs nesting throughout the UK (Woodward 2020)33, although it is widely believed this doesn't reflect the true status of the species and represents a large underestimate of the true figures. In Wales it is a breeding resident in every county, with the wider Glamorgan area supporting a small proportion of nesting record (Hughes 201721, Glamorgan Bird Club 202125). The East Glamorgan Bird Report (which covers Rhondda Cynon Taff) recorded multiple sightings of Goshawk in 2020 with 159 recorded sightings from 88 different locations. This report confirmed at least 4 nests were active with a further 5 nests considered "possible". All locations were to the north of the M4 corridor which cuts across the wider county area. Given the expansion of this species the total number of breeding pairs is likely to be more than this.

9.9.3 Baseline surveys completed between 2020 and 2022 infrequently recorded goshawk with the Breeding Raptor Assessment confirming successful breeding at one nest in 2021. Observations of goshawk were largely limited to the areas within and adjacent to the woodland habitats associated with Barry Sidings Country Park to the east of the Proposed Development.

9.9.4 Based on the regularity of sightings and the availability of suitable nesting and foraging habitat it is assumed for the purposes of assessment that a maximum of one breeding pairs occur within 1km of the Proposed Development.

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

Construction Phase - Turbines

Production of aural and visual stimuli and vibration during construction resulting in disturbance and displacement of breeding Goshawk

9.9.5 Confirmed and potential nest sites were identified within woodland associated with Barry Sidings Country Park to the east of the Proposed Development as shown in **Figure 3.15, Appendix 9A**. These locations are outside of the Proposed Development Site but are within 500m of proposed construction locations associated with Turbine 5, located in the east of the Proposed Development Site. Visual and aural disturbance have the potential to disturb or displace breeding goshawk which could result in the abandonment or failure of nesting attempts and a reduction in associated breeding success, leading to potential decline of the local population of goshawk.

9.9.6 This assessment of the potential effects of disturbance is based on the description of the likely construction methods provided in **Chapter 4**. As described in **Section 4.5,** construction activity required to support the development can be divided into three main types:

- enabling works – required prior to the main construction phase and including:
  - geotechnical investigations (trial pits or boreholes);
  - up-grading of existing tracks and construction of new access tracks;
  - upgrades to public roads and junctions; and
  - establishment of site compounds.
- Site infrastructure works – required to support construction and safe, reliable operation of the wind farm, this would include:
  - wind turbine foundations;
  - crane hard standing (to support turbine construction and maintenance);
  - cable trenching and routeing;
  - switchroom and substation compounds; and
  - construction and storage compounds (temporary).
- turbine installation:
  - installation of wind turbine towers, nacelles and three blades.

9.9.7 Works associated with Turbine 5 and its associated infrastructure include the majority of activities listed above all of which could occur[34] approximately 500m (straight line distance) from the observed nest location. These will require the presence of multiple contractors and the use of heavy plant and other machinery in delivery of these tasks.

9.9.8 The current nest is located within dense woodland and is heavily screened by surrounding trees and other vegetation. The position of the current nest results in there being no clear line of sight between the nest location and the proposed working areas. If goshawk continue to breed in this location, in particular in the short term, it can be assumed that visual disturbance and likely impacts of aural disturbance would not occur.

9.9.9 If the current nesting location were to change, or further nest sites become established it is highly likely that any alternative nesting location would provide similar natural screening

[34] Measurements include buffers to enable micrositing of turbines and construction areas as described in Section 4.

regardless of position on site. However, Goshawk favour areas of dense forestry and tree cover for nest sites which occur <200m from the proposed working areas for Turbine 5. All other turbine locations and their workings areas are >500m from areas of dense forestry.

9.9.10 Of the works identified, those with the highest potential to cause aural disturbance include works to create the wind turbine foundation (see para. 4.5.12), installation of crane pads (see para. 4.5.15) and the final turbine installation (see para 4.5.11).

9.9.11 The works programme assumes a 24-month duration though the exact start date has not yet been identified. It has been assumed that given the nature and scale of the site that opportunities for scheduling works to avoid specific constraints would be possible. For the purposes of this assessment it is assumed that steps to avoid risk of disturbance to goshawk during the breeding period would be included as part of the final construction and installation programme.

9.9.12 In the UK, goshawk favour woodland and forestry for nesting and are susceptible to disturbance, in particular from forestry operations during incubation and early nestling stages (Ruddock and Whitfield 2007)[29]. Suggested safe working distances (designed to avoid disturbance) have been identified as needing to be between 250m and 500m by several authors (Currie & Elliot 1997[35], Petty 1989[36], 1996[37], Richter 2005[38] and Jones 1979[39]). There is some variation in recommendations with Petty (1996[37]) suggesting that reductions of buffers down to 200m can occur, especially during the later stages of nesting. More recent recommendations (Richter 2005[38]) suggests that maintaining a buffer of 400m ensures that fledglings to not prematurely leave nests.

9.9.13 Embedded measures specific to goshawk are described in **Table 9.19** and include measures designed to avoid and minimise the risk of disturbance. This includes:

- monitoring of suitable habitat prior to construction to identify active nest locations;
- phasing and timing of construction works to avoid key nesting periods such as incubation and early stages of young rearing at the nearest turbines; and
- establishment of “no activity” buffers adjacent to known nest sites. These would be on a case by case basis dependant on the positioning and location of any nest site and the nature of any working activities required.

9.9.14 Taking into account the current and likely positioning of any future nest sites, the identified construction methods and locations and the proposed embedded measures, the potential impact of disturbance is considered to be very low in magnitude and therefore not significant.

