

Regener8 Rhigos

Rhigos Road Solar Farm **Landscape and Ecological** **Management Plan**

Final report

Prepared by LUC

April 2023



Regener8 Rhigos

Rhigos Road Solar Farm Landscape and Ecological Management Plan

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Chapter 1

Introduction

Scope

1.1 In May 2022, LUC was appointed by Regener8 Power to prepare a Landscape and Ecological Management Plan (LEMP) of a parcel of land adjacent to Rhigos Road, hereafter referred to as 'the Site'. This input was required to inform a planning application for a new solar farm at the Site.

1.2 The purpose of this LEMP is to set out habitat creation and protection measures, as well as to outline the management and monitoring required to deliver ecological enhancements in the long term. The LEMP has been designed to improve and maximise the landscape value and ecological value of the Site.

1.3 This LEMP also presents a summary of the existing conditions and ecological protection, creation and enhancement measures identified as part of the Ecological Assessment Report¹.

1.4 The LEMP has been informed by the following documents:

- The **Rhigos General Layout Drawing, ref: P_Rhigos_General Layout_RevG-General Layout**, a copy of which is provided in **Appendix A**.
- The **Regener8 Rhigos Landscape Plan and Planting Schedule, Drawing Number 12057-LD-PLN-100, P03**, a copy of which is provided in **Appendix A**.
- The **Regener8 Rhigos: Ecological Assessment Report (LUC, 2023)**, a copy of which is provided in **Appendix B**.

Site Description

1.5 The Site lies to the east of the village of Rhigos, Aberdare, immediately south of Rhigos Road (OS grid reference: SN 93468 05732). The Site comprised species-poor semi-improved grassland fields, which were nutrient enriched, had a low sward height and were used for sheep grazing. These fields were bordered by drainage ditches and hedgerows. Small parcels of broadleaved and mixed woodland were present along the Site boundaries in the west and south-east. To the east and south-east was a stream and a series of standing waterbodies.

¹ LUC (December 2022). Regener8 Rhigos: Ecological Assessment Report. LUC, London.

1.6 Immediately to the north and east of the Site, within the same land ownership, were additional fields used for grazing, a series of waterbodies with reedbed and other marginal habitats, a stream connecting these waterbodies, areas of broadleaved woodland and scrub and areas of marshy grassland. To the east of the Site, along the A4061, was a particularly large area of marshy grassland dominated by rushes, which (along with the largest waterbody and associated marginal habitat) formed part of the Hirwaun Common Site of Importance for Nature Conservation (SINC).

1.7 To the north of the Site, outside of the land ownership, lies Rhigos Road and a small area of woodland which backed onto an industrial estate and urban area. To the east an electricity sub-station and beyond that a large quarry. In the south and west of the Site was additional farmland habitats in the form of sheep grazed fields and associated woodland and hedgerow habitat.

Project Description

1.8 The current proposals include the use of all fields within the Site for the construction of a solar farm. The proposals also include use of an existing access route, connecting up to the A4061 in the south-east.

1.9 The existing hedgerows are to be retained and access within the solar farm utilises existing field entrances, in order to prevent fragmentation of hedgerows. Habitats immediately adjacent to the Site, such as woodland edge, waterbodies and watercourses will also be retained and protected. Ecological enhancements will include: the creation of species-rich grassland beneath the solar arrays (using a locally sourced wildflower seed mix, appropriate to the Site and local area); enhancement of the hedgerows into a native species-rich composition; and provision of bat and bird boxes on mature trees beyond the Site boundary (within the same landownership).

Legislation and Planning Policy

1.10 This report has been prepared in cognisance of relevant legislation and policy. Further detail is provided in the **Ecological Assessment Report in Appendix B**. The primary documents of relevance are outlined below:

- The Conservation of Habitats and Species Regulations 2017 (SI 2017/1012), as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (SI 2019/579);
- The Countryside Rights of Way Act 2000;
- The Wild Mammals (Protection) Act 1996;
- Species and Habitats of Principal Importance for Conservation in England and Wales;

- The National Planning Policy Wales (PPW) 2021;
- National Development Framework (Future Wales – the National Plan 2040);
- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Environment (Wales) Act 2016; and
- Priority Species UK Post-2010 Biodiversity Framework.

Report Structure

1.11 The report is structured as follows:

- **Chapter 2: Vision and Objectives** – This Chapter sets out the vision for the landscape and ecological enhancement and subsequent objectives, which form the basis of the subsequent Sections.
- **Chapter 3: Ecology and Landscape Baseline** – This Chapter sets out the baseline ecological and landscape data for the Site, thereby outlining the key drivers of the LEMP.
- **Chapter 4: Retention, Protection, Enhancement and Creation** – This Chapter sets out which habitats will be retained, protected, created and enhanced within the Site. Measures for protection and establishment of new habitats are provided as well as measures to protect the species associated with these habitats. This section also details the biodiversity enhancements, including the creation of new habitats and the installation of species-specific features such as bat and bird boxes.
- **Chapter 5: Management and Monitoring** – This Chapter sets out how each habitat will be managed to maximise its ecological and landscape value, including the management of existing retained habitats to ensure their value is enhanced, and monitoring measures are specified along with measures to control invasive species.

Chapter 2

Vision and Objectives

2.1 This section sets out the landscape and ecological enhancement vision and objectives.

Vision

2.2 The vision for this project is to build a solar farm whilst remaining sensitive to the existing landscape and local character. The design proposals draw on the information provided in the Ecological Assessment Report, to protect and enhance the ecological value and connectivity of the habitats within and around the Site.

Objectives and Design Approach

2.3 The landscape plan to deliver this vision ensures that a strong and resilient framework for development is provided. The proposals are informed by landscape and ecological assessments and aim to realise the opportunities identified in these, reinforcing, extending and enhancing landscape and ecological assets in an integrated manner.

2.4 The landscape plans show a range of measures to enhance the Site's ecological value, including enhancement of the existing poor semi-improved grassland into species-rich grassland, enhancement of the existing hedgerows to make them native species-rich, and the provision of bat and bird boxes.

Aims

2.5 The aim of the LEMP is to ensure appropriate protection and enhancement of biodiversity, to make appropriate provision for natural wildlife within the solar farm and its surroundings, and to provide a reliable process for implementation and aftercare, which will secure an enhancement for biodiversity.

Objectives

2.6 The Landscape Proposals for the Site develop and enhance the key strands of the strategy, particularly in relation to:

- Conserving the existing landscape character of the Site.
- Strengthening the ecological connectivity within the Site and immediate surroundings, for a range of species including bats and birds, through the enhancement of the existing hedgerows and grassland enhancement.

- Enhancing the existing habitats on Site, through the enhancement of the existing poor semi-improved grassland into species-rich grassland, the enhancement of the existing hedgerows to make them species-rich, and the provision of bat and bird boxes.
- Taking measures to promote the successful establishment and growth of all new landscaping by providing appropriate long-term management measures.
- Taking measures to use species of local provenance in the landscape scheme, including locally sourced grassland seed mixes, to reinforce local distinctiveness and character.
- Ensure the protection and management for target species/groups, including bats, badger, birds, invertebrates and flora, in line with legislative and policy requirements.
- Contributing to local Biodiversity Action Plan targets and strategies, by increasing biodiversity and providing enhancements for species and habitats listed on those plans.
- Providing a mechanism for management, monitoring and reviewing the implementation of the LEMP to ensure long-term success.

The Responsibilities

2.7 LUC is responsible for the production of this LEMP. LUC's point of contact details are:

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Principal Ecologist

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2.8 The delivery of the LEMP will be the responsibility of Regener8 Power or their appointed contractor.

Chapter 3

Ecology and Landscape Baseline

3.1 This Chapter sets out the baseline ecological and landscape data for the Site, thereby outlining the key drivers of the LEMP. Detailed habitat descriptions and information regarding protected species surveys can be found within the **Ecological Assessment Report in Appendix B**.

Ecology and Landscape Baseline

Habitats

3.2 The following habitats were recorded within the Site during the Phase 1 Habitat Survey (while considering this information, reference should be made to the **Phase 1 Habitat Survey Map, target notes and full habitat descriptions within the Ecological Assessment Report, in Appendix B**):

- All fields within the Site comprised **poor semi-improved grassland**, which were heavily sheep grazed with a sward height of less than 10cm. Species composition comprised dominant perennial rye-grass *Lolium perenne*, and Yorkshire fog *Holcus lanatus*, abundant sweet vernal grass *Anthoxanthum odoratum*, and white clover *Trifolium repens*, frequent crested dogs-tail *Cynosurus cristatus*, and bent grass *Agrostis* sp., and occasional soft rush *Juncus effusus*.
- The fields were bordered by **species-poor hedgerows**, which were all fenced off to prevent sheep access. The majority of the hedgerows were associated with a drainage ditch, which were dry in the higher altitudes but occasionally wet in the lower altitudes. Species recorded included dominant hawthorn *Crataegus monogyna*, and blackthorn *Prunus spinosa*, with occasional rowan *Sorbus aucuparia*, pedunculate oak *Quercus robur*, and rarely dog rose *Rosa canina*. Ivy *Hedera helix*, docks *Rumex* sp., and bramble *Rubus fruticosus* agg., were also frequent across the hedgerows.
- To the east and south of the fields was a **bare earth access track** with occasional patches of poor semi-improved grassland, leading south-eastwards to connect the Site with the A4061 (target note 6 in the Ecological Assessment Report). The track also ran northwards, past the ponds, to connect to Rhigos Road.

3.3 Beyond the Site boundary but within the same landownership, the following habitats were present: a large area of marshy grassland to the east of the Site; small patches

of broadleaved, mixed woodland and scrub; a stream along the eastern boundary of the Site; and a series of waterbodies to the east and north of the Site, which were associated with the stream and included areas of dense marginal vegetation and reedbed. The largest of these waterbodies (to the north of the Site) and the marshy grassland (to the east of the Site) formed part of the Hirwaun Common Site of Importance for Nature Conservation (SINC).

Protected and Notable Species

3.4 The Desk Study and the site visit (conducted on the 25th May 2022) identified the following protected or notable species/species groups as potentially present at the Site and with potential to be impacted by the works:

- Bats;
- Badger;
- Great Crested Newt *Triturus cristatus*;
- Reptiles;
- Birds;
- Dormouse *Muscardinus avellanarius*;
- Otter *Lutra lutra*;
- Water vole *Arvicola amphibius*; and
- Marsh fritillary.

3.5 The implementation of mitigation, compensation and enhancement is discussed in the Ecological Assessment Report.

Bats

Bat Roost Suitability – Trees

3.6 Very few trees were located within the Site itself and none of these had BRS. Two of the trees immediately adjacent to the western Site boundary were assessed to have low BRS. This included an alder tree in the south-west corner of the Site where a branch had split from the trunk and a willow tree in the woodland on the western edge of the Site where a branch had split.

Foraging and Commuting Habitat

3.7 The grassland habitats within the Site and the immediate surroundings, which were kept short due to sheep grazing, were of low suitability for bats due to a lack of structural and floral diversity (likely corresponding to a lack of abundance and diversity in insect prey).

3.8 The hedgerows provided suitable habitat for foraging and commuting bats, however, this was limited due to the fact they

were relatively low in height (less than 2m) and were species-poor. The woodland areas, stream and waterbodies beyond the Site boundaries provided sheltered foraging and commuting opportunities for a range of bat species. These features were connected to other suitable habitats for bats in the wider landscape, contributing to the network of available commuting routes for bats.

Badger

3.9 No evidence of badger activity within the Site was noted during the survey and no badger setts were identified within the Site or the immediate surroundings. The Site provided limited habitat for badger sett building, due to the poor drainage across the Site and lack of shelter. It is therefore considered unlikely that badgers would use these areas for sett building, however, it is likely that this species will occasionally visit the Site for commuting or foraging.

Great Crested Newt

3.10 The majority of the Site comprised open grassland with a short sward due to sheep grazing, therefore provided very limited sheltering and foraging opportunities for GCN. The hedgerows and woodland areas provided connectivity across the Site for GCN as well as sheltering and foraging habitat.

3.11 The marshy grassland fields to the north and east of the Site comprised tussocky grassland dominated by rush species and limited sheep grazing. These areas provided high quality terrestrial habitat for GCN with an abundance of sheltering and foraging opportunities available.

3.12 No ponds were present within the Site, however eleven ponds were present within 500metres of the Site boundary, four of which were within the same ownership. A series of wet and dry ditches were present along field boundaries, both within the Site and the surroundings, which were considered to be of poor suitability for GCN. Six of the eleven ponds were tested for GCN environmental DNA (eDNA) and all of these returned a negative result, indicating that GCN are likely absent from the Site and immediate surroundings. Access to the remaining five ponds within 500metres of the Site was requested but not granted.

Reptiles

3.13 The majority of the Site comprised poor semi-improved grassland, which was kept short by sheep grazing. These areas provided limited shelter for reptiles and limited suitability for basking. The hedgerow and woodland areas bordering the sheep grazed fields provided sheltering suitability, however there were limited basking opportunities due to dense vegetation and canopy cover.

3.14 There was an access track running from the north of the Site by the fishing lake, along the eastern boundary to the

centre of the Site. This was made up of stone and bare ground and provided basking opportunities for reptiles, though was subject to occasional disturbance from vehicles and walkers.

3.15 The ponds and the marshy grassland to the north and east of the Site was suitable for basking, foraging and sheltering reptiles with long tussocky grassland/rush vegetation. In addition, three log piles were present within the northern field and were suitable for sheltering or torpor.

Birds

3.16 The hedgerows within the Site and the habitats beyond the site boundary (such as tussocky grassland and woodland) provided optimum habitat for common species of woodland and farmland birds to forage and build nests. These habitats were well connected to other suitable habitats for these species in the wider landscape. Beyond the Site boundary, suitable habitat for wetland birds was present in the form of a number of connected ponds and marshy grassland habitat.

3.17 Of the 29 bird species recorded using the Site, at least 21 were considered likely to nest within the Site. A further eight species include the Site within a breeding territory and may nest within the Site, although no evidence of such was recorded. In line with the Breeding Diversity Importance Thresholds, the Site is considered to have a Local level of Importance. No species were present in numbers approaching the 1% national breeding population level.

3.18 No nationally rare birds were recorded. Nationally rare birds are those considered to number 1000 or fewer breeding pairs nationally. A total of two red listed Birds of Conservation Concern were recorded within the Site. A further eight amber listed species were also recorded within the Site. Red listed species are those whose breeding range or population has declined by 50% or more in the preceding 25 years.

3.19 Bird activity was mainly focussed around the field margins. No ground-nesting activity was recorded within the Site and the only ground nesting birds recorded were mallard and coot, which were likely associated with the nearby waterbodies.

Dormouse

3.20 No records for dormouse were returned within the Desk Study. The hedgerows within the Site provided suitable habitat for dormouse nest building, foraging and dispersal, though these opportunities were sub-optimal due to the low plant species diversity, which would be unlikely to offer a reliable food supply throughout the whole length of the active season. The habitats immediately adjacent to the Site also provided opportunities for dormouse and the Site was well connected to other suitable habitats in the surrounding landscape.

Otter

3.21 No signs of otter were observed during the surveys, despite a search being undertaken. The pond to the north of the Site provided suitable foraging opportunities for otter due to the presence of fish. However, resting opportunities were limited due to the exposed nature of the pond margins and regular informal access from members of the public. Connectivity to the pond was limited, due to the shallow, narrow and exposed structure of the stream to the east of the Site and lack of other suitable aquatic habitats in the surrounding landscape. It is therefore considered unlikely that otter would be present within the Site or immediate surroundings, and as such, this species is not considered further in this LEMP.

Water Vole

3.22 No signs of water vole were identified during the survey in any of the ponds, the stream or the wet ditches within the area surveyed. Occasional signs of field or bank vole were noted around the margins of the ponds.

3.23 The aquatic habitats within the survey area provided optimum foraging habitat for water vole, with dense marginal habitats dominated by rushes and grasses. These habitats were well connected to each other, though connectivity to other suitable habitats within the wider landscape was more limited.

3.24 Burrowing opportunities for water vole were limited throughout the survey area, which is likely to account for the absence of identified field signs. Pond 1 had shallow margins and therefore lacked the built-up earth banks usually favoured by this species. In addition, this pond was regularly subject to informal access from members of the public. The other ponds within the area surveyed and the stream and wet ditches appeared to be artificially constructed, or at least reinforced, with dry stone slopes, creating densely rocky bank habitats. As a result, these habitats had very limited earth substrate and likely prevented the creation of burrows and runs characteristic of water vole. The locations of the ponds and watercourses are provided in **Figures 2 and 5 or the Ecological Assessment Report in Appendix B.**

Marsh Fritillary

3.25 No marsh fritillary butterflies were observed during either site visit. A thorough search of the poor semi-improved grassland fields within the Site did not identify any devil's bit scabious or marsh violet *Viola palustris*, which are the food

plants of marsh fritillary. These fields were intensively sheep grazed, making them unsuitable for this species².

3.26 More suitable habitat for marsh fritillary was present beyond the Site boundary, within the same land ownership, in the form of tussocky and marshy grassland to the north and particularly to the east. No devil's bit scabious, or marsh violet, were identified within these areas, though the large expanse of marshy grassland to the east was not searched extensively and therefore presence cannot be ruled out. The marshy grassland appeared to be primarily cattle-grazed and formed part of the Hirwaun Common SINC, which stretched further east beyond the A4061. One marsh fritillary butterfly has been recorded within this SINC, though information on the exact location of this record was not available (most likely further east within land that has public access). It is therefore possible that marsh fritillary may be present in low numbers within the land to the north and east of the Site.

3.27 The bare earth access track in the south crosses the tussocky and marshy grassland and the Hirwaun Common SINC. However, the access track itself is considered to be unsuitable for marsh fritillary, due to the absence of suitable vegetation and lack of sheltering opportunities.

² Butterfly Conservation. Marsh Fritillary in Wales: A Practical Guide to Managing Grassland for Marsh Fritillary in Wales. Available at: [https://butterfly-conservation.org/sites/default/files/2021-](https://butterfly-conservation.org/sites/default/files/2021-09/Marsh%20Fritillary%20-%20Managing%20grassland_0.pdf)

[09/Marsh%20Fritillary%20-%20Managing%20grassland_0.pdf](https://butterfly-conservation.org/sites/default/files/2021-09/Marsh%20Fritillary%20-%20Managing%20grassland_0.pdf)
(Accessed: 17th October 2022).

Chapter 4

Retention, Protection, Enhancement and Creation

4.1 This Chapter sets out which habitats will be retained, protected, enhanced and created within the Site. Measures for protection and establishment of new habitats are provided as well as measures to protect the species associated with these habitats.

4.2 Details of the landscape proposals are shown on the Landscape Plan and Planting Schedule, provided in **Appendix A**.

Habitat Retention and Loss

4.3 All hedgerows within the Site will be retained, protected and enhanced, with the proposed solar farm footprint limited to existing areas of poor semi-improved grassland. Around the margins of the fields, the grassland which is outside of the proposed solar farm footprint will also be retained, protected and enhanced.

4.4 Grassland loss within the solar farm footprint will be minimised, as detailed below, and then replaced with species-rich grassland, resulting in an enhancement.

