

Ecological Impact Assessment

Swansea Road, Merthyr Tydfil

November 2023

Ecology | Green Space | Community | GIS

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Report Produced for Merthyr Valley Homes

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SUMMARY

Purpose of the report	This report has been produced by Ethos Environmental Planning on behalf of Merthyr Valley Homes. It provides an assessment of the likely ecological effects associated with the proposed residential development of an area of land known as 'Swansea Road, Merthyr Tydfil'.
Description of the scheme	The development proposals for the site include plans for 39 residential dwellings with associated access.
Methodology	A desk study and detailed surveys for habitats, bats, reptiles, amphibians and invertebrates were undertaken during optimal survey periods in 2023.
Baseline ecological conditions	• The site was 1.5 Ha (Hectares) in size and comprised of neutral grassland, acid grassland, dwarf shrub heath, scattered scrub, bare ground and scattered trees. • The acid grassland and dwarf shrub heath were identified as a key habitat feature and Section 7 Priority habitats. • Japanese knotweed was identified in the northwest of the site, a smaller stand of Japanese knotweed was found at the north of the site, these should be controlled and eradicated at the site to avoid the spread of invasive species; • The woodland and scrub were assessed as suitable habitat for nesting birds, bats, invertebrates, reptiles and hedgehog.
Key impacts and mitigation	The development proposals will result in the loss of habitats and invertebrate species which are of County importance for nature conservation, thus requiring off site compensation measures. Mitigation measures are described to ensure compliance with protected species legislation for hedgehog, bats, birds, invertebrates and reptiles, details of which will be provided within a CEMP.
Conclusion	In order for the proposals to be compliant with local policy EnW1 on nature conservation, mitigation measures set out within this report comprising a CEMP, LEMP and lighting strategy will need to be secured by planning condition. In addition to this, an offsite compensation strategy for habitats and invertebrates will be required in agreement with the LPA and measures secured through appropriate planning obligations.

1 INTRODUCTION

- 1.1 This Ecological Impact Assessment (EclA) report has been prepared by Ethos Environmental Planning (Ethos) on behalf of Merthyr Valley Homes. The EclA has been written by Kane Burchill, Senior Ecologist, and approved by Jim Phillips, Managing Director at Ethos. The details and experience of the authors and field survey team are provided in Section 3.16.
- 1.2 The report provides the results of an EclA in relation to the proposed development of Land at Swansea Road, Merthyr Tydfil (Central Grid Reference: SO 02529 07051), hereafter referred to as 'the site' and shown in Figure 1.
- 1.3 The site was 1.5 Ha (Hectares) in size and comprised of neutral grassland, acid grassland, dwarf shrub heath, scattered scrub, bare ground and scattered trees.

