Preliminary Environmental Information Report

Chapter 9: Ornithology

PEIR Chapter [PINS Ref: EN 010171]

Document Reference: EN 010171/PEIR CHP/9

Revision Number: 1

December 2025

Future Energy Llanwern Limited

Contents

9.0 Ornithology

9.1 Introduction

9.1.1 This Chapter reports the outcome of the preliminary assessment of likely significant effects arising from the Proposed Development upon ornithological receptors.

9.1.2 It assesses the following potentially significant effects:

- Direct effects including direct disturbance, killing/ injury of birds and removal of nests/ eggs and fragmentation due to severance of habitats.
- Indirect impacts including visual, noise, lighting or vibration which may affect the behaviour of bird species and therefore reduce survival or reproductive fitness, pollution and dust deposition which could affect food resources and habitat degradation (e.g. via shading or management) which could also reduce food/ prey availability.

9.1.3 Effects are considered during construction, operation and decommissioning phases, covering the lifetime of the Proposed Development.

9.1.4 This Chapter (and its associated figures and appendices) is intended to be read as part of the wider PEIR, with particular reference to:

- **Chapter 2: Description of the Proposed Development**;
- **Chapter 8: Ecology**;
- **Chapter 10: Water Environment**;
- **Chapter 13: Noise and Vibration**; and
- **Chapter 15: Transport and Access**.

9.1.5 This Chapter describes:

- the legislation, planning policy and other documentation that has informed the assessment (**Section 9.2**);

- limitations and assumptions (**Section 9.3**);
- the outcome of consultation and engagement that has been undertaken to date, including how matters relating to ornithology within the Scoping Opinion received in January 2025 will be addressed (**Section 9.4**);
- the methods used for the baseline data gathering and the scope of the assessment for ornithology (**Section 9.5**);
- a description of significance criteria (**Section 9.6**);
- the overall baseline as it currently stands (**Section 9.7**);
- embedded environmental measures relevant to ornithology (**Section 9.8**);
- a preliminary assessment of likely impacts and effects during construction, operation and decommissioning based on information available to date (**Section 9.9**);
- consideration for the potential mitigation and enhancement measures to reduce the impact of the Proposed Development (**Section 9.10**);
- the application of the Step-wise Approach (**Section 9.11**);
- a summary of residual effects for ornithology (**Section 9.12**);
- consideration of cumulative effects (**Section 9.13**);
- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 9.14**);
- A summary (**Section 9.15**); and,
- References (**Section 9.16**).

9.1.6 The appendices in **Table 9-1** below also accompany this assessment.

Table 9-1 Appendices which have informed the ornithological assessment

Drawing number / Document reference	Description
Appendix 8A	Desk Study
Appendix 9A	Breeding Bird Survey Results
Appendix 9B	Wintering Bird Survey Results

Appendix 8I	Shadow Habitat Regulations Assessment (sHRA)
Appendix 8J	Outline Landscape and Ecological Management Plan (oLEMP)

9.2 Legislation and Planning Policy

Legislative Framework

9.2.1 The ecology assessment has been prepared in accordance with the legislation and policy presented in **Table 9-2**.

Table 9-2 Legislation and policy relevant to ecology

Policy/ Legislation	Context
The Birds Directive **(Ref 9-1)**	The Directive provides a framework for the protection and management of wild birds in the EU. The Directive provides protection for wild birds and their habitats and promotes co-operation internationally on the issue of migratory birds.
The Ramsar Convention on Wetlands 1971 **(Ref 9-2)**	The Convention is an international treaty which aims to ensure the sustainable use and conservation of wetlands on a global level. The convention recognises the ecological importance of wetlands as habitats for various species
The Conservation of Habitats and Species Regulations 2017 (as amended) **(Ref 9-3)**	The Conservation of Habitats and Species Regulations 2017 (as amended) constitute the UK Government's implementation of the European Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (often referred to as the 'Habitats Directive') in England and Wales. Changes were made by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 to transfer functions from the European Commission to the appropriate authorities in England and Wales. The Regulations provided for the designation of both Special Protection Areas (SPA) (first established under Council Directive 79/409/EEC on the conservation of wild birds, often referred to as the 'Birds Directive') and Special Areas for Conservation (SAC) as part of the Natura 2000 network of protected areas across the European Union. The 2019 amendment includes the following changes: • the creation of a National Site Network (NSN) within the UK territory comprising the protected sites already designated under the Nature Directives (comprising the Habitats Directive 92/43/ECC and the Birds Directive

79/409/EEC), and any further sites designated under these Regulations
- the establishment of management objectives for the national site network (the 'network objectives')
- a duty for appropriate authorities to manage and where necessary adapt the national site network as a whole to achieve the network objectives
- an amended process for the designation of Special Areas of Conservation (SACs)
- arrangements for reporting on the implementation of the Regulations, given that the UK no longer provides reports to the European Commission
- arrangements replacing the European Commission's functions with regard to the imperative reasons of overriding public interest (IROPI) test where a plan or project affects a priority habitat or species
- arrangements for amending the schedules to the Habitats and Species Regulations 2017 (as amended) and the annexes to the Nature Directives that apply to the UK

The Regulations also place a requirement for 'Appropriate Assessment' to be undertaken of plans and proposals likely to affect those sites.

For European Protected Species (EPS), the Regulations give protection from deliberate capture, killing or disturbance (where disturbance; affects the ability of the EPS to survive, breed or reproduce, to rear or nurture their young, to hibernate or migrate; or significantly affects the local distribution or abundance of the EPS) of animals listed in Schedule 2. Schedule 2 species are:

- Horseshoe bats (all species)
- Typical bats (all species)
- Eurasian beaver
- Large blue butterfly
- Wild cat
- Dolphins, porpoises and whales (all species)
- Dormouse
- Pool frog
- Sand lizard
- Fisher's estuarine moth
- Great crested newt
- Otter
- Lesser whirlpool ram's-horn snail
- Smooth snake
- Sturgeon
- Natterjack toad
- Marine turtles

	It is also an absolute offence to destroy or damage the resting place or breeding site of an EPS. The Regulations ensure that activities that will impact upon an EPS or its habitat cannot be undertaken unless authorised by a Mitigation Licence issued by NRW. Such a licence is granted until after planning consent has been obtained and once NRW are satisfied that adequate measures are to be put in place to mitigate for the impact of the development.
Wildlife and Countryside Act 1981 (as amended) **(Ref 9-4)**	The Wildlife and Countryside Act 1981 (the Act) and subsequent amendments, as strengthened by the Countryside and Rights of Way Act 2000, is the principal legislative mechanism for the protection of wildlife in Great Britain. It implements the Convention on the Conservation of European Wildlife and Natural Habitats (The Bern Convention) and EC Directive 2009/147/EC 'The Birds Directive'. The Act established a statutory framework for the protection of wildlife. It provides for the designation of Sites of Special Scientific Interest (SSSI), which are selected as the best national examples of habitat types, sites with notable species and sites of geological importance. Schedules 1-4 of the Act (as amended) deal with the protection of wild birds, making it an offence (subject to exceptions) to intentionally kill, injure or take any wild bird or their eggs or nests. Bird species listed in Schedule 1 have additional protection to prevent disturbance of these birds at their nests or the disturbance of their dependent young. Schedule 5 of the Act details protection of certain animal species. Full protection is given by Section 9 to some animals listed under Schedule 5, such as water vole. Partial protection under Section 9 is given to certain other species, including all common species of reptile and EPS such as bats (which receive the majority of their protection under the Conservation of Habitats and Species Regulations 2017). Schedule 8 of the Act details protection for plants. Schedule 9 Section 14(2) of the Act makes it an offence to cause any species of plant listed in Part II of Schedule 9 of the Act to grow in the wild (e.g. Japanese knotweed and Himalayan Balsam).
Environment (Wales) Act 2016 **(Ref 9-5)**	Part 1 – Section 6 of the Environment (Wales) Act 2016 sets out requirements and duties for the Welsh Government and other public authorities to maintain and enhance biodiversity and promote the resilience of ecosystems. The duty places biodiversity as a natural and integral part of policy and decision making within public authorities.

	The Policies are designed to: • Maintain and enhance the natural environment through managing land appropriately to create healthy functioning ecosystems; • Increase awareness of the importance of a biodiverse natural environment with healthy functioning ecosystems; • Support ecological resilience, making the environment healthier for wildlife and people; and • Be adaptive to a changing environment where there is a need to use resources efficiently.
Future Wales: the National Plan 2040 **(Ref 9-6)**	The National Plan 2040 is Wales's National Development Framework (NDF), setting the direction for development in Wales to 2040. It is a development plan with a strategy for addressing key national priorities through the planning system. Policy 9 (Resilient Ecological Networks and Green Infrastructure) focuses on enhancing biodiversity and resilience of ecosystems, urging safeguarding and creation of ecological networks and maximising green infrastructure through nature-based solutions.
Planning Policy Wales **(Ref 9-7)**	Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties. Noteworthy policies relating to ecology and biodiversity are as follows: • Green Infrastructure – an emphasis is placed on taking a proactive approach to green infrastructure including cross-boundary considerations; • Net Benefit for Biodiversity and the Step-wise Approach - a strong focus is placed on securing a net benefit for biodiversity through the application of the step-wise approach utilising the DECCA framework, including the acknowledgement of off-site compensation measures as a last resort, and the need to consider enhancement and long-term management at each step;

	• Non-statutory designations - Sites of Importance for Nature Conservation, Local Wildlife Sites, Local Nature Reserves, and Regionally Importance Geodiversity Sites make a vital contribution to delivering an ecological network for biodiversity and resilient ecosystems, and they should be given protection in development plans and the development management process; and • Protected species- The presence of a species protected under European or UK legislation, or under Section 7 of the Environment (Wales) Act 2016 is a material consideration in the planning process and it is considered best practice that screening to determine the presence of protected species should be carried out by a competent ecologist on the basis of data provided by the relevant Local Environmental Record Centre.
Technical Advice Note (TAN) 5: Nature Conservation and Planning **(Ref 9-8)**	Technical Advice Note 5 (TAN 5) provides advice on how the land use planning system should aid in the protection and enhancement of biodiversity and geological conservation. TAN 5 includes a five point approach to decision making of *"information, avoidance, mitigation, compensation and new benefits."* This means that potential harm to biodiversity should first be avoided wherever possible. If avoidance is not feasible, steps should be taken to mitigate any adverse impacts. Finally, any residual impacts should be addressed through compensation to ensure no net loss of biodiversity.
Monmouthshire Local planning policy - Monmouthshire County Council Local Development Plan (LDP) 2011-2021 or its successor (currently in preparation) **(Ref 9-9)**	The policy of most relevance is Policy SD1 (Renewable Energy). The policy states that "renewable energy schemes will be permitted where….there are no unacceptable adverse impacts on biodiversity."
Newport Local planning policy – Newport Local Development Plan (LDP) 2011- 2026 **(Ref 9-10)**	The policy of *most relevance is Policy GP5 (General Development Principles – Natural Environment).* The policy lists the criteria that development must comply with in order to be permitted. This criteria relates to the design and management of proposals to ensure the protection of biodiversity and ecological connectivity and how the proposals address impacts (avoid, mitigate, compensate) on biodiversity. The policy also states that proposals should not result in unacceptable impacts on water quality,

	landscape quality or the loss or reduction of high quality agricultural land. The policy states that proposals should be accompanied by a landscape scheme and should include appropriate tree planting or retention as required. The proposals should not *"result in the unacceptable loss of or harm to trees, woodland or hedgerows that have wildlife or amenity value."*
Overarching National Policy Statement for Energy (EN-1), specifically in relation to Section 4.6 Environmental and Biodiversity Net Gain and Section 5.4 Biodiversity and Geological Conservation **(Ref 9-11)**	National Policy Statement EN-1 sets out national policy for delivery of major energy infrastructure, which includes renewable electricity generation. Section 4.6 relates to Environmental and Biodiversity Net Gain. The section states that projects should "*not only avoid, mitigate and compensate harms, following the mitigation hierarchy, but also consider whether there are opportunities for enhancements".* The section goes on to state that *"in Wales, Net Benefit for Biodiversity is based on the concept that development should leave biodiversity and the resilience of ecosystems in a better state than before, through securing long-term, measurable and demonstrable benefit, primarily on or immediately adjacent to the site."* *Section 5 states that "development on land within or outside a SSSI, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits (including need) of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of SSSIs".*
National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 9-12)	National Policy Statement *EN-3 states that "Applicants need to consider environmental and biodiversity net gain as set out in Section 4.5 of EN-1 and the Environment Act 2021. Applicants should assess the potential of their proposed development to have net positive effects on marine ecology and biodiversity, as well as negative effects."*
National Policy Statement for Electrics Networks Infrastructure (EN-5) **(Ref 9-13)**	National Policy Statement EN-5 sets out the government's policies for developing nationally significant electricity networks. It includes Biodiversity and Geological Conservation, in particular feeding and hunting grounds, migration corridors and breeding grounds, where they are functionally linked to sites designated or allocated under the 'national site network' provisions of the Conservation of

	Habitats and Species Regulations. The applicant should consider and address routing and avoidance/ minimisation of environmental impacts both onshore and offshore at an early stage in the development process.

Technical Guidance Relevant to Ecology

9.2.2 The ecology assessment has been prepared in accordance with the following guidance and standards as presented in **Table 9-3**.

Table 9-3 Guidance and standards relevant to ecology

Technical Guidance	Context
Chartered Institute of Ecology and Environmental Management's (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3 (CIEEM, 2018, updated in 2024) **(Ref 9-14)**	The guidance provides *"practical advice for all professionals involved with ecological evaluation and assessment for proposed developments in terrestrial, freshwater, marine and coastal environments"* *and sets out the methodology for assessing ecological effects.*
Local Biodiversity Action Plans (BAP), including The Greater Gwent Nature Recovery Action Plan (undated) and Newport City Council's Local BAP (undated) **(Ref 9-15)**	The Greater Gwent Nature Recovery Action Plan is a strategic document, set in the context of national and regional legislation and policy drivers, aiming to halt and reverse negative biodiversity trends identified in both the State of Natural Resources Report and the Greater Gwent State of Nature Report. It provides guidance and recommendations on nature recovery actions within the Greater Gwent Area, allowing all stakeholders to work collaboratively to halt biodiversity decline and promote the recovery of nature across Greater Gwent. The Newport BAP provides a list of seven species and seven habitats which are priorities for conservation in the region.
Biodiversity and Ecosystem Resilience Forward Plans for Monmouthshire and Newport **(Ref 9-16)**	The plan is a proactive initiative which aims to maintain and enhance biodiversity and promote ecosystem resilience. The plan is part of a wider commitment *"to address the climate and nature emergency."*

British Standard BS42020: Biodiversity - Code of Practice for Planning and Development **(Ref 9-17)**	The BS42020 *"gives recommendations and provides guidance primarily for ensuring that actions and decisions taken at each stage of the planning process are informed by sufficient and appropriate ecological information."*
BRE (2014) National Solar Centre Biodiversity Guidance for Solar Developments **(Ref 9-18)**	The guidance *"provides guidance to planners and the solar industry on how they can support biodiversity on solar farms."*

9.3 Assessment Assumptions and Limitations

9.3.1 To ensure transparency within the EIA process, the following limitations and assumptions have been identified:

- Survey results and assessment are based on the information available and collected during the study period(s), and within the resources available for the Proposed Development. However, the possibility of important ecological features being missed due to survey timings, absence during surveys or the year of survey cannot be ruled out.
- Much of the Site is currently managed as pastoral farmland. Surveyors deviated from the planned survey route when livestock were deemed dangerous for safe access to fields. In these circumstances, fields were observed from the field gate or from the vantage point provided by the sea wall and therefore not likely to have significantly affected the validity of results.
- Carrying out surveys at specific tidal states during the short days of winter imposed some restrictions and some surveys were carried out in suboptimal weather conditions. Given that data has been collected over multiple years, it is considered that population assemblages can be deduced across the survey areas.

9.4 Stakeholder Engagement

9.4.1 **Table 9-4** provides a summary of the consultation activities undertaken in support of

the preparation of this assessment.

Table 9-4 Summary of consultation undertaken

Body/organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
Natural Resources Wales	Non-statutory pre-application advice 2nd July and meeting on 14th August 2024.	Seeking agreement as to the method of calculating the threshold for Functionally Linked Land (FLL). The proposed approach is to calculate the peak mean across the 3 survey seasons, i.e. the peak count of birds from each season, averaged across 3 seasons. FLL is considered where the peak mean exceeds 1% of the WeBS 'moving 5 year average' 2022 – 2023 (published by Woodward et al., 2024). NRW's ornithologist did not attend the meeting therefore, a formal request for agreement was made (see below).
Natural Resources Wales	Discretionary planning advice response provided 27 September 2024 (ref: CAS-264330-X0X8).	• Broad acceptance of approach to assessing functionally linked land for the Severn Estuary Special Protection Area (SPA) and request for overwintering bird survey reports. • EIA should include all of the data collected in the surveys (not just peak counts of birds) as well as a map indicating where on the site or it's wider footprint, the birds were recorded. NRW also advise that the tidal and weather conditions at the time of each survey are clearly presented within the report. The report should clearly describe the methods used for field surveys, data recording and any analysis. • NRW also advise that the numbers of birds detected on surveys need to be considered against the conservation objectives for the Severn Estuary SPA. Once we have this information, NRW will be able to make a more informed decision on the proposed method for identifying functionally linked land.

9.4.2 An EIA Scoping Report (**Appendix 1C**) for the Proposed Development was submitted in December 2024, **Table 9-5** presents a summary of comments provided by the Planning Inspectorate and consultees through the Scoping Opinion (**Appendix 1D)** and the Applicant's response, highlighting where relevant how these comments have been addressed within this Chapter.