Ecological Protection Measures

Habitats

Grassland Within the Proposed Solar Farm

4.5 The areas of existing grassland within the proposed solar farm footprint will not be stripped and reseeded, but instead retained as much as possible. Damage to the grassland will be minimised during the piling of the solar tables, with only localised disturbance to the existing ground cover, where required. The grassland will then be enhanced, as detailed in the Enhancement section below.

Hedgerows

4.6 The hedgerows and ditches will be fenced off from the development site with interlocking weld-mesh panels (e.g. Heras) fencing in accordance with BS 5837:2012 Trees in

Relation to Design, Demolition and Construction³; to ensure that these habitats are not impacted by the works. A buffer of three metres will be provided between the hedgerows and the solar farm installation, which is considered to be sufficient given the limited ground disturbance involved.

Stream, Waterbodies and Marshy Grassland

4.7 These habitats will be fenced off, as specified above, to prevent damage, such as trampling and inappropriate storage of materials. Access to the Site and use of vehicles will be restricted to the existing access track.

4.8 Best construction measures will also be followed throughout the project, including secure storage and safe disposal of any materials and substances, and dust prevention measures, to prevent accidental contamination of the habitats.

Protected Species

Bats

4.9 The construction and operational phases are not anticipated to require any lighting. However, if lighting is later required, then a sensitive lighting scheme will be provided, in consultation with an ecologist, which will incorporate all external light fittings within the Site. In particular, this will ensure that lighting is directed away from linear features, so that these remain dark and available to bats. In line with good practice guidance⁴, the following lighting measures will be incorporated, where appropriate:

- Implementation of dark buffer zones, illumination limits and zonation to separate habitats or features of importance for bats.
- Use of LED lighting, which does not emit UV and which has a warm white light spectrum (preferably <2700Kelvin) and uses wavelengths higher than 550nm.
- Lighting will be directional, such as through the use of specialist bollards, low-level downward direction lighting or column lighting to minimise light spill.
- Use of motion sensor lighting or timers to restrict lighting to required periods.
- Dimming or part-night lighting to reduce light levels when bats are most active.
- Use of the lowest lux possible.
- Screening through soft landscaping and installation of walls and fences.

Badger

4.10 The following measures will be implemented:

- Given the rapidity with which badgers can establish new setts and the legal protection afforded to this species, an update badger survey will be undertaken by an ecologist within three months before the start of the construction works and/or site clearance works. This survey will minimise risks to the project timescale, by confirming whether badger setts are present and ensuring that any mitigation requirements are identified early.
- Badgers will be deterred from entering the construction site by using suitable fencing during the construction phase. Suitable fencing includes interlocking weld-mesh panels (e.g. Heras), well braced to resist impacts by attachment to a scaffold framework that is set firmly into the ground but could also include close board solid fencing.
- Excavations will be covered at the end of each working day and any temporary exposed pipes will be capped to prevent badgers gaining access during the night. Any excavations or deep pits within the construction site that have to be left open overnight will be provided with a means of escape should a badger enter. This could simply be in the form of a roughened plank of wood placed in the excavation as a ramp to the surface.
- The storage of topsoil or other 'soft' building materials on site will be given careful consideration. Badgers will readily adopt such mounds as setts. To avoid the adoption of any mounds by badgers, mounds will be kept to a minimum and any essential mounds subject to daily inspections. It is recommended that topsoil and 'soft' building materials are not stored within the south-eastern area of the construction site.
- The storage of any chemicals within the Site will be contained in such a way that they cannot be accessed or knocked over by any roaming badgers.
- During the operational phase, the solar panel areas will be fenced off from the surrounding area to prevent access from members of the public. However, mammal gates measuring a minimum of 300mm wide by 200mm high will be provided at regular intervals, to provide access for badgers and other mammals.

³ BSI (2012). *BS 5837:2012: Trees in relation to design, demolition and construction – Recommendations*. British Standards Institution, Bristol.

⁴ Bat Conservation Trust and Institute of Lighting Professionals (2018) Guidance Note 08/18: Bats and artificial lighting in the UK. ILP, Rugby.

Great Crested Newt

4.11 GCN were considered likely to be absent from Site and no mitigation is therefore required. However, the mitigation measures outlined for Reptiles below would also provide protection for GCN in the unlikely event that an individual was present within the Site during the proposed works.

Reptiles

4.12 Given the low suitability of the Site and the proposed enhancements, in the long-term, impacts to reptiles are not anticipated. In the short-term, there is a moderate risk of killing or injury of reptiles, if present within the Site during the construction phase. The following mitigation will therefore be required to negate that risk:

- Prior to and during construction of the solar farm, the Site will be maintained in its current short grassland condition, to prevent it from increasing in suitability for reptiles.
- Any working areas and storage of materials will be located away from the hedgerows to minimise the risk of reptiles sheltering underneath these materials and being affected by the works.

Birds

4.13 Any works to trees, hedges or in close proximity to the marshy grassland and waterbodies within the Site should be undertaken between September-February (inclusive) to avoid the season during which birds are most likely to nest. Where clearance of suitable habitat is programmed during the bird breeding season, which is typically March to August inclusive, prior to works, a suitably qualified person must undertake a survey to determine whether birds are nesting in the area. If a nest is discovered, clearance or other construction works would need to be delayed within an exclusion zone. Works may only recommence once it is confirmed that chicks have fledged and that no other nests are in use within the exclusion zone.

Dormouse

4.14 The following measures will be implemented to provide protection for dormouse:

- During the construction and operational phases, light, vibration and noise disturbance to hedgerows, scrub and woodland edge habitats will be minimised by directing these activities away from these features. Plant vehicles will also be kept away from these features. A buffer of three metres will be provided between the hedgerows and the solar farm installation, which is considered to be sufficient given the limited ground disturbance involved.

Water Vole

4.15 The existing access track crosses the stream and wet ditches at two locations, at existing crossings. The crossings and habitat within 100metres were subject to a thorough inspection during the water vole survey, which did not identify any signs of use by this species.

4.16 No long-term impacts to water vole are anticipated, as the proposals will not result in any loss or degradation of suitable habitat. However, there is a low risk of impacts in the short-term if this species is present during the construction phase. Therefore:

- Access to the Site and the use of vehicles will be restricted to the existing stream and ditch crossings, to ensure that disturbance of these habitats is minimised.

Marsh Fritillary

4.17 The poor semi-improved grassland within the Site is not considered to be suitable for marsh fritillary and therefore mitigation for its loss is not required. The proposals will not result in any long-term loss of suitable habitat for marsh fritillary and therefore no long-term impacts are anticipated. In the short-term, in the absence of mitigation, there is a low risk of injury to this species, if the Site were allowed to increase in habitat suitability, though this is considered unlikely given the ongoing sheep grazing.

Mitigation

- The poor semi-improved grassland within the Site is not considered to be suitable for marsh fritillary and therefore mitigation for its temporary loss is not required.
- Prior to and during construction of the solar farm, the Site will be maintained in its current short grassland condition, to prevent it from increasing in suitability for marsh fritillary.
- Access to the Site and the use of vehicles will be restricted to the existing access track, to ensure that there is no disturbance of suitable habitat for marsh fritillary within the Hirwaun Common SINC.
- Prior to commencement of works, site workers will be given a Toolbox Talk on how to recognise this species, its legal protection and what to do if it is encountered.

Habitat Enhancement

Species-Rich Grassland Within the Solar Farm

4.18 Within the fields, the grassland will be enhanced and recreated where damage has occurred during the solar panel installation. This grassland will be over-seeded, using the method outlined in the next chapter, using a locally sourced

wildflower meadow seed mix, comprised of species suitable for the Site (commercially available seed mixes will be avoided). If possible, this seed mix will be in the form of green hay from a local donor site. Opportunities to engage with local conservation organisations to source green hay could be explored, such as the Wildlife Trust for South and West Wales, the Rhondda Cynon Taf Local Nature Partnership and the National Trust.

4.19 The species mix selected will provide a diverse range of wildflowers, which will enable different species to colonise shaded or less shaded areas, according to the conditions created under and around the solar panels. The grassland will be grazed at a low density, using a conservation grazing method, as outlined in the next chapter, whilst also enabling appropriate maintenance of the solar panels. This will encourage a species-diverse sward, with grazing avoided and/or minimised during the peak flowering season to allow wildflowers to establish and reproduce.

Species-rich Hedgerows

4.20 The species-poor hedgerows within the Site will be enhanced through native shrub planting (within their existing footprint). This planting will aim to increase the plant species diversity of all hedgerows so that they have a minimum of five species regularly present throughout. These hedgerows will be maintained at a height of 2.5 to 3metres, to provide some screening of the solar farm and to maximise biodiversity interest. The cutting regime will be relaxed to once every two to three years, to encourage flowering and berrying and to minimise disturbance. No trees will be planted along these features, due to the need to maximise sun exposure to the solar panels.

4.21 The species to be planted will include 60-80cm bare-root whips of dogwood *Cornus sanguinea*, hazel *Corylus avellana*, holly *Ilex aquifolium*, honeysuckle, dog rose and elder *Sambucus nigra*. The planting specifications for hedgerows are provided in **Appendix A**.

Species-rich Hedgerows with Trees

4.22 Along the northern-western part of the Site boundary, the existing hedgerow will be enhanced into a native species-rich hedgerow with trees (though avoiding the section underneath the over-head line). In addition to increasing habitat connectivity and species diversity in this area, the inclusion of tree planting along this hedgerow will increase its height to provide screening of the solar farm from the property to the north-west. This tree planting has been designed in consultation with the local residents and the Landscape and Visual Impacts Assessment team.

4.23 The trees will comprise 10-12cm girth, root-balled specimens of pedunculate oak, rowan and hornbeam *Carpinus*

betulus. The planting specifications for hedgerows and trees are provided in **Appendix A**.

Habitat Creation

Species-rich Hedgerow

4.24 A new species-rich hedgerow will be created along the northern boundary of the solar panel area, parallel to the solar farm fence line. This hedgerow has been designed following consultation with the local residents to the north and the Landscape and Visual Impacts Assessment team, to provide screening of the solar farm, without screening the picturesque hills to the south. It was necessary to select a location close to the solar panels themselves, due to the varying levels within the Site, which increase in height towards the solar panels. The hedgerow will be managed so that an appropriate height is established and maintained, so as to screen the solar farm but not the hills. A gap will be retained to the east of the hedgerow to allow access for livestock and the site maintenance team and grazier.

4.25 Given the low ecological value of the existing poor semi-improved grassland, this planting will result in an enhancement in species and structural diversity within this part of the Site, without any loss of high value habitat.

4.26 The species to be planted will include 90-120cm bare-root whips of hawthorn, blackthorn, dogwood, hazel, holly, honeysuckle, dog rose and elder. The planting specifications for hedgerows are provided in **Appendix A**.

Bat Boxes

4.27 The creation and enhancement of hedgerows and tree/scrub planting within the Site will enhance habitat connectivity for commuting bats. In addition, the increase in plant species diversity as a result of the hedgerow, tree/scrub and species-rich grassland habitats will provide an enhancement in foraging opportunities for the local bat populations.

4.28 In addition, five bat boxes will be provided to increase the roosting opportunities for bats, which are currently limited due to the lack of trees with BRS. These boxes will be installed on mature trees to the north of the Site (within the same landownership), within suitable areas of woodland/scrub adjacent to the waterbodies. The boxes will be erected at a minimum height of four meters, and sited in sheltered wind-free areas, facing in south-easterly, southerly or south-westerly directions. These boxes must be located in areas free of light spill. Woodcrete models have been selected, as they are longer-lasting and self-cleaning. The following will be provided and the indicative locations are shown on the **Landscape Plan in Appendix A**:

- Five woodcrete bat boxes (Schwegler 1FF 1FS or 2F, or a similar model, such as the General Purpose Bat Box provided by NHBS at: <https://www.nhbs.com/convex-wood-concrete-bat-box>)

Bird Boxes

4.29 The creation and enhancement of hedgerows, the planting of trees immediately adjacent to the Site and the enhancement of the grassland will provide high quality nesting and foraging habitat for various bird species.

4.30 Six bird boxes will be provided, with two sizes of hole diameters in order to benefit a greater range of species. These boxes will be installed on mature trees to the north of the Site (within the same landownership), within suitable areas of woodland/scrub adjacent to the waterbodies. All boxes will be installed onto mature trees at a minimum height of 4 metres and sited in sheltered wind-free areas, facing north, north-east or east. The boxes will have greater potential for use if sited as high up as possible. The following will be provided and the indicative locations are shown on the **Landscape Plan in Appendix A:**

- Three Vivara Woodstone Seville Nest Boxes, with a 28mm entrance (or a similar model).
- Three Vivara Woodstone Seville Nest Boxes, with a 32mm entrance (or a similar model).

Chapter 5

Management and Monitoring

5.1 This Chapter sets out how each habitat will be managed to maximise its ecological and landscape value, including the management of existing retained habitats to ensure their value is enhanced. Monitoring measures are also specified. A schedule for management is provided in **Table 5.1**.

Habitat Management and Enhancement

Species-rich Grassland

Establishment

- The grasslands will be close cut below 50mm in height, with arisings to be removed (the arisings could be moved off-site or used to create compost piles adjacent to the woodland, which would provide sheltering habitat for wildlife).
- Where possible, the grasslands should then be scarified/harrowed/scraped and raked to create 50% bare earth across the entire area (with arisings removed).
- The areas will then be over-seeded with the wildflower seed mix in autumn or spring, in line with the recommendations of the seed mix provider. If dried seed is used rather than green hay, it is recommended that the seed mix be bulked up with an inert carrier, such as sand, to make distribution easier. The seed must be surface sown and can be applied by machine or hand scatterer.

Management

5.2 The grassland will be managed as species-rich grassland, using a conservation grazing method, with consideration given to the requirements of the solar farm and the grazier.

- The Site has a history of sheep grazing and therefore it is considered appropriate that the grasslands continue to be grazed in this manner. This form of livestock is also considered the most suitable for a solar farm (cattle and ponies are incompatible with the solar panels due to their body size and risk of damage to the equipment).
- While grazing and/or cutting is generally required in order to maintain a species-rich sward, overgrazing can result in a loss of species diversity. This is particularly true for sheep grazing during the spring and summer months, as this species has a small mouth, which enables them to preferentially select wildflowers, preventing pollination

and seed dispersal. For this reason, conservation grazing requires a lower stocking density, with regular monitoring and review.

- In line with guidance provided by English Nature and The Wildlife Trusts⁵, a maximum Livestock Unit (LU) stocking rate of 0.4LU/ha/year will be employed.
- Given the need to minimise wildflower consumption in the spring and summer months (whilst balancing this with the need to minimise rankness and scrub encroachment), the following measures will also be employed:
 - In April to August inclusive, a resting period of approximately three months will be provided each year, during which no grazing occurs; and
 - In April to August inclusive, grazing density will not exceed 0.4LU/ha at any time.
- The grazing density will be regularly reviewed and adjusted by the grazer, where required, to prevent over-grazing or under-grazing. For example, it may be necessary to reduce winter grazing if heavy poaching occurs, to reduce the stocking rate if extensive rabbit grazing is present, or to increase grazing for short periods in the summer to control scrub encroachment.
- Ultimately, the grazing density should aim to ensure that a species-diverse and wildflower-rich sward is maintained. This sward should contain a mixture of long and short vegetation with a range of plant species in flower. Scattered scrub patches can be beneficial for wildlife but should not cover more than 15% of the grassland.
- Completion of a hay cut in August to September, followed by aftermath grazing, could also be considered as a management method, if the required machinery is compatible with the solar panel layout.
- The use of inorganic or organic fertilisers, pesticides and insecticides will be avoided, other than for rush management.
- Further information on conservation grazing is provided by English Nature/ The Wildlife Trusts⁵ at <http://publications.naturalengland.org.uk/publication/35034>.

Rush Management

5.3 The existing grassland is currently managed to minimise rush colonisation. In the absence of continued management,

the rush would eventually dominate, leading to a reduction in available grazing land and degradation of the proposed species-rich grassland.

- Areas subject to rush colonisation will be managed by cutting/topping, where compatible with the solar panel layout. In order to minimise impacts on wildflowers, this method will be targeted to specific areas of dense rush and will not be used across the whole fields. Cutting/topping will take place in August, while the rush is in flower and while nesting birds are less likely to be present.
- Where cutting/topping is not possible due to the solar farm equipment, areas subject to rush colonisation will be spot-sprayed, using a knapsack, only where required. This method will avoid large-scale use of herbicides, which would adversely affect the species-diversity of the grassland. Spot-spraying will be avoided in areas within close proximity to and/or up-slope from the stream, to avoid contamination of the water.

Species-rich Hedgerows

5.4 The following establishment and management measures will be implemented:

Establishment

- The new hedgerow and also any gaps within the existing hedgerows will be planted in triple staggered rows of 90-120cm bare-root whips, at nine plants per metre, with all necessary tree guards, mulch and staking.
- Elsewhere, selective thinning will be undertaken, to create gaps for planting and to reduce the dominance of species such as blackthorn and hawthorn. Specimens of 60-80cm bare-root whips will then be planted in appropriate locations and densities within thinned areas and/or adjacent to the hedgerow to enhance the hedgerow to a species-rich status.
- Planting will take place when the soil and weather conditions are suitable between late October to mid-March.
- New Planting will be regularly monitored to ensure that it is not smothered by the existing hedgerow and/or fast-growing species such as bramble.

⁵ A Crofts and R G Jefferson (eds) (1999). The Lowland Grassland Management Handbook 2nd edition. English Nature/The Wildlife Trusts

Management

- All hedgerows (with the exception of the hedgerow with trees on the north-western boundary) will be maintained at 2.5-3m in height (excluding trees) to have a uniform finish with a flat top and vertical faces.
- The hedgerow on the north-western boundary will be managed so as to increase its height to provide an appropriate level of screening of the solar farm, when combined with the trees within the hedgerow. Clipping of the top of this hedgerow should therefore be minimised.
- Newly planted hedges will be clipped in late Summer and possibly again in early Winter for the first few years, ideally to below the final intended height to encourage leafing down to the base. Once the required height is achieved, the hedges will be clipped once every two to three years, between December to January. Minimising the frequency of clipping will increase biodiversity and the availability of flowers and berries for wildlife.
- Clipping of the existing established hedgerows (and new hedgerows once established) will be undertaken once every two to three years (ideally three years) in December to January, using the appropriate tools, in order to maintain a dense and well-formed hedge. Minimising the frequency of clipping will increase berrying and flowering, which will be of benefit to wildlife.
- Hedgerow laying should be considered for any hedges that develop a high gap between the ground and canopy, to encourage a good, stock-proof structure, with leafing down to the base.
- Clipping and hedgerow laying will avoid the breeding bird season and dormouse active period of April to mid-November, when these species rely on hedgerows for nesting and foraging.

Tree Planting Within the Western Hedgerow

5.5 The following establishment and management measures will be implemented:

- Trees will comprise 10-12cm girth, root-balled specimens, with all necessary tree guards, mulch and staking.
- New trees will be planted when soil and weather conditions are suitable between late October to mid-March.
- Young trees will be inspected each month, staking monitored and adjusted twice per annum to allow for the growth of the trees. Epicormic growth will be removed, and formative pruning and irrigation carried out as required, promoting healthy growth.