Operational Phase – Turbines

Physical changes to the spatial environment that could result in collision, injury and fatality of individual goshawks

9.9.15 The Proposed Development would see the installation and operation of up to seven wind turbines. There is therefore the potential for goshawk to collide with turbine blades. CRM

[35] Currie, F. & Elliott, G. (1997). Forests and Birds: A Guide to Managing Forests for Rare Birds. Forestry Authority, Cambridge and Royal Society for the Protection of Birds; Sandy, UK
[36] Petty, S.J. (1989). Goshawks, their status, requirements and management. Forestry Commission Bulletin, 81. HMSO; London.
[37] Petty, S.J. (1996). Reducing the disturbance to goshawks during the breeding season. Forestry Commission Research Information Note, 267. Forestry Commission; Edinburgh.
[38] Richter, D.J. (2005). Territory occupancy, reproductive success and nest site characteristics of goshawks on managed timberlands in central and northern California 1993-2000. California Fish and Game, 91, 100-118.
[39] Jones, S. (1979). The Accipiters, Goshawk, Cooper's Hawk, Sharp-shinned Hawk. U.S. Bureau of Land Management Technical Note 335. 51 pp

based on goshawk flight data collected from vantage point surveys undertaken between March 2020 – March 2022 (inclusive) has been carried out.

9.9.16 Whilst records of goshawk were infrequent, modelling for goshawk was carried out for the non -breeding seasons using data from both 2020/2021 and 2021/2022. This has been completed using the recommended avoidance rate of 98% (SNH, 2017)[13]. The methods, workings and results of the CRM for goshawk are provided in **Appendix 9B**.

9.9.17 **Table 9.14** presents a summary of the predicted number of collisions for goshawk annually and over the 30 year operation period of the windfarm.

Table 9.14 Predicted collision rates for goshawk

		Year 1	Year 2	Average
Non-Breeding Season (September – February)	Predicted collisions per year	0.058	0.216	0.137
	Predicted collision over 30 years	1.74	6.47	4.105

9.9.18 Results from the CRM on the 2020/22 VP survey data predict that the potential rate of collisions for goshawk (based on 85% operational time and 98% avoidance) would be 0.055 – 0.216 collisions per year during the non-breeding season, equivalent to between 1.66 and 6.47 birds over 30 years.

9.9.19 The effect of the loss of an individual bird on a population is influenced by several characteristics of the affected population, notably its size, density, recruitment rate (additions to the population through reproduction and immigration) and mortality rate (the natural rate of losses due to death and emigration). In general, the effect of an individual lost from the population will be greater for species that occur at low density, are relatively long lived and reproduce at a low rate.

9.9.20 The estimated Welsh population of goshawks is estimated to be between 70 and 108 pairs, though this is considered to be an underestimate with goshawk numbers increasing throughout Wales. Using this as a basis and taking into consideration juvenile survival rates and estimated clutch sizes the total population (including adults and immature birds) in Wales is estimated to be between 224 and 345 individuals. The annual mortality rate for adult goshawks is estimated to be 17% (BTO data, www.bto.org/birdfacts/) which would account for the death of between 38 and 59 individuals per year.

9.9.21 The additional mortality predicted from the CRM represents an increase between 0.23% and 0.36% of the background mortality for the regional population which would not represent a significant increase in mortality.

9.9.22 Based on the current design, observed flight activity levels and the outputs of CRM, the predicted effect of collision is of low magnitude and therefore not significant.

Physical changes to the spatial environment that could result in disturbance or displacement of goshawk from existing breeding sites

9.9.23 The operational phase of the Proposed Development could lead to the displacement of nesting and foraging birds and a reduction in reproductive success for the goshawk

population within the area. The impact on goshawk would potentially have an effect over the lifetime of the Proposed Development, though habituation may occur.

9.9.24 Drewitt & Langston (2006)[40] found that most bird species were unlikely to be affected by the operational disturbance of a wind farm beyond 600m, and (Ruddock and Whitfield, 2007)29 found little evidence of any disturbance effects on goshawk beyond 400m.

9.9.25 Beier & Drennan (1997)[41] is a study (including radio tracking) of goshawks in North America which found the species selected foraging sites not on the basis of prey abundance but by prey availability determined by the structure of the forest in which they bred. It was concluded that goshawks are morphologically adapted to hunting in relatively dense areas of forestry (rather than open habitats such as those where the turbines will be located) and thus would not select more open areas for foraging. These findings are in keeping of the observations recorded on Site with flights over open areas infrequent and often short in length as an individual moves between areas of woodland. The majority of flights were associated with the woodland and forestry habitats found on the sides of the Proposed Development Site.

9.9.26 There is a paucity of specific evidence to indicate whether or not disturbance or displacement of goshawk can occur as a result of the presence and operation of a wind farm. However, it is noted that within Wales and the United Kingdom, onshore wind farm sites are widespread and often occur in close proximity to commercial forestry that supports breeding goshawk. Given the tolerance that this species shows for nesting in commercial forestry, adapting to changes in tree cover, it is considered that birds could also be tolerant to other changes in the wider landscape. The number of breeding goshawk continues to increase across Wales and regionally (Hughes 2017[21] Glamorgan Bird Club 2021[25]) despite the development of increasing numbers of wind farms in rural areas adjacent to forestry.

9.9.27 Therefore, considering the current breeding status of goshawk within the area local to the Proposed Development and the behavioural responses of this species to disturbance, the predicted effect of displacement or disturbance during operation is low and therefore not significant.

9.10 Preliminary assessment of ornithology effects – Red Kite

Baseline for assessment

9.10.1 Red kite has been identified as present on the Site in each month of survey, however the Breeding Raptor Assessment and VP surveys have recorded limited territorial behaviour and no evidence of nesting was recorded within 2km of the Proposed Development.