Table 9-5 Main Matters Raised during Consultation

Consultee	Main matter raised	How has the concern been addressed	Location of response
Planning Inspectorate	Visual disturbance to the Severn Estuary Ramsar (ornithological features) and Special Protection Area (SPA) - construction. The Scoping Report proposes to scope out impacts from visual disturbance on the Severn Estuary Ramsar (ornithological features) and SPA on the basis of the presence of the sea wall between the site and estuary which would provide visual screening. The Inspectorate considers that insufficient evidence has been provided to demonstrate that there would be no visual disturbance impacts during construction on the ornithological features of the Severn Estuary SPA and Ramsar. This matter should be assessed in the ES where significant effects are likely to occur, or evidence provided to demonstrate the absence of likely significant effects including agreement with relevant consultation bodies. The applicant's attention is drawn to the consultation response from NRW (Appendix 2 of this Opinion) regarding their commissioned survey of disturbance in 2024 *"Monitoring Noise and Visual Disturbance at Severn Estuary SPA/SAC/Ramsar/SSSI"*.	This has been addressed in **Section 9.9** and **Appendix 8I Draft Shadow Habitat Regulations Assessment** provided as part of the application.	**Section 9.9** and **Appendix 8I Draft Shadow Habitat Regulations Assessment**
Planning Inspectorate	Severn Estuary Ramsar (ornithological features) and SPA – operation. The Scoping Report proposes to scope this matter out on the basis that the operational phase is unlikely to cause direct or indirect effects as by nature solar schemes do not create noise or damage once in place. Visual disturbance is also proposed to be	Operational effects on functionally linked land used by SPA/ Ramsar bird species has been scoped in and addressed in **Section 9.9** and **Appendix 8I Draft Shadow Habitat Regulations Assessment**	**Section 9.9** and **Appendix 8I**

Consultee	Main matter raised	How has the concern been addressed	Location of response
	scoped out due to the high sea wall between the site and the estuary. In the absence of evidence that the site does not provide functionally linked land that supports the ornithological features of the Severn Estuary Ramsar and SPA, and evidence demonstrating clear agreement with relevant consultation bodies, the Inspectorate is not in a position to agree to scope these matters out of the assessment. Accordingly, the ES should include an assessment of these matters or the information demonstrating agreement with the relevant consultation bodies and the absence of likely significant effect.	Operational effects on birds using the estuary itself remain scoped out as there are no visual pathways due to the sea wall.	
Planning Inspectorate	Study area. The Scoping Report states that a search was made of the UK governments on-line tool Multi-Agency Geographic Information for the Countryside (MAGIC) for International/ National Site Network sites up to 10km from the application site, relating to birds only. The ES should ensure the study area for each ecological receptor reflects the proposed development's Zone of Influence (ZoI) rather than being based on a fixed distance. In relation to internationally designated sites, the ES should consider the potential for effects to occur beyond 10km. Efforts should be made to agree the study area(s) with relevant consultation bodies.	The Study Area is described in **Section 9.5**, however by considering the distance that key species may travel beyond the boundary of their SPA, 10km was considered appropriate.	Section 9.5
Planning Inspectorate	Barn owl survey. The Inspectorate notes that no species-specific survey for breeding/foraging barn owls have been	Barn owl survey methodology is provided in **Section 9.5**, with detailed results provided in **Section**	**Section 9.5, Section 9.7, Appendix 9A** and **Appendix 9B.**

Consultee	Main matter raised	How has the concern been addressed	Location of response
	proposed. The applicant's attention is drawn to the consultation response from NRW (Appendix 2 of this Opinion) regarding the need for barn owl surveys during the breeding season. The applicant should seek to agree the scope and timing of surveys with relevant consultation bodies.	**9.7**, **Appendix 9A** and **Appendix 9B.**	
Planning Inspectorate	Llandegfedd Reservoir SSSI and Flatholm SSSI. The applicant's attention is drawn to the consultation response from NRW (Appendix 2 of this Opinion) which advises that Llandegfedd Reservoir SSSI and Flatholm SSSI are scoped into the ES. Effort should be made to agree the designated sites scoped in for ornithological interest with relevant consultation bodies.	This has been scoped in and addressed in **Section 9.5** and **9.7**.	**Section 9.5** and **9.7**
Planning Inspectorate	Mitigation and enhancements. The applicant's attention is drawn to the consultation response from NRW (Appendix 2 of this Opinion) regarding details of appropriate mitigation, enhancements and details for a scheme of post-construction monitoring of any proposed mitigation.	Mitigation is detailed within **Section 9.10** and the accompanying oLEMP (**Appendix 8J**)	**Section 9.10** and the oLEMP (**Appendix 8J**)
Monmouthshire County Council	Surveys have been undertaken over three survey seasons; 2019-20, 2020-21 and 2022-23. The level of baseline surveys is considered acceptable, although it should be noted that update surveys may be required if more than 24 months has expired since the previous survey.	Update surveys will be completed prior to the submission of the ES.	N/A
Monmouthshire County Council	All ornithological elements have been scoped into the EIA, apart from the impact of the operational phase of the scheme on the Severn Estuary RAMSAR and SPA features. Whilst it is not detailed	Operational effects on functionally linked land used by SPA/ Ramsar bird species has been scoped	**Section 9.9** and **Appendix 8I**

Consultee	Main matter raised	How has the concern been addressed	Location of response
	within Table 9-3, it would appear this is referring purely to disturbance (noise and visual). The attached table (Table 1) exhibits the impacts that it is understood will be scoped in and out of the EIA. Whilst the majority of the above is agreed with, I would suggest that the disturbance impact of additional lighting on ornithological features of the SPA should be considered as part of the EIA and therefore this should be scoped into the assessment. Chapter 9 of the scoping report does not mention any potential impacts of lighting on foraging/ roosting waders and without view of the baseline surveys/lighting proposals, it should not be scoped out at this time.	in and addressed in **Section 9.9** and **Appendix 8I Draft Shadow Habitat Regulations Assessment** Operational effects on birds using the estuary itself remain scoped out as there are no visual pathways due to the sea wall.	
Natural Resources Wales	We note and welcome the surveys for breeding birds within Table 9-2 Baseline Survey Methods. We consider these to be in line with industry best practice. However, we note no specific surveys for breeding/foraging barn owls have been undertaken. Without such surveys it may not be possible to fully assess the impacts of the scheme on this species. We therefore recommend that the ES includes either: • A species-specific survey for barn owls during the breeding season to assess the impacts on the scheme on foraging barn owls and identify the potential for breeding barn owls. Such as survey for barn owls Barn Owl Survey Methodology and Techniques for use in Ecological Assessment CIEEM In lieu of additional surveys, a robust	Barn owl survey methodology is provided in **Section 9.5**, with detailed results provided in **Section 9.7**, **Appendix 9A** and **Appendix 9B**. Mitigation is discussed in **Section 9.10** and **9.11**	**Section 9.5, Section 9.7, Section 9.10** and **9.11, Appendix 9A** and **Appendix 9B.**

Consultee	Main matter raised	How has the concern been addressed	Location of response
	mitigation/ enhancement package aimed at retaining and promoting barn owls on site. This should include how appropriate habitat will be retained and managed for the life time of the scheme, and the provision of suitable nest boxes.		
Natural Resources Wales	Determining the importance of species and populations identified from surveys should refer to Wales specific resources and publications where practical. Relevant population estimates can be found in, but not limited too, Hughes et al. 2020 (Wales) and Woodward et al. 2020 (UK/Britain). County Bird Reports, the Welsh Bird Reports, as well as Birds of Wales/Adar Cymru (Pritchard et al. 2021) may also contain relevant information.	Populations have been compared to relevant international and Welsh population estimates – refer to **Appendix 9A** and **9B.**	**Appendix 9A** and **9B**.
Natural Resources Wales	In section 9.5.14 for clarity, NRW expects Birds of Conservation Concern Wales 4 (BoCCW4) to be used as the “BoCC” reference. We welcome the inclusion of species listed on Section 7 of the Environment Act (Wales) 2016. Species listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended) should also be included here.	BoCC4 has been adopted. UK BoCC5 has also been referenced.	**Section 9.5. Appendix 9A** and **9B**.
Natural Resources Wales	Details of appropriate mitigation (following the step-wise approach) for any likely significant effects identified should be provided along with appropriate enhancements. In some instances, mitigation may need to take the form of curtailment or redirection of activities during particular times of year. Where buffer distances are required or need to be considered then reference should be made to Goodship & Furness	The step-wise approach has been used – see **Section 9.11**. Buffer distances include Goodship and Furness and the Waterbird Disturbance Mitigation Toolkit (Cutts et al., 2013) (Ref 9-27)	**Section 9.11. Appendix 8I.**

Consultee	Main matter raised	How has the concern been addressed	Location of response
	2022 or alternative published references for species not listed within Goodship & Furness 2022.		
Natural Resources Wales	Details for a scheme of post-construction monitoring of any migration should be provided. This should include, where appropriate details of metrics to determine the effectiveness of any mitigation/ enhancement/ compensation measure, and details of alternative strategies if primary approaches are shown not to be delivering results as expected.	Monitoring will be detailed within the ES/ LEMP.	oLEMP (**Appendix 8J**)
Natural Resources Wales	Marine ornithology. We are satisfied with the designated sites and elements scoped in for further assessment. We would advise that Llandegfedd Reservoir SSSI and Flatholm SSSI are also scoped into the ES. Llandegfedd Reservoir is designated for wintering widgeon, pochard and teal, and Flatholm is designated for breeding lesser black-backed gull (LBBG) which may utilise the Development Area and estuary for feeding during the breeding season. Note that LBBG are included in the Severn Estuary SPA.	Llandegfedd Reservoir SSSI and Flatholm SSSI have been scoped in.	Section 9.7 and Section 9.9.

9.5 Assessment Methodology

Scope of the Assessment

9.5.1 This scope has been developed as the Proposed Development design has evolved through an ongoing scoping process and responds to feedback received to-date as set out in **Section 9.4** above. Information presented in this Chapter is preliminary, therefore this scope will continue to be reviewed as a result of ongoing engagement and consultation.

9.5.2 This section provides an update to the scope of the assessment and updates the evidence base for scoping out elements following further iterative assessment. Further information can be found in **Chapter 5: Environmental Impact Assessment Methodology**.

9.5.3 The starting point for defining the scope of the ornithological assessment was to assess the baseline data that was collected through the desk study and field surveys undertaken to-date (see **Section 9.7**) to determine which of the identified ornithological features are 'important'. Following CIEEM (2018) guidance, the importance of each ornithological feature was determined using a geographic scale (see full details in **Table 98**). With the exception of species receiving specific legal protection, all ornithological features determined to be important at below the 'local' level are scoped out of the assessment. This approach is consistent with that described in CIEEM (2018).

9.5.4 Ornithological features that are of sufficient importance were then taken through to the next stage of the scoping assessment. Through an understanding of the activities associated with the Proposed Development during construction, operation and decommissioning and the resulting environmental changes, as well as the habitats on which they rely, it is possible to identify ornithological features that may be subject to potentially significant effects, or may be scoped out.

9.5.5 When scoping in or out important ornithological features from further assessment, embedded environmental measures (see **Section 9.8**) associated with good practice

have been taken into account.

9.5.6 The scoping also takes into account the Zone of Influence (ZoI) as described in **Paragraph 9.5.9**, as some important ornithological features may be affected by environmental change beyond the PEIR Assessment Boundary.

9.5.7 Wherever there is uncertainty as to the potential level of effect or the occurrence of a particular ornithological feature, a precautionary approach has been taken.

9.5.8 The ecological features shown in **Table 9-6** provide the evidence base for scoping in and out elements of the assessment.

Table 9-6 – Ornithological Features scoped in or out of the assessment

Ecological Feature	Phase	Scoped In	Scoped Out	Justification
Severn Estuary Ramsar (ornithological features) and SPA	Construction and Decommissioning	✔		Noise disturbance to birds on protected sites e.g. by construction activities (piling, excavations etc), construction personnel. vehicles. Potential spillages/ siltation effects on habitats within the designation on which bird species rely (e.g. reduction in foraging resource). Reduction in winter foraging and loafing areas for wintering birds that are part of the SPA assemblage (functionally linked land) both from disturbance during construction and as the large fields become unavailable to them due to the presence of Solar Panels
	Operation	✔		The operational phase is unlikely to cause direct effects on the Severn Estuary Ramsar and SPA as by nature solar schemes do not create noise or damage once in place. Impacts from visual

			disturbance e.g. from maintenance personnel, can be scoped out due to the high sea wall between the Site and the estuary. Operation impacts on SPA birds using functionally linked land within the Site remains scoped in. This includes overall loss of foraging and loafing areas for species associated with the SPA, in particular in fields close to the sea wall. Fields without PV arrays which could be used as functionally-linked land are at risk of short-term and periodic visual disturbance by maintenance personnel and vehicles.
Wintering shelduck, snipe and curlew	Construction and decommissioning	✔	Noise disturbance e.g. by construction activities (piling, excavations etc.), construction personnel, vehicles etc. causing displacement. Reduction in winter foraging and loafing areas both from disturbance during construction and as the large fields become unavailable to them due to the presence of Solar Panels.
	Operation	✔	Overall loss of foraging and loafing areas due to presence of panels reducing quantity of large, open fields available. Fields without PV arrays are at risk of short-term and periodic visual disturbance by maintenance personnel and vehicles.
Wintering bird assemblage	Construction and decommissioning	✔	Disturbance to foraging areas of other wintering species such as thrushes, finches and buntings due to construction

			vehicles and personnel during winter.
	Operation	✔	Due to potential hedgerow removal for reen enhancement, there will be an overall loss of foraging habitat for wintering birds such as thrushes. The presence of Solar Panels may also reduce the area in which wintering birds forage.
Ground-nesting birds (excluding lapwing, curlew, gadwall)	Construction and decommissioning	✔	Destruction of nests for ground-nesting species due to moving plant and personnel and disturbance of adults off nests leading to increased predation of nests. This includes species such as skylark, meadow pipit, oystercatcher and shelduck.
	Operation	✔	Overall loss of available habitat for ground-nesting birds, which generally require open areas with good visibility. Access by maintenance personnel has the potential to cause disturbance to ground-nesting birds.
Breeding lapwing	Construction and decommissioning	✔	Destruction of nests for ground-nesting species due to moving plant and personnel and disturbance of adults off nests leading to increased predation of nests.
	Operation	✔	Overall loss of available habitat for ground-nesting birds, which generally require open areas with good visibility. Access by maintenance personnel to non-panelled areas has the potential to cause disturbance to ground-nesting birds such as lapwing.

Breeding curlew	Construction and decommissioning	✔	Destruction of nests for ground-nesting species due to moving plant and personnel and disturbance of adults off nests leading to increased predation of nests.
	Operation	✔	Overall loss of available habitat for ground-nesting birds, which generally require open areas with good visibility. Access by maintenance personnel to non-panelled areas has the potential to cause disturbance to curlew.
Breeding gadwall	Construction and decommissioning	✔	Destruction of nests for ground-nesting species due to moving plant and personnel and disturbance of adults off nests leading to increased predation of nests.
	Operation	✔	Access by maintenance personnel to panelled and non-panelled areas, close to reens, has the potential to cause disturbance to gadwall.
Schedule 1 birds (Barn owl and Cetti's warbler)	Construction and decommissioning	✔	Disturbance of nests of Schedule 1 species by personnel and moving plant and removal of vegetation, potentially leading to nest failure. Removal of nesting habitat during habitat removal (e.g. at reen crossings, or during hedgerow removal).
	Operation	✔	Potential reduction in foraging areas for Schedule 1 species barn owl due to solar arrays and overall reduction in nesting habitat for Cetti's warbler during hedgerow removal to enhance reens. There is potential for

			beneficial or adverse effects as a result of long-term management practices undertaken.
Other breeding birds	Construction and decommissioning	✔	Removal of nesting habitat during habitat removal (e.g. at reen crossings, or during hedgerow removal).
	Operation	✔	Overall reduction in nesting habitat for other bird species due to removal of one side of double hedgerows to enhance reens. There is potential for beneficial or adverse effects as a result of long-term management practices undertaken.

Extent of the Study Area

9.5.9 The Study Area or Zone of Influence (ZoI) incorporates areas where significant effects could have potential to occur throughout the life of the Proposed Development and has been extended for certain components defined below to take into consideration populations of more mobile species and the effects that could occur, with reference to the Chartered Institute of Ecology and Environmental Management (CIEEM) EcIA guidance (2018). The Study Area is as follows:

- Land within the PEIR Assessment Boundary;
- A desk-based search within 10km of the PEIR Assessment Boundary for international / European designated sites;
- A desk-based search within 2km of the PEIR Assessment Boundary for other statutory designated sites and non-designated sites, with the addition of two Site's of Special Scientific Interest (SSSI) in the wider area designated for ornithological interest, as agreed with NRW; and
- A desk-based search within 2km of the PEIR Assessment Boundary for records of notable bird species.

9.5.10 The baseline survey work also encompassed additional land due to changes in the

PEIR Assessment Boundary during the course of the initial design stage.

Method of Baseline Data Collection

9.5.11 To date, a number of ornithological surveys have been undertaken following best practice guidance, and following consultation advice, as detailed in **Table 9-7**. Note that surveys relating to other ecological features are discussed in **Chapter 8: Ecology**.

9.5.12 Further surveys planned to be carried out at the Site include updates to the desk study and nocturnal bird surveys, breeding and winter bird surveys and will be reported within the ES (see **Section 9.15**).