- All trees will be visually inspected on routine maintenance visits for storm damage and general safety and security issues. Damaged branches will be removed from both tree and ground promptly. Where possible, dead wood will be retained on site as log piles, as specified in the previous chapter.
- A more comprehensive tree inspection will be carried out each year by suitably experienced person to assess any works required to maintain the health, safety and form of the trees and to conserve their landscape and ecological value. Sensitive minor crown lifting works may be carried out periodically to maintain an open aspect and to maintain appropriate clearance over access routes. If required, these works will be carried out by a qualified arboricultural contractor to the accepted professional standard (BS 3998).
- Any mature trees of a significant age and size will be given attention at the annual safety inspections. As these trees age, the works identified will need to be assessed to balance the safety considerations against the need to preserve such specimens for as long as is safe to do so.

Species Specific Measures

5.6 The proposed development includes the inclusion of species-specific habitats and features to support the protected and notable species within the Site and surrounding areas.

Bats

5.7 Bats and their roosts are protected from disturbance, damage and destruction, as detailed in **Appendix A of the Ecological Assessment** Report. Therefore, **the bat boxes can only legally be inspected by a licenced bat worker, who will advise on appropriate actions.** Bat boxes can be visually inspected from the ground without a licence to identify if these require maintenance or replacement, due to damage or disappearance.

Nesting Birds

5.8 Bird boxes can be inspected without a licence by a suitably experienced person and will be managed as follows:

- The boxes will be monitored to check that any nests are no longer active before maintenance work is carried out.
- Old nests will be removed from the bird boxes in the autumn or winter, once the birds have stopped using the box.
- Unhatched eggs in the box can only be removed legally between September and January.

- The box should be cleaned with boiling water, where possible, and allowed to dry thoroughly before replacing the lid.

badger sett activities cause issues for the operation of the solar farm, a suitably experienced ecologist must be consulted on how to proceed.

Badgers

5.9 Badger setts are protected from disturbance and damage, and therefore, it is illegal to destroy or interfere with a sett e.g. blocking the entrance. If a badger sett is discovered within the Site or a 50m buffer, it should be left undisturbed, and any works must be avoided within a minimum of a 30m buffer. If the

Log piles

5.10 If log piles are created to enhance the Site for reptiles and amphibians, they will be left in situ and undisturbed. The areas will be topped up in the Autumn with any brash or tree limbs created from the Site management.

Table 5.1: Work Schedule and Annual Work Plan

Maintenance Component and Operation	Period of year	Frequency per annum	Responsibility
Species-rich Grassland Within the Solar Farm			
Grassland establishment	September – November or March – April	N/A	Contractor
Grazing during the autumn/winter - a maximum stocking rate of 0.4LU/ha/year will be employed	September to March inclusive	N/A	Contractor/grazier
Grazing during the spring/summer - a resting period of approximately three months will be provided each year, during which no grazing occurs	April to August inclusive	Once per year, for approximately 3 months	Contractor/grazier
Grazing during the spring/summer - grazing density will not exceed 0.4LU/ha at any time	April to August inclusive	N/A	Contractor/grazier
Completion of a hay cut, followed by aftermath grazing, could also be considered as a management method, if the required machinery is compatible with the solar panel layout	August to September	Once per year	Contractor/grazier
The grazing regime will be reviewed to ensure that it achieves the objectives for maintaining a species-rich, wildflower-rich sward	During the flowering season	In Years 1, 2, 3 and 5. Thereafter every 5 years, as required	Contractor/grazier
Species-rich Hedgerows			
Undertake new hedge and hedgerow planting	Late October to mid-March	N/A	Contractor
Clipping newly planted hedges to encourage leafing down to the base	Late summer and again in early winter if required	Up to twice per year for establishing hedges/hedgerows	Contractor
Clipping established hedgerows and maintaining a height of 3 metres	December to January (to avoid the breeding bird season and dormouse active period)	Once every two to three years (ideally three years), to encourage flowers and berries	Contractor

Maintenance Component and Operation	Period of year	Frequency per annum	Responsibility
Spreading mulch to 75mm depth at the base of newly planted hedgerows	March	Once per year until established	Contractor
Carry out replacement planting of dead plants	Late October to mid-March	As required	Contractor
Hedgerow laying of any hedges that develop a high gap between the ground and canopy, to encourage a good, stock-proof structure	December to January (to avoid the breeding bird season and dormouse active period)	Every 10 – 20 years, as required	Contractor
Trees			
Undertake new tree planting	Late October to mid-March	N/A	Contractor
Inspection of tree stakes	November – February and June – August	2	Contractor
Spread mulch 75mm diameter around young trees	March	Once per year until established	Contractor
Water trees	May – September	Minimum 15 times per year for year 1, as required for years 2 – 5	Contractor
Formative pruning / pruning damaged branches	As required	1/3	Contractor
Carry out replacement planting of dead trees	Late October to mid-March	As required	Contractor
Species Specific Measures			
Bat Boxes			
Installation of bat boxes	Year round	N/A	Contractor / Licenced bat worker
Monitoring / cleaning of bat boxes	May - August	Once every 2-3 years	Licenced bat worker
Replacement of boxes	Year round	As required	Licenced bat worker
Bird Boxes			
Installation of bird boxes	Year round	N/A	Contractor / Ecologist (licence not required)
Cleaning of bird boxes	October – February	Once every 2-3 years	Contractor / Ecologist (licence not required)
Replacement of boxes	Year round	As required	Contractor / Ecologist (licence not required)
Loggeries and Log Piles			

Maintenance Component and Operation	Period of year	Frequency per annum	Responsibility
Add to existing piles and create new piles using deadwood retained from management activities	September – October (when reptiles are less sensitive to disturbance)	1	Contractor

Ecological Trends and Constraints Which May Influence Management

Water Resources and Hot Weather

5.11 There is a requirement for close liaison between the site management and their appointed contractor for the habitat works. This will be imperative to ensure that the new habitats establish and that enhancement are effective. Effective use of water resources in the spring and summer months when new planting is at its most vulnerable will be crucial in achieving satisfactory outcomes. In times of drought or water shortages, a balance will need to be sought between sustainable use of water resources and the need for vegetation establishment.

Pests and Disease

5.12 There is the potential for plant pests and disease to affect new habitat creation and landscaping works. In particular, diseases such as ash dieback *Hymenoscyphus fraxineus*, and Dutch elm disease *Ophiostoma novo-ulmi*, pose significant threat to UK native tree species. Biosecurity measures to reduce the risk of introducing pests and diseases will include:

- Planting of a range of tree and shrub species;
- Planting species with known provenance and documentation of origin; and
- Planting of UK only plant stock.

Invasive Non-native Species (INNS)

5.13 A record of Himalayan balsam *Impatiens glandulifera*, from 2021 was documented in the Desk Study within the marshy grassland to the east of the Site (within the same land ownership). This species is listed as a species of special concern under retained European Union (EU) law. This means it is an offence to plant or cause these plants to grow in the wild, or intentionally release them into the environment. Schedule 4 of the Invasive Alien Species (Enforcement and Permitting) Order 2019 removes plants listed under the EU IAS Regulation from Schedule 9 of The Wildlife and Countryside Act 1981, although the same offence applies. Himalayan balsam plant material (including soil contaminated with seeds) is also a 'controlled waste' under the Environmental Protection Act 1990 which means it can only be transported by a registered waste

carrier to suitably permitted or exempt sites. Transfer notes shall be kept for each load for a minimum of 2 years.

5.14 The Site and immediate surroundings will be monitored and any sign of Himalayan balsam will be recorded and managed to ensure its removal and/or to prevent its spread.

Timing of Landscape Works and Management

5.15 There is a requirement for landscape and management works to take into account seasonal constraints with regard to protected species. For example, hedgerow and tree works will take place outside of the bird nesting season (March – August inclusive) and hedgerow clipping should take place outside of the dormouse active season when this species relies on hedgerows for nesting and foraging (mid-March – mid November inclusive). In order to maximise food availability for species such as birds and small mammals, hedgerow clipping will ideally take place in December/January.

Monitoring

5.16 There is a commitment to maintain the soft landscape proposals for the duration of the solar farm lease period. Monitoring of the Site will be undertaken to determine if the aims and objectives of the landscaping proposals are being realised and if adaptations to the maintenance programme and management regimes are required.

5.17 At year five a review of the Site management actions will be undertaken. Thereafter, a review will be undertaken every three to five years for the duration of the solar farm lease period. Upon review, the LEMP requirements will be adapted as required in line with the monitoring findings.

5.18 Monitoring will be undertaken of each habitat and any feedback will update the management prescriptions. **Table 5.2** sets out each management prescription and will be used to assist in the monitoring review of the effectiveness of the management regimes.

Remedial Actions

5.19 Any remedial measures required (for example, replacement or relocation for bat or bird boxes, replacement of failed tree specimens), or adjustment to the grazing regime, will be identified and detailed for implementation by Regener8 Power or their appointed contractor.

5.20 Should adjustments to the management regimes be required to aid in vegetation establishment or to address issues/further enhance habitat value for wildlife, these will be incorporated into the next review of the LEMP at year five.

Management Plan review

5.21 The LEMP will be reviewed at year five, and in the intervening period, as necessary in line with remedial actions and management prescriptions outlined above. This review, and any resulting adjustments to the LEMP, will be informed by observations from Regener8 Power (or the appointed contractor) and site users. Thereafter, a review will be undertaken every three to five years for the duration of the solar farm lease period. The Local Planning Authorities will be informed of any significant changes that might affect the objectives within this LEMP.

5.22 The Management Plan Review will seek to ensure that the Site still delivers the fully functioning biodiversity objectives of the originally approved scheme.

Table 5.2: Monitoring Schedule

Maintenance Component and Operation	Monitoring Visit Year				
	1	2	3	4	5
Species-Rich Grassland					
Is grazing being maintained at an appropriate density to allow wildflowers to establish and reproduce and to prevent over-dominance of coarse grasses?					
Count the number of flowering species and check against seed mix species list (species richness should approach seed mix by year five)					
Is rush colonisation being managed appropriately?					
Are scrub and species such as nettles and creeping thistle covering less than 15% of the grassland?					
Are there any management interventions required?					
Trees					
Is the new tree planting being appropriately managed?					
Is the species mix and density of the planting being maintained?					
Is replacement planting of dead trees being undertaken?					
Hedgerows					
Are the hedgerows being managed appropriately given their setting?					
Is the species-rich mix and density of the planting being maintained?					
Is replacement planting of dead whips being undertaken?					
Species Specific Measures					
Bat Boxes					
Is monitoring and cleaning of bat boxes being undertaken?					
Do any boxes require replacement or repair?					
Bird Boxes					
Is monitoring and cleaning of bird boxes being undertaken?					
Do any boxes require replacement or repair?					
Log Piles					
Are existing hibernacula, loggeries and log piles being retained and new deadwood added from tree and scrub management activities?					

Appendix A

PV Layout, Landscape Plans and Planting Specifications



Key

- Site boundary
- Ownership boundary
- Existing vegetation and grassland retained
- Existing hedgerow strengthened/ reinforced with additional planting*
- Proposed trees
- Proposed hedgerow
- Proposed species-rich grassland
- Proposed solar arrays
- Proposed access track
- Proposed LV Transformer Station
- Proposed Customer Switchgear Enclosure
- Proposed security fence
- Approximate location of existing mining shaft & exclusion zone.
- Schwegler 2F Bat Boxes
- Vivara Woodstone Seville Nest Bird Box, 28mm entrance
- Vivara Woodstone Seville Nest Bird Box, 32mm entrance

*Note: Existing hedgerow to be enhanced through minor thinning of selective dominant species (Hawthorn & Blackthorn), replanting with new native whips and scattered trees (as per the Plant Schedule) to facilitate the creation of species-rich hedgerows.



Key plan not to scale

P03	05.04.23	Third Issue	TP	KL	SL
P02	04.01.23	Second Issue	TP	ET	CP
P01	14.12.22	First Issue	TP	ET	CP

Iss	Date	Description	Dm	Chk	App

Scale 1:2500

0 20 40 60 80 100 120m

Do not scale from this drawing
All dimensions are to be verified on site
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Rhigos Road : Indicative Plant Schedule and Specification		
Species	Name	Specification
Scattered trees within proposed hedgerows and adjacent to existing hedgerows.		
Carpinus betulus	European hornbeam	10 - 12cm girth, rootballed
Sorbus aucuparia	Rowan	10 - 12cm girth, rootballed
Quercus robur	English Oak	10 - 12cm girth, rootballed
Existing hedgerows enhanced to species-rich using the following species		
Cornus sanguinea	Dogwood	60-80cm whip, Bareroot
Corylus avellana	Hazel	60-80cm whip, Bareroot
Ilex aquifolium	Holly	60-80cm whip, Bareroot
Lonicera periclymenum	Honeysuckle	60-80cm whip, Bareroot
Rosa canina	Dog rose	60-80cm whip, Bareroot
Sambucus nigra	Common elder	60-80cm whip, Bareroot
Proposed hedgerow triple staggered 9 per linear meter		
Cornus sanguinea	Dogwood	90cm - 120cm whip, Bareroot
Corylus avellana	Hazel	90cm - 120cm whip, Bareroot
Crataegus monogyna	Common Hawthorn	90cm - 120cm whip, Bareroot
Ilex aquifolium	Holly	90cm - 120cm whip, Bareroot
Lonicera periclymenum	Honeysuckle	90cm - 120cm whip, Bareroot
Prunus spinosa	Blackthorn	90cm - 120cm whip, Bareroot
Rosa canina	Dog rose	90cm - 120cm whip, Bareroot
Sambucus nigra	Common elder	90cm - 120cm whip, Bareroot
Proposed species-rich grassland to be seeded with locally-sourced, species-rich wildflower seed mix, appropriate to the site.		

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Project

REGENER8 RHIGOS

Client

REGENER8 POWER

LUC Job Nr

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Status

12057

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FOR PLANNING

Drawing Title

LANDSCAPE PROPOSALS PLAN

Drawing Nr

Issue

12057-LD-PLN-100

P03

Appendix B

Ecological Assessment Report

Regener8 Power

Regener8 Rhigos **Ecological Assessment**

Final report

Prepared by LUC

April 2023



Regener8 Power

Regener8 Rhigos Ecological Assessment

Version	Status	Prepared	Checked	Approved	Date
1.	Draft report for client comment	C. Tustain R. Warwick-Haller	K. Luxmoore	E. Moseley	14.12.2022
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Chapter 1

Introduction

1.1 In May 2022, LUC was appointed by Regener8 Power to undertake an Ecological Assessment (EA) of a parcel of land adjacent to Rhigos Road, hereafter referred to as 'the Site'. This input was required to inform a planning application for a new solar farm at the Site.

1.2 The EA presents the findings of a Desk Study, an Extended Phase 1 Habitat survey, Bat Roost Suitability (BRS) assessment, Breeding Bird survey, great crested newt eDNA survey and an otter and water vole survey. The EA also includes recommendations for avoidance and mitigation of ecological impacts and opportunities for ecological enhancement.

1.3 This report has been prepared for the exclusive use of Regener8 Power. No part of this report should be considered legal advice.

Site Description

1.4 The Site lies to the east of the village of Rhigos, Aberdare, immediately south of Rhigos Road (OS grid reference: SN 93468 05732). The Site comprised species-poor semi-improved grassland fields, which were nutrient enriched, had a low sward height and were used for sheep grazing. These fields were bordered by drainage ditches and hedgerows. Small parcels of broadleaved and mixed woodland were present along the Site boundaries in the west and south-east. To the east and south-east was a stream and a series of standing waterbodies.

1.5 The location of the Site is shown in **Figure 1 in Appendix B**.

Surrounding Landscape

1.6 Immediately to the north and east of the Site, within the same land ownership, were additional fields used for grazing, a series of waterbodies with reedbed and other marginal habitats, a stream connecting these waterbodies, areas of broadleaved woodland and scrub and areas of marshy grassland. To the east of the Site, along the A4061, was a particularly large area of marshy grassland dominated by rushes, which (along with the largest waterbody and associated marginal habitat) formed part of the Hirwaun Common Site of Importance for Nature Conservation (SINC).

1.7 To the north of the Site, outside of the land ownership, lies Rhigos Road and a small area of woodland which backed onto

an industrial estate and urban area. To the east an electricity sub-station and beyond that a large quarry. In the south and west of the Site was additional farmland habitats in the form of sheep grazed fields and associated woodland and hedgerow habitat.

- Action for Nature: A Local Biodiversity Action Plan for Rhondda Cynon Taf, January 2008.

Project Description

1.8 The current proposals include the use of all fields within the Site for the construction of a solar farm. The proposals also include use of an existing access route, connecting up to the A4061 in the south-east.

1.9 The existing hedgerows are to be retained and access within the solar farm utilises existing field entrances, in order to prevent fragmentation of hedgerows. Habitats immediately adjacent to the Site, such as woodland edge, waterbodies and watercourses will also be retained and protected. Ecological enhancements will include: the creation of species-rich grassland beneath the solar arrays (using a locally sourced wildflower seed mix, appropriate to the Site and local area); enhancement of the hedgerows into a native species-rich composition; and provision of bat and bird boxes on mature trees beyond the Site boundary (within the same landownership).

Policy and Legal Considerations

1.10 This report has been prepared in accordance with relevant legislation and policy. Further detail is provided in **Appendix A**. The primary documents of relevance are outlined below:

- The Conservation of Habitats and Species Regulations 2017 (SI 2017/1012), as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (SI 2019/579);
- The Countryside Rights of Way Act 2000;
- The Wild Mammals (Protection) Act 1996;
- Species and Habitats of Principal Importance for Conservation in England and Wales;
- The National Planning Policy Wales (PPW) 2021;
- National Development Framework (Future Wales – the National Plan 2040);
- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Environment (Wales) Act 2016;
- Priority Species UK Post-2010 Biodiversity Framework;
- The Rhondda Cynon Taf County Borough Local Development Plan; and

Chapter 2

Methods

2.1 The methods adopted in the survey and appraisal are outlined below. They are in accordance with best practice guidance documents produced by the Chartered Institute of Ecological and Environmental Management¹ and the British Standards Institute².

Desk Study

2.2 To provide additional background to the report and to highlight likely features or species of interest, a study of available biological records was undertaken to identify sites designated for their nature conservation value, and existing records of protected or notable species of relevance to the Site. A search of the following resources was undertaken, within the following radii from the Site:

- Multi-Agency Geographical Information for the Countryside (MAGIC) to identify Natura 2000 designated sites within 5km and UK statutory designated sites within 2km of the Site's central grid reference;
- Ordnance Survey (OS) mapping.
- Aerial photography.
- Rhondda Cynon Taf (RCT) Council Local Development Plan Evidence Base³ – SINC information.
- South East Wales Biodiversity Records Centre (SEWBRc) – records of protected species and non-statutory sites within 2km of the Site's central grid reference.

2.3 The scope of the Desk Study, including the resources examined and the radii used, were determined in line with good practice guidance¹ and based on the professional judgement of the ecologist.

Extended Phase 1 Habitat Survey

2.4 An Extended Phase 1 Habitat Survey was undertaken within the Site boundary in line with standard methods set out by the Joint Nature Conservation Committee Handbook for Phase 1 Habitat Survey (1990)⁴. Phase 1 Habitat Survey

¹ CIEEM (2017). Guidelines for Preliminary Ecological Appraisal. 2nd Edition. Chartered Institute for Ecology and Environmental Management, Winchester.