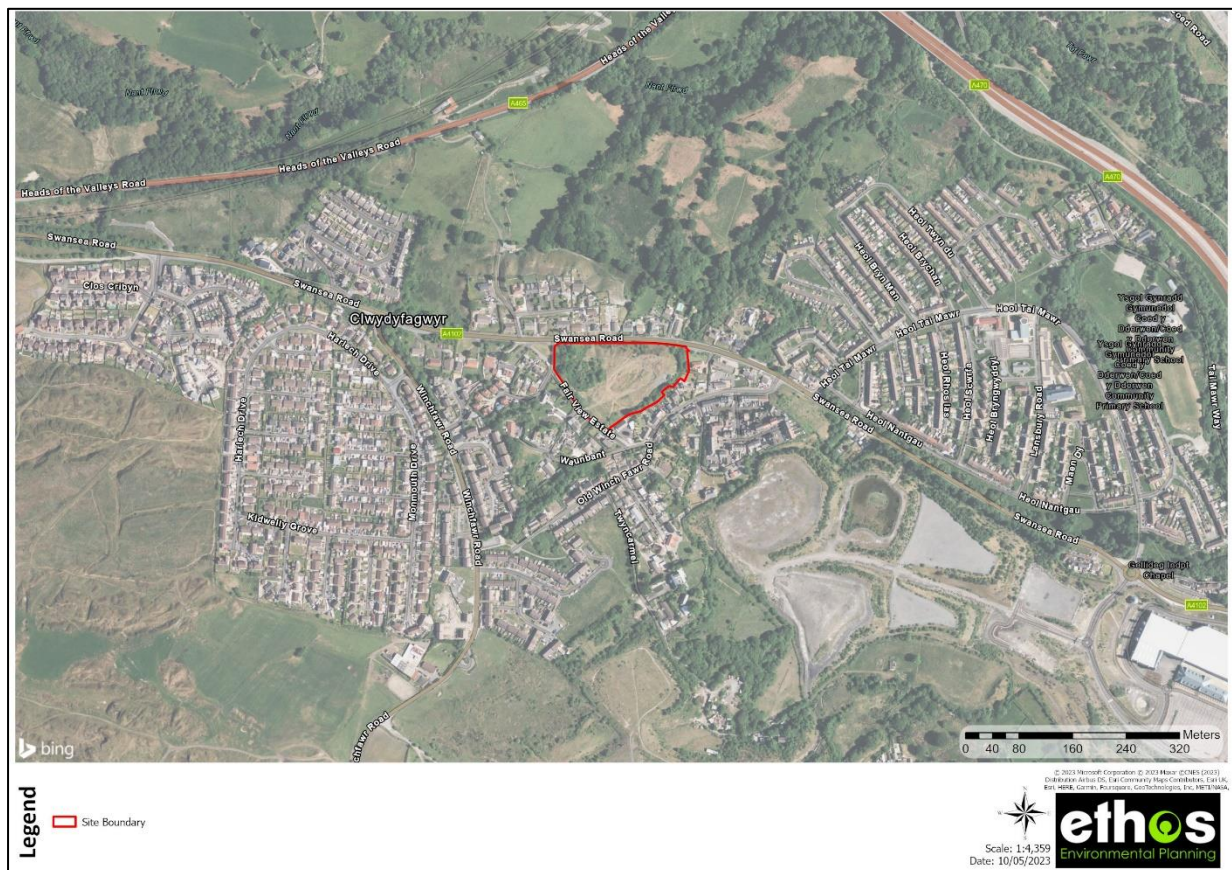


Figure 1 Site location

- 1.4 The site is proposed for development of 39 residential houses and associated infrastructure.
- 1.5 This assessment is based on detailed species surveys undertaken by Ethos in 2018 with an updated surveys undertaken in 2023. Surveys include a National Vegetation Classification (NVC) survey, and targeted surveys for bats, reptiles and invertebrates.

1.6 The aims of this EclA report are to:

- provide an assessment of the likely effects of the proposed development on ecological features on site;
- provide an assessment of the likely effects of the proposed development on designated nature conservation sites within 1km of the site;
- identify the measures required to mitigate impacts on important ecological features;
- identify opportunities to deliver ecological enhancements as part of the development proposals; and
- to enable the Local Planning Authority to assess whether the proposals comply with relevant planning policy or legislation.

1.7 This report has been produced following the approach set out in CIEEM's 'Guidelines for Ecological Report Writing' (CIEEM, 2017).

2 POLICY AND LEGISLATION

2.1 National Policy

- 2.1.1 **Planning Policy Wales (2021) and Future Wales: The National Plan 2040** set out the national planning policies for the Welsh Government, including policies of relevance to conserving and enhancing the natural environment. Objectives of relevance to the proposed development have been summarised below:

The planning system has a key role to play in helping to reverse the decline in biodiversity and increasing the resilience of ecosystems, at various scales, by ensuring appropriate mechanisms are in place to both protect against loss and to secure enhancement. Development plan strategies, policies and development proposals must consider the need to:

- *support the conservation of biodiversity, in particular the conservation of wildlife and habitats;*
- *ensure action in Wales contributes to meeting international responsibilities and obligations for biodiversity and habitats;*
- *ensure statutorily and non-statutorily designated sites are properly protected and managed;*
- *safeguard protected and priority species and existing biodiversity assets from impacts which directly affect their nature conservation interests and compromise the resilience of ecological networks and the components which underpin them, such as water and soil, including peat; and*
- *secure enhancement of and improvements to ecosystem resilience by improving diversity, condition, extent and connectivity of ecological networks.*

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, in particular the following aspects:

- *diversity between and within ecosystems;*
- *the connections between and within ecosystems;*
- *the scale of ecosystems;*
- *the condition of ecosystems including their structure and functioning; and*
- *the adaptability of ecosystems.*

Planning authorities must have regard to the relative significance of international, national and local designations in considering the weight to be attached to nature conservation interests.

2.2 Local Policy

- 2.2.1 Merthyr Tydfil County Borough Council adopted the **Replacement Local Development Plan (LDP) 2016-2031** in January 2020. It supersedes and replaces the adopted Merthyr Tydfil County Borough Council Local Development Plan (LDP) 2006-2021. The following policies relate to nature conservation and development:

Policy EnW1: Nature Conservation and Ecosystem Resilience

Development proposals will be required to promote the resilience of ecosystems. In particular, proposals will be required to maintain and enhance biodiversity interests unless it can be demonstrated that:

- 1) *The need for the development clearly outweighs the biodiversity value of the site; and*
- 2) *The impacts of the development can be satisfactorily mitigated and acceptably managed through future management regimes.*

Policy EnW2: Internationally and Nationally Protected Sites and Species

Development proposals likely to affect protected species will only be permitted where it is demonstrated that:

- 1) *The population size, range, distribution and long-term prospects of the species will not be significantly adversely impacted;*
- 2) *There is no suitable alternative to the proposed development;*
- 3) *The benefits of the development clearly outweigh the adverse impacts on the protected species; and*
- 4) *Appropriate, avoidance, minimisation, mitigation, compensation and enhancement measures are provided.*

Policy EnW3: Regionally Important Geological Sites, Sites of Importance for Nature Conservation, Local Nature Reserves and Priority Habitats and Species

Development proposals likely to have an adverse impact on Regionally Important Geological Sites, Sites of Importance for Nature Conservation, Local Nature Reserves, or Priority Habitats and Species will only be permitted where it can be demonstrated that:

- 1) *The need for the development clearly outweighs the conservation value of the site;*
- 2) *Adverse impacts on nature conservation features or geological features can be avoided;*
- 3) *Appropriate and proportionate mitigation and compensation measures can be provided; and*
- 4) *The development maintains and where possible enhances biodiversity and geodiversity interests.*

Policy EnW4: Environmental Protection

Development proposals will be required to demonstrate they will not result in an unacceptable impact on people, residential amenity, property and / or the natural environment from either:

- *Pollution of land, surface water, ground water and the air;*
- *Land contamination;*
- *Hazardous substances;*
- *Land stability;*
- *Noise, vibration, dust, odour nuisance and light pollution; or*
- *Any other identified risk to public health and safety.*

Where impacts are identified the Council will require applicants to demonstrate that appropriate measures have been incorporated to reduce, or minimise the impact identified to the lowest possible acceptable level. Planning conditions may be imposed or legal obligation entered into, to secure any necessary mitigation and monitoring processes.

- 2.2.2 The **Merthyr Tydfil County Borough Council Nature Recovery Action Plan (2019-2014)** replaces the previous Merthyr Tydfil Biodiversity Action Plan (2014-2019), and represents the S6 plan for Merthyr Tydfil County Borough, in accordance with Welsh Government Guidance: 'Environment (Wales) Act 2016 Part 1: Guidance for Section 6 – The Biodiversity and Resilience of Ecosystems Duty'. The objectives relating to development are as follows:

- 1) *Engage and support participation and understanding to embed biodiversity throughout decision-making at all levels.*
- 2) *Safeguard species and habitats of principal importance and improve their management.*
- 3) *Increase the resilience of our natural environment by restoring degraded habitats and habitat creation.*
- 4) *Tackle key pressures on species and habitats.*

2.3 Relevant Legislation

- 2.3.1 The following pieces of legislation have been considered within this assessment with an explanation of their relevance provided.