Table 9-7 Ornithological field surveys completed

Survey and relevant technical appendix	Survey Area	Survey Method	Date of Survey Period
Desk-based study Appendix 8A	Various – see Survey Method column.	A desk study included a data enquiry from South-East Wales Biodiversity Records Centre (SEWBReC) in January 2024 for designated sites and bird species within 2km of the PEIR Assessment Boundary. Data was requested from the British Trust for Ornithology (BTO). This included Monthly Core Counts at Redwick, Undy and Magor Reserve during 2014-2018. An updated data set will be obtained for the submission. A search was made of the UK governments on-line tool Multi-Agency Geographic Information for the Countryside (MAGIC) for International/ National Site Network sites up to 10km from the PEIR Assessment Boundary, relating to birds only.	January 2024 2026 – update proposed
Winter bird surveys Appendix 9A	Proposed panelled areas and mitigation fields	Covering the panelled areas and comprising four surveys per month in October and March to increase effort in the passage months with	October 2019 – March 2020

		two surveys per month from November to February. Based on a methodology for census of lowland waders (Ref 9-20); half to coincide with a high tide and half to coincide with a low tide.	October 2020 – March 2021 October 2022 – March 2023 **2025/26** – further survey proposed
Nocturnal bird surveys Appendix 9A	Proposed panelled areas and mitigation fields	Once per month. To record species, particularly waders, which may move and feed in the hours of darkness in response to tidal influence. Incidental sightings of other species such as owls and cryptic species (such as woodcock) that are mainly active at night were recorded.	October 2019 – March 2020 October 2020 – March 2021 October 2022 – March 2023 **2025/26** – further survey proposed
Breeding bird survey Appendix 9B	Proposed panelled areas and mitigation fields	The survey was conducted once per month following a method based on Gilbert *et al*., (1998) (Ref 9-20) and increased to twice per month from 2020.	April – June 2019 April – July 2020 April – July 2023 **2026** – further survey proposed
Barn owl assessment Appendix 9A Appendix 9B	Proposed panelled areas and mitigation fields	Habitats were assessed for barn owl suitability during an initial walkover of the Site in 2019 and updated in 2025 – "Stage 1 survey" as defined by Shawyer (2012) (Ref 9-21) Aerial assessments of trees were undertaken – "Stage 2 Investigative Survey" as defined by Shawyer (2012) or trees	**Habitat: 2019** - July – September and **2025** - July. **Roosting**: **2019** - 20th and 21st May, 12th September,

	exhibiting potential to support roosting/ nesting barn owl. Additional sightings of barn owl during bat and nocturnal bird surveys were recorded. A full tree survey will be completed prior to submission of the Application.	**2021** – 15th and 16th February. **2026** – further survey proposed

Assessment Methodology

General Approach

9.5.13 The assessment methodology has been developed with reference to the CIEEM Guidelines for Ecological Impact Assessment in the United Kingdom and from considerable experience of EcIA relating to similar developments throughout the UK.

9.5.14 These guidelines set out the process for assessment through the following stages:

- Describing the ecological baseline;
- Identifying and evaluating 'Important Ecological Features' (IEFs);
- Identifying and characterising the likely effects on IEFs during construction, operation and decommissioning;
- Determining the significance of effects in the absence of mitigation;
- Describing mitigation, compensation and/or enhancement measures associated with the development and assessing residual significance;
- Assessing cumulative effects with other projects/ plans; and
- Identification of monitoring requirements.

9.5.15 The baseline for this assessment comprises the ornithological species and relevant designated sites within the Site plus those within the Zone of Influence (ZoI) of the Site. The ZoI describes the area over which construction, operational and decommissioning activities associated with the Proposed Development could influence identified ecological features/receptors. The ZoI varies for different ecological features depending on its sensitivity to an environmental change.

9.5.16 The approach also takes into account the Step-Wise Approach (with reference to the

DECCA Framework) to assess impacts, in accordance with Edition 12 of Planning Policy Wales (February 2024) (Ref 9-22). Paragraph 6.4.11 states "*planning authorities must follow a step-wise approach to maintain and enhance biodiversity, build resilient ecological networks and deliver net benefits for biodiversity by ensuring that any adverse environmental effects are firstly avoided, then minimised, mitigated and as a last resort compensated for.*"

9.5.17 These steps are as follows:

9.5.18 "*1a) The first priority for planning authorities is to avoid damage to biodiversity in its widest sense (i.e. the variety of species and habitats and their abundance) and ecosystem functioning. Where there may be harmful environmental effects, planning authorities will need to be satisfied that any reasonable alternative sites (including alternative siting and design options) that would result in less harm, no harm or benefit have been considered.*

9.5.19 *1b) Proposals in statutory designated sites are, as a matter of principle, unacceptable and therefore must be excluded from site searches undertaken by developers. This principle also extends to those sites containing protected species and habitats which are irreplaceable and must be safeguarded. Such sites form the heart of resilient ecological networks and their role and the ecosystem services they provide must be protected, maintained and enhanced and safeguarded from development. It will be wholly exceptional for development to be justifiable in such instances.*

9.5.20 *2. When all locational, siting and design options for avoiding damage to biodiversity have been exhausted, applicants, in discussion with planning authorities, must seek to minimise the initial impact on biodiversity and ecosystems by:*

- *Maintaining the largest possible area of existing habitat supporting biodiversity and functioning ecosystems particularly Section 7 habitats and species where present, by minimising development size and appropriate orientation on site, paying due regard to the potential for continued long term maintenance and management of retained areas to benefit biodiversity;*

- *Ensuring that retained habitats continue to be well connected to adjacent habitats to provide connectivity for key species and ensuring that the favourable conservation status of local species populations is maintained;*

- *Retaining existing features, develop a management plan for their future care (e.g., trees, hedgerows, species rich grasslands, heath, wetlands, ponds and freshwater habitats) and use appropriate buffers to protect these from construction and operational impacts; and*

- *Using proven innovative/creative solutions (where required) to minimise damage and maintain existing biodiversity features and ecosystems in tandem with robust monitoring and rectification strategies.*

9.5.21 *3a) Where after measures to minimise impact, biodiversity and ecosystems could still be damaged, or lost through residual impacts, the Proposed Development should mitigate that damage. Mitigation measures must be put in place to limit the negative effects of a development.*

9.5.22 *3b) Effective mitigation or restoration measures should be incorporated into the design proposal following the consideration of steps one and two above. Mitigation or restoration measures must be designed to address the specific negative effects by repairing damaged habitats and disturbed species. They should seek to restore in excess of like for like, accounting for disturbance and time lags for the recovery of habitat and species, and in every case, mitigation or restoration measures should seek to build ecosystem resilience within the site and where possible the wider area. In some circumstances, where like for like mitigation measures are not possible, particularly in respect of restoration measures, it may be necessary to consider on site compensation measures in the first instance. In designing mitigation measures where uncertainty exists, applicants should follow the precautionary principle and assume a significant effect. Offsite compensation measures (as set out in step four below) should be considered as a last resort.*

9.5.23 *4. When all the steps above have been exhausted, and where modifications,*

alternative sites, conditions or obligations are not sufficient to secure biodiversity outcomes further on-site/immediately proximate, as a last resort off-site compensation for unavoidable damage must be provided. This must be of significant magnitude to fully compensate for any loss. In the absence of a planned approach, compensation measures must be guided by place-based evidence and the onus is on applicants to address the following:

- *Off-site compensation should normally take the form of habitat restoration, or habitat creation, or the provision of long-term management agreements to enhance existing habitats and deliver a net benefit for biodiversity. It should also be informed by a full ecological assessment to establish a formal baseline before habitat creation or restoration starts and secured far enough in advance before the loss of biodiversity on site.*

- *The Green Infrastructure Assessment should be used to identify suitable locations for securing off-site compensation. Where possible, a landscape–scale approach, focusing on promoting wider ecosystem resilience, should help guide locations for compensation. The Green Infrastructure Assessment should provide a spatial guide to opportunities already identified for securing a net benefit for biodiversity. Using the assessment will help determine whether locations for habitat compensation should be placed close to the development site, or whether new habitat or additional management located further away from the site would best support biodiversity and ecosystem resilience at a wider scale.*

- *Where compensation for specific species is being sought, the focus should be on maintaining or enhancing the population of the species within its natural range. This approach might also identify locations for providing species-specific compensation further away from the site. Where they exist, Spatial Species Action Plans should be used to help identify suitable locations.*

- *Any proposed compensation should be place based, take account of the Section 6 Duty (Biodiversity and Resilience of Ecosystems Duty), the DECCA*

framework and appropriate ecological advice from the local authority Ecologist, NRW or a suitably qualified ecologist.

9.5.24 *5. Each stage of the step-wise approach must be accompanied by a long term management plan of agreed and appropriate avoidance, minimisation, mitigation/restoration and compensation measures alongside the agreed enhancement measures. The management plan should set out the immediate and on-going management of the site, future monitoring arrangements for all secured measures and it should clearly identify the funding mechanisms in place to meet the management plan objectives. The management plan must set out how a net benefit for biodiversity will be achieved within as short a time as possible and be locally responsive and relevant to local circumstances.*

9.5.25 *6. Finally, where the adverse effect on biodiversity and ecosystem resilience clearly outweighs other material considerations, the development should be refused."*

9.5.26 The DECCA Framework is similarly explained and refers to the resilience of ecosystems in the following regards:

- Diversity;
- Extent;
- Condition;
- Connectivity; and
- Adaptability to change.

Determining Value

9.5.27 The importance and sensitivity of ornithological features have been determined based on CIEEM Guidelines. Whilst the legal protection afforded to habitats and species does not necessarily reflect actual biodiversity value, the assessment methodology will fully acknowledge statutory requirements, policy objectives, rarity, rate of decline, and local or intrinsic nature conservation value.

9.5.28 Important Ecological Features have been defined on a geographical scale

(international, national (Wales), regional, county or local) according to:

- The statutory and non-statutory designated sites present, and their associated qualifying features/species;
- Species of conservation concern, including those of Principal Importance on Section 7 of the Environment (Wales) Act 2016 and the Local Biodiversity Action Plan (Local BAP) which may be present on the Site or in the surrounding area; and
- The local distribution of bird species in the area, for which the Site may support suitable habitat.

9.5.29 Individual ornithological features were assigned levels of importance for nature conservation in a geographical context as set out in **Table 9-8**.

Table 9-8 Criteria for Valuing Important Ecological Features

Geographic Value	Description
International or European	• Statutory Sites designated or classified under international conventions or European legislation for example Biosphere Reserves, Wetland of International Importance (Ramsar Sites), Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). • A species which is part of the cited interest of a SPA or Ramsar Site under international legislation • International EU Birds Directive Annex 1 species or regularly occurring migratory species listed under Annex II/B of the Birds Directive connected to a SPA designated for this species.
National	• Statutory Sites designated under national legislation for example Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR). • A species listed on Annex 1 of the EU Birds Directive and/or Schedule 1 of the Wildlife and Countryside Act 1981 occurring in nationally important numbers. • A species which is part of the cited interest of a SSSI and which regularly occurs in nationally or regionally important numbers. • A nationally important assemblage of breeding or over-wintering species. • A species present in nationally important numbers (>1% Welsh population).

	• A species included on the Section 7 of the Environment (Wales) Act 2016 in nationally important numbers. Fifty-one bird species and sub-species are included on the List that is currently based on the pre-existing Section 42 list of the NERC Act 2006. • National Birds of Conservation Concern Red List species that are breeding in nationally important numbers
Regional	• Species listed as Section 7 priority species, which are not covered above, and which regularly occur in regionally (South Wales) important numbers. • Species present in regionally important numbers. • Sustainable populations of species that are rare or scarce within a region. • Species on the BoCC5 (Ref 9-23) and/or BoCC4 (Wales) (Ref 9-24) Red and Amber List and which regularly occurs in regionally important numbers.
County	• Species listed as Section 7 priority species, which are not covered above, and which regularly occur in important numbers for the county. • A Site designated for its county important assemblage of birds (e.g. a SINC Site). • Sustainable populations of species that are rare or scarce within the county. • Species on the BoCC5 and/or BoCC4 (Wales) Red and Amber List and which regularly occur in important numbers for the county.
Local	• A regularly occurring, locally important population of a nationally important species listed as a Section 7 priority species • Other species of conservation interest (e.g. species on the BoCC Amber List which are not covered above) regularly occurring in locally important sustainable populations. • Species on the BoCC5 and/or BoCC4 (Wales) Red and Amber List and which breed or winter in Locally important numbers. • Local BAP priority species.

9.5.30 Features not meeting the criteria of being 'important' within CIEEM's geographic frame of reference will be scoped out of the assessment as it will be considered that impacts upon them are unlikely to be significant (in terms of legislation, policy or nature conservation value).

Identifying Effects and Determining Magnitude

9.5.31 The assessment will be undertaken in accordance with the CIEEM guidelines (2018). This differs from the approach used for other environmental disciplines, where the significance of an effect is based on a combination of the magnitude of the change and the sensitivity of the receptor.

9.5.32 The potential effects of the Proposed Development on IEF's will be characterised, taking into account relevant aspects of ecosystem structure and function, according to the following terms:

- beneficial or adverse;
- extent;
- magnitude;
- duration;
- frequency and timing; and
- reversibility.

9.5.33 As per the guidelines, only those characteristics relevant to understanding the ecological effect of the impacts and determining its significance are described.

9.6 Significance Criteria

Determining Significance

9.6.1 For the purpose of the ecological impact assessment, a 'significant effect' is an effect that either, supports or undermines biodiversity conservation objectives, irrespective of the value of the ecological receptor. Once a significant effect has been identified (i.e. it is considered likely to affect the integrity / favourable conservation status of an ecological feature), the importance of the receptor will be used to help determine the geographical scale at which the effect is significant.

9.6.2 As stated in the CIEEM guidelines (2018),

"the scale of significance of an effect may not be the same as the geographic context

in which the feature is considered important. For example, an effect on a species which is on a national list of species of principal importance for biodiversity may not have a significant effect on its national population".

9.6.3 Where a significant effect on integrity / favourable conservation status is not predicted for a given geographical level, consideration will be given to whether an effect may be significant at lower geographical levels.

Description of Likely Significant Effects

9.6.4 Significant effects upon the ecological features present within the ZoI may arise either directly or indirectly in the absence of mitigation.

9.6.5 Direct impacts include loss of foraging and loafing areas for wintering birds, loss of nesting habitat, habitat modification, disturbance to wintering and nesting birds, fragmentation, collision risk and destruction of nests/ eggs of ground-nesting birds.

9.6.6 Indirect impacts include behavioural changes (e.g. avoidance) and habitat degradation which can affect conservation status (e.g. as a result of pollution, reduction in prey or lighting).

9.6.7 The PEIR includes a separate Draft Shadow Habitats Regulations Appraisal (HRA) (see **Appendix 8I**) to assist the competent authority in conducting the Appropriate Assessment that will be required prior to determination of the application.

9.6.8 Where no likely significant effects are predicted on an IEF, these will be scoped out of further assessment in the ES chapter.

9.6.9 Table 9-9 below demonstrates how the CIEEM criteria of significance has been adapted to match the other technical chapters.

Table 9-9 Relating CIEEM assessment terms to those used in other EIA chapters

Effect classification terminology used in other EIA chapters	Equivalent CIEEM assessment
Major (significant)	Significant at International/ European scale
Major (significant)	Significant at National scale
Moderate (probably significant)	Significant at Regional scale
Moderate (probably significant)	Significant at County scale

Minor (not significant)	Significant at Local scale
Negligible (not significant)	Significant at Site scale or below

9.7 Baseline Conditions

Designated Sites

9.7.1 A summary of designated sites within the Study Area and scoped into the assessment due to the potential to be impacted is provided in **Table 9-10** and illustrated in Figures 8.1.1 and 8.1.2 in **Appendix 8A**. Only sites relating to birds have been included.

Table 9-10 Sites statutorily designated for the ornithological value within 10km (international) and 3km (national) of the PEIR Assessment boundary, extended to include sites requested by NRW

Statutory Site Name and designation	Description	Distance (km) and direction from the closest point of the PEIR Assessment Boundary	Importance
Severn Estuary Ramsar	The Ramsar site covers over 24,000 hectares (ha) and meets the following Ramsar criteria: Ramsar criterion 1 Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities. Habitats Directive Annex I features present include: • H1110 Sandbanks which are slightly covered by sea water all the time • H1130 Estuaries • H1140 Mudflats and sandflats not covered by seawater at low tide • H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Ramsar criterion 3 • Due to unusual estuarine communities, reduced diversity and high productivity. Ramsar criterion 4 • This site is important for the run of migratory fish between sea and river via estuary. • It is also of particular importance for migratory birds during spring and autumn. Ramsar criterion 8	0.02km south	International

- The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad and twaite shad which feed on mysid shrimps in the salt wedge.