² BSI (2013). BS 42020:2013: Biodiversity – code of practice for planning and development. British Standards Institution, Bristol.

³ RCT Local Development Plan Evidence Base (EB44 & EB46) <https://www.rctcbc.gov.uk>

⁴ Joint Nature Conservation Committee (2010). Handbook for Phase 1 habitat survey - a technique for environmental audit. JNCC, Peterborough.

provides a rapid means of classifying broad habitat types in any given terrestrial site.

2.5 The survey was 'extended' to consider the suitability of the Site to support notable or protected flora or fauna. Species considered included those identified during the Desk Study, and those considered appropriate by the surveyor during the survey. This included, but was not limited to, consideration of the following species groups: badger, bats, water vole, otter, birds, amphibians, reptiles and invertebrates. In particular, an assessment was made for the potential for trees to support bat roosts (see below), as well as the potential for nesting birds. Based on an understanding of species ecology, consideration was given to the Site's potential to provide sheltering or foraging habitat and/or connectivity to allow dispersal between populations.

2.6 The Extended Phase 1 Habitat Survey and Preliminary Bat Roost Assessment and badger survey (see below) were carried out during the daytime on the 25th May 2022 by Chloe Tustain BSc (Hons) MSc with due consideration for best practice guidelines as outlined by The Bat Conservation Trust⁵.

Weather conditions during the survey were wet, windy and warm.

Preliminary Bat Roost Assessment

2.7 In addition to the Extended Phase 1 Habitat Survey, a preliminary bat roost assessment of the trees within and immediately adjacent to the Site, which have potential to be affected by proposals, was undertaken. The Preliminary Roost Assessment comprised a detailed search from ground level of any external features on the trees with potential to support access points and roosting places suitable for bats, and noted evidence of bat activity, such as droppings, staining, feeding remains and presence of bats (live/dead specimens).

2.8 Additionally, the habitats within and surrounding the Site were assessed for their suitability to support foraging and commuting bats, and to identify potential commuting links to habitats of value to bats in the wider area.

2.9 When potential roosting features (PRFs) were recorded, they were classified in accordance with the categories described in **Table 2.1** below.

Table 2.1: Bat Roost Suitability Criteria

Bat Roost Suitability Category	Roosting Habitat Features	Commuting and Foraging Habitat Features	Survey Requirements
Negligible	Negligible habitat features likely to support roosting, commuting or foraging bats.		No further surveys required
Low	Structures in this category offer one or more potential roost sites for individual, opportunistically roosting bats. These sites do not offer the space, shelter or appropriate conditions to support large numbers of bats or maternity roosts. Trees in this category include those of sufficient size and age to support suitable roosting features but none are visible from the ground.	Habitat on and around the site could be used by a small number of commuting bats. This category includes densely urbanised landscapes or linear vegetation features poorly connected to the wider landscape (e.g. gaps in hedges in an agricultural context).	One dusk or dawn survey required for structures. No surveys required for trees.
Moderate	Structures and trees in this category offer one or more roost site that, due to their space, shelter or conditions, offer roosting potential for a range of species. Roosts may be more permanent, rather than opportunistic. Small maternity roosts of common species may form in one of these roost sites.	Habitat on and around the site is well-connected to wider continuous habitat and offers commuting and foraging habitat to a larger number of bats across several species (e.g. tree lines or linked gardens in the urban context, or continuous hedge/tree lines and watercourses in an agricultural setting).	One dusk and one dawn survey required for both structures and trees. Tree-climbing may be an appropriate alternative to dusk and dawn surveys.

⁵ Collins, J. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Bat Roost Suitability Category	Roosting Habitat Features	Commuting and Foraging Habitat Features	Survey Requirements
High	Structures and trees in this category have one or more potential roost sites that are suitable for large number of bats. Roosts are likely to be permanent and include maternity roosts. Potential roost sites exist for a wide range of species or species of particular conservation interest.	Habitat on and around the site is diverse, continuous and linked to extensive suitable habitat. This category includes well-vegetated rivers, streams, hedgerows and woodland edge. Habitat is sufficiently diverse to offer opportunities to a wide range of species or those of particular conservation interest.	Three surveys, including both dusk and dawn surveys. Tree-climbing may be an appropriate alternative to dusk and dawn surveys.

Badger Survey

2.10 A badger survey, comprising an inspection of all habitat types suitable for badger was undertaken across the Site, including an approximate 50m buffer from the site boundary, where accessible, in line with good practice guidelines. Signs

of activity were mapped including setts, footprints, paths, dung, latrines, hairs and snuffle holes (scrapes where badgers have foraged for invertebrate). Any setts located were classified by the number of entrance holes and level of activity (the latter based on the 'openness' of the hole). This is summarised in **Table 2.2**, below.

Table 2.2: Classification of Badger Setts

Sett type	
Main	A breeding sett, these usually have 5-20 entrances. These are large, well-established setts, normally in continuous use. Each group will use only one main sett and it will form the most likely location for the raising of cubs.
Annexe	These setts are usually found in close association with the main sett, and will often be linked to it by a well-worn path. Where a second litter of cubs is born they will be raised in the annexe sett.
Subsidiary	Subsidiary setts will usually have five or more holes, although not all of these will be in continuous use.
Outlying	These setts are used on an occasional basis and will usually consist of only one to three holes. Spoil heaps will generally be smaller than those found associated with the other sett types, indicating a smaller underground structure.
Level of activity	
Well used	Holes in regular use and are therefore free of debris. They may have been recently excavated.
Partially used	Debris, including leaves, twigs and other vegetation clutter the entrance to these holes, indicating they are not in regular use. The holes can be used after a minimum of clearance.
Disused	A considerable amount of clearance is needed before these holes can be used. The holes may become so blocked that only a depression in the ground is visible where the hole used to be.

Great Crested Newt Surveys

Waterbody Habitat Suitability Index (HSI) Assessment

2.11 A HSI was carried out on accessible waterbodies within 500 metres of the Site boundary to determine their relative suitability for providing breeding habitat for GCN.

2.12 The HSI is a numerical index between 0 and 1 and incorporates 10 suitability indices (factors thought to affect GCN presence such as pond size, levels of over-shading and macrophyte cover). The HSI category scores are shown below in **Table 2.3**⁶ and the location of the ponds is shown in **Figure 2 in Appendix B**.

Table 2.3: HSI Category Scores

HSI	Pond Suitability
<0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

2.13 The HSI score was used to inform the need for additional surveys to identify the potential presence and size of resident GCN populations.

eDNA Presence/Absence Survey of Waterbodies

2.14 Where waterbodies were deemed to be suitable for GCN and had sufficient connectivity to the Site, Environmental DNA (eDNA) sampling was carried out to confirm presence or absence of this species.

2.15 Water samples were taken on 26th May 2022 by Chloe Tustain (Natural England GCN Class Licence Number: 2021-51010-CLS-CLS) who was acting as an accredited agent of Katie Luxmoore BSc (Hons) MSc ACIEEM (Natural Resources Wales GCN Licence Number: S0989820/1), assisted by Holly Gillon BSc (Hons) MSc QCIEEM during suitable weather conditions and using the methods outlined in good practice guidance⁷. These methods are summarised below.

2.16 In line with good practice guidance (as referenced above) 20 samples of 30 mL of pond water were collected from around each pond. Sample locations were spread out evenly around the pond edge, ensuring that samples were collected from both open water and vegetated areas, if present, and, where possible, from areas of water greater than 10cm deep. Once all 20 samples were collected the bag was closed and shaken for ten seconds to ensure any DNA present was mixed across the sample. Fifteen mL of water was then transferred from the bag into each of the six sample tubes containing preservative. Finally, each tube was shaken for ten seconds to mix the water sample and preservative. A new sample kit was used at each pond to prevent cross contamination of samples. Samples were then sent to the laboratory at SureScreen Scientifics Ltd. for analysis.

Bird Surveys

Breeding Bird Survey

Habitat Appraisal

2.17 During the Extended Phase 1 Habitat Survey, the Site was assessed for the suitability of habitats to support breeding birds. This included consideration of all bird activity, including foraging, dispersing, sheltering, and breeding.

Breeding Bird Survey

2.18 An adaptation of the Common Birds Census (CBC) method⁸ was considered appropriate for the Site as follows:

- Two survey visits were undertaken between May and June 2022. This enabled the survey to record all species (including those secretive species that may not be recorded on one visit only), and those that breed both earlier and later in the season (such as some migrant species).
- On each survey visit the entire survey area was slowly walked and the location and behaviour of each bird species marked on a map. The intention was not to map the extent of breeding bird territories but rather to establish the number and approximate distribution of species within the Site.

⁶ Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000). *Evaluating the suitability of habitat for the great crested newt (Triturus cristatus)*. Herpetological Journal, 10: 143-155.

⁷ Biggs J. *et al* (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great

crested newt (*Triturus cristatus*) environmental DNA. Oxford: Freshwater Habitats Trust.

⁸ Gilbert, G., Gibbons, D.W., Evans, J. (1998) *Bird Monitoring Methods: A manual of techniques for key UK species*. Bedfordshire: Royal Society for the Protection of Birds (RSPB).

- British Trust for Ornithology (BTO) standard species codes⁹ were used along with qualifying symbols relating to the activity observed. For example, WR encircled denotes a singing wren.
- Surveys commenced shortly after dawn and continued to late morning in order to cover the period of greatest territorial activity for most bird species.

2.19 The surveys were undertaken by experienced bird surveyor Rosalind Warwick-Haller BSc (Hons) MSc Qual CIEEM on the 20th May and 23rd June 2022, in weather conditions suitable for recording bird activity. The survey area is shown on **Figures 3 and 4 in Appendix B**.

Assessment of Bird Communities

2.20 The method for the assessment of bird communities present within the Site follows best practice guidance¹⁰. This method is used to determine Breeding Diversity Thresholds and the terminology is similar to those used for Ecological Impact Assessment. The Breeding Diversity Thresholds consider the following factors:

Population Size

2.21 Conservation value is expressed at five geographic scales of importance: international, national, regional, county and local. Clearly, these assessments can only be made where reasonable population estimates already exist at each level.

2.22 A site supporting a single territory of a species numbering less than 100 pairs nationally is classified as regionally important. However, single territories of species which are not nationally rare, although they may be above the 1% level of the recorded county or regional population would be regarded as of local or county importance.

Diversity

2.23 The best practice guidance¹⁰ presents breeding diversity criteria, the number of different breeding species, to assess the importance of a site to birds in the breeding season, as shown in **Table 2.4** below.

Table 2.4: Breeding Diversity Importance Thresholds

National	Regional	County	Local
85+	70-84	50-69	25-49

2.24 The quality of the breeding community considers the number of scarce species, considered to be those with a national population of less than 100,000 pairs. These are divided into five categories and species falling within each abundance category are scored from 1 to 5 as shown in **Table 2.5** below:

Table 2.5: Breeding Population Scores

Category	National Number of Breeding Pairs	Score
A	1 – 10	5
B	11 – 100	4
C	101 – 1000	3
D	1001 – 10,000	2
E	10,001 – 100,000	1

2.25 The presence of one species in Category B (1 x 4), two in C (2 x 3), three in D (3 x 2) and 10 in E (10 x 1) would give an index or score of 26.

2.26 This is referred to as the Index of Diversity. It is considered that the following ranges of indices are appropriate to the various levels of conservation importance, as shown in **Table 2.6** below.

Table 2.6: Index of Diversity Thresholds

National	Regional	County	Local
60+	40-59	20-39	10-19

Rarity

2.27 The best practice¹⁰ considers any species numbering 1000 or fewer breeding pairs to be nationally rare. In this assessment this category includes species protected under Schedule 1 of the Wildlife and Countryside Act, species considered by the Rare Breeding Birds Panel (RBBP)¹¹ and species included in the Red List of Birds of Conservation Concern (BOCC)¹². Red List bird species are those whose UK breeding population, or breeding range, has contracted by 50% or more in the preceding 25 years.

2.28 The best practice guidance¹⁰ criteria are drawn from data supplied for the compilation of the BTO's Register of Ornithological Sites which was mostly gathered between 1973

⁹ British Trust for Ornithology (BTO) Species Codes. Available at: http://www.bto.org/sites/default/files/u16/downloads/forms_instructions/bto_bird_species_codes.pdf (Accessed in 2021).

¹⁰ Fuller, R.J. (1980) A method for assessing the ornithological interest of sites for conservation Biol. Cons. 17:229-239.

¹¹ <https://rbbp.org.uk/>

¹² <https://britishbirds.co.uk/content/status-our-bird-populations>

and 1977. Since that time significant decreases have occurred in many bird populations and it is possible that the qualifying diversity levels will also have reduced. It is thought that no similar diversity analysis has been conducted since that time. However, population estimates are frequently revised and, in this report, Baker *et al* (2006)¹³ has been used.

Water Vole Survey

The survey involved search for direct evidence of water vole in accordance with good practice guidance. This included:

- Sightings of water vole;
- Latrines;
- Feeding stations;
- Feeding marks on vegetation;
- Tunnel entrances above and below waterlines;
- Paths and runs at the water's edge or within bank vegetation; and
- Footprints.

2.29 The otter and water vole surveys were undertaken by Katie Luxmoore on the 23rd September during sunny, warm and dry weather conditions. The features surveyed for this species are shown in **Figure 5 in Appendix B**.

Limitations and Constraints

2.30 It is important to note that ecological surveys provide a 'snapshot' of the ecological baseline at the time of the survey. Therefore, if significant time lapses between the surveys and the further development or implementation of proposals, updated ecological surveys may be required to identify any change in the baseline, such as natural succession of habitats, or local extinction or colonisation of species. Ecological surveys can generally be considered as up to date for 1 to 3 years dependent on the nature of the site, ecological baseline, development proposals and likely impact. Therefore, if a year lapses between the progression of development proposals, it is recommended that ecological advice is sought regarding the applicability of the survey findings.

2.31 The woodland areas adjacent to the west and south-eastern Site boundaries were dense and fenced off and could not be accessed internally for the badger survey. However, given the stream along the southern boundary and the poor drainage throughout the Site, it is considered unlikely that any badger setts were missed in these areas.

Due to the time of appointment, only two breeding bird surveys could be undertaken (in May and June), as the March to April survey window had been missed, which is a deviation from good practice guidance. The breeding bird surveys were undertaken in line with a precautionary approach, despite limited suitability for breeding birds within the sheep grazed grassland fields. The May and June surveys recorded relatively little bird activity and this activity was mainly focussed around the field margins. No ground-nesting activity was recorded and the only ground nesting birds recorded were mallard and coot, which were likely associated with the nearby waterbodies. The survey data collected is therefore considered sufficient to conclude that ground-nesting is unlikely to occur within the Site and the deviation from best practice is therefore not considered to represent a significant constraint to the survey findings

¹³ Baker, H., Stroud, D.A., Aebischer, N.J., Cranswick, P.A., Gregory, R.D., McSorley, C.A., Noble, D.G. & Rehfisch, M.M. (2006) Population

estimates of birds in Great Britain and the United Kingdom. British Birds 99: 25–44

Chapter 3

Results

3.1 The findings of the Desk Study are presented in the tables below. **Table 3.1** summarises Natura 2000 statutory designated sites, other statutory designated sites and non-statutory designated sites within 2km of the Site. The locations of the designated sites are shown in **Figure 6 in Appendix B**.

3.2 **Table 3.2** summarises records of protected and notable species of relevance to the Site within 2km, in the last 10 years.

Table 3.1: Designated Sites

Site Name	Designation	Qualifying Features	Distance / Orientation
Statutory Sites			
Cors Bryn-y-Gaer	Site of Special Scientific Interest (SSSI)	The site is designated for its wildlife, for taxonomic groups such as birds, butterflies, lizards, reptiles or insects. It covers a wide range of habitats including small fens, river meadows, sand dunes, woodlands and uplands.	825m north, northeast and east
Blaen Cynon	Special Area of Conservation (SAC)	Designated for its extensive complex of damp pastures and heaths supporting the largest metapopulation of marsh fritillary <i>Euphydryas aurinia</i> a species of butterfly threatened across Europe.	825m north, northeast and east
Woodland Park and Pontpren	SSSI	Categorised for its populations of marsh fritillary butterfly. Additional special interest is provided by its mixture of habitat types, including marshy grassland, dry acid and neutral grassland, heathland and woodland, which add to the ecological and biodiversity interest of the site which also provide food and shelter necessary for the survival of the marsh fritillary.	1673m north
Coedydd Nedd A Mellte	SAC	Designated as it is a very large and diverse example of old sessile oak wood containing complex mosaics of sessile oak <i>Quercus petraea</i> , ash <i>Fraxinus excelsior</i> and lowland woodland types. The site is biologically rich with many woodland plant communities represented and rich bryophyte and lichen assemblages. Notable higher plant species include wood fescue <i>Festuca altissima</i> and the ferns <i>Dryopteris aemula</i> , <i>Hymenophyllum tunbrigense</i> and <i>Asplenium viride</i> .	1697m north west
Dyffrynoedd Nedd A Mellte A Mellte Penderyn	SSSI	The site includes wooded valleys of the rivers Need and Mellte and their tributaries as they pass through a grit and limestone plateau. The rivers have eroded deep, narrow valleys in the plateau, with gorges, river cliffs, block scree and waterfalls. It is of biological interest for its extensive and diverse semi-natural woodland, important populations of several flowering plants and supporting outstanding assemblages of mosses, liverworts and lichens. It is the most	1697m north west

Site Name	Designation	Qualifying Features	Distance / Orientation
		southerly known location in Britain for Marsh Hawks-beard <i>Crepis paludosa</i> .	
Non-Statutory Sites			
Hirwaun Common	SINC	Upland parts of this large SINC support an extensive upland mosaic characterised by marshy grassland and acid grassland with significant areas of dry heath and flushed wet heath. There are a number of rare or local species recorded including Newman oak fern <i>Gymnocarpium Dryopteris</i>, fir clubmoss <i>Huperzia selago</i>, mossy saxifrage <i>Saxifraga hypnoides</i>, cowberry <i>Vaccinium vitis-idaea</i>, beech fern <i>Phegopteris connectilis</i> and ivy-leaved bell flower <i>Wahlenbergia hereracea</i>. Upland bird communities include skylark <i>Alauda arvensis</i> and wheatear <i>Oenanthe aerulea</i>. The lower slopes of Hirwaun Common represent an expanse of marshy grassland, which includes, sphagnum flushes, wet heath and acid grassland and dry heath on old spoil. Pools have potential for great crested newt. Marsh fritillary butterfly <i>Euphydryas aurinia</i> habitat occurs and an adult has recently been recorded. Small pearl-bordered fritillary <i>Boloria selene</i> and grayling <i>Hipparchia Semele</i> have also been recorded.	Immediately adjacent to the Site and the Site's access track crosses the SINC in the south along an existing access track.
Hirwaun Industrial Estate	SINC	Large mosaic site which at its heart includes an ancient peat bog and arounds its edges a mosaic of 'brown field' grassland and scrub habitats. The peat bog is a continuation of the deep peat of the closely adjacent Cors Bryn-y-Gaer SSSI (part of the Blaen Cynon SAC). It is unmanaged peat land with extensive areas of rank purple moor-grass <i>Molinia caeruleae</i>, with varying amounts of associated cross-leaved heath <i>Erica tetralix</i>, deer-grass <i>Trichophorum cespitosum</i>, heather <i>Calluna vulgaris</i>, common and hares-foot cotton-grass <i>Eriophorum angustifolium</i>. There are numerous peat pools (possibly associated with old peat diggings) and these have associated sphagnum moss communities. The habitat mosaic supports good invertebrate habitat, which includes the mountain bumblebee <i>Bombus monticola</i>, and has a high potential for green hairstreak and dingy skipper. The peat bog supports keeled skimmer dragonflies with amphibian and reptile habitat, and diverse breeding bird habitat (including linnet, stonechat and warblers) and potential (in the peat bog) for breeding snipe.	500m north
Hirwaun Ponds	SINC	A species rich area of marshy grassland, swamp and ponds occupying low-lying land between A465 and A4061, and part based on old colliery spoil. The marshy grassland supports purple moor-grass, rush and tufted hair-grass and although unmanaged is very diverse. It is best characterised as a mosaic of marshy grassland habitats and tall fen communities, which includes meadow thistle, angelica, marsh bedstraw and whorled caraway. This marshy grassland/fen grades into swamp dominated by reed mace and willow scrub. Royal fern has been recorded on the site. At the western end Tower Colliery manage and maintain a number of fishing pools, which contain a rich emergent flora including sea club-rush, common reed and lesser water parsnip. The pools support very species rich dragonfly	800m west