9.10.2 Red kite is listed on Annex I of the Birds Directive and Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) and therefore, receives additional protection from disturbance during the breeding season. In 2016, the UK population of red kite was estimated to be close to 4,400 pairs (Woodward 2020), although as recently as 2019 the Red Kite trust estimated the population Wales to be in excess of 2,500 pairs (The Welsh Kite Trust, 2019)**Error! Bookmark not defined.**. National and regional trends show that the population of red kite in the UK and Wales continues to increase. In the two most recent "Birds of Conservation Concern"[19] [14] red kite were listed as "Green" with a large increase in numbers observed between 1996 and 2020. Modelled population estimates based on the numbers of birds in Wales[22] predicts continued increase in population

[40] Drewitt, A.L & Langston, R.H.W. (2006). Assessing the impacts of wind farms on birds. Ibis 148, 29-42.
[41] Beier, P. & Drennan, J.E. (1997). Forest structure and prey abundance in foraging areas of northern goshawks. Ecological Applications 7(2), 1997, pp564-571.

numbers based on the observed breeding success of nests monitored by the Welsh Kite Trust and validated against the results of breeding bird survey results.

9.10.3 The majority of sightings were of individual birds, with a number of immature birds recorded. During vantage point surveys, observations were typically of foraging individuals flying overhead the grassland and moorland that dominates the hill top.

9.10.4 No up-to-date population estimate for red kite in RCT or the former Glamorgan County area is available, though given the number of records reported in local bird reports[25] and number of observed nesting efforts red kite is still a rare breeding bird in RCT. In 2020 there were records of only two breeding records in the wider Glamorgan area however, observations of red kite continue to increase with the species identified as a "Locally Common Resident and rare breeder".

9.10.5 Based on the number and distribution of observed flights during vantage point surveys, the results of the Breeding Raptor Assessment and the observed numbers of breeding red kite in the wider area, red kite is categorised as a non-breeding resident with respect to the Proposed Development with no observed breeding attempts occurring within 2km of the Site. Therefore, any baseline for assessment of impacts reflects the estimated breeding population of red kite in the wider area.

Operational Phase – Turbines

Physical changes to the spatial environment that could result in collision, injury and fatality of individual red kite

9.10.6 The Proposed Development would see the installation and operation of up to seven wind turbines. There is therefore the potential for red kite to collide with turbine blades. CRM based on red kite flight data collected from vantage point surveys undertaken between March 2020 – March 2022 (inclusive) has been carried out.

9.10.7 Modelling for red kite was carried out using the recommended avoidance rate of 99% (SNH, 2017)[13]. The methods, workings and results of the CRM for red kite is provided in **Appendix 9B**.

9.10.8 **Table 9.15** provides a summary of the collision risk modelling results for red kite.

Table 9.15 Predicted collision rates for red kite

		Year 1	Year 2	Average
Breeding Season (March – August)	Predicted collisions per year	0.135	0.099	0.1145
	Predicted collision over 30 years	4.06	2.97	3.515
Non-Breeding Season (September – February)	Predicted collisions per year	0.215	0.113	0.164
	Predicted collision over 30 years	6.46	3.39	4.925

		Year 1	Year 2	Average
Annual Total	Predicted collisions per year	**0.35**	**0.212**	**0.281**
	Predicted collision over 30 years	**10.52**	**6.36**	**8.44**

9.10.9 Results from the CRM on the 2020/22 VP survey data predict that the potential rate of collisions for red kite (based on 85% operational time and 99% avoidance) would be between 0.099 and 0.135 collisions per breeding season (a total of 2.97-4.06 birds over the anticipated life-span of the proposed development of 30 years) and 0.113-0.215 collisions per year during the non-breeding season (between 3.39-6.46 birds over the anticipated life span of the proposed development of 30 years). Overall, the predicted number of collisions considering both the breeding and non-breeding period is just over eight birds in 30 years.

9.10.10 The effect of the loss of an individual bird on a population is influenced by several characteristics of the affected population, notably its size, density, recruitment rate (additions to the population through reproduction and immigration) and mortality rate (the natural rate of losses due to death and emigration). In general, the effect of an individual lost from the population will be greater for species that occur at low density, are relatively long lived and reproduce at a low rate.

9.10.11 Estimating the impacts on the county population of red kite is complicated by the absence of accurate estimates of the number of breeding pairs present within RCT or the wider Glamorgan area and increasing numbers of non-breeding but resident birds in the area. Red kites are current experiencing an increase in numbers across Wales and the UK, with key populations in Powys, Shropshire and Carmarthenshire which could result in movement of individual red kite between counties as they search for breeding locations. Research in Wales (Newton *et al* 2008)[42] suggests that individuals move up to 22km between birthplace and breeding place though many birds remain local to their chosen location year to year.

9.10.12 Whilst the loss of eight birds over 30 years from the local population could have a minor impact at a local level, immigration into the area from neighbouring counties is likely to balance any loss through collision. If the population growth rate of red kite in RCT (or the wider Glamorgan area) were to stabilise due to density dependent factors (such as the availability of suitable breeding and foraging habitat) then the population would likely benefit from birds relocating into the area from neighbouring counties, where birds unable to establish a suitable breeding territory explore more widely to establish a territory.

9.10.13 Based on the current design, observed flight activity levels and the outputs of CRM, the predicted effect of collision is of very low magnitude and therefore not significant.

Physical changes to the spatial environment that could result in disturbance or displacement of red kite from potential breeding sites

9.10.14 The operational phase of the Proposed Development could lead to the displacement of nesting and foraging birds and a reduction in reproductive success for the red kite population within the area. The impact on red kite would potentially have an effect over the lifetime of the Proposed Development, though habituation may occur.