Ramsar criterion 5

- Assemblages of international importance: Species with peak counts in winter: 70919 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6

- Species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): **Species with peak counts in winter**:
- Tundra swan
- Greater white-fronted goose
- Common shelduck
- Gadwall
- Dunlin
- Common redshank

- Species/populations identified subsequent to designation for possible future consideration under criterion 6. **Species regularly supported during the breeding season**:
- Lesser black-backed gull
- Species with peak counts in spring/autumn:
- Ringed plover

Species with peak counts in winter:

	• Eurasian teal • Northern pintail		
Severn Estuary Special Protection Area (SPA)	The Severn Estuary qualifies under: Article 4.1 of the Birds Directive by regularly supporting an international important wintering population of **Bewick's swan**. Article 4.2 as a wetland of international important by regularly supporting in winter over 20,000 waterfowl. • The wintering waterfowl assemblage includes all regularly occurring waterfowl. Species that qualify as a listed component of the assemblage include all the internationally important regularly occurring migratory species as well as the Annex 1 wintering species. The list also includes species present in nationally important numbers or species whose populations exceed 2,000 individuals Article 4.2 by regularly supporting in winter internationally important numbers of the following 5 species of migratory waterfowl: • European white-fronted goose • Dunlin • Redshank • Shelduck • Gadwall.	0.02km south	European
Severn Estuary (Wales) SSSI	The Severn Estuary lies at the mouth of four major rivers (the Severn, Wye, Usk and Avon) and many lesser rivers. The immense tidal range (the second highest in the world) and classic funnel shape make the Severn Estuary unique in Britain and very rare worldwide. The intertidal zone of mudflats, sand banks, rocky platforms and saltmarsh is one of the largest and most important in Britain. The estuarine fauna	0.02km south	National

	includes: internationally important populations of waterfowl; invertebrate populations of considerable interest; and large populations of migratory fish.		
Magor Marsh SSSI	Magor Marsh is the last relatively natural area of fenland on the Gwent Levels. It is an important site for breeding water and marsh birds.	0.8km north	National
Newport Wetlands SSSI	Newport Wetlands SSSI is part of the Newport Wetlands NNR, which was constructed to meet the commitment by the UK Government to create "a substantial area of wetland habitat on the shores of the Severn Estuary" as part of the compensation for the loss of the Taf/Ely Estuary SSSI following the construction of the Cardiff Bay Barrage. Newport Wetlands SSSI has a number of special features including: • Reens and ditches • Reedbeds • Higher plants • Over-wintering birds • Insects and other invertebrates	1.1km west	National
Newport Wetland National Nature Reserve (NNR)	Newport Wetlands is best known for its range of wetland birds. This reserve at the mouth of the river Usk was opened in 2000 to compensate for loss of extensive mudflats with the completion of the Cardiff Bay barrage. It stretches from Goldcliff to Uskmouth and was once an ash covered wasteland for the neighbouring coal-fired Uskmouth power station. The reserve covers 4.38 sq km (438 hectares) and provides a variety of habitats including reedbeds, saltmarsh, saline lagoons and lowland wet grassland. In 2008 it was designated as a National Nature Reserve.	1.1km west	National
Llandegfedd Reservoir SSSI	This reservoir is the largest inland open water habitat in the county and is one of the three regionally important overwintering wildfowl refuges in Wales.	14km north of Site	National

	The site is particularly important for the overall numbers and variety of wintering wildfowl, with large numbers of wigeon, pochard and mallard. Other notable species include goosander, teal and goldeneye. The area around the reservoir includes grassland, important for feeding and roosting wildfowl, woodland and scrub.		
Flat Holm SSSI	The island cliff-top soils support a maritime grassland including red fescue, sea stork's-bill, thrift and buck's-horn plantain. The island supports a notable breeding colony of lesser black-backed gulls and herring gulls (1,500 pairs total) and shelduck (>100 pairs).	24km south-west of Site	National

9.7.2 A summary of non-statutory designated sites with ornithological interest within the Study Area (as defined in **Section 9.5**) and scoped into the assessment due to the potential to be impacted is provided in **Table 9-11**. A full list is provided in **Appendix 8A**.

Table 9-11 Sites non-statutorily designated for ornithological value within 2km of the PEIR Assessment Boundary

Non-statutory site name and designation	Description	Distance (km / m) and direction from the closes point of the PEIR Assessment Boundary	Importance
Elver Pill Reen Grassland & Pond Site of Importance in Nature Conservation (SINC)	Lagoon with mosaic of swamp and marshy and dry semi-improved neutral grassland; supports Cetti's warblers.	Directly adjacent at N Row along north of Site	County
Bridewell Common Field SINC	Designated for its species rich grassland, floodplain pastures, mature willow and hedgerows interest.	800m north	County
Gwent Wetland Reserve SINC	Mosaic of wet grassland reed beds, open water, hedgerows and saline lagoon, which supports internationally important numbers of wildfowl as well as UK BAP Priority species such as water vole, great crested newt and brown hare.	900m west	County
Greenmoor Pool SINC	Formerly standing water which now supports reed swamp (UKBAP Priority Habitat), which itself supports bird populations including Cetti's warbler.	1.1km north	County
Land at Barecroft Common SINC	Designated for its lowland species-rich grassland and semi-improved grassland interest.	1.5km north	County
Bowkett Field, Barecroft SINC	Designated for its Priority Habitat lowland species-rich marshy grassland with bird interest.	1.7km north	County
Solutia Site SINC	A series of improved and semi-improved grasslands with traditional ditches and ponds; site	1.9km west	County

supports a range of species including nesting birds such as Cetti's warbler, and invertebrates including hairy dragonfly (Brachyton prantense).

Wintering Birds

9.7.3 The data search with SEWBReC returned just under 6,000 bird records within the Study Area; taking into account species likely to utilise the Site during the winter and passage seasons this is c. 135 species. This includes species dependent on open areas for foraging and are listed in the SPA designated and/or those that are potentially breeding (for species which are present year-round), for example barn owl, common crane, curlew, grey partridge, lapwing, lesser black-backed gull, meadow pipit, oystercatcher, ringed plover, shelduck, skylark and yellow wagtail, amongst others.

9.7.4 Across the winter surveys, a total of 83 notable species were recorded on and adjacent to the Site. Of these, five species are specifically named in the SPA/ Ramsar designation (European white-fronted goose, dunlin, shelduck, gadwall and redshank). Thirty-three species are waterbirds and therefore can be considered to be a part of the SPA 'Waterbird Assemblage'.

9.7.5 Accounts of SPA/ Ramsar named species are detailed below.

European white-fronted goose (Article 4.2 Species of SPA and Ramsar Criteria 6) (Red BoCC5 and BoCC4 Wales)

9.7.6 A single European white-fronted goose was recorded during one nocturnal survey (13/03/2021) within Field 15 at the west of the PEIR Assessment Boundary. This represents 0.53% of the Severn Estuary population 5-year average 2019/20 to 2023/24 (187). Refer to **Figure 9.1.4**, **Appendix 9A**.

9.7.7 Given the single occurrence across 18 separate nocturnal surveys, it is considered European white-fronted goose are not likely to be present on Site with any regularity; because of this the PEIR Assessment Boundary would not be considered functionally linked to the SPA for this species.

Dunlin (Article 4.2 Species of SPA and Ramsar Criteria 6) (Red BoCC5 and BoCC4 Wales)

9.7.8 Dunlin were recorded on four dates (three diurnal and one nocturnal survey), with a peak count of 156 (within Fields 119 and 126 collectively) on 16/01/2020. Other counts were one bird on Field 181 on 17/01/2020, 20 birds in Field 124 on 25/01/21 and four birds in Field 15 on 13/03/2021. The peak count of 156 represents 0.56% of the Severn Estuary population 5-year average 2019/20 to 2023/24 (27,695). Dunlin are not considered to be present on Site in consistently high numbers or with any regularity; because of this the PEIR Assessment Boundary would not be considered functionally linked to the SPA for this species. Refer to **Figure 9.1.5**, **Appendix 9A**.

Shelduck (Article 4.2 Species of SPA and Ramsar Criteria 6) (Amber BoCC5 & Red BoCC4 Wales)

9.7.9 Shelduck were recorded on 23 dates, distributed across 33 different fields. Peak counts ranged from 1 and 48 birds on a single survey date. Highest numbers were recorded on 25/02/2020 when 48 birds were recorded within Fields 121, 124 and 139, and on 05/03/2020 when 47 birds were recorded within Fields 106, 107, 119, 135 and 137. The peak count represents 0.62% of the Severn Estuary population 5-year average 2019/20 to 2023/24 (7696). The PEIR Assessment Boundary would not be considered functionally linked to the SPA for this species. Refer to **Figure 9.1.2**, **Appendix 9A**.

9.7.10 The numbers would however exceed 1% of the Welsh national population (4504) on two occasions (see **Paragraph 9.7.20** below) (Ref 9-26).

Gadwall (Article 4.2 Species of SPA and Ramsar Criteria 6) (Amber BoCC5)

9.7.11 Gadwall were recorded on ten survey dates, and sightings were across just seven different fields. Peak counts ranged from one to six birds on a single survey date. Highest numbers were recorded on 26/03/2021 when six birds were recorded within Fields 24 and 98. The peak count represents 2.4% of the Severn Estuary population 5-year average 2019/20 to 2023/24 (240). This would be considered functionally linked to the SPA for this species as it exceeds 1% of the average population

however this threshold was only exceeded on four occasions: 26/03/2021 (as above), on 05/12/2022 when five birds were recorded in Field 215, on 13/01/2023 when four birds were recorded in Fields 24 and 124, and on 15/03/23 when four birds were recorded in Field 124. Refer to Figure 9.1.7, **Appendix 9A**.

9.7.12 Across all surveys, gadwall were generally only observed once within an individual field, with the exception of Field 124 when gadwall were recorded on four separate occasions (out of 66 surveys). This is not considered to be frequent or regular use that would constitute functionally linked land (refer to **Appendix 8I** for additional detailed assessment).

Common redshank (Ramsar Criteria 6) (Red BoCC4 Wales)

9.7.13 Common redshank were recorded on a single occasion within Field 148 on a nocturnal survey (12/01/2020) and occasionally offsite, on the foreshore. This represents 0.02% of the Severn Estuary population 5-year average 2019/20 to 2023/24 (4432). Refer to Figure 9.1.6, **Appendix 9A**.

9.7.14 Given the single occurrence across 18 separate nocturnal surveys, it is considered that common redshank are not likely to be present on Site with any regularity; because of this the PEIR Assessment Boundary would not be considered functionally linked to the Ramsar for this species.

SPA/ Ramsar Waterbird Assemblage

9.7.15 The published SPA assemblage as a whole in the original citation amounts to 68,026 individual waterbirds (5 year peak mean, 1988/89 – 1992/93). This was updated in the Natura 2000 form to 84,317 waterfowl (5 year peak mean, 01/04/1998).

9.7.16 The peak count of all waterfowl species recorded within the PEIR Assessment Boundary over the three winter survey periods amounts to 258 birds, recorded on 05/03/2020. This equals 0.31% of the Severn Estuary SPA Assemblage as per the Natura 2000 figures. This figure falls below the 1% threshold and therefore the PEIR Assessment Boundary is not considered likely to be functionally linked. Refer to Figure 9.1.8, **Appendix 9A**.

9.7.17 Taking into account the latest five-year moving average of 78,096 (19/20 – 23/24), the peak count would equate to 0.33% across all survey years. Therefore, the PEIR Assessment Boundary is not considered functionally linked for the assemblage as a whole.

Nationally Important Winter Bird Populations

9.7.18 Peak counts of three species exceed 1% of the national 5 year moving average population: shelduck (Amber BoCC5 & Red BoCC4 Wales), snipe (Amber BoCC5 & BoCC4 Wales) and curlew (Red BoCC5 & BoCC4 Wales).

9.7.19 **Shelduck** – Shelduck exceeded 1% of the Welsh average population (4504) on two dates. Looking at regularity of field use, the most often used field by shelduck was Field 124, used on five survey dates with a peak of 38 birds. Other regularly used fields (all used on four survey dates) are Field 119 with a peak of 18 birds, Field 134 with a peak of five birds and Field 170 with a peak of seven birds. Refer to Figure 9.1.2, **Appendix 9A**.

9.7.20 **Snipe** – Snipe exceeded 1% of the Welsh average population (1373) on 24 dates. Snipe were recorded within 86 fields across the surveys, with a peak count of 60 on 12/12/2020 collectively within Fields 13, 16, 20, 22, 25, 30, 33, 40, 48. Frequently used fields included Field 16 and 25, both used on 12 survey dates, Field 33, used on 21 survey dates and Field 48, used on 19 survey dates. Refer to Figure 9.1.3, **Appendix 9A**.

9.7.21 **Curlew** – Curlew exceeded 1% of the Welsh average population (6441) on four dates, with the highest individual count being 121 birds on Field 160 on 11/12/2019. Curlew were recorded within 37 different fields across the Site, however reviewing regularity of field use, the most often used fields by curlew was Field 160, used on 12 survey dates, Field 170/166, used on 9 survey dates, Field 124, used on five survey dates and Field 134, used on five survey dates, indicating semi-regular use. Refer to **Figure 9.1.1**, **Appendix 9A**.

9.7.22 The Site is considered to be of low importance for other waterfowl species, which individually were recorded in low numbers but make up part of the Severn Estuary

winter assemblage, for example wintering lapwing (Red BoCC5 & BoCC4 Wales), oystercatcher (Amber BoCC5 & BoCC4 Wales), golden plover (BoCC4 Wales), greylag goose (Amber BoCC5), wigeon (Amber BoCC5 & BoCC4 Wales) and teal (Amber BoCC5 & BoCC4 Wales) which were recorded in numbers below 1% of the national average population.

Migratory Winter Passerines

9.7.23 Migratory species such as redwing (Schedule 1), fieldfare (Schedule 1, Red BoCC5, Amber BoCC4 Wales) and starling (Red BoCC5 and BoCC4 Wales) and a Section 7 species were regularly recorded in flocks feeding in fields and hedgerows and moving across the PEIR Assessment Boundary as well as the surrounding countryside.

Passage Birds

9.7.24 The Severn Estuary Ramsar criteria identifies species/populations identified subsequent to designation for possible future consideration under criterion 6, which includes ringed plover for peak counts in spring/ autumn. This species was not recorded during the surveys and it is not considered further within this report.

9.7.25 Other passage birds were recorded but not in significant numbers.

Nocturnal Species

9.7.26 During nocturnal surveys a total of 21 waders and wildfowl were recorded: curlew, dunlin, gadwall, golden plover, grey plover, greylag goose, jack snipe, lapwing, little grebe, mallard, mute swan, oystercatcher, redshank, shelduck, snipe, teal, water rail, white-fronted goose, whooper swan, wigeon and woodcock. Those which form part of the SPA/Ramsar named species are considered above, as well as collectively as part of the assemblage.

9.7.27 Four owl species were recorded: barn owl (WCA Schedule 1), little owl, tawny owl (Amber-listed BoCC5) and short-eared owl (Amber-listed BoCC5 & Amber BoCC4 (Wales)). Barn owl were recorded semi-regularly (43 sightings) within the western and northern parts of the Site, south of Redwick and in a small number (generally singly) of fields east of Summerleaze. Refer to **Figure 9.1.9**, **Appendix 9A**. Short-

eared owl were recorded on five occasions in three discrete locations of the Site.

Other Notable Species

9.7.28 Other species recorded during the wintering birds surveys which are notable either as Schedule 1 species and/or listed as red or amber on the UK and/or Welsh BoCC include resident Schedule 1 species Cetti's warbler, barn owl and kingfisher, and Red listed BoCC5/ Amber listed BoCC4 Wales skylark.

Breeding Birds

9.7.29 The data search from SEWBReC returned 140 species of birds in the spring and summer period from an area within 2km of the Site. Of the species in the SEWBReC records, 42 were considered to have the potential to breed on Site considering the habitats present.

9.7.30 68 notable species were recorded during the surveys, with 24 species confirmed as breeding on Site including barn owl, bullfinch, Cetti's warbler, dunnock, gadwall, goldcrest, greenfinch, house sparrow, lapwing, linnet, mallard, mistle thrush, moorhen, oystercatcher, reed bunting, skylark, song thrush, starling, stock dove, teal, whitethroat and wren.

9.7.31 There were 12 species that were 'probably' breeding and four species were recorded as 'possibly' breeding though marsh harrier are more likely to be breeding in habitats off Site and then foraging on Site.

9.7.32 The majority of breeding species recorded utilise the extensive network of hedgerows, reens and ditches for nesting and foraging, although with some reliance on grassland and arable fields for foraging on seeds and insects. Selected species are considered in more detail below.

Ground-nesting species

9.7.33 Notable ground nesting species that are (at least possibly) breeding on Site include skylark, curlew, oystercatcher, lapwing and meadow pipit, species accounts are detailed below.

9.7.34 **Skylark** (Red listed BoCC5 & Amber listed BoCC4 Wales) - Skylark were recorded 156 times across Site during the breeding bird surveys. Breeding on Site was confirmed by the presence of recently fledged young and in three cases by observations of occupied nests. Fifteen fields consistently supported breeding during each of the three survey periods.

9.7.35 **Curlew** (Red listed BoCC5 & BoCC4 Wales) - Curlew were recorded as 'probable' breeders nine times across the breeding bird surveys with an additional record of 'possible' breeding. A peak count of 20 curlew in appropriate nesting habitats was recorded during the 2020 surveys, this peak count includes 15 individuals recorded in Field 137 on 08/04/2020. During a low tide diurnal VP survey on 7th May 2020, a female curlew was observed in Field 137, thought to be sitting on a nest and a male flew in to join her, foraging close by. By 21st May the pair had gone, it is not known if this was a successful breeding attempt. One 'probable' breeding pair was recorded in 2023 from field 20. Refer to **Figure 9.2.1**, **Appendix 9B**.

9.7.36 **Oystercatcher** (Amber listed BoCC5 & BoCC4 Wales) - Oystercatcher were recorded during 10 surveys within the Site during the breeding bird surveys. The peak count comprises four individual birds within field 126 and an additional one in field 119. These records consist of a pair seen performing a distraction display, a bird occupying a nest, one bird visiting a possible nesting site and a bird showing agitated behaviour. Oystercatcher were recorded as 'probable' breeders on Site during 2023 within Fields 95, 102, 105 and 177. Refer to **Figure 9.2.1**, **Appendix 9B**.

9.7.37 **Lapwing** (Red listed BoCC5 & BoCC4 Wales) – this species was confirmed as breeding in both 2020 and 2023. In 2020, breeding was confirmed in seven fields (Fields 96, 99, 105,124, 126, 134, 173). In 2023, only one occupied nest was recorded but recently fledged young were observed in a further two fields indicating confirmed breeding in Fields 95, 102 and 211. Behaviour indicative of 'probable' breeding was recorded in a further 13 fields. Refer to **Figure 9.2.1**, **Appendix 9B**.

9.7.38 **Meadow pipit** (Red listed BoCC4 Wales) - Meadow pipit were recorded 37 times during the breeding bird surveys of which five were of birds in flight. Behaviours

recorded in the surveys were indicative of breeding, but this could not be confirmed, and this species is a 'probable' breeder on Site.