Site Name	Designation	Qualifying Features	Distance / Orientation
		populations and the site is one of the best recorded sites in RCT with 14 species recorded, including small blue-tailed damselfly, broad bodied chaser, black-tailed skimmer, and keeled skimmer. The mosaic of wetland vegetation offers excellent invertebrate, amphibian (frogs and toads have been recorded) and nesting bird habitat including reed bunting, grasshopper warbler, reed warbler, water rail, redpoll and sedge warbler. Barn owl and kestrel both breed on or close to the SINC. Coal spoil areas support a mosaic of thin open grassland (with silver hair-grass, carline thistle, pearly everlasting, thyme leaved sandwort, marsh cudweed, and rats tail fescue) and emerging heath (with some lichen heath). Grayling and small copper butterflies occur on the site.	
Rhigos Tramway	SINC	A large site which supports a complex mosaic of wet and dry grassland, with areas of gorse scrub, and a wooded stream. The SINC includes extensive areas of purple moor-grass and rush pasture. The mosaic includes purple moor-grass (dominate), sphagnum bog moss (frequent), heather (frequent), cross-leaved heath (frequent), soft rush (locally frequent), devil's bit scabious (locally frequent), deer-grass, lousewort and common sedge. Much of this grassland has been identified as suitable marsh fritillary butterfly habitat.	1200m east
Werfa Farm	SINC	Extensive area of marshy and acid grassland (Rhos Pasture) with smaller areas of associated habitat. Good example of lowland species rich marshy grassland, particularly species whorled caraway. The main part of the SINC is sheep grazed marshy grassland with a complex mosaic of purple moor grass and rush pasture with wet heath and acid flushes (sphagnum bog moss) and large areas of wet acidic grassland. It's an important area of marsh fritillary habitat which lies close to the Blaen Cynon SAC.	1300m north west
Nant Fforch	SINC	Complex valley of mire and associated purple moor-grass and rush pasture associated with an apparent drumlin field. The valley mire supports purple moor-grass on deep peat with stands of common cotton grass and sphagnum bog moss. The marshy grassland areas are National Vegetation Classification system code M25 in character with devils bit scabious. The site includes areas of marshy grassland assessed as good and suitable marsh fritillary habitat.	1700m west
Brickyard Mire	SINC	Small valley mire closely associated with the valley mires of nearby SINCs (Nant Fforch). The site occurs on deep peat and is dominated by purple moor-grass and rush pasture with common cotton grass, soft rush, compact rush, carnation sedge and deer grass. The site has been degraded by drainage, but retains important peat land features and key species, including the keeled skimmer dragonfly.	1700m west

Table 3.2: Relevant Protected and Notable Species Records

Species Name	Status	Distance/Orientation (m)
Amphibians		
Common frog <i>Rana temporaria</i>	Wildlife and Countryside Act 1981 (W&CA) Schedule 5 Priority Species UK Post-2010 Biodiversity Framework	Record from 2014 922m north
Common toad <i>Bufo bufo</i>	Wildlife and Countryside Act 1981 (W&CA) Schedule 5 The Environment (Wales) Act 2016 Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 1070m east
Reptiles		
Common lizard <i>Zootoca vivipara</i>	W&CA Schedule 5 The Environment (Wales) Act 2016 Priority Species UK Post-2010 Biodiversity Framework	record from 2020 538m east
Birds		
Teal <i>Anas crecca</i>	W&CA Schedule 2 Birds of Conservation Concern Red List for UK Birds (BoCC) (Species of Conservation Concern)	Record from 2020 within the same landownership
Eurasian Coot <i>Fulica atra</i>	W&CA Schedule 2 & 3 Species of Conservation Concern	Record from 2020 within the same landownership
Mallard <i>Anas platyrhynchos</i>	W&CA Schedule 3 Species of Conservation Concern	Record from 2020 within the same landownership
Kestrel <i>Falco tinnunculus</i>	W&CA Section 1 Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2017 within the same landownership
Eurasian Bullfinch <i>Pyrrhula pyrrhula</i>	W&CA Schedule 3 Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 within the same landownership
Little Grebe <i>Tachybaptus ruficollis</i>	W&CA Locally Important Species	Record from 2020 within the same landownership
Canada Goose <i>Branta canadensis</i>	W&CA Schedule 2 Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 within the same landownership
Spotted Flycatcher <i>Muscicapa striata</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 within the same landownership

Species Name	Status	Distance/Orientation (m)
Little Ringed Plover <i>Charadrius dubius</i>	W&CA Schedule 1 Species of Conservation Concern The Environment (Wales) Act 2016	Record from 2020 608m north
Tree Pipit <i>Anthus trivialis</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 727m north
Lesser Redpoll <i>Acanthis cabaret</i>	W&CA Schedule 3 Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 737m north
Common Sandpiper <i>Actitis hypoleucos</i>	W&CA Schedule 1 Species of Conservation Concern	Record from 2020 752m north
Long-tailed Tit <i>Aegithalos caudatus</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Swift <i>Apus spus</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Meadow Pipit <i>Anthus pratensis</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Dipper <i>Cinclus cinclus</i>	W&CA Species of Conservation Concern	Record from 2019 752m north
Common Raven <i>Corvus corax</i>	W&CA Locally Important Species	Record from 2020 752m north
Grey Heron <i>Ardea cinerea</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Common Reed Bunting <i>Eberiza schoeniclus</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 752m north
Snipe <i>Gallinago gallinago</i>	W&CA Schedule 2 & 3 Species of Conservation Concern	Record from 2020 752m north
Oystercatcher <i>Haematopus ostralegus</i>	W&CA Species of Conservation Concern	Record from 2019 752m north
Swallow <i>Hirundo rustica</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Grasshopper Warbler <i>Locustella naevia</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 752m north

Species Name	Status	Distance/Orientation (m)
	The Environment (Wales) Act 2016	
Red Crossbill <i>Loxia curvirosta</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 752m north
Red Kite <i>Milvus milvus</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 752m north
Grey Wagtail <i>Motacilla cinerea</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Redstart <i>Phoenicurus phoenicurus</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Willow Warbler <i>Phylloscopus trochilus</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
European Green Woodpecker <i>Picus viridis</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Willow Tit <i>Poecile montanus</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 752m north
Dunnock <i>Prunella modularis</i>	W&CA Schedule 3 Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 752m north
Willow Tit <i>Poecile montanus</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 752m north
Goldcrest <i>Regulus regulus</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Starling <i>Sturnus vulgaris</i>	W&CA Schedule 3 Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 752m north
Redwing <i>Turdus iliacus</i>	W&CA Schedule 1 Priority Species UK Post-2010 Biodiversity Framework	Record from 2019 752m north
Song Thrush <i>Turdus philomelos</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2020 752m north
Fieldfare <i>Turdus pilaris</i>	W&CA Schedule 1 Priority Species UK Post-2010 Biodiversity Framework	Record from 2018 752m north

Species Name	Status	Distance/Orientation (m)
Mistle Thrush <i>Turdus viscivorus</i>	W&CA Species of Conservation Concern	Record from 2020 752m north
Woodcock <i>Scolopax rusticola</i>	W&CA Schedule 2 & 3 Species of Conservation Concern	Record from 2018 924m north east
Greenfinch <i>Chloris chloris</i>	W&CA Schedule 3	Record from 2020 930m south
Whitethroat <i>Curruca communis</i>	W&CA Species of Conservation Concern	Record from 2020 930m south
Wigeon <i>Mareca penelope</i>	W&CA Schedule 2 & 3 Species of Conservation Concern	Record from 2020 930m south
Brambling <i>Fringilla montifringilla</i>	W&CA Schedule 1 & 3 Priority Species UK Post-2010 Biodiversity Framework	Record from 982m 2010 east
Jack Snipe <i>Lymnocyptes minimus</i>	W&CA Species of Conservation Concern	Record from 2018 982m west
Sedge Warbler <i>Acrocephalus schoenobaenus</i>	W&CA Locally Important Species	Record from 2020 982m east
Goshawk <i>Accipiter gentilis</i>	W&CA Schedule 4 Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 1079m west
Eurasian Skylark <i>Alauda arvensis</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2017 1210m north
Turtle Dove <i>Streptopelia Turtur</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2019 1217m east
Marsh Tit <i>Poecile palustris</i>	W&CA Priority Species UK Post-2010 Biodiversity Framework The Environment (Wales) Act 2016	Record from 2019 1366m north west
Hobby <i>Falco subbuteo</i>	W&CA Schedule 1 Priority Species UK Post-2010 Biodiversity Framework	Record from 2018 1570m southeast
Short-eared Owl <i>Asio flammeus</i>	W&CA Species of Conservation Concern	Record from 2019 1632m south east
Tufted Duck <i>Aythya fuligula</i>	W&CA Schedule 2 Species of Conservation Concern	Record from 2019 1991m north

Species Name	Status	Distance/Orientation (m)
Mammals		
European Hedgehog <i>Erinaceus europaeus</i>	The Environment (Wales) Act 2016 Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 1210m west
Badger <i>Meles meles</i>	Protection of Badgers Act 1992 Priority Species UK Post-2010 Biodiversity Framework	Confidential – records found within 2km of the site
Bats		
Common pipistrelle <i>Pipistrellus pipistrellus</i>	W&CA Schedule 5 The Conservation (Natural Habitats &c.) Regulations 2017, as amended, Schedule 2 (Habitats Regulations Schedule 2) Habitats Directive Annex 4 The Environment (Wales) Act 2016 Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 632m north
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	W&CA Schedule 5 Habitats Regulations Schedule 2 Habitats Directive Annex 4 The Environment (Wales) Act 2016 Priority Species UK Post-2010 Biodiversity Framework	Record from 2020 632m north
Whiskered Bat <i>Myotis mystacinus</i>	W&CA Schedule 5 Habitats Regulations Schedule 2 Habitats Directive Annex 4 The Environment (Wales) Act 2016 Priority Species UK Post-2010 Biodiversity Framework	Record from 2010 1269m west
Invertebrates		
Common Emerald Damselfly <i>Lestes sponsa</i>	Locally Important Species	Record from 2020 adjacent to the Site and within the same landownership
Shaded Broad-bar <i>Scotopteryx chenopodiata</i>	Priority Species UK Post-2010 Biodiversity Framework	Record from 2012 adjacent to the Site and within the same landownership
Small Pearl Bordered Fritillary <i>Boloria selene</i>	Environment (Wales) Act 2016 Section 7 W&CA Schedule 5 Priority Species UK Post-2010 Biodiversity Framework	Record from 2019 752m north
Marsh Fritillary Butterfly <i>Euphydryas aurinia</i>	Environment (Wales) Act 2016 Section 7 W&CA Schedule 5 Priority Species UK Post-2010 Biodiversity Framework	Record from 2013 752m north

Species Name	Status	Distance/Orientation (m)
Dingy Skipper Butterfly <i>Erynnis tages</i>	Environment (Wales) Act 2016 Section 7 Priority Species UK Post-2010 Biodiversity Framework	Record from 2015 884m north east
Small Heath Butterfly <i>Coenonympha pamphilus</i>	Environment (Wales) Act 2016 Section 7 Priority Species UK Post-2010 Biodiversity Framework	Record from 2017 922m north
Cinnabar Moth <i>Tyria</i> <i>Jacobaeae</i>	Priority Species UK Post-2010 Biodiversity Framework	Record from 2017 922m north
Narrow-bordered Bee Hawk Moth <i>Hemaris tityis</i>	Priority Species UK Post-2010 Biodiversity Framework Nationally Scarce	Record from 2019 1655m east
Invasive Species (within 1km accuracy)		
Himalayan Balsam <i>Impatiens glandulifera</i>	W&CA Schedule 9	Record from 2021 adjacent to the Site and within the same landownership

Extended Phase 1 Habitat Survey

Site Description

3.3 The Site is located on Rhigos Road, Aberdare (central grid reference: SN 93461 05723). The majority of the Site comprised poor semi-improved grassland fields, which were nutrient enriched, had a low sward height and were used for sheep grazing. These fields were bordered by species poor hedgerows, with associated drainage ditches, and patches of mixed woodland along the southern and western boundary.

3.4 Immediately to the north and east of the Site, within the same land ownership, were additional fields used for grazing, a series of waterbodies with reedbed and other marginal habitats, a stream connecting these waterbodies, areas of broadleaved woodland and scrub and areas of marshy grassland. To the east of the Site, along the A4061, was a particularly large area of marshy grassland dominated by rushes, which (along with the largest waterbody and associated marginal habitat) formed part of the Hirwaun Common SINC.

3.5 To the north of Rhigos Road, beyond the Site ownership, there was an industrial estate and area of woodland. In the east there was a large active quarry site and to the south and west of the Site ownership there was additional farmland and associated habitats.

Habitat Descriptions – Within the Site Boundary

3.6 Habitat descriptions are set out below. While considering this information, reference should be made to the Phase 1 Habitat Map presented in **Figure 1 in Appendix B** and target notes and photos in **Appendix C**.

Poor semi-improved grassland

3.7 All fields within the Site comprised poor semi-improved grassland (target note 1), which were heavily sheep grazed with a sward height of less than 10cm. Species composition comprised dominant perennial rye-grass *Lolium perenne*, and Yorkshire fog *Holcus lanatus*, abundant sweet vernal grass *Anthoxanthum odoratum*, and white clover *Trifolium repens*, frequent crested dogs-tail *Cynosurus cristatus*, and bent grass *Agrostis sp.*, and occasional soft rush *Juncus effusus*.

Intact species-poor hedgerows

3.8 The fields were bordered by species-poor hedgerows (target note 2), which were all fenced off to prevent sheep access. The majority of the hedgerows were associated with a drainage ditch, which were dry in the higher altitudes but occasionally wet in the lower altitudes. Species recorded included dominant hawthorn *Crataegus monogyna*, and blackthorn *Prunus spinosa*, with occasional rowan *Sorbus aucuparia*, pedunculate oak *Quercus robur*, and rarely dog rose *Rosa canina*. Ivy *Hedera helix*, docks *Rumex sp.*, and bramble *Rubus fruticosus* agg., were also frequent across the hedgerows.

Bare Ground

3.9 To the east of the fields was a bare earth access track with occasional patches of poor semi-improved grassland, leading south-eastwards to connect the Site with the A4061 (target note 6). This access track crosses the Hirwaun Common SINC. The track also ran northwards, past the ponds, to connect to Rhigos Road (target notes 3, 4 and 5).

Habitat Descriptions – Beyond the Site Boundary but Within the Same Ownership

Marshy Grassland

3.10 To the east of the Site, between the access track and the A4061, was a large area of marshy grassland, with a sward height between 50-100cm, which appeared to be primarily cattle-grazed. This marshy grassland formed part of the Hirwaun Common SINC (target note 8). This area was dominated by soft rush and sharp-flowered rush, with locally frequent tufted hair-grass, purple moor-grass *Molinia caerulea*, and Yorkshire fog and *Rhytidiadelphus squarrosus*, and occasional marsh thistle *Cirsium palustre*, and cuckoo flower *Cardamine pratensis*.

Tall Ruderal/ Scattered Scrub Mosaic

3.11 To the north-east of the Site, north of the marshy grassland, was a small area of tall ruderal vegetation with scattered scrub (target note 7). This vegetation was dominated by rosebay willowherb *Chamaenerion angustifolium*, with locally dominant bramble, grey willow *Salix cinerea*, and goat willow *Salix caprea*, locally abundant common nettle *Urtica dioica*, occasional tufted hair-grass *Deschampsia cespitosa*, and sharp-flowered rush *Juncus acutiflorus*.

Standing and Running Water

3.12 A series of waterbodies were present to the north and east of the Site (target notes 9 – 13), connected by a small stream (target note 14), with the largest being in the north-east close to Rhigos Road (target note 9). These water bodies had dense marginal vegetation and reedbed, which were dominated by soft rush and sharp-flowered rush, with locally abundant bulrush *Typha latifolia*, gypsywort *Lycopus europaeus*, water-mint *Metha aquatica*, grey willow, and occasional brooklime *Veronica beccabunga*.

Mixed Woodland and scrub

3.13 There were a number of small copses of woodland and willow scrub beyond the boundary of the Site. All of these woodland habitats contained species of similar age and height, the majority being young to semi-mature.

3.14 Immediately to the west was a small parcel of woodland along the field boundaries (target note 15). The understorey was open in areas and comprised dominant poplar *Populus* sp., with occasional hazel, birch, alder, sycamore *Acer pseudoplatanus* and conifer trees. Immediately to the north of this parcel was another small parcel of woodland along the field boundary (target note 16), with species including ash *Fraxinus excelsior*, and willow *Salix* sp. The understorey comprised bramble and bracken.

3.15 Immediately to the east of the Site, was a small parcel of scrub with trees adjacent to a waterbody (target note 17). This habitat comprised abundant hawthorn and blackthorn, frequent grey willow *Salix cinerea*, and alder *Alnus glutinosa*, with occasional hazel *Corylus avellana*. The understorey was dense with bracken *Pteridium aquilinum*, bramble and nettles.

3.16 Immediately to the south of the Site was an area of mixed woodland and scrub (target note 18) with abundant with willow *Salix* sp., and blackthorn with occasional rowan, larch *Larix* sp., Norway maple *Acer platanoides*, and birch *Betula* sp. Bramble dominated the understorey. Elsewhere within this habitat were areas with occasional hazel, pedunculate oak *Quercus robur*, Norway maple and poplar *Populus* sp.

Protected and Notable Species

3.17 The Desk Study and site visit identified the following protected or notable species/species groups as potentially present at the Site or immediate surroundings and with potential to be impacted by the works, in the absence of mitigation:

- Bats;
- Badger;
- Great Crested Newt *Triturus cristatus*;
- Reptiles;
- Birds;
- Dormouse *Muscardinus avellanarius*;
- Otter *Lutra lutra*;
- Water vole *Arvicola amphibius*; and
- Marsh fritillary.