Legislation	Relevance
The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all, the Directive protects over 1,000 animals and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The Habitats Directive	Presence of commuting/ foraging bats on site, utilising boundary lines of trees.

Legislation	Relevance
and parts of the Birds Directive are transposed into legislation by The Conservation of Species and Habitat Regulations 2017. Since the UK has left the EU, these regulations have been amended to retain the legal powers of the regulations to the UK and are now referenced as: Conservation of Habitat and Species Regulations (Amendment) (EU Exit) Regulations 2019.	
Wildlife and Countryside Act 1981 (as amended, including by the Countryside and Rights of Way Act 2000), which provides legislative protection for certain species. The Act also prohibits the spread of invasive plant species, as well as providing the mechanism for the designation and protection of Sites of Special Scientific Interest;	Potential for nesting birds in woodland and scattered scrub. Presence of reptiles on site.
The Environment (Wales) Act 2016 came into force in 2016 and puts into place the necessary legislation to enable the planning and management of the natural resources of Wales in a more sustainable, pro-active and joined-up way than was previously possible. Part 1 Section 7 requires Welsh Ministers to publish and maintain lists of species and habitats in Wales that are regarded as of 'principal importance' for the purpose of maintaining and enhancing biodiversity. This part of the Act replaces the duty outlined in Section 42 of the Natural Environment and Rural Communities Act 2006.	Enhancements for biodiversity. Presence of Habitats of Principal Importance. Potential presence of hedgehog.
The Hedgerows Regulations 1997 protect 'important hedgerows' from being removed (uprooted or destroyed). Hedgerows are protected if they are at least 30 years old and meet at least one of the criteria listed in part II of schedule 1.	Presence of tree lines on site boundaries.

3 METHODOLOGY

3.1 Scope of Assessment

3.1.1 This assessment has been undertaken following the approach set out in the 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (CIEEM, 2018). The assessment has considered 'Important Ecological Features' that are present within the 'Zone of Influence' of the project. Important Ecological Features for this project comprise¹:

- Designated nature conservation sites;
- Habitats and Species of Principal Importance for the conservation of biodiversity in Wales (Section 7 of the Environment Act Wales);
- Legally protected species; and
- Red Listed or rare species (based on Red Data Book lists, Birds of Conservation Concern and species considered to be nationally rare / scarce).

3.1.2 The Zone of Influence (Zoi) is the area over which the project could have an influence on ecological features. The Zoi is likely to vary for different features. However, in general terms the Zoi for this development proposal is considered to comprise the land within the red line boundary as well as immediate adjacent habitat features. It also includes designated nature conservation sites present on and around the site.

3.1.3 The scope of the assessment was informed by an 'ecological walkover' undertaken on 15th February 2018 and then updated in March 2023. The purpose of this was to identify the habitats on site, their potential for protected species and to establish the scope of surveys that would be required to inform a future planning application at the site.

3.2 Desk Study

3.2.1 A background data search was received from South East Wales Biodiversity Records Centre (SEWBReC) on 6th February 2023. The search included records of non-statutory designated sites and protected and notable species within 1km of the proposed development site. This was extended to 2km for wide-ranging species such as bats.

3.2.2 A search for other developments within 1km of the site was carried out using the Merthyr Tydfil County Borough Council planning portal to assess the potential cumulative impacts of this development.

3.3 National Vegetation Classification (NVC) Survey

3.3.1 A National Vegetation Classification (NVC) survey was carried out on 10th July 2018. Different kinds of broad vegetation type were identified by their floristic and structural signatures and the extent of each was mapped as accurately as possible. Within each type, all species of higher and lower plant (mosses, liverworts and hornworts) were

¹ Box 14 in CIEEM's ECiA Guidelines (2018)

identified and accorded a measure of abundance in relation to other species within the same kind of vegetation (DAFOR scale²). Detailed sampling of vegetation to characterise different National Vegetation Classification (NVC) types was not undertaken but where a community was distinctive enough to refer it to a likely NVC type, this was noted.