[42] Newton, I., Davis, P. E., and Davis, J. E. (2008) Age of first breeding, dispersal and survival of Red Kites Milvus milvus in Wales. Ibis 131(1):16-21

9.10.15 Drewitt & Langston (2006)[40] found that most bird species were unlikely to be affected by the operational disturbance of a wind farm beyond 600m, and (Ruddock and Whitfield, 2007)[29] found little evidence of any disturbance effects on red kite beyond 500m. Currie & Elliott (1997)[35] suggested a safe working buffer of 300–600m around red kite nests during the breeding season and Petty (1998)[43] suggested distances of 400–600m during incubation. This reference also suggested a potential reduction of 25–50 % once chicks have hatched although he indicated tolerance to disturbance varied between individuals and so potential working situations involving disturbance should be assessed individually. In a review of the impacts of wind farms on upland raptors (including hen harrier, red kite and peregrine), Madders and Whitfield (2006)[44] concluded that displacement of raptors as a result of wind farms appears to be negligible (most studies involved foraging birds). The same authors have also reviewed the impacts of wind farms on a number of species and hen harrier was the only raptor where any displacement effect is apparent and that birds are only likely to be displaced from foraging habitat within 100m of turbines (Madders and Whitfield 2006)[44].

9.10.16 Therefore, considering the current breeding status of red kite within the area local to the Proposed Development and the observed effects of displacements on red kite, the predicted effect of displacement or disturbance during operation is negligible and therefore not significant.

9.11 Preliminary assessment of ornithology effects – Golden Plover (Non-breeding)

Baseline for Assessment

9.11.1 Golden plover is listed on Annex I of the Birds Directive and is a priority species listed in Section 7 of the Environment (Wales) Act 2016. The species is also red-listed (in Wales) due to a rapid (>50%) decline in the Welsh breeding population over the past 25 years (Johnstone & Bladwell, 2016)[15] with only 70–90 pairs remaining, nearly half of which are on moorland within the Cambrian Mountains[45]. The wintering population of golden plover was estimated to be 400,000 birds in Britain in 2006/07 (Musgrove et al., 2013)[23], and the five-year peak mean count from WeBS sites located entirely (or partly) in Wales for 2015/16 – 2019/20 was 15,723 birds[46]. This compares to co-ordinated counts across Wales totalling 18,000 birds in January 1977 (Lovegrove et al., 1994)[24].

9.11.2 In East Glamorgan, the golden plover is also described as a fairly common passage migrant and winter visitor, again, mainly along the coast, with Sker Point being the main site, supporting 280 - 300 birds in 2020 (Glamorgan Bird Club 2021)[25]. Estimates of non-breeding golden plover typically focus on counts made in coastal areas where low tide counts are completed. Flocks of birds which winter on suitable habitat away from coasts are likely to be unaccounted for in estimates.

9.11.3 Golden plover were recorded during all months during the non-breeding season. A peak flock size of 322 was recorded in November 2020, and there were thirty-one records during VP surveys of flocks more than one hundred birds. Golden plover flocks roosted and foraged on the plateau around the highest point and were regularly disturbed and

[43] Petty, S.J. (1998). Ecology and conservation of raptors in forests. Forestry Commission Bulletin 118. HMSO; London.
[44] Madders, M & Whitfield, D.P. (2006). Upland raptors and the assessment of wind farm impacts. Ibis, 148, 43–56.
[45] RSPB Golden plover advisory sheet - http://www.rspb.org.uk/Images/Englishgoldenplover_tcm9-133252.pdf
[46] This figure is the sum of each 5-year peak mean count from each WeBS site counted in Wales ontained from the BTO website (www.bto.org). It is acknowledged that this figure could include some double recording of birds moving from one site to another, and that WeBS does not include many sites away from estuaries and wetlands that are used by golden plover.

often flew for extended periods within the red line boundary. The longest duration of flight recorded was 1,440 seconds, and there were fifty flights that were over 5 minutes in duration. The mean average duration of flight was 243 seconds. Golden plover were recorded flying across the Site including the Proposed Development Site, buffer zone and a small number of flights beyond the 2km viewshed.

9.11.4 Golden plover are a non-breeding winter visitor to the Site with the total flock size fluctuating throughout the period between September and March (as observed in both 2020/2021 and 2021/2022). Based on the observations and recorded activity it is assumed that between 200-300 golden plover occur on an annual basis within the Proposed Development Site.

Construction Phase - Turbines

Production of aural and visual stimuli and vibration during construction resulting in disturbance and displacement of Golden Plover (Non-breeding)

9.11.5 Golden plover were recorded roosting and feeding throughout the Proposed Development during non-breeding periods in both 2020/2021 and 2021/2022. Whilst they were widespread in distribution, their preferred habitats and locations was focused on areas of grassland in the northern part of the Proposed Development Site on the plateau directly below the high points on Mynydd y Glyn.

9.11.6 Their distribution coincides with the proposed locations for Turbines 01, 02, 03 and 04 but roosting or feeding flocks were not recorded close to the other proposed turbine locations in the south and east of the Proposed Development Site.

9.11.7 As described in **Chapter 4** and **Section 9.10**, the Proposed Development requires a range of different construction activities ranging from minor works in support of site infrastructure to major construction such as the installation of the turbines themselves.

9.11.8 Disturbance distances reported for non-breeding golden plover (Hotker *et al* 2005)[47] show minimum displacement distances of 175m (+/-167m) associated with wind farms. Construction impacts and responses of non-breeding waders are summarised in Cutts *et al* (2013)[30], which identified golden plover as being of “Moderate Sensitivity” to both visual and aural disturbances. A precautionary approach is recommended that sees consideration of any birds within 200m of construction activities.