Bats

Foraging and Commuting

3.18 The hedgerows provided suitable habitat for foraging and commuting bats, however, this was limited due to the fact they were relatively low in height (<2m) and were species-poor. The woodland areas, stream and waterbodies beyond the Site boundaries provided sheltered foraging and commuting opportunities for a range of bat species. These features were connected to other suitable habitats for bats in the wider landscape, contributing to the network of available commuting routes for bats.

3.19 The grassland habitats within the Site and the immediate surroundings, which were kept short due to sheep grazing, were of low suitability for bats due to a lack of structural and floral diversity (likely corresponding to a lack of abundance and diversity in insect prey).

Assessment of Bat Roost Suitability (BRS)

3.20 Very few trees were located within the Site itself and none of these had BRS. Two of the trees immediately adjacent to the western site boundary were assessed to have low BRS.

The locations of these trees are shown on **Figure 1** in **Appendix B** and in **Table 3.3** below.

Table 3.3: Assessment of Trees with Bat Roost Suitability

Tree Number	Location	Description of Bat Roost Suitability (BRS) Features	BRS Category
1	An alder tree located immediately to the west of the Site on the edge of a woodland area (target note 15,).	Branch had half split from tree trunk approximately 1.5m up the tree creating a small potential cavity space.	Low
2	A willow is located within the woodland area on the western boundary of the Site (target note 16).	Split in a branch around 3m up the tree creating a small potential cavity space.	Low

Notes: The woodland area where the trees were situated are fenced off and do not fall within the site boundary, although they were on the edge of the site boundary and any bats if using these trees would likely also be utilising the Site.

Badger

3.21 No evidence of badger activity within the Site was noted during the survey and no badger setts were identified within the Site or the immediate surroundings.

3.22 Mammal paths were present along the hedgerows / fence lines surrounding the fields, however it is likely these were created by the sheep.

3.23 The Site provided limited habitat for badger sett building. The areas on Site with the most suitable habitat (woodland and hedgerow) are inaccessible for survey, however, due to the poor drainage across the Site, it is considered unlikely that badgers would use these areas for sett building.

3.24 It is therefore unlikely that badgers use the Site for sett building, however they will likely visit the Site for commuting or foraging.

Great Crested Newt (GCN)

Terrestrial Habitat

3.25 The majority of the Site comprised open grassland with a short sward due to sheep grazing, therefore provided very limited sheltering and foraging opportunities for GCN. The hedgerows and woodland areas provided connectivity across the Site for GCN as well as sheltering and foraging habitat.

3.26 The marshy grassland fields to the north and east of the Site comprised tussocky grassland dominated by rush species

and limited sheep grazing. These areas provided high quality terrestrial habitat for GCN with an abundance of sheltering and foraging opportunities available.

Waterbody Habitat Suitability Index (HSI) Assessment

3.27 No ponds were present within the Site, however eleven ponds were present within 500metres of the site boundary.

3.28 Four ponds were present within the same site ownership but outside of the Site. Of these four ponds, Pond 2 and Pond 5 were assessed as 'Excellent', Pond 3 was assessed as 'Average' and Pond 1 as 'Poor'.

3.29 Seven waterbodies were present outside of the site ownership but within 500 metres of the site boundary and had sufficient habitat connectivity to the Site (though this was limited for Ponds 7, 8, 9, 10 and 11 due to the presence of roads). Pond 4 was assessed as 'Below Average'. The other ponds were not assessed as there was no access granted, despite attempts to gain permission to access being made prior to the survey.

3.30 A series of wet and dry ditches were present along field boundaries, both within the Site and the surroundings. These were assessed as 'Poor', due to the high level of shade, lack of suitable egg-laying vegetation, poor water quality and frequent drying out.

Table 3.4. presents the results of the HSI Assessment. The locations of the waterbodies and their HSI assessments are shown in **Figure 2** in **Appendix B**.

Table 3.4: Habitat Suitability Index Assessment

Waterbody Number	Distance from the Site	Description	HSI Score	Suitability
1	Immediately adjacent, north	Large fishing lake which was deep with evidence of human disturbance and heavy use, though with some suitable marginal vegetation.	0.35	Poor
2	Immediately adjacent, north	This pond was completely covered in rush and grass species, and relatively shallow across the full area. It was located in a lower area and connected to other ponds via streams and rock falls.	0.82	Excellent
3	Immediately adjacent, east	The pond was heavily vegetated with bulrush, the northern side of the pond was very shallow and dry in some areas. The southern section was slightly deeper around 30-100cm.	0.68	Average
4	50m, south-west	This pond was medium sized with open water and marginal vegetation around the edges. No access was granted. However, the pond could be viewed from the Site.	0.51	Below Average
5	65m, north	Surrounded by high quality terrestrial habitat to the north of the Site, with good connectivity to surrounding ponds and shelter for GCN.	0.83	Excellent
6	215m, west	A pond within a different landholding to the west of the Site. No access was granted.	n/a	n/a
7	50m, north	A small pond within woodland adjacent to industrial estate on the opposite side of Rhigos Road. No access was granted. The very small size of this pond and fact that it is completely shaded by woodland likely limit its suitability to Average or lower.	n/a	n/a
8 - 11	375m, east	A series of waterbodies within an active quarry to the east of the Site, separated by the A4061. No access was granted. From aerial photography, these waterbodies appeared to be unvegetated and ephemeral in nature and related to the varying water levels caused by the quarrying activities. As such, they were likely to be subject to regular high levels of disturbance. Suitability for GCN is therefore considered to be Low.	n/a	n/a
Drainage ditches	Within the Site and surroundings	A series of drainage ditches along field boundaries, which regularly dried for prolonged periods of time.	0.48	Poor

eDNA Presence/Absence Survey of Waterbodies

3.31 All of the ponds within the Site ownership (1, 2, 3 and 5) were subject to an eDNA survey (though within the same ownership, these ponds were outside of the Site boundary). The results of the eDNA tests were negative for all four ponds¹⁴.

3.32 Ponds 4 and 6 were subject to an eDNA survey in 2022, as part of a separate planning application (planning application number 22/0634/10, available on the Rhondda Cynon Taff

County Borough Council website) and returned negative results¹⁵.

Reptiles

Habitat Appraisal

3.33 The majority of the Site comprised poor semi-improved grassland, which was kept short by sheep grazing. These areas provided limited shelter for reptiles and limited suitability for

¹⁴ Surescreen Scientifics Technical Report, dated 10/06/2022, Folio Number: E13905. Lab sample numbers: 4542, 4543, 4544, 4545.

¹⁵ Moore, S. (May 2022) eDNA Survey Report: Bryngolwg Solar. Phlorum, Manchester.

basking. The hedgerow and woodland areas bordering the sheep grazed fields provided sheltering suitability, however there were limited basking opportunities due to dense vegetation and canopy cover.

3.34 There was an access track running from the north of the Site by the fishing lake, along the eastern boundary to the centre of the Site. This was made up of stone and bare ground and provided basking opportunities for reptiles, though was subject to occasional disturbance from vehicles and walkers.

3.35 The ponds and the marshy grassland to the north and east of the Site was suitable for basking, foraging and sheltering reptiles with long tussocky grassland/rush vegetation. In addition, three log piles were present within the northern field and were suitable for sheltering or torpor.

Birds

Habitat Appraisal

3.36 The hedgerows within the Site and the habitats beyond the site boundary (such as tussocky grassland and woodland) provided optimum habitat for common species of woodland and farmland birds to forage and build nests. These habitats were well connected to other suitable habitats for these species in the wider landscape.

3.37 Beyond the site boundary, suitable habitat for wetland birds was present in the form of a number of connected ponds and marshy grassland habitat.

Breeding Bird Survey

3.38 A list of species recorded within the Site, and their conservation status is provided in **Table 3.5** below and shown in **Figures 3 and 4 in Appendix B**.

Table 3.5: Bird Territories Recorded

Species	Conservation Status	Activity Location / no. of territories			Estimated minimum total no. territories
		Semi-improved grassland	Mixed woodland	Hedgerow	
Blackbird	n/a		5	15	20
Blackcap	n/a		3		3
Blue Tit	n/a		1	1	2
Chaffinch	n/a		1	4	5
Chiffchaff	n/a		1	2	3
Coal Tit	n/a			1	1
Dunnock	BoCC (amber)			1	1
Goldcrest	n/a		1		1
Goldfinch	n/a	1	2	5	8
Great Tit	n/a			1	1
Grey Heron	n/a	1			1
Grey Wagtail	BoCC (amber)	1			1
Long-tailed Tit	n/a		1		1
Mallard	n/a	1			1
Meadow Pipit	BoCC (amber)	1			1
Pied Wagtail	n/a	2			2

Species	Conservation Status	Activity Location / no. of territories			Estimated minimum total no. territories
		Semi-improved grassland	Mixed woodland	Hedgerow	
Robin	n/a		6	2	8
Song Thrush	BoCC (amber)	2	3	1	6
Starling	BoCC (red)	3	1	3	7
Willow Warbler	BoCC (amber)		13		13
Wren	BoCC (amber)		5	11	16
Offsite					
Coot	n/a	On pond to north east of the Site			

3.39 Species recorded within the Site, which were highly mobile, forming aggregates and where breeding status and/or number of breeding territories could be determined with accuracy included:

- Carrion crow (several foraging throughout).
- Herring gull (BoCC red) (several birds loafing above the Site).
- Jackdaw (numerous foraging throughout).
- Lesser Black-backed Gull (BoCC amber) (several birds loafing above the Site).
- Magpie (several foraging throughout).
- Sparrowhawk (BoCC amber) (recorded overhead)
- Swallow (several recorded feeding over the Site).
- Wood pigeon (numerous foraging throughout).

3.40 A total of 21 species were recorded within the Site and were confirmed as breeding or probably breeding. A further eight species were recorded foraging or loafing across the Site and are likely to breed within or close to the Site. A further one species was recorded adjacent to the Site.

Dormouse

3.41 No records for dormouse were returned within the Desk Study. The hedgerows within the Site provided suitable habitat for dormouse nest building, foraging and dispersal, though these opportunities were sub-optimal due to the low plant species diversity, which would be unlikely to offer a reliable food supply throughout the whole length of the active season. The habitats immediately adjacent to the Site also provided opportunities for dormouse and the Site was well connected to other suitable habitats in the surrounding landscape.

Otter

3.42 No signs of otter were observed during the surveys, despite a search being undertaken. The pond to the north of the Site provided suitable foraging opportunities for otter due to the presence of fish. However, resting opportunities were limited due to the exposed nature of the pond margins and regular informal access from members of the public. Connectivity to the pond was limited, due to the shallow, narrow and exposed structure of the stream to the east of the Site and lack of other suitable aquatic habitats in the surrounding landscape. It is therefore considered unlikely that otter would be present within the Site or immediate surroundings, and as such, this species is not considered further in this report.

Water vole

3.43 No signs of water vole were identified during the survey in any of the ponds, the stream or the wet ditches within the area surveyed. Occasional signs of field or bank vole were noted around the margins of the ponds.

3.44 The aquatic habitats within the survey area provided optimum foraging habitat for water vole, with dense marginal habitats dominated by rushes and grasses. These habitats were well connected to each other, though connectivity to other suitable habitats within the wider landscape was more limited.

3.45 Burrowing opportunities for water vole were limited throughout the survey area, which is likely to account for the absence of identified field signs. Pond 1 had shallow margins and therefore lacked the built-up earth banks usually favoured by this species. In addition, this pond was regularly subject to informal access from members of the public. The other ponds within the area surveyed and the stream and wet ditches appeared to be artificially constructed, or at least reinforced, with dry stone slopes, creating densely rocky bank habitats. As

a result, these habitats had very limited earth substrate and likely prevented the creation of burrows and runs characteristic of water vole.

Marsh Fritillary

3.46 No marsh fritillary butterflies were observed during either site visit. A thorough search of the poor semi-improved grassland fields within the Site did not identify any devil's bit scabious or marsh violet *Viola palustris*, which are the food plants of marsh fritillary. These fields were intensively sheep grazed, making them unsuitable for this species¹⁶.

3.47 More suitable habitat for marsh fritillary was present beyond the Site boundary, within the same land ownership, in the form of tussocky and marshy grassland to the north and particularly to the east. No devil's bit scabious, or marsh violet, were identified within these areas, though the large expanse of

marshy grassland to the east was not searched extensively and therefore presence cannot be ruled out. The marshy grassland appeared to be primarily cattle-grazed and formed part of the Hirwaun Common SINC, which stretched further east beyond the A4061. One marsh fritillary butterfly has been recorded within this SINC, though information on the exact location of this record was not available (most likely further east within land that has public access). It is therefore possible that marsh fritillary may be present in low numbers within the land to the north and east of the Site.

3.48 The bare earth access track in the south crosses the tussocky and marshy grassland and the Hirwaun Common SINC. However, the access track itself is considered to be unsuitable for marsh fritillary, due to the absence of suitable vegetation and lack of sheltering opportunities.

¹⁶ Butterfly Conservation. Marsh Fritillary in Wales: A Practical Guide to Managing Grassland for Marsh Fritillary in Wales. Available at: [https://butterfly-conservation.org/sites/default/files/2021-](https://butterfly-conservation.org/sites/default/files/2021-09/Marsh%20Fritillary%20-%20Managing%20grassland_0.pdf)

[09/Marsh%20Fritillary%20-%20Managing%20grassland_0.pdf](https://butterfly-conservation.org/sites/default/files/2021-09/Marsh%20Fritillary%20-%20Managing%20grassland_0.pdf) (Accessed: 17th October 2022).

Chapter 4

Discussion

Designated Sites

Discussion

The Blaen Cynon SAC and Hirwaun Common SINC

4.1 The Site is located within 825m of the Blaen Cynon SAC. The primary reason for its designation is the extensive complex of damp pastures and heaths which support the largest metapopulation of marsh fritillary butterfly. The Site itself was not considered to be suitable for this species, as outlined in the Results section above. Suitable habitat for this species, in the form of areas of tussocky and marshy grassland, were present immediately beyond the site boundaries, particularly to the east within the Hirwaun Common SINC. These habitats will be retained and protected.

4.2 In the south of the Site, the bare earth access track crosses the Hirwaun Common SINC, before it connects to the A4061. However, this access track is considered to have negligible ecological value, due to the absence of suitable vegetation and sheltering opportunities. For the same reason, the access track is considered unsuitable for marsh fritillary, given the absence of food plants for this species. Given this, and that the access track is already in regular use for farming activities, its use during the construction and operational phases of the solar farm will not result in significant impacts on the SINC or on the qualifying features of the SAC.

Other Designated Sites

4.3 The Site is located within 1697m of the Coedydd Ned A Mellte SAC. Designated for its large and diverse old sessile oak wood. Containing a mosaic of species including sessile oak *Quercus petraea*, ash *Fraxinus excelsior* and lowland woodland types. Similar species were present within the woodlands immediately adjacent to the Site, although due to the distance from the Site and because the areas of woodland are not to be impacted by the proposed solar farm, the proposals will not result in impacts to the SAC.

4.4 The Site is located within 2km of Cors Bryn-y-Gaer SSSI, Dyffrynoedd Ned A Mellte Penderyn SSSI and Woodland Park and Pontpren SSSI. The first is designated for its varied fauna of birds, butterflies, lizards, reptiles and insects, it is located 825m from the Site which also provides habitat for the same fauna through its woodland, hedgerow, marshy grassland and

ponds. The second is designated for valleys and species of mosses, liverworts and lichens. None of these features are represented within the Site and it is located over 1500m away. The third is designated for its populations of marsh fritillary butterfly and mixture of habitat types. Due to the Site being over 1500m from the SSSI and the development not impacting areas of marshy grassland or woodland habitat it is considered unlikely that the proposed development will impact the SSSI.

4.5 There are six other non-statutory sites within 2km of the Site. Hirwaun Industrial Estate SINC, Hirwaun Ponds SINC, Rhigos Tramway SINC, Nant Fforch SINC, Werfa Farm SINC and the Brickyard Mire SINC are designated for their mosaic of marshy grassland, ancient peat bog, brown field and scrub habitat. As outlined above, given the habitats present within the Site, the low impacts associated with the proposals and the distance from the designated sites, impacts are not anticipated.

Mitigation

- The poor semi-improved grassland within the Site is not considered to be suitable for marsh fritillary and therefore mitigation for its temporary loss is not required.
- Prior to and during construction of the solar farm, the Site will be maintained in its current short grassland condition, to prevent it from increasing in suitability for marsh fritillary.
- Access to the Site and the use of vehicles will be restricted to the existing access track, to ensure that there is no disturbance of suitable habitat for marsh fritillary within the Hirwaun Common SINC.
- Prior to commencement of works, site workers will be given a Toolbox Talk on how to recognise this species, its legal protection and what to do if it is encountered.

Habitats

Discussion

4.6 The habitats within the Site comprised poor semi-improved grassland, species-poor hedgerow and a bare earth access track. These are common and widespread habitats within the surrounding landscape and within the UK as a whole. The proposed development will result in the temporary loss of the poor semi-improved grassland. Given the extent of similar habitats in the surrounding area, this is not considered a significant loss of these habitats at landscape scale and will be replaced with a more species-rich grassland of higher ecological value.

4.7 The proposed development has been designed to retain and protect the habitats of higher value, such as the hedgerows within the Site and the woodland, marshy grassland and waterbodies, stream and ditches beyond the site boundaries.

Mitigation

- The poor semi-improved grassland will be replaced with species-rich grassland, created through the use of a locally sourced wildflower meadow seed mix, comprised of species suitable for the Site (commercially available seed mixes will be avoided and opportunities to use local green hay will be explored where possible). This grassland will then be managed using conservation grazing methods in order to encourage the establishment and maintenance of an ecologically valuable grassland habitat. Further information is provided within the LEMP. These measures are expected to result in a significant enhancement of the existing grassland, over and above the mitigation requirements.
- Any development within the Site has the potential to impact on retained mature trees and shrubs. Therefore, tree protection measures will be put in place around these features during works in accordance with BS5837: 2012. Trees in Relation to Construction.
- A buffer of three metres will be provided between the hedgerows and the solar farm installation, which is considered to be sufficient given the limited ground disturbance involved.
- Best construction measures will also be followed throughout the project, including: fencing off the hedgerows, woodland edge, waterbodies, stream and ditches; secure storage and safe disposal of any materials and substances, and dust prevention measures, to prevent accidental contamination to the adjacent habitats.
- All habitat mitigation and enhancements will be implemented through a Landscape and Ecological Management Plan.

Bats

Discussion

Commuting and Foraging

4.8 The majority of the Site comprised open habitats of poor semi-improved grassland. These habitats were considered to be of low suitability for bats due to a lack of species and structural diversity (likely corresponding to a lack of abundance and diversity of insect prey) and due to the fact that most bat species will avoid large open areas.

4.9 The boundaries of the grassland fields comprised hedgerows and areas of woodland. These habitats formed linear features which provided habitat connectivity for bats both across the Site and with the surrounding landscape.

4.10 The proposed development will be situated within the grassland habitats, which are considered to be of low suitability for bat foraging, due to the current poor species and structural diversity. This enables the linear features to be retained. Therefore, the proposals are not considered to result in impacts to bat commuting or foraging.