- 3.3.2 Populations of any plants listed on Schedule 8 of the Wildlife & Countryside Act (W&CA) 1981 (as amended) or species of significant conservation importance (Appendix I) were georeferenced using a GPS/GLONASS receiver³. This was also used to map any populations of invasive plants listed on Schedule 9 of the W&CA 1981.
- 3.3.3 Botanical nomenclature used in this report follows Stace (2010) for vascular plants and Hill *et al.* (2008) for mosses and liverworts.
- 3.3.4 Any changes to the NVC survey were assessed in the updated UKHab survey (see below).

3.4 UKHab Survey

- 3.4.1 A UKHab survey was undertaken on 6th June 2023. The surveys incorporated detailed assessment of the land within the development boundary, including a description and mapping of all key features and habitat types. The surveys were carried out to identify the range of habitats within the site and the predominant and notable species of flora. Both surveys were informed by the UKHab classification User's Manual (Butcher *et al.*, 2020).

3.5 Section 7 Species

- 3.5.1 The survey included an assessment of the habitats on site for their potential to support Environment (Wales) Act Section 7 species such as hedgehog (*Erinaceus europaeus*), polecat (*Mustela putorius*), harvest mouse (*Micromys minutus*) and brown hare (*Lepus europaeus*). This included a search for nests, runs, latrines, paw prints and live specimens.

3.6 Badger

- 3.6.1 The survey for badger (*Meles meles*) included a search of the development site for any evidence of badgers, including setts, foraging signs (snuffle holes), runs and latrines. The suitable habitats were systematically surveyed for evidence of badgers in the form of:
 - Faeces (dung pits): badgers usually deposit faeces in characteristic excavated pits, concentrations of which (latrine sites) are typically found at home-range boundaries;

² Dominant; Abundant; Frequent; Occasional; Rare. A Local (L) prefix indicates a patchy or localised distribution.

³ Garmin model GPSMAP 64S. This receiver connects to both GPS and GLONASS satellite networks to give a typical combined positioning accuracy of 2-5m, even in difficult/wooded terrain.

- setts: comprising either single isolated holes or a series of holes likely to be interconnected underground;
- paths between setts or leading to feeding areas;
- scratching posts at the base of tree trunks;
- hair traces;
- snuffle holes (foraging), formed during foraging and comprising characteristically disturbed ground vegetation; and,
- footprints.

3.7 Hazel Dormouse

- 3.7.1 The survey included an assessment of the potential of the site for hazel dormouse (*Muscardinus avellanarius*), focusing on the connectivity and suitability of the habitat on site.

3.8 Riparian Mammals

- 3.8.1 The survey included an assessment of the potential of the site to support riparian mammals such as otter (*Lutra lutra*) and water vole (*Arvicola amphibius*). The principal survey technique employed was a search for field signs including holts/burrows, couches, feeding sites, spraints/latrines, and tracks.

3.9 Bats

- 3.9.1 The methodology for the bat survey has been informed by the Bat Conservation Trust 'Bat Surveys Good Practice Guidelines' (Collins, 2016).

Habitats

- 3.9.2 The habitats on site were assessed for their suitability to support foraging and commuting bats. This assessment was also contextualised through examination of suitable habitat and features in the wider landscape and possible flight-lines across the proposed site following natural linear features such as hedgerows.

Activity Surveys

- 3.9.3 Three activity transects were undertaken between May and July 2023. The surveys involved two surveyors walking a transect from approximately 15 minutes before sunset to approximately three hours after sunset. The transect locations are shown in Figure 4 and the dates of the surveys for each transect are shown below:
- 1st May 2023;
 - 15th June 2023;
 - 6th July 2023;

- 3.9.4 The survey involved a pair of surveyors walking a transect around the site. The bat detectors used during the surveys included an Echo Meter Touch. All calls recorded were analysed using Bat Explorer and Kaleidoscope software and were compared to a library of known bat calls to confirm species presence.