9.11.9 Aural disturbance is often difficult to separate from visual disturbance in birds, with birds typically more susceptible to human presence rather than machinery or noise. Golden plover have been shown to tolerate noise up to 72dB (at the bird) with caution recommended at 55dB. Noise levels reduce significantly with distance, as an example, a noise level of 100dB (typical for heavy plant) would reduce to <60dB at a distance of 85m.

9.11.10 Vantage point surveys showed that the golden plover flocks present on the Site were susceptible to human disturbance, frequently flushing or taking flight when disturbed by recreational or farming activity. It is therefore assumed that a similar response could occur with respect to the increase in human activity required to construct the wind farm.

9.11.11 The construction works programme has been estimated to be 24 months in length thought exact start date has not yet been identified. Given the length and nature of the work it is assumed that that opportunities for scheduling works to avoid specific constraints would be possible to some degree. For the purposes of this assessment, it is assumed that

[47] Hötker, H., Thomsen, K.-M. & Jeromin, H. (2006) Impacts on biodiversity of exploitation of renewable energy sources: the example of birds and bats - facts, gaps in knowledge, demands for further research, and ornithological guidelines for the development of renewable energy exploitation. Michael-Otto-Institut im NABU, Bergenhusen.

steps to avoid risk of disturbance to golden plover are included as part of proposed embedded measures. These would likely include measures such as:

- monitoring of non-breeding birds to confirm their number and distribution;
- scheduling of construction works at Turbines 01-04 to avoid key periods for golden plover;
- use of visual screening around construction compounds and turbine construction areas to minimise risk of human disturbance; and
- identification of "no walking" areas designed to minimise the risk of visual disturbance in open areas.

9.11.12 The wider area also provides a number of other sites with similar habitat which have the potential to support golden plover, should they be temporarily displaced by activities at the Proposed Development Site.

9.11.13 Based on the current design and also assuming the adoption of embedded measures the predicted effect of disturbance on golden plover during construction is considered to be of low magnitude and therefore not significant.

Operational Phase – Turbines

Physical changes to the spatial environment that could result in collision, injury and fatality of individual red kite

9.11.14 There is the potential for golden plover to collide with turbine blades. Mortality from collision has the potential to lead to a decline in the local population of golden plover. In view of this, collision risk modelling, based on golden plover flight data collected from VP survey during the non-breeding season 2020/2021 and 2021/22, was carried out. Modelling for golden plover was carried out using the recommended avoidance rate of 98% (SNH, 2017)[13].

9.11.15 The methods, workings and results of the CRM for golden plover is provided in **Appendix 9B**.

9.11.16 **Table 9.16** provides a summary of the collision risk modelling results for golden plover.

Table 9.16 Predicted collision rates for golden plover

		Year 1	Year 2	Average
Non-Breeding Season (September – February)	Predicted collisions per year	345	346	345
	Predicted collision over 30 years	10,351	10,381	10,366

9.11.17 Due to the number of birds present within the Proposed Development Site and the regular extend flight behaviour of the flocks, the predicted number of collisions is very high and is likely to represent a significant overestimate.

9.11.18 The number of predicted collisions per year is approximately 345 birds, which when considered against the predicted life span of the Proposed Development (30 years) could result in more than 10,000 collisions assuming a consistent number of collisions per year.

9.11.19 The effect of the loss of multiple birds on a population is influenced by several characteristics of the affected population, notably its size, density, recruitment rate (additions to the population through reproduction and immigration) and mortality rate (the natural rate of losses due to death and emigration).

9.11.20 No specific estimate for the non-breeding population of golden plover within RCT or the wider Glamorgan area is available. However, the results of BTO WeBS counts suggest that peak counts of golden plover in coastal areas typically range between 2,000 and 2,500 individuals. This is likely to represent an underestimate for non-breeding populations with sites such as Mynydd y Glyn supporting flocks of golden plover that forage or roost at inland locations.

9.11.21 Assuming an estimated County population of between 2,000 and 2,500 individuals (based on BTO total counts for West Glamorgan), the loss of an average of 345 individual birds per year would represent between 13.8% and 17.25% of the county non-breeding population which, unmitigated would have the potential to have a long term and significant impact on the County population.

9.11.22 However, the behaviour of golden plover and their responses to operational wind farms may indicate that the predicted level of collision is a significant over-estimate.

9.11.23 The approach to collision risk modelling assumes that the observed behaviour (recorded through vantage point surveys) is consistent throughout the “occupation” period – i.e. when birds could be present within a site. Whilst surveys completed between 2020-2022 regularly observed golden plover roosting within the Proposed Development Site, they are typically nocturnal feeders and it would be expected that flocks or small groups would move away from roosting areas to feed in other locations, potentially outside of the Proposed Development Site.

9.11.24 Golden plover may also be displaced from Mynydd y Glyn (discussed as a separate effect below) which would result in reduced risk of collision, as birds would not be present within the Site or occur less frequently or in smaller numbers. Displacement of golden plover into the wider area could ensure that the risk to the local population is reduced and any impacts are much reduced.

9.11.25 Additional survey work, to be completed in 2022/2023 will assess further the behaviour of the golden plover which utilise Mynydd y Glyn, this will include dusk/nocturnal surveys to identify whether the flocks remain within the Proposed Development Site and also look to confirm the occupancy rate of the Site with a view to generating a more realistic collision rate estimate.

9.11.26 Using the information gathered, bespoke mitigation measures will also be developed that seek to reduce the risk of collision for golden plover. Potential measures which could reduce that risk include:

- measures to reduce the risk of disturbance through management of recreational access and farming activity;
- creation or enhancement of other suitable roosting and feeding sites for golden plover which encourage flocks away from the Proposed Development Site;
- operational measures to manage the Proposed Development in such a way as to decrease risk of collision during periods when golden plover are present; and

- measures to change habitat management at the Site to discourage golden plover from using the Site for roosting or feeding.