9.7.39 **Gadwall** (Amber listed BoCC) – Gadwall were recorded in association with Windmill Reen and Yoke Reen north and south of Mead Lane, where breeding was confirmed of recently fledged young in 2020 and 2023 both times within the reen bordering field 108.

Resident Schedule 1 breeding species

9.7.40 Schedule 1 species that are (at least possibly) breeding on or close to the Site include Cetti's warbler, barn owl and kingfisher.

9.7.41 **Cetti's warbler** – this species has been a rapidly colonising species in Wales and other parts of the UK in recent years and has been recorded regularly throughout the winter and breeding season across the Site, where it is associated with scrubby areas and reeds along the ditch and reen network. This is now a relatively commonly occurring species on the Gwent levels in suitable habitat. Refer to **Figure 9.2.6**, **Appendix 9B**.

9.7.42 **Barn owl** – Nesting was recorded within a tree nest box within Field 35 and from within the barn in Field 133 (2023). A barn owl was also recorded within a barn in the northwestern corner of Field 92 although nesting was not confirmed. Permanent territory was recorded within Field 185 but no associated nest site. Hunting was recorded during bat surveys across a number of fields which potentially suggest a small number of discreet territories (including associated with the above nest sites). Refer to **Figure 9.2.2**, **Appendix 9B**.

9.7.43 **Kingfisher** - Kingfisher were seen in suitable nesting habitat within reens associated with Fields 124 and 504 and are considered to be 'possibly' breeding on Site. Refer to **Figure 9.2.6**, **Appendix 9B**.

9.7.44 **Peregrine** - Peregrine were recorded four times across the surveys, they are considered to be a resident in the area holding permanent territory but breeding offsite.

9.7.45 **Marsh harrier** - Marsh harrier were recorded on a handful of surveys. Most records are for non-breeding registrations of a single individual in flight. One 'possible' breeding female was recorded as holding permanent territory within the Site during 2020 and 2023, though it is likely that this bird is breeding offsite, but territory overlaps with the Site.

Gulls

9.7.46 No gulls were recorded breeding on Site.

9.7.47 The Severn Estuary Ramsar criteria identifies species/populations identified subsequent to designation for possible future consideration under criterion 6, which includes lesser black-backed gull for being regularly supported during the breeding season.

9.7.48 Lesser-black backed gull was recorded frequently in the breeding bird surveys with a total of 335 records though two-thirds of them were of birds in flight. This gull does use approximately half the fields on Site for foraging and loafing in low-moderate numbers, including immature non-breeding individuals, but were not recorded breeding. Refer to **Figure 9.2.3** to **9.2.5**, **Appendix 9B**.

Important Ecological Features

9.7.49 **Table 9-12** details the following sensitive receptors that have been assessed. Only receptors assessed as being important at the 'Local' scale or above have been taken forward for further assessment.

Table 9-12 Summary of important ecological features

Important Ecological Feature	Reason for Valuation	Biodiversity Importance
Severn Estuary Ramsar (ornithological features) and SPA	International	*Severn Estuary Ramsar (ornithological features) and SPA*
Wintering shelduck, snipe and curlew	National	*Wintering shelduck, snipe and curlew*
Wintering bird assemblage	Local	*Wintering bird assemblage*

Ground-nesting birds (excluding lapwing, curlew, gadwall)	Local	*Ground-nesting birds (excluding lapwing, curlew, gadwall)*
Breeding lapwing	County	*Breeding lapwing*
Breeding curlew	District	*Breeding curlew*
Breeding gadwall	District	*Breeding gadwall*
Schedule 1 birds (Barn owl and Cetti's warbler)	County	*Schedule 1 birds (Barn owl and Cetti's warbler)*
Other breeding birds	Local	*Other breeding birds*

9.8 Embedded Design Mitigation

9.8.1 The Commitments Register (**Appendix 19A**) lists the 'embedded environmental measures' which have been developed to avoid and mitigate environmental effects. The intention is to implement all measures as part of the design of the Proposed Development, the preliminary assessment of likely significant effects is based on this assumption.

9.8.2 A summary of those relevant to ecology are listed below:

- Following construction, construction compounds will be returned to previous conditions as far as reasonably possible.
- An outline landscape strategy (oLEMP) will be prepared detailing management objectives for mitigation and compensation land.
- A decommissioning plan would be developed prior to the end of the project detailing sensitive methods of decommissioning.
- A detailed Construction Environmental Management Plan (CEMP) to ensure that the construction phase is carefully planned to avoid the more significant impacts, including:
  - Implementing measures to prevent ground-nesting species such as skylark from nesting in the areas to be panelled. Such measures would include keeping the sward very short in the fields and using deterrents such as raptor kites.
  - Surveying and buffering nest sites of Schedule 1 species (e.g. barn owl) during the breeding season.

- Utilise acoustic barriers where necessary (e.g. at nesting Cetti's warbler sites).
- An Ecological Clerk of Works will be on Site, throughout the works but most importantly during the bird breeding season to undertake pre-works checks for nests.

- Utilising existing farm access tracks wherever possible during construction, maintenance and decommissioning to minimise impacts to breeding habitat within reens and hedgerows. Whilst improvements to these tracks including possible widening will be required, tracks will aim to utilise existing hedgerow gaps wherever possible and only very small scale hedgerow loss will be required.
- Habitat creation for loss of breeding and foraging habitat, including infill hedgerow planting in gaps of retained hedgerows.
- Panel installation to reduce unnecessary land take and allow grassland to be maintained below to provide foraging habitat.
- Panel installation to have significant clearance between rows and the arrays themselves are partially transparent, which will permit vegetation growth beneath and continue to provide bird foraging and potential nesting habitat.
- By design Solar Panels will be positioned at an inclined angle and this, along with the large gaps between rows this will enable birds to distinguish the surface from a water body.

9.9 Assessment of Likely Impacts and Effects

Construction and Decommissioning Phase

Severn Estuary Ramsar (ornithological features) and SPA

9.9.1 During both construction and decommissioning, noise disturbance to birds on protected sites by construction activities, personnel and vehicles could result in disturbance to birds within the estuary in winter.

9.9.2 The guidance within the Waterbird Disturbance Mitigation Toolkit (Cutts et al., 2013) (Ref 9-27) classifies noise responses by birds as follows:

- Low: noises of less than 55 dB at the bird are unlikely to cause a response. Noise between 55-72 dB in some highly disturbed areas may elicit a low level of disturbance provided the noise level was regular as birds will often habituate to a constant noise level.
- Moderate: high level noise which has occurred over long periods so that birds become habituated to it or lower-level noise which causes some disturbance to birds. This includes occasional noise events above 55 dB, consistent elevated level noise between 60-72 dB over long periods and long-term regular noise above 72 dB, where birds have become habituated.
- High: sudden noise event of over 60 dB (at the bird, not the source) or a more prolonged noise of over 72 dB may cause birds to move away from the works to areas which are less disturbed. Birds that remain in the affected area may not forage efficiently and if there are additional pressures on the birds (cold weather, extreme heat etc.) then this may impact upon the survival of individual birds or their ability to breed.

9.9.3 Preliminary assessment of noise and vibration for noise receptors on the Wales Coast Path (which is the closest measured noise receptor to the Severn Estuary SPA) has been made within **Chapter 13: Noise and Vibration**. This suggests that noise from screw piles for Solar Panels and Inverters could have potentially significant impacts, with noise levels at up to 75 dB, for one to three days at a time when works are closest to the sea wall (e.g. 30m). This would constitute 'high level' noise disturbance to birds, although it is not clear how much noise the sea wall itself would attenuate. Given the size of the Severn Estuary SPA, disturbance is only likely to affect a percentage of birds within proximity to the Site. Therefore noise effects have the potential to be temporary but **Significant** at the National scale and will be further assessed in the ES. In EIA terms this would be **Major Significant**.

9.9.4 Construction will take place during daylight hours therefore noise impacts are not

predicted at night.

9.9.5 Visual disturbance to SPA birds on the estuary is considered highly unlikely due to the presence of the sea wall which provides a robust visual barrier screening the Site (and construction activities) from SPA birds. There are no locations within the Site where the estuary is visible due to the height of the sea wall. There will be no use of the sea wall during construction or decommissioning by personnel or vehicles. Visual disturbance would therefore be negligible and **Not Significant** at any geographic scale. In EIA terms this would be **Negligible Not Significant**.

9.9.6 Potential spillages/ siltation effects within the Proposed Development could adversely affect habitats within the Severn Estuary on which winter birds rely (e.g. for foraging) through smothering or toxic effects via the reens/ ditches which provide a pathway to the estuary. This could occur during the creation of reen/ ditch crossings for cable routes and vehicular access tracks. Water pollution is identified as a pressure and threat in the Severn Estuary Site Improvement Plan (Natural England, 2015) (Ref 9-28) to the following notified features of the SAC: subtidal sandbanks, estuaries, intertidal mudflats reefs and Atlantic salt meadows; habitats which support wintering birds. Additional impacts during construction and decommissioning could include dust deposition during the creation and removal of access tracks and vehicle tracking. However, embedded measures, as set out in **Section 9.8**, includes 7m and 12.5m buffers around ditches and main reens respectively, therefore there is a very low risk of any siltation or accidental spillage during panel installation causing pollution in reens and ditches that could eventually end up in the estuary via the reen network, as long as these buffers remain vegetated to slow/ capture run-off. Potential effects regarding run-off and hydrological issues are addressed in **Chapter 10: Water Environment**.

9.9.7 A detailed CEMP will be implemented which will include measures such as refuelling locations, use of spill kits and method statements detailing the construction of crossing points to avoid waterbody siltation. An Outline CEMP (oCEMP) has been included within this PEIR (**Appendix 2A**). Initial method statements have been prepared for road construction and decommissioning, management of stockpiles and installation of cable trays across reens and are being finalised for ES. These detail

sensitive working practices including marking out buffer zones, installation of silt fences, dust control, storage of topsoil and reinstatement of habitats. Each crossing will be individually reviewed/surveyed during detailed design to confirm the crossing methodology employed. With the implementation of these documents the effects are negligible and are **Not Significant** at any geographic scale. In EIA terms this would be **Negligible Not Significant**.

Functionally Linked Land (associated with Severn Estuary SPA)

9.9.8 The Site is not considered to be 'functionally linked' to the SPA for any of the qualifying features and it would appear to be sub-optimal habitat for these species. Where SPA birds do use the Site, numbers are not regular or in high enough quantities to constitute functionally linked land. Therefore, whilst there could be temporary displacement effects on SPA wintering birds using the Site during construction and decommissioning due to vehicles, plant and noise as described above, this would not have significant adverse effects on the integrity of the SPA.

9.9.9 Furthermore, the Proposed Development is phased, ensuring that large parts of the Site will remain undisturbed whilst construction/ decommissioning is taking place in other parts of the Site. 51.5ha of suitable grassland will also be retained and remain undisturbed by personnel and vehicles for the duration of the Proposed Development, including during construction and decommissioning activities.

9.9.10 Effects on functionally linked land is considered negligible and **Not Significant** at any geographic scale. In EIA terms this would be **Negligible Not Significant**.

Wintering shelduck, snipe and curlew

9.9.11 There are potential adverse effects to winter foraging and loafing areas for shelduck, snipe and curlew from disturbance during construction (e,g, noise/ visual disturbance) and as the large fields become unavailable to them due to the presence of the Solar Panels. These species are present in numbers exceeding 1% of the Welsh population.

9.9.12 As discussed above, research from the Waterbird Disturbance Mitigation Toolkit (Ref 9-27) indicates that noise from screw piles for Solar Panels and Inverters could have

potentially significant impacts, with noise levels at up to 75 dB, for one to three days at a time. This would constitute 'high level' noise disturbance to birds, in particular shelduck and curlew for which disturbance data is available. Aural disturbance occurs to shelduck from 72dB upwards. Curlew are moderately tolerant of noise, with 107-112dB of noise required to create disturbance at 100m. No data is currently available for snipe. These effects could displace birds from winter foraging ground within the Site to other similar habitats in the surrounding area, and reduce the available foraging land where works are undertaken throughout winter. To minimise displacement effects from noise, the Proposed Development will be phased, so that fields are available each winter until the development is complete. A method statement as part of the detailed CEMP will be designed with input from the project ecologist to minimise visual/ noise disturbance to retained fields during construction/ decommissioning. Further information on construction phases will be available during the ES.

9.9.13 Visual disturbance from personnel and vehicles is also expected to cause avoidance and disturbance behaviour. Shelduck are very sensitive to visual disturbance, being affected up to 400m from the source (Ref 9-29), whilst curlew are moderately sensitive, being affected at 120 – 300m (Ref 9-27) or 200 – 650m (Ref 9-29) although are more tolerant of vehicles than people. No data is currently available for snipe.

9.9.14 Key fields which supported regular numbers of shelduck and curlew have been excluded from being panelled (Fields 160, 166/170, 124 and 134). A further six fields will also be retained and enhanced for birds, totalling c. 51.5ha (refer to **Appendix 8J**, **Figure 1**). These areas will be avoided during construction and decommissioning to provide habitat undisturbed from visual disturbance during construction and decommissioning, with some screening provided by the retained hedgerows on the boundaries. These habitats will be available disturbance free for nocturnal use as no night-time work is proposed. However, it is considered that indirect disturbance from noise and visual within the construction/ decommissioning areas could affect birds within the mitigation fields and therefore impacts on wintering shelduck, curlew and snipe is considered to have a temporary but **Significant** effect at the Local level. In EIA terms this would be **Minor Not Significant**.

Wintering bird assemblage

9.9.15 Whilst the Site is not considered to comprise functionally linked land for the waterbird assemblage of the SPA, it still supports a range of species in winter that could be affected by the Proposed Development, including other waterbirds, thrushes and finches. There is therefore potential for disturbance to foraging and loafing areas due to construction and decommissioning activities, vehicles and personnel, including noise and visual disturbance. These effects could occur throughout the Site as these species were distributed relatively evenly. These birds are considered to be less sensitive to noise than the waders considered above but some species are likely to be displaced to other parts of the Site due to highly disturbing activities, whilst others will tolerate noise and may remain within retained habitat such as hedgerows.

9.9.16 To reduce displacement effects, the Proposed Development will be phased, so that fields are available each winter until the Proposed Development is complete, allowing other grassland fields, hedgerows and reens to be accessible for foraging and roosting. Habitats will also be available disturbance-free for nocturnal use as no night-time work is proposed. 51.5ha of land will not be panelled, providing foraging land for waterbirds which will be undisturbed during the construction/ decommissioning phases and habitats in the surrounding landscape would be used, such that local bird populations would remain stable, in particular for non-resident wintering species.

9.9.17 It is considered that there will be temporary, short-term, adverse effects on the wintering bird assemblage that are **Not Significant** above the Site level. In EIA terms this would be **Negligible Not Significant**.

Ground-nesting birds (excluding lapwing, curlew, gadwall)

9.9.18 During construction/ decommissioning, potential effects include destruction of nests by moving plant and personnel and disturbance of adults off nests from noise or visual disturbance which could lead to increased predation of nests. This includes species such as skylark, meadow pipit and oystercatcher, species which nest in open fields and as such would be vulnerable to construction and decommissioning traffic and associated noise, dust and vibration. These species are distributed across the

Site with no particular fidelity to fields. This would occur for up to three years during construction and a similar period of decommissioning.

9.9.19 Whilst the Proposed Development will be phased, so that habitat is available during each year of construction/ decommissioning, there is likely to be some displacement or disturbance of low numbers of ground-nesting species during these times.

9.9.20 To reduce the likelihood of nests being damaged, vegetation clearance will be timed to avoid breeding bird season, or preceded with a check for nests. All active nests will be retained until all chick have fledged, as detailed in the oCEMP (**Appendix 2A**).

9.9.21 Whilst 51.5ha of bird mitigation land will be available and undisturbed for the duration of the Proposed Development, there will be an overall loss of nesting habitat across the Site which is considered to be **Significant** at the Local level. In EIA terms this would be **Minor Not Significant.**

Breeding lapwing, curlew, gadwall

9.9.22 During construction/ decommissioning, potential effects to breeding lapwing and curlew include destruction of nests by moving plant and personnel and noise or visual disturbance flushing adults off nests leading to increased predation of nests. Direct removal of riparian habitat (e.g. at reen crossings) could directly affect gadwall nests. This effect would occur for up to three years during construction and a similar period of decommissioning.

9.9.23 Direct effects to these species will be controlled through retention of key fields and the implementation of embedded design measures. Nesting gadwall, which nests in association with reens, will be protected by the inherent 7m and 12.5m watercourse buffers, except where crossings are required. Where crossings are required, a pre-works check for active nests would be implemented via the detailed CEMP to ensure any active nests are identified and protected until all chicks have fledged. The majority of fields that have supported breeding lapwing on at least one occasion (124, 134, 126, 173, 105, 95, 102 and 211) have been excluded from the construction zone and will be avoided during works. Two fields which supported breeding lapwing

will be panelled (96 and 99) however breeding was only confirmed once during 2020 in each field and with enhancements to the retained fields it is considered that sufficient breeding habitat will be available. This will ensure that habitat is available for curlew and lapwing to breed during construction.

9.9.24 Curlew are moderately tolerant of noise, with 107-112dB of noise required to create disturbance at 100m (Ref 9-27), and during breeding are sensitive to visual disturbance at 200-300m (Ref 9-29). Gadwall are sensitive to visual disturbance at 100 – 200m during the breeding season (Ref 9-29). A method statement will be designed as part of the detailed CEMP with input from the project ecologist to minimise visual/ noise disturbance occurring within adjacent fields during construction/ decommissioning. This may require avoidance of construction within fields where noise and visual disturbance would be significant during the breeding season. Furthermore, the Proposed Development will be phased, so that only parts of the Site are affected in each year of construction/ decommissioning.