Static Detector Surveys

- 3.9.5 Two static bat detectors were deployed across the site between April and October 2021, and May and July 2023. The detectors used were Wildlife Acoustics Song Meter 4 (SM4) passive bat detectors. The detectors provided an assessment of bat activity across the site and highlighted areas of high activity. All calls recorded were analysed using Kaleidoscope Software.
- 3.9.6 The detectors were deployed in similar locations during the monitoring period to enable comparison of bat activity during the different seasons. Deployment and collection dates are shown in Table 2 below.

Table 1 Static detector dates.

Detectors	Deploy Date	Collect Date	Month	Duration Nights
SM4 mini	01/04/2021	09/04/2021	April	8
SM4 mini	21/05/2021	01/06/2021	May- June	11
SM4 mini	09/06/2021	23/06/2021	June	14
SM4 mini	13/07/2021	27/07/2021	July	14
SM4 mini	18/08/2021	31/08/2021	August	13
SM4 mini	14/09/2021	29/09/2021	September	15
SM4 mini	05/10/2021	14/10/2021	October	9
SM4 mini	02/05/2023	07/05/2023	May	5
SM4 mini	15/06/2023	20/06/2023	June	5
SM4 mini	06/07/2023	11/07/2023	July	5

- 3.9.7 All calls recorded were analysed using Kaleidoscope/British Trust for Ornithology (BTO) Acoustic Pipeline/ECobat Software. This software provides a confidence score for each species returned and highlights rare species which are unlikely to be detected in the survey area. Results with a low confidence <50% probability were excluded from the analysis. This data was then input into the ECOBAT online database which compares the bat activity onsite to all bat results within a 100km radius of the site. This ensures that the bat results are comparable and bat activity can be assessed against a national database. The data run through the automatic processors are also manually checked for quality assurance. Species belonging to the *Myotis*, *Nyctalus* and *Plecotus* genus that have a significant overlap between the echolocation call characteristics at the species level, or those of incomplete and/or inconclusive calls are identified to genus only.

3.10 Birds

- 3.10.1 The bird survey included an assessment of the habitats on site for their potential to support protected and notable species of bird as well as their potential to support breeding birds.

3.11 Reptiles

- 3.11.1 The potential presence of reptiles on site was assessed considering the habitats present (availability of refugia and basking areas) and suitability of surrounding environment.
- 3.11.2 Reptile surveys were undertaken in the active season of 2018 and 2023. Artificial refugia were deployed in suitable habitat throughout the site (Figure 4) using 80 artificial refugia as heat traps, spread across the site in suitable habitat areas. The mats were deployed on 18th June 2018 and the 28th March 2023. A total of fourteen checks were undertaken at the site, 7 in 2018 and seven in 2023. All checks were undertaken within suitable weather conditions. Where possible, attempts to confirm reptile presence on site were made following Froglife Advice Sheet 10 – Surveying for Reptiles through direct observation in reptile “hotspots” and checking of any existing refugia.



Figure 2 Reptile mat locations

3.12 Amphibians

Habitat Assessment

- 3.12.1 The habitats on site were assessed for their potential to support amphibian species, including great crested newt (*Triturus cristatus*) (GCN). This included an examination of suitable waterbodies and for breeding terrestrial habitat and terrestrial habitats which may provide sufficient structured vegetation in which amphibians may forage or hibernate.