9.11.27 Provisional analysis based on baseline surveys is predicted to result in a Medium-High, significant effect on the County population of non-breeding golden plover over the duration of the operational phase of this project. Further work is proposed (see **Section 9.16**) to further assess this effect and also to support the development of a mitigation approach which would reduce the potential effect below current levels such that a Low magnitude impact occurs.

Physical changes to the spatial environment that could result in disturbance or displacement of golden plover from potential breeding sites

9.11.28 The operational phase of the Proposed Development could lead to the displacement of roosting and foraging golden plover which in turn could lead to a reduction in survival rates for individual birds as a result of increased energy expenditure and the loss of favoured habitat. The impact on golden plover would potentially have an effect over the lifetime of the Proposed Development, though some habituation may occur.

9.11.29 The effects of displacement are often difficult to quantify and have been widely studied at windfarm sites across the UK and Europe, often with contradictory evidence or variation in the levels of effect. A review of wind farm studies (Hotker *et al* 2006)[47] summarised the outputs from 127 studies across European, American and Australian windfarm sites to collate the findings of studies at a range of different windfarm sites, sampling a wide range of different species. This review found that windfarms could have a displacement effect on golden plover (and similar species such as lapwing) with a mean distance displacement distance of 175m and a maximum of approximately 350m.

9.11.30 In the UK, in particular in Scotland, studies have been carried out with respect to breeding golden plover which have also shown displacement effects on golden plover associated with wind farms (Pearce-Higgins *et al* 2009)[48] with effects detectable up to 200m from turbine locations.

9.11.31 Based on the findings of Hotker *et al* (2006), it is assumed that the Proposed Development could result in displacement of non-breeding golden plover from Mynydd y Glyn as a roosting or feeding location. Further work is proposed to understand in greater detail how the non-breeding golden plover population interacts with the wider landscape and to identify other nearby sites that already support non-breeding golden plover populations. An initial review of similar habitat (i.e. open, grassland areas above 300m altitude) has identified 4-5 sites within 7km which appear to provide similar conditions to those present at Mynydd y Glyn. The availability of similar sites in the wider area could reduce the magnitude of any effects associated with displacement as nearby sites offer alternative locations.

9.11.32 Therefore, considering the current distribution and number of non-breeding golden plover, the availability of other suitable habitat within the area local to the Proposed Development and the observed effects of displacements on golden plover, the predicted effect of displacement or disturbance during operation is predicted to be medium - low and considered unlikely to be significant. However, further work is proposed (see **Section 9.16**) to further assess this effect and also to support the development of a mitigation approach which would reduce the potential effect below current levels such that a Low magnitude impact occurs

[48] Pearce-Higgins, J.W., Stephen, L., Langston, R.W., Bainbridge, I.P. and Bullman, R. (2009) The distribution of breeding birds around upland wind farms. Journal of Applied ecology, 46: 1323-1331.

9.12 Preliminary assessment of ornithology effects – Breeding Bird Assemblage (Grassland and Moorland Assemblage)

Baseline for Assessment

9.12.1 As detailed in **Table 9.7** the grassland and moorland habitats present on the Site support an assemblage that includes the following notable species:

- Dunnock – Section 7, BoCC5 Amber, BoCCW3 Green - six territories;
- Linnet - Section 7, BoCC5 Red, BoCCW3 Red – 6 territories;
- Reed Bunting - Section 7, BoCC5 Amber, BoCCW3 Amber – nine territories;
- Skylark –Section 7, BoCC5 Red, BoCCW3 Red – 90 territories;
- Whitethroat – BoCC5 Amber, BoCCW3 Red – 6 territories; and
- Willow warbler – BoCC5 Amber, BoCCW3 Red List – 15 territories.

9.12.2 All listed as Section 7 species under the Environment (Wales) Act 2016, the majority of these species have declining populations as indicated by their status both in the UK (BoCC5) and Wales (BoCCW3).

9.12.3 Accurate estimates of breeding populations either within Wales or within RCT/East Glamorgan are not available for these species, however consideration of their abundance can be based on the results of population trends (BoCCW3) and regional/local bird reports (Glamorgan Bird Club)[25] which attribute qualitative assessments of these species.

9.12.4 Of the species identified dunnock is considered "Abundant" within Wales and the East Glamorgan Area whilst linnet, reed bunting, skylark, whitethroat and willow warbler are considered "Common" or "Fairly Common".

Permanent or temporary land take / changes to habitat resulting in reduction of available nesting, foraging, or resting habitats of breeding grassland / moorland assemblages

9.12.5 The Proposed Development would result in the loss of an estimated 6-10ha of predominantly grassland habitat, where turbine locations, access tracks and construction areas are proposed. A full description of the layout and locations of each turbine is provided in **Chapter 4**.

9.12.6 Whilst the footprint of Proposed Development is relatively small, allowances at this stage of the process include "limits of deviation" that allow for micrositing of turbines and construction infrastructure (tracks, construction compounds). The current proposal includes limits of deviation that would be up to 50m for turbines and 100m for construction infrastructure.

9.12.7 For the purposes of a 'worst-case' assessment, it is assumed that during construction any areas within those limits of deviation could be "lost" to breeding birds providing a precautionary approach to the distribution of areas impacted by habitat loss.

9.12.8 The proposed layout, as shown in **Figure 4.1**, incorporates areas of habitat used by the notable species listed in **Table 9.7**. This includes, one linnet territory, eight reed bunting territories, two willow warbler territories and 34 skylark territories.

9.12.9 Consideration has therefore only been given to those species identified as breeding within the footprint of the Proposed Development Site that could be directly impacted by

construction works and / or the loss of habitat due to land-take. Of these, only skylark, linnet, willow warbler and reed bunting have potential to be impacted.