9.9.25 Overall, it is anticipated that with the above mitigation measures, there will be temporary, short-term, adverse effects on breeding lapwing, curlew and gadwall that are **Not Significant** above the Site level.

9.9.26 In EIA terms this would be **Negligible Not Significant**.

Breeding Schedule 1 birds (Barn owl, kingfisher and Cetti's warbler)

9.9.27 Disturbance of nests by dust, noise, personnel and moving plant is likely to affect the ability of Schedule 1 birds to hold territory and breed successfully within habitats adjacent to the works area. This includes habitat adjacent to reens/ ditches used by kingfisher and Cetti's warbler (**Figure 9.2.6**, **Appendix 9B** although subject to variation in territories each year) and around known nesting sites for barn owl (Field 35, Field 92, **Figure 9.2.2**, **Appendix 9B**). This effect would occur for up to three years during construction and a similar period of decommissioning, particularly around reens/ ditches, although this would be phased, and impacts to barn owl would occur for much shorter durations, only whilst in proximity to the known nesting sites.

9.9.28 Inherent reen/ ditch buffers of 7 – 12.5m will in most cases protect species such as

kingfisher and Cetti's warbler from disturbance, however direct removal of nesting habitat during vegetation removal (e.g. at reen crossings for cables and vehicular access) could directly effect nests. Where crossings are required, a pre-works check for active nests would be implemented via the detailed CEMP to ensure any active nests are identified and protected until all chicks have fledged.

9.9.29 Nest sites for barn owl will be protected from noise/ visual disturbance with a 30m exclusion zone during breeding. This will be set out within the detailed CEMP.

9.9.30 Overall it is anticipated that there will be temporary, short-term, adverse effects on breeding Schedule 1 species that are **Not Significant** above the Site level. In EIA terms this would be **Negligible Not Significant**.

Other breeding birds

9.9.31 In the absence of mitigation, there is a risk of destruction of nests/ eggs during habitat removal (e.g. hedgerows and at reen crossings) when this is undertaken during the breeding season (March – August inclusive). This effect would occur for up to three years during construction and a similar period of decommissioning, although this will be phased to reduce impacts. There is also the potential for works and any pollution incident occurring during construction and decommissioning to have an indirect, adverse impact on ditches/ reens as breeding habitat for waterbirds.

9.9.32 To partially mitigate for this, all boundary vegetation, ditches and reens will be retained and protected with a 7 – 12.5m buffer as part of the development. This will in most cases protect active nests from accidental damage/ destruction. Where vegetation removal is undertaken during the breeding season (March – August inclusive), a pre-works check for active nests within reens/ ditches and hedgerows would be implemented via the detailed CEMP to ensure any active nests are identified and protected until all chicks have fledged. These impacts will be negligible and are **Not Significant** at any geographic scale. In EIA terms this would be **Negligible Not Significant**.

9.9.33 There will be an overall loss of nesting habitat for other breeding birds, including c. 4.65km of hedgerow habitat that requires removal for cable and vehicular crossing

points. A fully detailed Tree Survey and Arboricultural Impact Assessment (AIA) is currently being carried out in order to fully establish the characteristics of the habitats in the field boundaries, alongside the reens and ditches. From observations made on site it is recognised that not all reens and ditches have tree and hedgerow habitat alongside them, therefore the length of hedgerow loss is likely to be far less. It is also proposed that the locations of all crossings would be carefully micro-sited so as to avoid hedgerow and to utilise any natural breaks in higher quality habitat on the bankside. On this basis the amount of hedgerow loss will continue to be minimised through the on-going design process resulting in a far lower figure than the precautionary one provided in this PIER document.

9.9.34 A schedule of nesting boxes for hedgerow species will be installed on existing trees, as detailed in the LEMP.

9.9.35 Retained hedgerows will be enhanced in the long-term under a LEMP (see objectives within **Appendix 8J**) and new scrub planted to provide compensation for loss of nesting habitat, however there are likely to be short to medium term impacts which would be **Significant** at the **Local** level, whilst new habitat establishes. In EIA terms this would be **Minor Not Significant**.

Operational Phase

Severn Estuary SPA/ Ramsar / SSSI

9.9.36 Due to the nature of Proposed Development, there will be limited noise during the operational phase, although some operational noise was predicted to occur to the Wales Coast Path in **Chapter 13: Noise and Vibration** which will be assessed further in the ES.

9.9.37 Maintenance personnel will access the Solar Panels in vehicles, which as discussed above, will not be visible from the estuary. Furthermore, such activities will not be at a greater frequency or intensity than typical Site agricultural activities. There will be no increase in users of the Wales Coast Path as a result of the scheme, which is visible from the estuary. No adverse effects are predicted during operation, subject to the findings of **Chapter 13: Noise and Vibration** and therefore effects are likely

to be **Not Significant** at any geographic scale. In EIA terms this would be **Negligible Not Significant**.

Wintering shelduck, snipe and curlew

9.9.38 During the operational phase, bird mitigation fields will be managed in accordance with a Landscape and Ecological Management Plan (LEMP), to accord with the oLEMP submitted as part of this PEIR (**Appendix 8J)**. This will include 51.5ha of land managed specifically for wintering birds (Fields 211, 160, 170, 173, 134, 124, 126, 102, 105 and 95) (refer to **Appendix 8J**, **Figure 1**).

9.9.39 Fields without PV Arrays used by wintering shelduck, curlew and snipe (Fields 160, 170, 173, 134, 124, 126, 105 and 95) are at risk of short-term and periodic disturbance by maintenance personnel and vehicles, although this is not considered likely to be higher than the current disturbance by normal farming activities. No access tracks for maintenance personnel and vehicles will be routed through or adjacent to bird mitigation fields, so that disturbance is limited to routine habitat management. Management activities will be timed to avoid sensitive periods for birds.

9.9.40 There may be an overall loss of land used by snipe due to panelling (149ha) for the duration of the Proposed Development which could be adverse and **Significant** at the **Local** level. In EIA terms this would be **Minor Not Significant**.

9.9.41 Effects on wintering shelduck and curlew are considered to be negligible and **Not Significant** at any geographic scale. In EIA terms this would be **Negligible Not Significant**.

Wintering bird assemblage

9.9.42 Due to potential hedgerow removal for reen enhancement, there will be an overall loss of foraging habitat for wintering birds such as thrushes, however at this stage the total removal of double hedgerows is unknown. The presence of Solar Panels over 149ha of land may also reduce the area in which wintering birds forage.

9.9.43 To compensate for hedgerow losses, a suite of measures will be designed to

enhance retained hedgerows across the Site, including gapping up of defunct hedgerows with a diverse mixture of whips and a LEMP implemented to ensure ongoing management focuses on restoring dense, continuous hedgerows. If appropriate, new hedgerows will be planted where they do not cause shading of watercourses or Solar Panels. Scrub will be planted to create further areas of foraging for winter thrushes.

9.9.44 Grassland will still persist under the PV Arrays, between blocks of Solar Panels, in rides and field margins/ buffers, which are likely to be used by wintering passerines. The change of management to reduce agricultural inputs (e.g. fertilisers) and a reduction in soil compaction from over-grazing will support a more diverse food source (invertebrates and vegetation) for species that forage within grasslands. These will also be managed sensitively under the LEMP to provide structural and botanical diversity, further enhancing the foraging habitat that is currently available. 51.5ha of mitigation land will be retained and enhanced to provide higher value habitat to other waders over winter, which will be a betterment over the current intensively grazed fields which supply a poor food supply.

9.9.45 The above measures are considered likely to increase winter food resources for the winter population of thrushes, passerines and waterbirds at a local level. Therefore effects on the wintering bird assemblage is considered to be beneficial and potentially **Significant** at the **Local** level. In EIA terms this would be **Minor Not Significant**.

Ground-nesting birds (excluding lapwing, curlew, gadwall)

9.9.46 There will be an overall loss of available habitat for ground-nesting birds to breed, which generally require open areas with good visibility – this equates to 149ha of land which will be panelled. For example, skylark were recorded in the majority of the Site and confirmed breeding in eight fields (Fields 19, 33, 48, 57, 126 and 135, 19 and 48) but are likely to breed in others.

9.9.47 55ha of arable fields which are reverted to grassland may further reduce the availability of foraging habitat during the breeding season for species such as skylark.

9.9.48 Observations suggest that close row spacing of Solar Panels may be negatively associated with skylark breeding density (Ref 9-30), and that sunny strips of 3m and more lead to an increase in population size. The Proposed Development includes gaps and rides within the PV Arrays (3m between rows) to break up the panel surfaces, therefore it is considered that this species could continue to successfully breed within the panelled areas. The provision of supporting habitat such as diverse grassland beneath the PV Arrays and within reen buffers (7 - 12.5m wide), managed over the long-term via the LEMP will increase foraging opportunities for ground nesting species. In addition, an increase in the diversity of the swards from a reduction in grazing density in these areas should increase the invertebrate numbers providing skylarks and their broods with more food; this can comprise both invertebrate and vegetable sources. Whilst the total area of this habitat is not currently quantified, this will be detailed as part of the ES submission.

9.9.49 Access by maintenance personnel to panelled areas has the potential to cause disturbance to ground nesting birds. However this is unlikely to be greater than current disturbance for agricultural purposes. Noise generated during operation from Inverters and transformers when operating at maximum as a worst-case scenario is presented within Chapter 13: Noise and Vibration. This suggests as a preliminary assessment that noise will be up to 42 dB at receptors outside the Site although no information is currently available on noise levels within the Site. A study on how farmland birds react to noise however suggests that noise over 53-60 dB leads to sharp decrease in bird densities (Ref 9-31). Therefore, operational noise is unlikely to significantly affect breeding birds.

9.9.50 51.5ha bird mitigation fields (refer to **Appendix 8J**, Figure 1) will provide large, open fields for ground nesting species, which whilst not managed specifically for species such as skylark, are considered likely to provide some additional habitat for this species.

9.9.51 This will be a beneficial effect assuming habitat management is effective, otherwise the loss of nesting habitat maybe a potentially adverse effect **Significant** at the **Local** level. In EIA terms this would be **Minor Not Significant**.

Breeding lapwing, curlew, gadwall

9.9.52 The retention of key fields supporting lapwing (124, 134, 126, 173, 105, 95, 102 and 211) and reens/ ditches with buffers will ensure that large areas of breeding habitat for lapwing and gadwall will be retained and enhanced. These fields form part of the 51.5ha mitigation fields that will be manged for breeding and wintering birds (refer to Appendix 8J, Figure 1). Two fields with possible/ probable curlew breeding attempts (Field 137 and 20) will be panelled and two fields that supported breeding lapwing on one occasion (Field 96 and 99), however the provision of 51.5 ha mitigation land across the Proposed Development will provide higher value habitat than currently available and is likely to be beneficial for these species. These fields will provide large, open fields for ground nesting species and will be enhanced in accordance with a LEMP, to include low intensity grazing and scrapes. This will provide a betterment to the current intensively grazed fields by providing lower livestock densities, scrapes to provide shallow water and areas of structural variation (E.g. small areas of rushes), which will increase the carrying capacity of these fields to support more breeding pairs.

9.9.53 Reens will be retained and buffered, to provide safe breeding habitat for gadwall. The provision of supporting habitat such as diverse grassland beneath the PV Arrays and within reen buffers will further increase foraging opportunities for ground nesting species.

9.9.54 Overall, it is considered that the Proposed Development will have a negligible effect on breeding lapwing, curlew and gadwall which is **Not Significant** at any geographic scale. In EIA terms this would be **Negligible Not Significant**.

Breeding Schedule 1 birds (Barn owl, kingfisher and Cetti's warbler)

9.9.55 During operation, reen/ ditch habitats will be retained and protected for species such as kingfisher. The LEMP will include a series of ditch enhancements including desilting and opening up of the waterbody through hedgerow removal which is further likely to increase foraging resources and water quality for kingfisher.

9.9.56 There will be an overall reduction in nesting habitat for Cetti's warbler due to the

removal of one side of selected double hedgerows to enhance reens. However, it should be noted that hedgerows are not always considered desirable from a conservation perspective in this landscape and that multiple NRW management plans for the area recommend hedge removal. The Proposed Development will include a number of habitat creation measures, managed via the LEMP, which will deliver a range of benefits for Schedule 1 birds, including the provision of higher quality, connected habitat, for example restored hedgerows, buffers to the retained hedgerows, reens and ditches and new areas of scrub. This is likely to have an overall beneficial effect on Cetti's warbler which could be **Significant** at a Local scale.

9.9.57 Information from the Barn Owl Trust[1] indicate that Solar Panels present a negligible collision risk and do not dazzle or have other adverse effects on foraging barn owl. Rough grassland creation in reen buffers, in particular in proximity to barn owl roosting sites, will enhance foraging opportunities by increasing opportunities for small mammals.

9.9.58 New nesting opportunities for barn owl will be provided through the installation of nest boxes on existing trees, poles or within barns. Details will be provided in the LEMP.

9.9.59 Overall it is considered that the Proposed Development will have a beneficial effect on breeding Schedule 1 birds which could be **Significant** at the **Local** scale. In EIA terms this would be **Minor Not Significant**.

Other breeding birds

9.9.60 There will be an overall reduction in nesting habitat for other breeding birds due to removal of one side of double hedgerows to enhance reens and the hedgerow loss described in the construction/ decommissioning section above. It is considered that the reduction in hedgerow foraging provision will be negligible as the implemented LEMP will ensure sensitive management of retained habitat to ensure that food

[1] https://www.barnowltrust.org.uk/barn-owls-ground-mounted-solar-panels/

sources (e.g. berries, nuts) are available into the winter which is likely to be a betterment on current agricultural practices. This will include infill planting and delayed cutting to provide food sources in winter, and a regime that allows the hedgerows to grow thicker. Additional nesting boxes will be provided to compensate for the loss of nesting habitat, to be detailed within the LEMP.

9.9.61 A recent study titled '*Solar parks can enhance bird diversity in agricultural landscape* (Ref 9-33[4])' investigating the impact of solar farms on bird diversity across a large number of sites in Central Europe concludes that solar farms can enrich vegetation, structural diversity, bird species diversity, abundance of invertebrate-eaters and abundance of ground foragers. The Proposed Development will include a number of additional habitat creation/ enhancement measures (including new scrub, grassland buffers and 51.5ha of bird mitigation land), managed via the LEMP, which will deliver a range of benefits for birds, including the provision of higher quality, connected habitat, for example restored hedgerows, buffers to the retained hedgerows, reens and ditches, new areas of scrub and rough grassland. Reversion of 55ha arable to grassland will also create additional foraging habitat with a higher diversity than the current arable crops.

9.9.62 Overall it is considered that the Proposed Development will have a beneficial effect on breeding birds which could be **Significant** at the **Local** scale, due to the creation of new scrub, 55ha of new grassland, new reen/ ditch buffers and 51.5ha bird mitigation land, as described above In EIA terms this would be **Minor Not Significant**.

9.10 Additional Mitigation and Enhancement Measures

Construction & Decommissioning Phases

9.10.1 Further assessment of noise disturbance will be required for the ES. This includes an assessment of noise receptors within the estuary itself, to confirm that the sea wall will attenuate noise and reduce impacts on birds within the estuary. Measures such as phasing work close to the sea wall to occur outside the winter period may be required.

9.10.2 Additional screening may be required to reduce noise impacts on birds within the retained fields during winter and breeding, e.g. shelduck, curlew and gadwall, which are sensitive to noise. This will be informed by the construction programme as it will only apply to noise created within close proximity to the bird mitigation fields.

9.10.3 To compensate for hedgerow loss, existing hedgerow gaps will be infilled and scrub planted.

9.11 Step-Wise Approach

9.11.1 **Table 9-13** below demonstrates how the Step-Wise Approach has been followed for each important ecological receptor, as described in Section 9.5.

Table 9-13: Step-wise Approach to Effects on IEFs

Receptor	Step 1 - Avoid	Step 2 - Minimise	Step 3 – Mitigate/ Restore	Step 4 – Compensate	Step 5 - Enhance
Severn Estuary Ramsar (ornithological features) and SPA	The Severn Estuary SPA/ Ramsar is outside the footprint of the Proposed Development will be avoided entirely. No personnel or plant will access the estuary or adjacent sea wall to prevent visual disturbance to birds on the estuary. No construction will take place to avoid lighting impacts to nocturnal species.	Indirect effects such as potential run-off, siltation and dust which could enter the estuary via reens will be minimised through the provision of watercourse buffers and mitigation measures such as method statements/ detailed CEMP. These will remain vegetated to slow/ capture run-off. Development will be phased to reduce noise disturbance at multiple locations adjacent to the estuary. Measures will be implemented to control adverse noise effects close to the estuary.	The Proposed Development will inherently contribute to the restoration of water quality within the estuary through the reduction in agricultural land uses e.g. fertilisers/ pesticides, siltation and run-off.	No compensation is required.	The Proposed Development will inherently contribute to the restoration of water quality within the estuary through the reduction in agricultural land uses e.g. fertilisers/ pesticides, which cause nutrient imbalance. Cessation of ploughing arable fields and reversion to grassland will also reduce siltation and run off entering the reen/ ditch network which could reduce suspended particles entering the estuary and enhance water quality. This could enhance foraging opportunities for SPA birds within the estuary.