Bat Roost Suitability (BRS)

4.11 The BRS assessment identified two trees across the Site with BRS, both of which had low BRS with only one potential feature each for bat roosting. Neither of these two trees will be removed for the proposed solar farm, therefore will not be considered further within this report.

Mitigation

- The construction and operational phases are not anticipated to require any lighting. However, if lighting is later required, then a sensitive lighting scheme will be provided, in consultation with an ecologist, which will incorporate all external light fittings within the Site. In particular, this will ensure that lighting is directed away from linear features, so that these remain dark and available to bats. In line with good practice guidance¹⁷, the following lighting measures will be incorporated, where appropriate:
 - Implementation of dark buffer zones, illumination limits and zonation to separate habitats or features of importance for bats.
 - Use of LED lighting, which does not emit UV and which has a warm white light spectrum (preferably <2700Kelvin) and uses wavelengths higher than 550nm.
 - Lighting will be directional, such as through the use of specialist bollards, low-level downward direction lighting or column lighting to minimise light spill.
 - Use of motion sensor lighting or timers to restrict lighting to required periods.
 - Dimming or part-night lighting to reduce light levels when bats are most active.
 - Use of the lowest lux possible.
 - Screening through soft landscaping and installation of walls and fences.

Badgers

Discussion

4.12 The Site provided limited sett building opportunities for badgers due to the poor drainage and extent of open grassland fields. Optimum foraging habitat was present beyond the site boundaries within the woodland waterbody margins and the tussocky and marshy grassland.

4.13 Mammal paths were noted around the boundaries of the poor semi-improved grassland fields, although this was most likely a result of sheep grazing. No evidence of use of the Site by badgers was identified during the badger survey, or during any of the site visits. Due to the lack of suitable habitat it is unlikely badgers will be using the Site for sett building although they may frequent the Site for foraging opportunities.

Further Survey Requirements

4.14 Given the rapidity with which badgers can establish new setts and the legal protection afforded to this species, an update badger survey will be undertaken by an ecologist within three months before the start of the construction works and/or site clearance works. This survey will minimise risks to the project timescale, by confirming whether badger setts are present and ensuring that any mitigation requirements are identified early.

Mitigation

- Badgers will be deterred from entering the construction site by using suitable fencing during the construction phase. Suitable fencing includes interlocking weld-mesh panels (e.g. Heras), well braced to resist impacts by attachment to a scaffold framework that is set firmly into the ground but could also include close board solid fencing.
- Excavations will be covered at the end of each working day and any temporary exposed pipes will be capped to prevent badgers gaining access during the night. Any excavations or deep pits within the construction site that have to be left open overnight will be provided with a means of escape should a badger enter. This could simply be in the form of a roughened plank of wood placed in the excavation as a ramp to the surface.
- The storage of topsoil or other 'soft' building materials on site will be given careful consideration. Badgers will readily adopt such mounds as setts. To avoid the adoption of any mounds by badgers, mounds will be kept to a minimum and any essential mounds subject to daily

¹⁷ Bat Conservation Trust and Institute of Lighting Professionals (2018) Guidance Note 08/18: Bats and artificial lighting in the UK. ILP, Rugby.

inspections. It is recommended that topsoil and 'soft' building materials are not stored within the south-eastern area of the construction site.

- The storage of any chemicals within the Site will be contained in such a way that they cannot be accessed or knocked over by any roaming badgers.
- During the operational phase, the solar panel areas will be fenced off from the surrounding area to prevent access from members of the public. However, mammal gates measuring a minimum of 300mm wide by 200mm high will be provided at regular intervals, to provide access for badgers and other mammals.

Great Crested Newt

Discussion

4.15 Pond 1 was assessed as having Poor suitability, primarily due to its size and function as a fishing lake, Pond 2 and Pond 5 were assessed as having Excellent suitability, Pond 3 was assessed as having Average suitability and Pond 4 was assessed as Below Average suitability for GCN.

4.16 Desk-based assessments identified six more ponds within 500 metres of the site boundary although they could not be surveyed due to access not being granted. However, Ponds 4 and 6 were subject to an eDNA survey in 2022, as part of a separate planning application (planning application number 22/0634/10, available on the Rhondda Cynon Taff County Borough Council website) and returned negative results.

4.17 The results of the eDNA surveys were negative for all four ponds within the Site ownership and two ponds to the west of the Site ownership. Therefore, GCN are considered likely to be absent from the Site and mitigation is therefore not required. However, the mitigation measures outlined for Reptiles below would also provide protection for GCN in the unlikely event that an individual was present within the Site during the proposed works.

Reptiles

Discussion

4.18 The Site provided very limited opportunities for reptiles, due to the open and exposed nature of the poor semi-improved grassland. Suitable basking, foraging and sheltering habitat for reptiles was present beyond the site boundary within the marshy grassland and within areas of scrub, hedgerows, waterbodies and treelines. The bare ground which made up the access track also provided additional basking opportunities, though the use of this track for farming activities is likely to result in regular disturbance of any reptiles, if present.

4.19 Given the low suitability of the Site and the proposed enhancements, in the long-term, impacts to reptiles are not anticipated. In the short-term, there is a moderate risk of killing or injury of reptiles, if present within the Site during the construction phase. The following mitigation will be required to negate that risk.

Mitigation

- Prior to and during construction of the solar farm, the Site will be maintained in its current short grassland condition, to prevent it from increasing in suitability for reptiles.
- Any working areas and storage of materials will be located away from the hedgerows and retained grassland to minimise the risk of reptiles sheltering underneath these materials and being affected by the works.

Nesting Birds

4.20 The hedgerows within the Site, and the habitats beyond the site boundary (such as trees and marshy grassland) provided optimum habitat for common species of woodland and farmland birds to forage and build nests. These habitats were well connected to other suitable habitats for these species in the wider landscape.

Assessment of Bird Communities

Population size

4.21 No species were present in numbers approaching the 1% national breeding population level.

Diversity

Species Richness

4.22 Of the 29 bird species recorded using the Site, at least 21 were considered likely to nest within the Site. A further eight species include the Site within a breeding territory and may nest within the Site, although no evidence of such was recorded. In accordance with the Breeding Diversity Importance Thresholds defined in **Table 2.1**, a total of 25 breeding species (considered a precautionary estimate for the Site) accords with a Local level of Importance.

Breeding Community Quality

4.23 The presence of 29 species in Category E (29 x 1) gives an Index of Diversity Score of 29 for the Site. This falls within the threshold of **Local Importance** as shown in **Table 2.3**.

4.24 Bird activity was mainly focussed around the field margins. No ground-nesting activity was recorded within the Site and the only ground nesting birds recorded were mallard and coot, which were likely associated with the nearby waterbodies.

Rarity and conservation concern

4.25 No nationally rare birds were recorded. Nationally rare birds are those considered to number 1000 or fewer breeding pairs nationally.

4.26 In this assessment this category also includes species that are not classed as nationally rare but are protected under Schedule 1 of the Wildlife and Countryside Act, species considered by the Rare Breeding Birds Panel¹¹ and species included in the Red List of Birds of Conservation Concern¹².

4.27 Therefore, a total of two red listed Birds of Conservation Concern were recorded within the Site. A further eight amber listed species were also recorded within the Site. Red listed species are those whose breeding range or population has declined by 50% or more in the preceding 25 years.

Impacts of the Proposals

4.28 The proposals are predicted to have the following impacts on birds:

- Temporary loss of foraging opportunities during construction due to loss or modification of large areas of grassland.
- Temporary noise and vibration disturbances to breeding birds during construction.
- In the long-term, the proposals will result in an enhancement of foraging opportunities for birds, due to the enhancement of extensive areas of grassland.

Mitigation

- Any works to trees, hedges or in close proximity to the marshy grassland and waterbodies within the Site should be undertaken between September-February (inclusive) to avoid the season during which birds are most likely to nest. Where clearance of suitable habitat is programmed during the bird breeding season, which is typically March to August inclusive, prior to works, a suitably qualified person must undertake a survey to determine whether birds are nesting in the area. If a nest is discovered, clearance or other construction works would need to be delayed within an exclusion zone. Works may only recommence once it is confirmed that chicks have fledged and that no other nests are in use within the exclusion zone.

Dormouse

Discussion

4.29 The hedgerows within the Site provided suitable nest building, foraging and dispersal opportunities for dormouse, though these were considered sub-optimal due to the low plant

species diversity. The adjacent broadleaved woodland and scrub also provided opportunities for this species.

4.30 All hedgerows, woodland and scrub are to be retained and protected within the scheme and access to the solar arrays will be via the existing field access points, in order to prevent fragmentation of these features. Therefore, no impacts to dormouse are anticipated in the long-term, as there will be no net loss in dormouse habitat or fragmentation of habitats. However, in the short-term, there is a low risk of injury and disturbance to this species, if present during the construction phase.

Mitigation

- During the construction and operational phases, light, vibration and noise disturbance to hedgerows, scrub and woodland edge habitats will be minimised by directing these activities away from these features. Plant vehicles will also be kept away from these features. A buffer of three metres will be provided between the hedgerows and the solar farm installation, which is considered to be sufficient given the limited ground disturbance involved.

Water Vole

Discussion

4.31 No signs of water vole were identified within the water vole survey area. While the area surveyed provided optimum foraging habitat, burrowing opportunities were very limited due to the shallow margins of Pond 1 and the artificial rocky substrate of the other ponds, stream and ditches. Habitat connectivity with the wider landscape was also limited. Nevertheless, there remains a low risk that water vole may occasionally be present within the habitats surrounding the Site.

4.32 The access track in the south of the Site crosses the stream and wet ditches at two locations, at existing crossings. The crossings and habitat within 100metres were subject to a thorough inspection during the water vole survey, which did not identify any signs of use by this species.

4.33 No long-term impacts to water vole are anticipated, as the proposals will not result in any loss or degradation of suitable habitat. However, in the absence of mitigation, there is a low risk of impacts in the short-term if this species is present during the construction phase.

Mitigation

- Access to the Site and the use of vehicles will be restricted to the existing stream and ditch crossings, to ensure that disturbance of these habitats is minimised.

Marsh Fritillary

Discussion

4.34 No evidence of marsh fritillary was identified within the Site or immediate surroundings during the surveys. In line with guidance provided by Butterfly Conservation, the Site itself is considered to be unsuitable for this species, due to the short, sheep grazed grassland. Suitable habitat for marsh fritillary was present elsewhere to the north and east of the Site, particularly within the tussocky and marshy grassland that comprised part of the Hirwaun Common SINC. The Site crosses the SINC via an existing bare earth access track, however, this access track is considered to be unsuitable for marsh fritillary, due to the absence of vegetation.

4.35 The proposals will not result in any long-term loss of suitable habitat for marsh fritillary and therefore no long-term impacts are anticipated. In the short-term, in the absence of mitigation, there is a low risk of injury to this species, if the Site were allowed to increase in habitat suitability, though this is considered unlikely given the ongoing sheep grazing.

Mitigation

- The poor semi-improved grassland within the Site is not considered to be suitable for marsh fritillary and therefore mitigation for its temporary loss is not required.
- Prior to and during construction of the solar farm, the Site will be maintained in its current short grassland condition, to prevent it from increasing in suitability for marsh fritillary.
- Access to the Site and the use of vehicles will be restricted to the existing access track, to ensure that there is no disturbance of suitable habitat for marsh fritillary within the Hirwaun Common SINC.
- Prior to commencement of works, site workers will be given a Toolbox Talk on how to recognise this species, its legal protection and what to do if it is encountered.

Enhancement Opportunities

4.36 Given the size of the Site and the common and widespread habitats that are currently present, there is significant opportunity to provide enhancements within the Site and wider site ownership, resulting in a net gain for biodiversity. The following will be provided:

- The hedgerows within the Site will be enhanced through native scrub planting (within their existing footprint). This planting will aim to increase the plant species diversity of all hedgerows so that they have a minimum of five species regularly present throughout.

- As outlined within the Habitats mitigation section above, the poor semi-improved grassland will be replaced with species-rich grassland, using a species mix of local provenance (commercial seed mixes will be avoided and opportunities to use local green hay will be explored where possible). These measures are expected to result in a significant enhancement of the existing grassland, over and above the mitigation requirements.
- A new hedgerow will be planted in the far north-west of the Site, close to the site boundary. This hedgerow planting has been designed in consultation with the local residents to the north and the Landscape and Visual Impacts Assessment team, to provide screening of the solar farm. Given the low ecological value of the existing poor semi-improved grassland, this planting will result in an enhancement in species and structural diversity within this part of the Site.
- Five bat boxes (Schwegler 1FF 1FS or 2F or a similar model) will be provided on retained mature trees to the north and east of the Site, within the same land ownership. The boxes will be erected at a minimum height of four meters, and sited in sheltered wind-free areas, facing in south-easterly, southerly and south-westerly directions.
- The following six bird nest boxes will be provided on mature trees to the north and east of the Site, within the same land ownership, thereby increasing nesting opportunities for birds:
 - Three Vivara Woodstone Seville Nest Boxes, with a 28mm entrance (or a similar model)
 - Three Vivara Woodstone Seville Nest Boxes, with a 32mm entrance (or a similar model)

The bird boxes will be installed in or near areas of suitable habitat at least three metres above ground level, facing north, north-east or easterly directions. The boxes will have greater potential for use if sited as high up as possible.

- Any dead wood will be retained on site and used to create log piles. These will be positioned in sheltered, ideally sunny locations, for example within long grass, marshy grassland, adjacent to the ponds or along the woodland edges, to provide sheltering opportunities for a range of wildlife, such as reptiles, hedgehogs and small mammals.

Appendix A

Policy and Legal Considerations

Planning Policy Legislation

A.1 Statutory nature conservation sites and protected species are a 'material consideration' in the Welsh planning process, set out in the National Planning Policy Wales (2021). Where planning permission is not required, for example on proposals for external repair to structures, consideration of protected species remains necessary given their protection under UK and EU law.

A.2 The Conservation of Habitats and Species Regulations 2017 (SI 2017/1012), as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (SI 2019/579) transpose the requirements of the European Habitats Directive (Council Directive 92/43/EEC) and Birds Directive (Council Directive 2009/147/EC) into UK law, enabling the designation of protected sites and species at a European level.

A.3 The Wildlife and Countryside Act 1981 (as amended) forms the key piece of UK legislation relating to the protection of habitats and species.

A.4 The Countryside Rights of Way Act 2000 provides additional support to the Wildlife and Countryside Act 1981; for example, increasing the level of protection for certain species of reptiles.

A.5 The Protection of Badger Act 1992 provides specific protection for this species.

A.6 The Wild Mammals (Protection) Act 1996 sets out the welfare framework in respect to wild mammals, prohibiting a range of activities that may cause unnecessary suffering.

A.7 Species and Habitats of Principal Importance for Conservation in England and Wales and priority habitats and species listed on the Local Biodiversity Action Plans (BAP) are species which are targeted for conservation. The government has a duty to ensure that involved parties take reasonable practice steps to further the conservation of such species under Section 41 of the Natural Environment and Rural Communities Bill 2006. In addition, the Act places a biodiversity duty on public authorities who 'must, in exercising their functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity' (Section 40 [1]). Criteria for selection of national priority habitats and species in the UK include international threat and marked national decline.

A.8 The National Planning Policy Wales (PPW) 2021 and the National Development Framework (also referred to as Future Wales – the National Plan 2040), together set out how the planning system is used to deliver sustainable development and improve the social, economic, environmental and cultural well-being of Wales.

A.9 As part of the PPW, the **Biodiversity and Resilience of Ecosystems Duty (Section 6 Duty)** states that 'Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity. In doing so, planning authorities must also take account of and promote the resilience of ecosystems. As part of this responsibility, in order to maintain and enhance biodiversity planning authorities are required to follow a stepwise approach to avoid, minimise, mitigate and compensated for as a last resort.

A.10 National Development Framework (Future Wales – the National Plan 2040) is the Welsh Government's National Development Framework and is the highest tier of the Development Plan in Wales.

A.11 Within this, **Policy 9 – Resilient Ecological Networks and Green Infrastructure of the Future Wales's Spatial Strategy** details how the Welsh Government will ensure the enhancement of biodiversity, the resilience of ecosystems, and the provision of green infrastructure. This is through the following actions:

- Identify areas which should be safeguarded and created as ecological networks for their importance for adaptation to climate change, for habitat protection, restoration or creation, to protect species, or which provide key ecosystems services, to ensure they are not unduly compromised by future development; and
- Identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature-based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well-being.

A.12 The Environment (Wales) Act 2016 sets out how the natural resources of Wales are to be sustainably managed in an integrated approach to achieve long-term sustainability. The key policies for biodiversity comprise Section 6 and Section 7 detailed below:

- Section 6 – Biodiversity and resilience of ecosystems duty is under Part 1 and requires that public authorities must 'seek to maintain and enhance biodiversity so far as consistent with the proper exercise of their functions and in so doing promote the resilience of ecosystems'.

- Section 7 – Creating biodiversity lists and duty to take steps to maintain and enhance biodiversity is also under Part 1 of the Act and replaces the duty in Section 42 of the NERC Act 2006. This duty requires the publication of lists of specific habitats and species of principal importance for Wales.

A.13 The Action Plan for Pollinators in Wales 2013 sets out the strategic vision, outcomes and action areas to halt and reverse pollinator decline in Wales and is a key policy to help address the six targets of the EU Biodiversity Strategy. It refers to insect pollinators including all types of bees, some wasps, butterflies, moths and hoverflies, and some beetles and flies.

Protected Species Legislation

Bats

A.14 All British species of bat are listed on the Wildlife and Countryside Act 1981 (as amended) Schedule 5. It is an offence to deliberately kill, damage, take (Section 9(1)) a bat; to intentionally or recklessly disturb a bat whilst it occupies a place of shelter or protection (Section 9(4)(b)); or to deliberately or recklessly damage, destroy or obstruct access to a bat roost (Section 9(4)(c)). Given the strict nature of these offences, there is an obligation on the developer and owner of a site to consider the presence of bats.

A.15 All British bats are listed on the Conservation of Habitats and Species Regulations 2017, Schedule 2, (SI 2017/1012), as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (SI 2019/579). Regulation 41 strengthens the protection of bats under the 1981 Act against deliberate capture or killing (Regulation 41(1) (a)), deliberate disturbance (Regulation 41(1) (b))[1] and damage or destruction of a resting place (Regulation 41(1) (d)).

A.16 A bat roost is defined as any structure or place which is used for shelter or protection, irrespective of whether or not bats are resident. Buildings and trees may be used by bats for a number of different purposes throughout the year including resting, sleeping, breeding, raising young and hibernating. Use depends on bat age, sex, condition and species as well as the external factors of season and weather conditions. A roost used during one season is therefore protected throughout the year and any proposed works that may result in disturbance to bats, and loss, obstruction of or damage to a roost would require a bat mitigation licence from Natural Resources Wales.

Application for a Natural Resources Wales EPS Licence

A.17 Development works that may cause killing or injury of bats or that would result in the damage, loss or disturbance of a bat roost would require a Natural Resources Wales (NRW) Bat Mitigation Licence.

A.18 For a Mitigation licence to be granted three tests must be met. Evidence is needed to determine these three tests: whether there is a need for the development which justifies the impact on the European Protected Species (EPS); whether there is an alternative which would avoid the impact and need for an EPS licence; and whether mitigation proposed is sufficient to maintain the conservation status of the EPS in question.