9.12.10 The available evidence suggests that beyond 100m of any works associated with the Proposed Development, significant adverse effects on skylark due to disturbance (from noise, vibration and the visual presence of operatives) are unlikely to occur.

9.12.11 The enhancement measures identified for the wider Site are in development as part of a Habitat Management Plan [HMP] to be produced as part of the final ES. These are expected to benefit the breeding species identified with proposals including reduction of bracken cover and management to encourage a more diverse grassland structure. The long term approach to habitat management would compensate for any temporary disturbance or reduction in habitat availability caused during construction and permanent loss of habitat due to operational land-take.

9.12.12 Direct injury to individual birds or damage / destruction of individual nests would be accounted for through the adoption of environmental measures as identified in the Draft CEMP developed for the construction programme. This would include management of habitats to discourage breeding birds in working areas and the employment of Ecological Clerks of Works during construction to identify and protect active bird nests where works have to take place during the breeding season.

9.12.13 Based on the small numbers of the species included in the assemblage, the relatively small area of land take and the use of embedded measures, it is assumed that the impacts of habitat loss associated with construction would be low in magnitude, and therefore not significant.

9.13 Preliminary assessment of cumulative (inter-project) effects

9.13.1 A preliminary cumulative effects assessment (CEA) has been undertaken for the Proposed Development which considers the combined impacts with other developments on the same single receptor or resource (inter-project effects). The detailed methodology followed in identifying and assessing potential cumulative effects is set out in **Section 2.8** of **Chapter 2**.

9.13.2 Consideration has been given as to whether any of the ornithology receptors that have been taken forward for assessment in this chapter are likely to be subject to cumulative effects because of ornithology effects generated by other developments.

9.13.3 Only developments (including other wind farms) which are either built, consented or with submitted planning applications have been considered within a distance of 10km of the Proposed Development site. There are:

- four operational windfarms;
- four consented and /or under construction wind farms; and
- one of unknown status (noting that this is a proposal for only 2 turbines.

9.13.4 Details of the approach for identifying other developments are included in **Chapter 2** with a full list of developments provided in **Table 2.4.**

9.13.5 **Table 9.17** provides a summary of the projects identified that have potential to have impacts on ornithology receptors.

9.13.6 Of the operational or consented windfarms, only Mynydd Portref and Headwind Taff Ely report collision risk modelling results for any of the species identified within this

assessment. Modelled collision rates for red kite from both of these sites are low (2 birds per year) which when considered cumulatively with the results detailed in Section 9.10 would still represent a small proportion of the wider, regional population of red kite, in particular when considering the ongoing expansion of this species' population. Therefore it is concluded that a cumulative impact with respect to collision would not occur, noting that data is only presented for red kite for any of these sites.

Table 9.17 Summary of wind farm developments within 10km of the Proposed Development

Name of wind farm	Local Authority	Number of wind turbines	Height to blade tip (m)	Approximate distance from boundary of Proposed Mynydd y Glyn Wind Farm (km)	Status	Ornithology identified as a constraint
Llwyncelyn Farm 1 & 2	Rhondda Cynon Taff County Borough Council	2	125	3.6km north	Consented - under construction	N
Bryntail Farm 1 & 2	Rhondda Cynon Taff County Borough Council	2	71	6.29km east	Submitted - unknown	Documents unavailable
Mynydd Portref and Extensions 1-7	Rhondda Cynon Taff County Borough Council	6	110	6.98km north west	Operational	Y – predicted collision rate of 0.075 red kite annually
Taff Ely 1 - 20	Rhondda Cynon Taff County Borough Council	20	53	4.9km south west	Operational	N – windfarm also scheduled for decomission
Headwind Taff Ely 1 - 7	Rhondda Cynon Taff County Borough Council	7	110	5km south west	Consented - in construction	Y – predicted collision rate of 2.1 red kite annually
Nant-y-Gwyddon	Rhondda Cynon Taff County Borough Council	1	121.5	7.15km north west	Consented - in construction	N – modelled for other species and all <1 collision over 25 years
Ferndale	Rhondda Cynon Taff County Borough Council	8	74	7.48km north west	Operational	Documents unavailable

Name of wind farm	Local Authority	Number of wind turbines	Height to blade tip (m)	Approximate distance from boundary of Proposed Mynydd y Glyn Wind Farm (km)	Status	Ornithology identified as a constraint
Pant-y-Wal	Bridgend County Borough Council	10	115	7.47km north west	Operational	Documents unavailable
Pant-y-Wal Extension	Bridgend County Borough Council	8	125	7.47km north west	Consented	No significant collision risk to red kite

9.14 Preliminary significance conclusions

9.14.1 A summary of the results of the preliminary ornithology assessment is provided in **Table 9.18**.

Table 9.18 Preliminary summary of significance of effects

Receptor and summary of predicted effects	Sensitivity / importance / value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Goshawk (breeding resident)				
Production of aural and visual stimuli and vibration during construction resulting in disturbance and displacement of breeding Goshawk	Wales National/ UK Regional	Low	Not significant	Identified nest sites and other suitable habitat may occur within observed disturbance buffers for goshawk. However, existing and potential nesting locations are naturally screened from all working areas by other habitats. In addition, embedded measures have been included as part of the Draft CEMP to further minimise or avoid risk of disturbance to this species.
Physical changes to the spatial environment that could result in collision, injury and fatality of individual goshawks	Wales National/ UK Regional	Low	Not significant	Analysis using CRM suggests that the number of birds that could collide with operational turbines represents a very small increase of annual mortality rates with four collision predicted over the operational period of 30 years.
Physical changes to the spatial environment that could result in disturbance or displacement of goshawk from existing breeding sites	Wales National/ UK Regional	Low	Not significant	Evidence to show displacement effects of operational wind farms is limited. However, goshawk are tolerant of commercial forestry activity and have been recorded at other locations within Wales with operational wind farms nearby. Displacement effects on other raptors (such as red kite) have been recorded as being negligible.
Red kite (non-breeding resident)				
Physical changes to the spatial environment that could result in collision, injury and fatality of individual red kite	County	Low	Not significant	Analysis using CRM suggests that the number of birds that could collide with operational turbines represents a small increase of annual mortality rates with only 6-10 predicted deaths from collision over the 30 year period of operation.
Physical changes to the spatial environment that could result in	County	Negligible	Not significant	Evidence from operational windfarms in the UK has shown negligible impacts of displacement on red kite with birds recorded foraging and breeding within and close to operational sites.