Wintering shelduck, snipe and curlew	Key fields (Field 124, 134, 160 and 166/170) used by more frequently by shelduck and curlew will be avoided for the duration of the Proposed Development.	To minimise displacement effects the Proposed Development will be phased to ensure not all fields are lost during one season and that fields are available each winter until the development is complete. A construction method statement will be designed with input from the project ecologist to minimise visual/ noise disturbance to retained Fields 124, 134, 160 and 166/170 during construction/ decommissioning to minimise noise effects during the winter period. Management activities during operation will be timed to avoid	The Proposed Development will retain and restore 10 fields for birds (exceeding 51.5ha) – Fields 211, 95, 102, 105, 124, 126, 134, 160, 170 and 173. These are fields considered most important for wintering and ground-nesting waders that utilise the Site and are generally located with clear flight paths to the estuary (i.e. there are no panelled areas on the flight path between the field and the estuary). The grasslands across the Site (both in panelled and non-panelled areas) will be restored through the reduction in agricultural land	The 10 bird mitigation fields will compensate for the loss of fields for wintering snipe. The fields will be managed to provide large, open fields (no trees will be allowed to grow within the fields), with damp ground and/or scrapes and areas of tussocky sward. No compensation is required for shelduck and curlew.	Reens/ ditches will be restored through selective hedgerow removal. By removing the southern side of east-west double hedgerows, an increase in sunlight will reach the water, increasing water quality and floral diversity. In addition, less siltation will occur as a result of leaf litter, improving water quality for shelduck. 51.5ha of existing grassland will be enhanced through a suite of measures to support waders/ waterfowl. This will include a sensitive grazing regime (using cattle if possible) and the creation of scrapes. No trees or tall infrastructure will be introduced to prevent the creation of perches for predators. Hedgerows

		sensitive periods for birds. No night-time work/ lighting will be used with the bird mitigation fields.	uses e.g. fertilisers/ pesticides, siltation and intensive grazing, and managed via a long-term sensitive management plan. This will provide higher botanical diversity therefore supporting a greater abundance and diversity of invertebrate prey, vegetation and seeds.		surrounding the mitigation fields will be kept at a suitable height to ensure line-of-sight is maintained for birds. The LEMP will secure the proposed enhancement measures, and would include monitoring and contingency measures to ensure the effectiveness across the lifetime of the scheme.
Wintering bird assemblage	The inherent reen/ ditch buffers will protect waterbody and hedgerow foraging areas for the winter bird assemblage such as thrushes and waterbirds, except at crossing points for cables and new vehicular access points. A further 51.5ha of bird mitigation fields will be avoided and there will be	To minimise displacement effects the proposed development will be phased to ensure not all fields are lost during one season and that fields are available each winter until the development is complete.	Grassland will still persist under the Solar Panels, between blocks of Solar Panels, in rides and field margins/ buffers, which are likely to be used by wintering passerines. These will also be managed	New hedgerow creation may be undertaken in suitable locations to compensate for the reduction in winter foraging habitat.	Hedgerows will be enhanced to created thick, bushy, continuous features with infill planting where gaps occur, as long as this doesn't result in reen/ ditch shading. The LEMP will ensure that berries/ nuts are maintained through winter by

	no access for personnel and vehicles during construction, operation and decommissioning.	Management activities will be timed to avoid sensitive periods for birds. No night-time work/ lighting will be used with the bird mitigation fields.	sensitively under the LEMP to provide structural and botanical diversity, creating higher value foraging habitat than currently available. Reens will be enhanced by reducing shading, which will increase macrophytes and therefore provide higher value foraging habitat for species such as ducks. A suite of measures will be designed to enhance retained hedgerows across the Site to provide a higher quality foraging resource, including gapping up of defunct hedgerows with a diverse mixture of	avoiding cutting too early. Reens/ ditches will be restored through selective hedgerow removal. By removing the southern side of east-west double hedgerows, an increase in sunlight will reach the water, increasing water quality and floral diversity. In addition, less siltation will occur as a result of leaf litter, improving water quality for waterbirds. 51.5ha of existing grassland will be enhanced through a suite of measures to support waders/ waterfowl. This will include a sensitive grazing regime (using cattle if possible) and the creation of scrapes. No trees or tall infrastructure will be introduced to prevent

		whips and a LEMP implemented to ensure ongoing management focuses on restoring dense, continuous hedgerows, with winter berries/ nuts. 55ha of arable will be reverted to grassland which will provide further grassland foraging habitat. The grasslands across the Site (both in panelled and non-panelled areas) will be restored through the reduction in agricultural land uses e.g. fertilisers/ pesticides, siltation and intensive grazing, and managed via a long-term sensitive	the creation of perches for predators. Hedgerows surrounding the mitigation fields will be kept at a suitable height to ensure line-of-sight is maintained for birds. The LEMP would secure the proposed enhancement measures, and would include monitoring and contingency measures to ensure the effectiveness across the lifetime of the scheme.

			management plan. This will provide higher botanical diversity therefore supporting a greater abundance and diversity of invertebrate prey, vegetation and seeds.		
Ground-nesting birds (excluding lapwing, curlew, gadwall)	51.5ha of large, open fields will be retained and avoided Fields 211, 95, 102, 105, 124, 126, 134, 160, 170 and 173) for the duration of the Proposed Development. There will be no access for personnel and vehicles during construction, operation and decommissioning.	Vegetation clearance will be timed to avoid breeding bird season, or preceded with a check for nests. All active nests will be retained until all chick have fledged. To minimise displacement effects the Proposed Development will be phased to ensure not all fields are lost during one season and that fields are available each summer until	Grassland will still persist under the solar arrays, between blocks of panels, in rides and field margins/ buffers, which are likely to be used by ground-nesting species. These will also be managed sensitively under the LEMP to provide structural and botanical diversity, creating higher value foraging habitat than currently available.	The Proposed Development will retain and restore 10 fields for birds (exceeding 51.5ha) - Fields 211, 95, 102, 105, 124, 126, 134, 160, 170 and 173. Whilst not managed specifically for species such as skylark, are considered likely to	A new 'bee highway' will be created along the southern boundary, increasing the extent of available foraging habitat for birds from invertebrate and vegetable sources. All buffer zones adjacent to reens and to ditches would also be enhanced and planted up with a seed mix to create structural and botanical diversity and attract invertebrate prey. This represents a vast enhancement over baseline conditions.

		the development is complete. Minimum 3m gaps will be provided between rows of Solar Panels to provide potential habitat for skylarks. A LEMP will be implemented to ensure habitat management is timed to avoid sensitive breeding periods for birds.	55ha of arable will be reverted to grassland which will provide further grassland foraging habitat. The grasslands across the Site (both in panelled and non-panelled areas) will be restored through the reduction in agricultural land uses e.g. fertilisers/ pesticides, siltation and intensive grazing, and managed via a long-term sensitive management plan. This will provide higher botanical diversity therefore supporting a greater abundance and diversity of invertebrate prey,	provide some additional habitat for this species.	51.5ha of existing grassland will be enhanced through a suite of measures to support ground-nesting birds including a sensitive grazing regime (using cattle if possible) and the creation of scrapes. No trees or tall infrastructure will be introduced to prevent the creation of perches for predators. The LEMP will secure the proposed enhancement measures, and would include monitoring and contingency measures to ensure the effectiveness across the lifetime of the scheme.

			vegetation and seeds.		
Breeding lapwing, curlew and gadwall	51.5ha of large, open fields will be retained and avoided Fields 211, 95, 102, 105, 124, 126, 134, 160, 170 and 173) for the duration of the Proposed Development. All fields that have supported breeding lapwing on at least one occasion (124, 134, 126, 173, 105, 95, 102 and 211) have been excluded from the construction zone and will be avoided during works. There will be no access for personnel and vehicles during construction, operation and decommissioning. The inherent reen/ ditch buffers will protect nesting gadwall, except at crossing points for cables and new vehicular access points.	Development will be phased to reduce disturbance occurring at multiple locations concurrently e.g. when construction/ decommissioning activities lie adjacent to breeding sites – curlew are sensitive to visual disturbance at 200 – 300m and gadwall at 100-200m. Information will be provided within the detailed CEMP. Curlew are sensitive to noise 107-112dB within 100m. Measures will be implemented to control adverse noise effects close to the estuary. This may require avoidance of construction within	The grasslands across the Site (both in panelled and non-panelled areas) will be restored through the reduction in agricultural land uses e.g. fertilisers/ pesticides, siltation and intensive grazing, and managed via a long-term sensitive management plan. This will provide higher botanical diversity therefore supporting a greater abundance and diversity of invertebrate prey, vegetation and seeds. Reens/ ditches will be restored by removal of one	The bird mitigation fields will compensate for the loss of nesting habitat for birds such as curlew as they will provide in excess of the area of fields lost to this species. Scrapes and enhanced management will ensure the carrying capacity of these fields is increased.	Reens/ ditches will be restored through selective hedgerow removal. By removing the southern side of east-west double hedgerows, an increase in sunlight will reach the water, increasing water quality and floral diversity. In addition, less siltation will occur as a result of leaf litter, improving water quality for gadwall. 51.5ha of existing grassland will be enhanced through a suite of measures to support waders/ waterfowl. This will include a sensitive grazing regime (using cattle if possible) and the creation of scrapes. No trees or tall infrastructure will be introduced to

		fields where noise and visual disturbance would be significant during the breeding season. The Proposed Development will be phased to ensure not all fields are lost during one season. A LEMP will be implemented to ensure habitat management is timed to avoid sensitive breeding periods for birds. Vegetation clearance will be timed to avoid breeding bird season, or preceded with a check for nests. All active nests will be retained until all chick have fledged.	side of double hedgerows and desiltation providing enhanced water quality, water quantity and foraging for gadwall.		prevent the creation of perches for predators. Hedgerows surrounding the mitigation fields will be kept at a suitable height to ensure line-of-sight is maintained for birds. The LEMP would secure the proposed enhancement measures, and would include monitoring and contingency measures to ensure the effectiveness across the lifetime of the scheme.
Schedule 1 birds (Barn owl,	The inherent reen/ ditch buffers will protect high value habitat for	Known barn owl breeding sites will be buffered during	The Proposed Development is considered to	Scrub planting is proposed to	The LEMP will include a series of ditch enhancements

kingfisher and Cetti's warbler)	kingfisher and Cetti's warbler, except at crossing points for cables and new vehicular access points. Barn owl nesting sites will be avoided.	the breeding season by a minimum of 30m, to be detailed within a detailed CEMP. The reen/ ditch buffers will minimise disturbance to breeding Cetti's warbler and kingfisher. Vegetation clearance will be timed to avoid breeding bird season, or preceded with a check for nests. All active nests will be retained until all chicks have fledged. A LEMP will be implemented to ensure habitat management is timed to avoid sensitive breeding periods for birds**.**	provide enhanced habitat for Schedule 1 birds through the provision of reen buffers, hedgerow restoration, lower input land uses and sensitive long-term management. Areas of rough grassland will be created to provide enhanced foraging for barn owl. The grasslands across the Site (both in panelled and non-panelled areas) will be restored through the reduction in agricultural land uses e.g. fertilisers/ pesticides, siltation and intensive grazing, and managed via a long-term sensitive	compensate for loss of hedgerows habitat for Cetti's warbler. Hedgerow planting may be undertaken in suitable locations. No compensation is required for barn owl or kingfisher.	including desilting and opening up of the waterbody through hedgerow removal which is further likely to increase foraging resources and water quality for kingfisher. Tussocky grassland buffers would be created close to barn owl nesting sites to provide habitat for voles and other small mammals, thereby increasing the foraging resource for barn owl. New barn owl boxes would be placed within the Proposed Development. The LEMP would secure the proposed enhancement measures, and would include monitoring and contingency measures to ensure the effectiveness across the lifetime of the scheme.

			management plan. This will provide higher botanical diversity therefore supporting a greater abundance and diversity of invertebrate prey, vegetation and seeds. Reens/ ditches will be restored by removal of one side of double hedgerows and desiltation providing enhanced water quality, water quantity and foraging for kingfisher.		
Other breeding birds	The majority of higher value nesting habitat for other breeding birds, such as watercourses, hedgerows and field margins will be avoided during construction,	Vegetation clearance will be timed to avoid breeding bird season, or preceded with a check for nests. All	The Proposed Development is considered to provide enhanced habitat for breeding birds through the	Scrub planting is proposed to compensate for loss of hedgerow habitat and	A suite of habitat management measures will enhance the Site for breeding birds.

	operation and decommissioning through the provision of permanent buffers to reens/ ditches.	active nests will be retained until all chicks have fledged. The Proposed Development will be phased to ensure not all fields are lost during one season, ensuring that foraging opportunities within grasslands are still available. Indirect effects to breeding habitat for riparian species, including potential run-off, siltation and dust will be minimised through the provision of watercourse buffers and mitigation measures such as method statements/ detailed CEMP. These will remain vegetated to slow/ capture run-off. A LEMP will be implemented to	provision of reen buffers, hedgerow restoration, lower input land uses and sensitive long-term management. The grasslands across the Site (both in panelled and non-panelled areas) will be restored through the reduction in agricultural land uses e.g. fertilisers/ pesticides, siltation and intensive grazing, and managed via a long-term sensitive management plan. This will provide higher botanical diversity therefore supporting a greater abundance and diversity of invertebrate prey,	nest boxes will be installed during construction. Hedgerow planting may be undertaken in suitable locations. Retained hedgerows will be enhanced by infilling gaps with a mixture of native species.	This includes of a number of additional habitat creation/ enhancement measures, managed via the LEMP, which will deliver a range of benefits for birds, including the provision of higher quality, connected habitat, for example restored hedgerows, buffers to the retained hedgerows, reens and ditches, new areas of scrub and rough grassland. A new ‘bee highway’ will be created along the southern boundary, increasing the extent of available foraging habitat for birds from invertebrate and vegetable sources. Adjacent to this will be scrub habitat creating a mosaic of habitat types and structural diversity, with eco-tone habitats creating additional ecological

		ensure habitat management is timed to avoid sensitive breeding periods for birds.	vegetation and seeds.	niches for invertebrate prey. All buffer zones adjacent to reens and to ditches would also be enhanced and planted up with a seed mix to create structural and botanical diversity and attract invertebrate prey. This represents a vast enhancement over baseline conditions. Reens/ ditches will be restored through selective hedgerow removal. By removing the southern side of east-west double hedgerows, an increase in sunlight will reach the water, increasing water quality and floral diversity. In addition, less siltation will occur as a result of leaf litter, improving water quality for breeding ducks. New nest boxes would be placed within the

		Proposed Development on suitable trees. The LEMP will secure the proposed enhancement measures, and would include monitoring and contingency measures to ensure the effectiveness across the lifetime of the scheme.

9.12 Residual Effects and Conclusions

9.12.1 A summary of residual effects indicated by the preliminary assessment presented here are provided in **Table 9-14** and **Table 9-15,** below, for the construction/ decommissioning phases and operational phase, respectively.

Table 9-14: Summary of Residual Effects (Construction and Decommissioning)

Receptor	Description of Impact	Significance of effect without mitigation	Mitigation/Enhancement measure	Residual effect after mitigation
Severn Estuary Ramsar (ornithological features) and SPA	Noise disturbance to SPA/ Ramsar birds within the estuary	Adverse temporary but Significant at the National scale. In EIA terms this would be **Major Significant**.	Further assessment of noise and screening solutions to be assessed as part of ES.	Adverse temporary but Significant at the National scale. In EIA terms this would be **Major Significant** – to be further assessed as part of ES.
	Visual disturbance to SPA/ Ramser birds within the estuary	Negligible, Not Significant at any geographic scale	N/A	Negligible, Not Significant at any geographic scale
	Pollution/ siltation affecting supporting habitat of notified features.	Negligible, Not Significant at any geographic scale	N/A	Negligible, Not Significant at any geographic scale
Wintering shelduck, snipe and curlew	Noise disturbance to loafing/ foraging areas for	Adverse, temporary but Significant effect at the	Further assessment of noise and screening solutions to be assessed as part of ES.	Adverse, temporary but Significant effect at the

	shelduck, snipe and curlew resulting in displacement and reduction in available foraging habitat.	Local level. In EIA terms this would be **Minor Not Significant**.		Local level. In EIA terms this would be **Minor Not Significant** – to be further assessed as part
Wintering bird assemblage	Displacement effects due to noise/ visual disturbance.	Adverse, not Significant above the Site level. In EIA terms this would be **Negligible Not Significant.**	Further assessment of noise and screening solutions to be assessed as part of ES.	Adverse, not Significant above the Site level. In EIA terms this would be **Negligible Not Significant**.
Ground-nesting birds (excluding lapwing, curlew, gadwall)	Overall loss of nesting habitat.	Adverse significant at the Local level. In EIA terms this would be **Minor Not Significant**.	N/A	Adverse, significant at the Local level. In EIA terms this would be **Minor Not Significant**.
Breeding lapwing, curlew and gadwall	Noise/ visual disturbance at nesting sites.	Adverse, temporary, short-term, effects o that are Not Significant above the Site level. In EIA terms this would be **Negligible Not Significant**.	N/A	Adverse temporary, short-term, effects on breeding lapwing, curlew and gadwall that are Not Significant above the Site level. In EIA terms this would be **Negligible Not Significant**.

Schedule 1 birds (Barn owl and Cetti's warbler)	Disturbance of nests by dust, noise, personnel and moving plant.	Adverse, temporary, short-term, effects that are Not Significant above the Site level. In EIA terms this would be **Negligible Not Significant**.	N/A	Adverse, temporary, short-term, effects that are Not Significant above the Site level. In EIA terms this would be **Negligible Not Significant**.
Other breeding birds	Destruction of nests/ eggs	Negligible, not significant at any geographic scale. In EIA terms this would be **Negligible Not Significant**.	N/A	Negligible, not significant at any geographic scale. In EIA terms this would be **Negligible Not Significant**.
	Overall loss of nesting habitat (hedgerows)	Adverse, short to medium term impact, Significant at the Local level. In EIA terms this would be **Minor Not Significant**.	Existing hedgerow gaps will be infilled and new scrub planted.	Negligible, not significant. In EIA terms this would be **Negligible Not Significant**.