A.19 An EPS Mitigation Licence application will generally only be considered by NRW on receipt of planning consent, and once any pre-commencement conditions of relevance to ecology have been discharged.

- NRW aim to determine the application within six weeks (although this can take longer).
- The application comprises three components including an application form (broad details of the applicant, site and proposals); a detailed Method Statement providing the survey methods and findings, impact assessment and mitigation measures (including detailed maps and schedule of works); and a Reasoned Statement outlining the 'need' for the development and consideration of alternatives.

A.20 Several species of bat, including brown long-eared and soprano pipistrelle are listed as species of principal importance under the NERC Act (2006), now replaced by Section 7 of the Environment (Wales) Act 2016. This designates them as of key significance to sustain and improve biodiversity in Wales.

Great Crested Newt

A.21 GCN and their places of shelter are subject to the same level of protection as bats as a European Protected Species (see above).

A.22 GCN is a priority species in Wales and listed under Section 7 of the Environment (Wales) Act 2016.

Otter

A.23 Otter and their places of shelter are subject to the same level of protection as bats as a European Protected Species (see above). Otters are a priority species in Wales and listed under Section 7 of the Environment (Wales) Act 2016.

A.24 An otter shelter is defined as any structure or place which is used for shelter or protection, irrespective of whether or not otters are resident. A shelter used during one season is protected throughout the year and any proposed works that may result in disturbance to otters, and loss, obstruction of or damage to a shelter are licensable.

Dormouse

A.25 Dormice are listed on the Wildlife and Countryside Act 1981 (as amended) Schedule 5. It is an offence to intentionally kill, injure, take (Section 9(1)) a dormouse; to intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a dormouse (Section 9(4)(a)); or to intentionally or recklessly disturb a dormouse while it is occupying a structure or place which it uses for that purpose (Section 9(4)(b)). Given the strict nature of these offences, there is an obligation on the developer and owner of a site to consider the presence of dormice.

A.26 Dormice are listed on the Conservation of Habitats and Species Regulations 2010, Schedule 2. Regulation 41 strengthens the protection of dormice under the 1981 Act against deliberate capture or killing (Regulation 41(1) (a)), deliberate disturbance (Regulation 41(1) (b))3 and damage or destruction of a resting place (Regulation 41(1) (d)). Dormice are also a priority species in Wales and are listed under Section 7 of the Environment (Wales) Act 2016.

A.27 Development works that may cause killing or injury of dormice or that would result in the damage, loss or disturbance of dormice would require a NRW Mitigation Licence.

Badger

A.28 The Protection of Badgers Act 1992 provides specific protection for this species. Under this act it is an offence to take, kill or injure badgers or cause cruelty to badgers. It is also an offence to interfere with a badger sett (including digging for badgers, permitting dogs to enter a badger sett, obstructing the entrance to, or destroying a badger sett or disturbing a badger when it is occupying a sett); or to buy or offer for sale or otherwise possess a live badger. Works which may result in damage to a badger sett, or potential disturbance to badger using setts, must be undertaken under a NRW licence.

Water Vole

A.29 Water vole and their places of shelter are protected by the Wildlife and Countryside Act 1981 (as amended). This Act gives protection to water vole with regard to killing, injury and taking, and to their places of shelter with regard to obstructing, damaging and destruction.

A.30 Water voles are a priority species in Wales and listed under Section 7 of the Environment (Wales) Act 2016.

Reptiles

A.31 All UK reptiles and amphibians are legally protected from intentional and reckless killing and injury under the Wildlife and Countryside Act 1981 (as amended). These species are listed as priority species in Wales and listed under Section 7 of the Environment (Wales) Act 2016.

Nesting Birds

A.32 Birds and their nests are protected by the Wildlife and Countryside Act 1981 (as amended). This Act gives protection to all species of bird with regard to killing and injury, and to their nests and eggs with regard to taking, damaging and destruction. Certain species listed on Schedule 1 of the Act, are afforded additional protection.

Appendix B

Figures

- Figure 1: Phase 1 Habitat Survey Map
- Figure 2: Great Crested Newt Habitat Suitability index (HSI) Survey
- Figure 3: Breeding Bird Survey Results (All Bird Points Recorded)
- Figure 4: Breeding Bird Survey Results (Notable Species)
- Figure 5: Water Vole Survey
- Figure 6: Statutory and Non-statutory Designated Sites

Figure 1: Phase 1 habitats



- Site boundary
- Land ownership
- Target note
- Hirwaun Common SINC
- Phase 1 linear feature**
 - G2 Running water
 - J2.1.2 Intact hedge (species-poor)
- Phase 1 habitat**
 - B6 Poor semi-improved grassland
 - J4 Bare ground

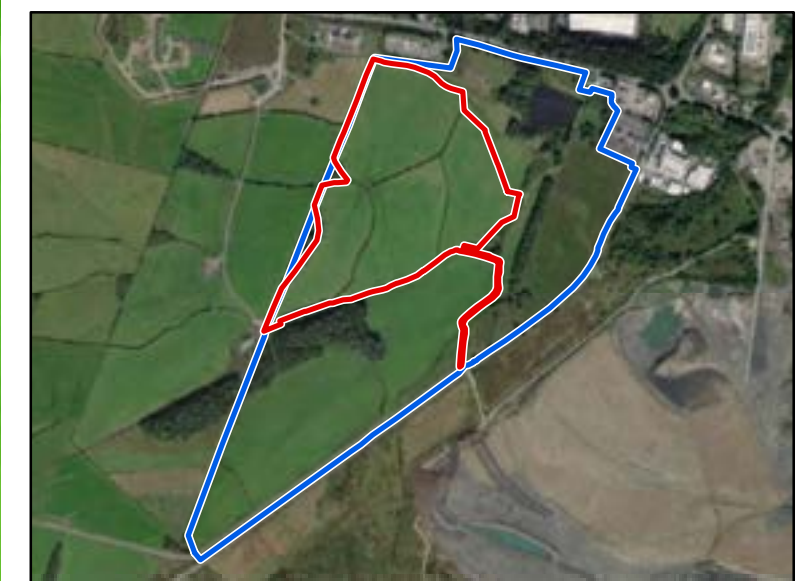


Figure 2: Pond HSI survey



- Site boundary
- Land ownership
- Site boundary 250m buffer
- Site boundary 500m buffer

Pond suitability * **

- Excellent
- Average
- Below average
- Poor
- No access

*Ponds 1, 2, 3, and 5 tested negative for eDNA.

**Ponds 4 and 6 tested negative for eDNA during surveys conducted for an adjacent planning application ref: 22/0634/10





Figure 3: BBS survey results - (all bird points recorded)

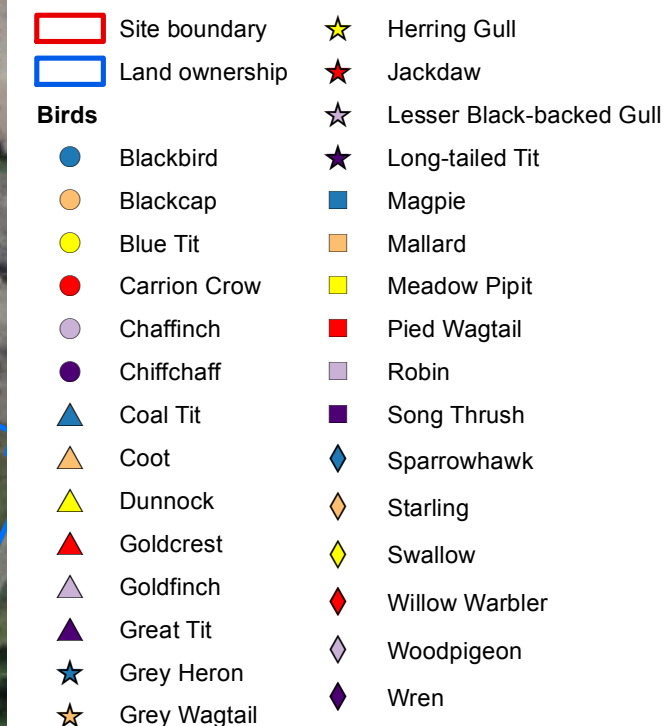




Figure 4: BBS survey results - (notable species)

- Site boundary
Land ownership
- Notable birds**
- Coot *Fulica atra*
 - Dunnock *Prunella modularis*
 - Goldcrest *Regulus regulus*
 - Grey Heron *Ardea cinerea*
 - Grey Wagtail *Motacilla cinerea*
 - Long-tailed Tit *Aegithalos caudatus*
 - Mallard *Anas platyrhynchos*
 - Meadow Pipit *Anthus pratensis*
 - Song Thrush *Turdus philomelos*
 - Starling *Sturnus vulgaris*
 - Willow Warbler *Phylloscopus trochilus*

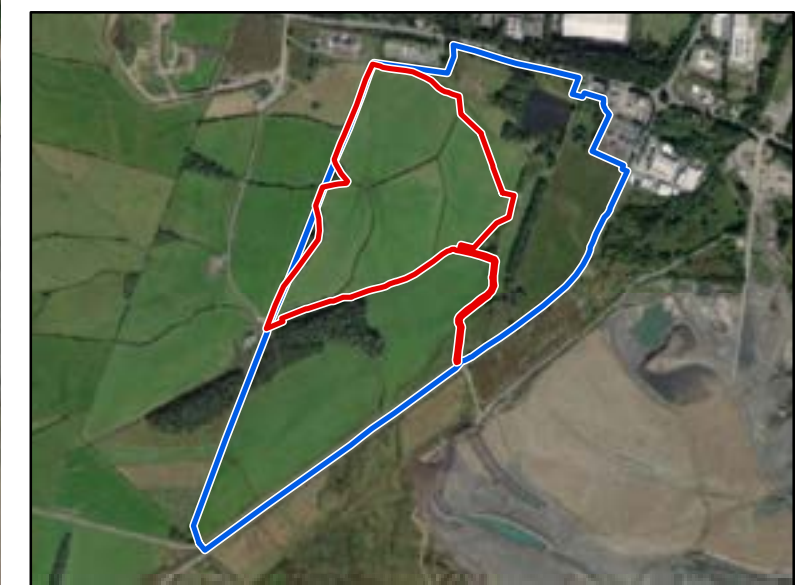




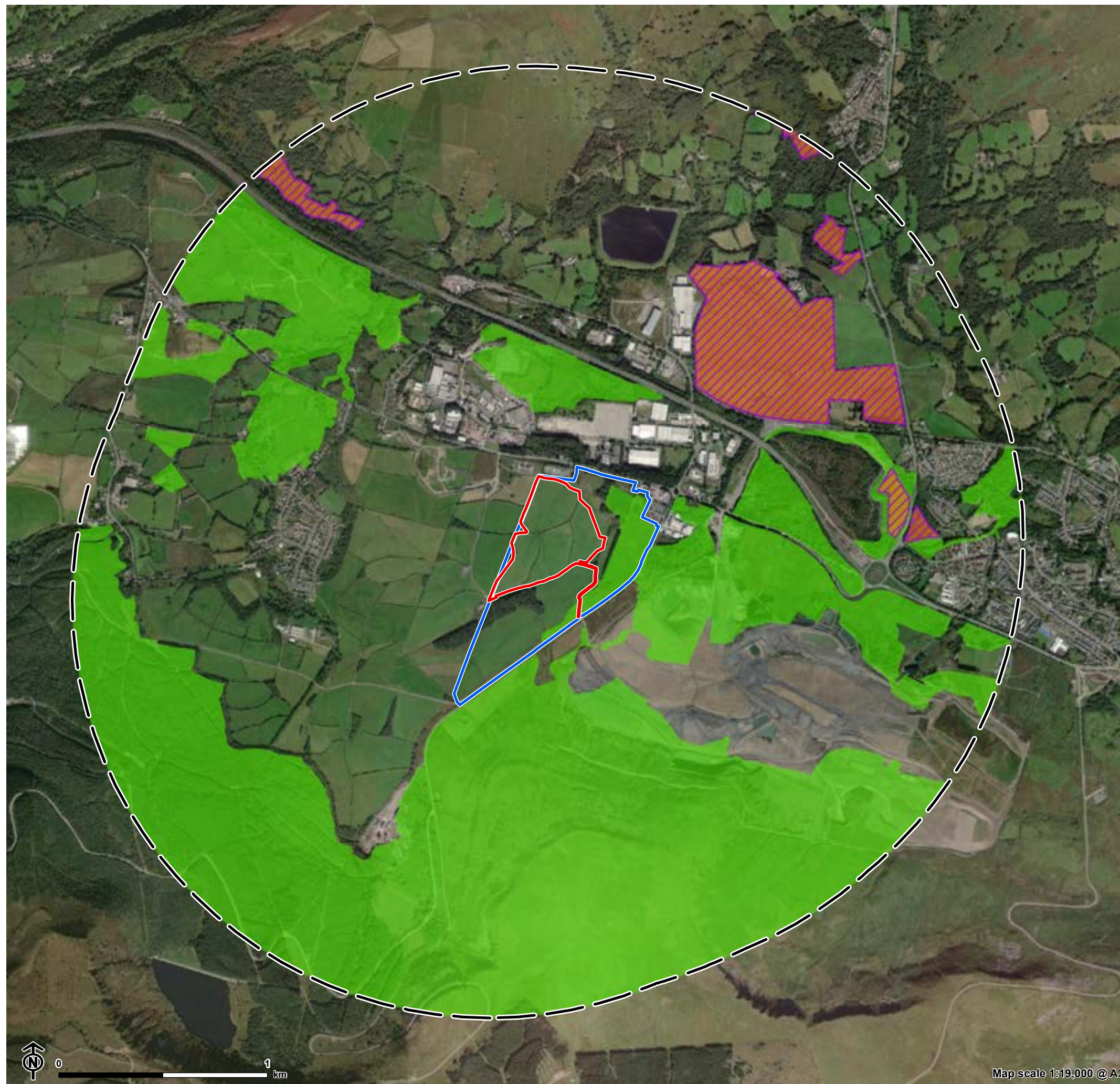
Figure 5: Otter and water vole survey

- Site boundary
- Land ownership
- Waterbody surveyed for water vole
- Watercourse surveyed for water vole



Figure 6: Statutory and non-statutory designated sites

- Site boundary
- Land ownership
- Site boundary 2km buffer
- SSSI
- SAC
- SINC



Appendix C

Target Notes and Photographs

Table C.1: Target Notes

Target Note	Description	Photographs
1	The majority of the Site comprised fields of poor semi-improved grassland, which were heavily sheep grazed with a sward height of <10cm. Species composition comprised dominant perennial rye-grass <i>Lolium perenne</i>, and Yorkshire fog <i>Holcus lanatus</i>, abundant sweet vernal grass <i>Anthoxanthum odoratum</i>, and white clover <i>Trifolium repens</i>, frequent crested dogs-tail <i>Cynosurus cristatus</i>, and bent grass <i>Agrostis</i> sp., and occasional soft rush <i>Juncus effusus</i>.	 

Appendix C
Target Notes and Photographs

Regener8 Rhigos: Ecological Assessment
April 2023

Target Note	Description	Photographs
2	The fields were bordered by species-poor hedgerows, which were all fenced off to prevent sheep access. The majority of the hedgerows were associated a drainage ditch, which were dry in the higher altitudes but occasionally wet in the lower altitudes. Species recorded included dominant hawthorn <i>Crataegus monogyna</i> , and blackthorn <i>Prunus spinosa</i> , with occasional rowan <i>Sorbus aucuparia</i> , pedunculate oak <i>Quercus robur</i> , and rarely dog rose <i>Rosa canina</i> . Ivy <i>Hedera helix</i> , docks <i>Rumex</i> sp., and bramble <i>Rubus fruticosus</i> agg., were also frequent across the hedgerows.	
3	The access track where it ran northwards, past the ponds, to connect to Rhigos Road.	

Target Note	Description	Photographs
4	The northern access road crossed the stream at this location over a wooden bridge with a metal frame. The stream in this section had been reinforced with stone walls.	 
5	The northern access road also crossed the stream at this location over a wooden bridge with a metal frame. The stream in this section had been reinforced with stone walls.	
6	Crossing point of the southern access track.	No photograph available.

Target Note	Description	Photographs
7	To the north-east of the Site was a small area of tall ruderal vegetation with scattered scrub. This vegetation was dominated by rosebay willowherb <i>Chamaenerion angustifolium</i> , with locally dominant bramble, grey willow <i>Salix cinerea</i> , and goat willow <i>Salix caprea</i> , locally abundant common nettle <i>Urtica dioica</i> , occasional tufted hair-grass <i>Deschampsia cespitosa</i> , and sharp-flowered rush <i>Juncus acutiflorus</i> .	
8	To the east of the Site, between the access track and the A4061, was a large area of marshy grassland, with a sward height between 50-100cm, which formed part of the Hirwaun Common SINC. This area was dominated by soft rush, and sharp-flowered rush, with locally frequent tufted hair-grass, purple moor-grass <i>Molinia caerulea</i> , and Yorkshire fog and mosses, and occasional marsh thistle <i>Cirsium palustre</i> and cuckoo flower <i>Cardamine pratensis</i> .	

Target Note	Description	Photographs
9	Large pond with shallow margins, densely vegetated with marginal vegetation and reedbed, which were dominated by soft rush and sharp-flowered rush, with locally abundant bulrush <i>Typha latifolia</i> , gypsywort <i>Lycopus europaeus</i> , water-mint <i>Metha aquatica</i> , grey willow, and occasional brooklime <i>Veronica beccabunga</i> .	
10	Pond to the west of the target note 9 with similar marginal and reedbed species composition.	
11	Pond to the south of target note 9 with a similar species composition.	
12	Pond to the south of target note 12 with a similar species composition.	No photograph available.

Target Note	Description	Photographs
13	Pond to the south of the Site, outside of the landownership. Not accessed but surveyed from a distance.	
14	A stream connecting the ponds. This appeared to be artificially constructed or reinforced, with sloping dry stone sides, vegetated with semi-improved grassland and small amounts of marginal vegetation were present, including soft rush, sharp-flowered rush, gypsywort, tufted hair-grass, brooklime and water mint.	

Appendix C
Target Notes and Photographs

Regener8 Rhigos: Ecological Assessment
April 2023

Target Note	Description	Photographs
		
15	An alder tree located in immediately to the west of the Site on the edge of a woodland area	No photograph available.
16	A willow located within the woodland area on the western boundary of the Site	No photograph available.
17	A small parcel of scrub with trees adjacent to a waterbody, immediately to the east of the Site, comprising abundant hawthorn and blackthorn, frequent grey willow <i>Salix cinerea</i> , and alder <i>Alnus glutinosa</i> , with occasional hazel <i>Corylus avellana</i> . The understorey had dense bracken <i>Pteridium aquilinum</i> , bramble and nettles.	No photograph available.
18	An area of mixed woodland and scrub immediately to the south of the Site with abundant with willow <i>Salix</i> sp., and blackthorn with occasional rowan, larch <i>Larix</i> sp., Norway maple <i>Acer platanoides</i> , and birch <i>Betula</i> sp. Bramble dominated the understorey. Elsewhere within this habitat were areas with occasional hazel, pedunculate oak <i>Quercus robur</i> , Norway maple and poplar <i>Populus</i> sp.	No photograph available.