Receptor and summary of predicted effects	Sensitivity / importance / value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
disturbance or displacement of red kite from potential breeding sites				
Golden Plover (Non-Breeding)				
Production of aural and visual stimuli and vibration during construction resulting in disturbance and displacement of non-breeding golden plover	County	Low	Not significant	Golden plover utilise habitats within 200m of Turbines 01-04 and therefore have potential to be disturbed by construction activities and increased levels of human activity during the construction period. Given the length and nature of the work it is assumed that that opportunities for scheduling works to avoid specific constraints would be possible and embedded measures to be included as part of the Draft CEMP would minimise risk of disturbance to this species. Golden plover are also a mobile species and could utilise other suitable habitat in the wider landscape if temporarily disturbed.
Physical changes to the spatial environment that could result in collision, injury and fatality of individual golden plover	County	Medium-High	Significant	Due to the number of birds present within the Proposed Development and the regular extended flight behaviour of the flocks, the predicted number of collisions is very high. Additional survey work, to be completed in 2022/2023 will assess further the behaviour of the golden plover which utilise Mynydd y Glyn with a view to developing more accurate collision predictions and to develop specific mitigation measures to address this effect. Consideration of the potential for birds to be displaced from the site by the operational windfarm may also lessen the potential for this effect to occur.

Receptor and summary of predicted effects	Sensitivity / importance / value of receptor[1]	Magnitude of change[2]	Significance[3]	Summary rationale
Physical changes to the spatial environment that could result in disturbance or displacement of golden plover from potential roosting and feeding sites	County	Low – Medium	Not Significant	Observed responses to operational wind farms by golden plover is contradictory with some studies showing displacement effects of up to 350m whilst other studies show no observed change in distribution and evidence of birds feeding within 25m of turbines. Additional survey work, to be completed in 2022/2023 will assess further the behaviour of the golden plover which utilise Mynydd y Glyn with a view to understanding how golden plover interact with the Site and wider area to develop specific mitigation measures that could further address this effect and reduce the predicted magnitude effect to Low.
Notable breeding bird assemblage (grassland and moorland habitats)				
Permanent or temporary land take / changes to habitat resulting in reduction of available nesting, foraging, or resting habitats of breeding grassland/moorland assemblages	County	Low	Not significant	Proposed construction areas (including additional areas to enable micrositing) would result in a relatively small area of temporary and permanent habitat loss. Species potential impacted are limited to ground nesting birds that utilise grassland habitats and have been identified as using habitats within or close to proposed construction areas (skylark, reed bunting, linnet and willow warbler). On the assumption that embedded measures would be adopted, to be delivered through a CEMP, effects would be avoided or minimised on these species.

1. The sensitivity / importance / value of a receptor is defined using the criteria set out in **Section 9.8** and is defined as negligible, local, county, Wales (national) / UK regional, National (UK) International
2. The magnitude of change on a receptor resulting from activities relating to the development is defined using the criteria set out in **Section 9.8** and is defined as [very low, low, medium, high and very high].
3. The significance of the environmental effects is based on the combination of the sensitivity / importance / value of a receptor and the magnitude of change and is expressed as major (significant), moderate (potentially significant) or minor / negligible (not significant), subject to the evaluation methodology outlined in **Section 9.8**.

9.15 Further work to be undertaken

9.15.1 The information provided in this Draft ES is preliminary, the final assessment of likely significant effects will be reported in the ES. This section describes the further work to be undertaken to support the ornithology assessment presented in the ES.

Baseline

9.15.2 A survey approach has been developed to understand in greater detail how non-breeding golden plover interact with the Proposed Development site and the wider area. Surveys will encompass multiple surveyors working in tandem to survey the Proposed Development Site and wider area simultaneously to understand if there are any observable movements of golden plover between areas of suitable habitat (i.e. open, grassland habitat, above 300m) within 10km.

9.15.3 Surveys will feature combined walkover and vantage point watches over two consecutive days that identify the distribution and number of golden plover in the period up to sunset. These will then be extended into nocturnal watches to record any movement of golden plover away from the Proposed Development Site.

Assessment

9.15.4 The results of these surveys would be used to update CRM estimates for collision rates and also to re-assess and update the following identified effects:

- physical changes to the spatial environment that could result in collision, injury and fatality of individual golden plover; and
- physical changes to the spatial environment that could result in disturbance or displacement of golden plover from potential roosting and feeding sites.

Environmental measures

9.15.5 The results of this additional work will be used to develop any additional measures required to address any residual effects. This has the potential to include:

- recommendations for habitat management approaches within the Proposed Development to discourage golden plover from roosting or feeding in certain locations;
- creation or enhancement of alternative suitable habitat in nearby areas;
- operational approaches and access management to reduce risk of disturbance and/or collision; and
- monitoring approaches to inform reactive management of the operational windfarm and surrounding land in response to the presence or absence of golden plover.

9.15.6 Mitigation for the construction and operational phase will be further described in a Collision Monitoring and Mitigation Strategy to be finalised alongside the ES.