Table 9-15: Summary of Residual Effects (Operation)

Receptor	Description of Impact	Significance of effect without mitigation	Mitigation/Enhancement measure	Residual effect after mitigation
Severn Estuary Ramsar (ornithological	None predicted	Negligible, Not significant at any	N/A	Negligible, Not significant at any

features) and SPA		geographic scale. In EIA terms this would be **Negligible Not Significant**.		geographic scale. In EIA terms this would be **Negligible Not Significant**.
Wintering shelduck, snipe and curlew	Overall loss of habitat for snipe.	Adverse and Significant at the Local level. In EIA terms this would be **Minor Not Significant**.	None proposed.	Adverse and Significant at the Local level (on snipe only). In EIA terms this would be **Minor Not Significant**.
Wintering bird assemblage	Overall loss of hedgerow habitat for foraging species such as thrushes Overall increase in foraging within grassland habitat.	Beneficial and potentially Significant at the Local level. In EIA terms this would be **Minor Not Significant**.	N/A	Beneficial and potentially Significant at the Local level. In EIA terms this would be **Minor Not Significant**.
Ground-nesting birds (excluding lapwing, curlew, gadwall)	Overall loss of available nesting habitat (large, open fields) Increase in quality of foraging habitat.	Beneficial effect, Significant at the Local level. In EIA terms this would be **Minor Not Significant**.	N/A	Beneficial effect, Significant at the Local level. In EIA terms this would be **Minor Not Significant**.
Breeding lapwing, curlew and gadwall	No adverse effects predicted.	Negligible effect which is Not Significant at any	N/A	Negligible effect which is Not Significant at any

		geographic scale. In EIA terms this would be **Negligible Not Significant**.		geographic scale. In EIA terms this would be **Negligible Not Significant**.
Schedule 1 birds (Barn owl and Cetti's warbler)	Increase in foraging habitat and quality of foraging resource.	Beneficial effect which could be Significant at the Local scale. In EIA terms this would be **Minor Not Significant**.	N/A	Beneficial effect on breeding Schedule 1 birds which could be Significant at the Local scale. In EIA terms this would be **Minor Not Significant**.
Other breeding birds	Increase in foraging habitat and quality of foraging resource.	Beneficial effect which could be Significant at the Local. In EIA terms this would be **Minor Not Significant**.	N/A	Beneficial effect which could be Significant at the Local. In EIA terms this would be **Minor Not Significant**.

9.13 Cumulative Effects

9.13.1 A preliminary assessment has been undertaken which examines the result from the cumulative effects of the Proposed Development with other developments on each Important Ecological Feature.

9.13.2 A short list of developments that may interact with effects on ecological features of the Proposed Development is presented in **Chapter 5: Environmental Impact Assessment Methodology)**. This equates to c. 200 approved (within the past five

years) and pending planning applications across the councils of Newport, Monmouthshire, Torfaen, Bristol City Council and North Somerset Council.

9.13.3 Only developments in the short list that fall within the Proposed Developments ZoI, as defined in **Paragraph 9.5.9** have the potential to result in cumulative effects with the Proposed Development. All developments falling outside the ZoI are excluded from this assessment. To further refine the list, the development description and location was reviewed and sites excluded where the development type was unlikely to have impacts on birds or ornithological features of designated sites, for example development sites away from the estuary that comprised householder developments, developments resulting in only small-scale land-take, domestic (small-scale) solar, developments within urban areas, change of use and refurbishment/ conversion of existing buildings.

9.13.4 In relation to pollution effects, it is assumed that the other developments will be designed and constructed in accordance with best practice guidance and that a detailed CEMP would be followed during the construction phase, such that the risk of cumulative pollution incidents will be low and there should not be potential for a significant cumulative effect.

9.13.5 On the basis of the above, the developments listed in **Table 9-16**, from the original short list, are scoped into the assessment, and will be addressed for cumulative effects within the ES Chapter.

9.13.6 The main impacts relate to cumulative displacement effects, i.e. birds being displaced from multiple sites concurrently due to construction being undertaken at the same time. In addition there will be an overall loss of habitat for snipe. It is considered that the cumulative effect could be **Significant**, at least at the **Local** scale.

Table 9-16 – Developments to be Considered for Cumulative Effects

Project	Planning Reference	Address	Status	Scoping	Further assessment
Newport City Council					
Battery energy storage system with associated infrastructure and works.	23/0949	Land At Uskmouth Power Station West Nash Road Nash Newport South Wales	Approved - 11/01/2024	The associated EcIA with reference to wintering birds, stated “Individuals displaced from areas closest to the development would be expected to use adjoining habitat within the wider area.” Therefore there could be cumulative displacement effects.	Yes – cumulative displacement effects.
Proposed solar development, new access and associated works.	21/0346	Land To West Of Docks Way Disposal Site Docks Way Newport South Wales	Approved - 01/12/2021	Cumulative loss of land for birds.	Yes– cumulative displacement effects.
Monmouthshire County Council					
The construction of industrial develoA20, B2 and B8 use and associated access, access road, parking, landscaping, swale and associated works. The	DM/2025/00852	Gwent Europark Bareland Street Magor NP26 3DB	Pending Consideration-Recommendation and/or Committee	NRW: “We advise that further information regarding overwintering birds is required to understand any potential effects the development may have on the SPA/Ramsar site.”	Yes – cumulative displacement effects.

proposal will deliver a combined total of 7,538m2 of industrial floorspace (B1, B2 and B8), 1,120m2 of open storage provision, and 330m2 of office accommodation.					
Proposed erection of 3 additional storage tanks and associated works.	DM/2025/00251	Magor Brewery Effluent Treatment Plant Newport Road Magor Monmouthshire NP26 3RA	Pending Consideration-Recommendation and/or Committee	Ecology officer: Insufficient information has been provided for the Local Planning Authority to carry out a Habitats Regulations Assessment. No assessment on wintering birds or shrill carder bee. NRW: We cannot rule out the proposal having a likely significant effect on the Severn Estuary SAC, the Severn Estuary SPA and the Severn Estuary Ramsar site at this stage	Yes – cumulative displacement effects.
South Gloucestershire Council					
Enhanced restoration of a former landfill Site with the importation of approximately 175,000m3 of	P25/01639/MW	Former Landfill Site Known As Northwick Landfill Severn Road Pilning South Gloucestershire	Awaiting decision	Ecology officer has concerns re impacts to Severn Estuary marine site.	Yes – cumulative displacement effects. Insufficient information

restoration materials.					available at this stage.
DNS					
Erection of a solar farm comprising ground mounted, fixed position solar panels, with a combined installed generating capacity of up to 99.9 MW, underground cabling, grid connection, associated infrastructure, landscaping and environmental enhancements, for a period of up to 40 years.	DNS/3279787 - Craig y Perthi Solar Farm	Land between the M4 Motorway and the South Wales Main Line Railway, near Llanwern, Underwood and Bishton	Awaiting Decision	The sHRA submitted with the application rules out adverse effects based on mitigation provided e.g. bird mitigation fields, however there would be potential for displacement effects during construction. Minor negative effect on ground nesting species e.g. skylark. Adverse residual impacts on the ornithological interest of the application area would be limited to the displacement of breeding and wintering lapwing and wintering snipe.	Yes – there is potential for adverse effects on wintering birds where the construction periods for the Proposed Development overlaps specifically with construction of this development e.g. through displacement/ disturbance effects. Overall loss of habitat for snipe
The installation of a solar park with an approximate design capacity of 75MW.	DNS/3220457 - Rush Wall Solar Park Ltd	Land near the village of Redwick, south east of Newport,	Examination	The effects to passage and wintering SPA assemblage species at the Rush Wall Solar Park were assessed as being adverse, short term and not significant to wintering	No Cumulative Impacts anticipated

Development includes ancillary electrical equipment and infrastructure, access tracks, security fencing and CCTV.		Wales on the Caldicot Levels		and passage birds of the SPA during construction. All other impacts to the SPA or SPA species were considered negligible and not significant.	
Erection of a Renewable Energy Hub comprising ground mounted solar panels, battery storage units (160 units) with a combined installed generating capacity of up to 125MW, underground cabling, grid connection hub, associated infrastructure, landscaping and environmental enhancements for a temporary period of 40 years	DNS/3216558 - Wentlooge - Renewable Energy Hub	Land on the Wentlooge Levels to the West of Hawse Lane	Appealed and resubmitted	The ES states that following mitigation the only adverse effects on birds are loss of wintering habitat for lapwing. Whilst this is not an SPA named species, it is part of the assemblage.	As the Proposed Development will not have adverse effects on wintering lapwing, no cumulative effects are predicted.
Renewable Energy & Green Hydrogen Production Facility including ground-	DNS CAS-01960-J2H3X5 - Magor Net Zero	Land at Magor, Monmouthsire	Not Progressed	Only scoping report available. Severn Estuary/ impacts to birds scoped in however further information on wintering bird surveys	Insufficient information available at this stage.

mounted solar PV, wind turbine, hydrogen electrolysers, hydrogen and energy storage and ancillary and associated infrastructure and cabling.		or assessment of effects not available.

9.14 Further Survey Work

9.14.1 Further work that will be undertaken to support the ornithology assessment and presented within the ES is set out below.

- Update desk study;
- Update nocturnal bird surveys;
- Update breeding bird surveys; and
- Update wintering bird surveys.

9.15 Summary

9.15.1 A preliminary assessment of the likely effects arising from construction, operation and decommissioning of the Proposed Development on important ornithological receptors has been undertaken.

9.15.2 The Proposed Development includes a range of embedded mitigation measures designed to reduce environmental effects on these receptors including inherent buffers, avoidance of key fields used by wading birds, and a detailed CEMP and LEMP to manage adverse effects.

9.15.3 Further information will be gathered to inform the ES, particularly surrounding the effects of noise on wintering birds both associated with the Severn Estuary SPA and birds using the Site itself, which will be used to design appropriate buffers or mitigation measures within the detailed CEMP.

9.15.4 Several beneficial effects are predicted during operation through the management of the Site, including a reduction in agricultural inputs, desilting of watercourses and sensitive management of grasslands and buffers, bringing in additional foraging opportunities for birds. In addition, the management of 51.5ha of land especially for wading birds will enhance the site by providing areas of shallow water (scrapes), low intensity grazing and increased invertebrate prey, managed via a LEMP

9.15.5 Further work to be completed and included in the ES includes:

- Continued consultation with stakeholders to discuss the Proposed Development and proposed mitigation;
- Further ornithological surveys as detailed above;
- An assessment on noise effects at key ornithological receptors.
- Further refinement of the LEMP and detailed CEMP to reduce ecological impacts.
- Potential for additional mitigation for snipe.
- Further refinement of the crossing schedule to reduce impacts of hedgerow loss and the species which rely upon them.

9.16 References

Ref 9-1 Directive (EU) 2009/147/EC on the conservation of wild birds (2009) Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147 [Accessed November 2025].

Ref 9-2 Convention on wetlands of international importance especially as waterfowl habitat (1971) Treaty no. 14583. Available at: https://treaties.un.org/doc/Publication/UNTS/Volume%20996/volume-996-I-14583-English.pdf [Accessed November 2025].

Ref 9-3 The Conservation of Habitats and Species Regulations (2017) Available at https://www.legislation.gov.uk/uksi/2017/1012/contents [Accessed November 2025].

Ref 9-4 Wildlife and Countryside Act (1981) Available at https://www.legislation.gov.uk/ukpga/1981/69 [Accessed November 2025].

Ref 9-5 Environment (Wales) Act (2016). Available at: https://www.legislation.gov.uk/anaw/2016/3/contents [Accessed November 2025].

Ref 9-6 Llywodraeth Cymru Welsh Government (2021) Future Wales: The national plan 2040, GOV.WALES. Available at: https://www.gov.wales/future-wales-national-plan-2040-0 [Accessed November 2025].

Ref 9-7 Llywodraeth Cymru Welsh Government (2024) Planning Policy Wales, GOV.WALES. Available at: https://www.gov.wales/planning-policy-wales [Accessed November 2025].

Ref 9-8 Llywodraeth Cymru Welsh Government (2025) Technical Advice Note 5 (Nature, Conservation and Planning), GOV.WALES. Available at https://www.gov.wales/technical-advice-note-tan-5-nature-conservation-and-planning [Accessed November 2025].

Ref 9-9 Monmouthshire County Council (2025) Monmouth Adopted Local Development Plan (2011-2021) Adopted February 2014. Available at https://www.monmouthshire.gov.uk/planning-policy/monmouthshire-local-development-plan/ [Accessed November 2025].

Ref 9-10 Newport City Council (2025) Newport Local Development Plan (2011-2026) Adopted Plan, January 2015. Available at https://www.newport.gov.uk/planning/planning-policy/local-development-plan/local-development-plan-adoption [Accessed November 2025].

Ref 9-11 Department for Energy Security and Net Zero (2024) Overarching national policy statement for energy (EN-1), GOV.UK. Available at:

https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1 [Accessed November 2025].

Ref 9-12 Department for Energy Security and Net Zero (2024a) National policy statement for Renewable Energy Infrastructure (EN-3), GOV.UK. Available at: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3 [Accessed November 2025].

Ref 9-13 Department for Energy Security and Net Zero (2023) National policy statement for Electricity Networks Infrastructure (EN-5), GOV.UK. Available at: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5 [Accessed November 2025].

Ref 9-14 CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, version 1.3. Chartered Institute of Ecology and Environmental Management, Winchester.

Ref 9-15 Edwards, S. (2022) The Greater Gwent Nature Recovery Action Plan. Available at: https://www.blaenau-gwent.gov.uk/media/xdndjdto/greater-gwent-nature-recovery-action-plan.pdf [Accessed November 2025].

Ref 9-16 Newport City Council (2025) Biodiversity. Available at: https://www.newport.gov.uk/environment/biodiversity [Accessed November 2025].

Ref 9-17 Monmouthshire County Council (2024) Biodiversity and Ecosystem Resilience Forward Plan. Available at: https://democracy.monmouthshire.gov.uk/documents/s38174/Appendix%201%20Biodiversity%20Ecosystems%20Resilience%20S6%20Forward%20plan%202024.pdf [Accessed November 2025].

Ref 9-18 BSI (2013) BS42020:2013 Biodiversity. Code of practice for planning and development. British Standards Institution, London, UK.

Ref 9-19 BRE (2014) Biodiversity Guidance for Solar Developments. Eds G E Parker and L Greene.

Ref 9-20 Gilbert G., Gibbons D.W. and Evans J. (1998) Bird Monitoring Methods: A manual of techniques for key UK species. RSPB, Sandy.

Ref 9-21 Shawyer C (2012). Barn Owl Tyto alba Survey Methodology and Techniques for use in Ecological Assessment. Wildlife Conservation Partnership.

Ref 9-22 Welsh Government (2024) Planning Policy Wales. Edition 12. Cardiff: Welsh Government.

Ref 9-23 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

Ref 9-23 Stanbury A.J., Burns F., Aebischer N.J., Baker H., Balmer D.E., Brown A., Dunn T., Lindley P., Murphy M., Noble D.G., Owens R. and Quinn L. (2024) The status of the UK's breeding seabirds: an addendum to 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 117: 471-487.

Ref 9-24 Johnstone, I.G., Hughes, J., Balmer, D.E., Brenchley, A., Facey, R.J., Lindley, P.J., Noble, D.G. and Taylor, R.C. (2022). Birds of Conservation Concern Wales 4: the population status of birds in Wales. Milvus: the Journal of the Welsh Ornithological Society. Available at: https://tinyurl.com/BoCCW4 [Accessed November 2025].

Ref 9-25 Natural England and Countryside Council for Wales (2009) The Severn Estuary / Môr Hafren European Marine Site. Available at: https://naturalresources.wales/media/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-june-09.pdf [Accessed November 2025].

Ref 9-26 Calbrade, N.A., Birtles, G.A., Woodward, I.D., Feather, A., Hiza, B., Caulfield, E., Balmer, D.E., Peck, K., Wotton, S.R., Shaw, J.M., and Frost, T.M. 2025. Waterbirds in the UK 2023/24: The Wetland Bird Survey and Goose & Swan Monitoring Programme. BTO/RSPB/JNCC/NatureScot. Thetford. Available at: https://app.bto.org/webs-reporting/principal.jsp [Accessed November 2025].

Ref 9-27 TIDE (2025) Waterbird Disturbance & Mitigation Toolkit. Available at: https://www.tide-toolbox.eu/tidetools/waterbird_disturbance_mitigation_toolkit/ [Accessed November 2025].

Ref 9-28 Natural England (2015) Site Improvement Plan: Severn Estuary Mor Hafren (SIP213). Available at: https://publications.naturalengland.org.uk/publication/4590676519944192 [Accessed November 2025].

Ref 9-29 Goodship, N.M. and Furness, R.W. (MacArthur Green) (2022) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

Ref 9-30 Peschel, R., Peschel, T., Marchand, M. and Hauke, J. (2019) Solar parks-profits for bio-diversity. Association of Energy Market Innovators. Available at:

https://www.bneonline.de/fileadmin/user_upload/201911_bne_study_biodiversity_profits_from_pv.pdf (Accessed 10/02/24) [Accessed November 2025].

Ref 9-31 Wiącek, J. (2023). How farmland birds react to traffic noise?. Belgian Journal of Zoology, 153. https://doi.org/10.26496/bjz.2023.108

Ref 9-32 Barn Owl Trust (2025) Ground-mounted solar panels and Barn Owls. Available at: https://www.barnowltrust.org.uk/barn-owls-ground-mounted-solar-panels/ [Accessed November 2025].

Ref 9-33 Jarčuška, B., Gálffyová, M., Schnürmacher, R., Baláž, M., Mišík, M., Repel, M., Fulín, M., Kerestúr, D., Lackovičová, Z., Mojžiš, M. and Zámečník, M. (2024) Solar parks can enhance bird diversity in agricultural landscape. Journal of Environmental Management, 351, p.119902.