3.13 Invertebrates

- 3.13.1 Due to the many invertebrate taxonomic groups that exist, the often-large differences in invertebrate diversity between habitats and the many survey techniques available, invertebrate surveys are highly specific to individual sites. Therefore, an assessment of the potential site for invertebrates was undertaken, including the need for targeted surveys.
- 3.13.2 Targeted invertebrate surveys were undertaken in 2023 by Christian Owens on 21st May, 17th July and 30th August 2023. Standard field techniques were employed to sample the invertebrate fauna across the site. These included sweeping vegetation with a wide mouthed sweep net, beating trees and bushes over a beating tray, and grubbing amongst tussocks and key host plant rosettes etc. (Drake *et al.* 2007). A battery powered suction sampler was also employed.
- 3.13.3 Because it is impracticable to survey all the potential invertebrates within any given site, only specific groups of species were examined during fieldwork. These groups are sufficiently well known as to allow meaningful comparisons to be made with other sites, both locally and nationally. They are also important as indicators of the quality of a site and the habitats present (see Brooks, 1993).
- 3.13.4 Groups covered during the survey were:
- Mollusca (slugs and snails).
 - Arachnida (spiders, harvestmen & pseudoscorpions).
 - Isopoda (woodlice).
 - Thysanura (bristletails).
 - Ephemeroptera (mayflies).
 - Odonata (dragonflies & damselflies).
 - Plecoptera (stoneflies).
 - Orthoptera (grasshoppers & crickets).
 - Dictyoptera (cockroaches).
 - Dermaptera (earwigs).
 - Hemiptera-Heteroptera (true-bugs).
 - Hemiptera-Homoptera (hoppers).
 - Neuroptera (lace-wings).

- Mecoptera (scorpion-flies).
- Lepidoptera (butterflies & moths).
- Trichoptera (caddis flies).
- Diptera (true flies).
- Aculeate Hymenoptera (ants, bees & wasps).
- Coleoptera (beetles).

3.14 Invasive Species

- 3.14.1 A visual search of the habitats on site was undertaken in 2018 and 2023 to determine if any Schedule 9 invasive plant species were present.

3.15 Limitations

- 3.15.1 The EcIA draws on some data which is from 2018 which could be considered out of date, however, as the baseline habitat conditions between 2018 and 2023 have not changed, it is considered that the information available to complete the impact assessment is appropriate.

3.16 Evaluation of Ecological Features

- 3.16.1 In line with CIEEM's guidelines on EcIA, this assessment has focused on relevant Important Ecological Features. The scale of importance of these features has been determined based on available contextual information. The potential scales of importance include:
- **International** – of international importance and protected through international legislation;
 - **National** – of importance in Wales and protected through national legislation;
 - **County** – of importance to the county (Merthyr Tydfil County Borough) but not sufficiently important to warrant 'National' scale of importance; and
 - **Local** – of importance to the local area (Merthyr Tydfil), but not sufficiently important to warrant County scale of importance.
- 3.16.2 Potential impacts on Important Ecological Features are identified and assessed; likely significant effects are those likely to result in a change to the conservation status of a habitat or species population or undermine/support nature conservation policy. Mitigation measures have been devised following the mitigation hierarchy; appropriate mechanisms for securing mitigation measures have been identified.

3.17 Personnel

- 3.17.1 The 2023 site surveyors and report authors/reviewers have been detailed below in Table 2.

Table 2 Site surveyors and report authors/reviewers from 2023 work

Ecologist	Position	Qualification/Licence	Experience	Role in Assessment
Jim Philips	Managing Director	MSc BSc (Hons), MCIEEM Class 2 Bat Licence Class 1 GCN Licence	Jim's experience in ecology covers a wide range of projects and clients and his focus is on interpreting relevant policy and legislation to ensure projects are delivered efficiently and meet the needs of the client. He holds survey licences for bats and GCN in England and Wales and is a registered consultant on Natural England's Bat Low Impact Class License (BLICL) and holds a level 2 certificate (AL2) on the bat earned recogniaiotn accreditation	Approved final report
Kane Burchill	Senior Ecologist	Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306) ACIEEM Class 2 Bat Licence (NE) Class 1 Hazel Dormouse Licence (NE) Class 1 GCN Licence (NE)	Kane has over eight years' experience in ecological field survey and consultancy. As an Senior Ecologist with Ethos; Kane is responsible for leading and undertaking comprehensive habitat assessments protected species surveys and is a licenced bat and dormouse worker.	Report author
Joe Bamforth	Ecologist	MSc, BSc (Hons) Class 1 Bat Licence 2022-10148-CL17-BAT Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306)	Joe has over three years' experience in ecological consultancy and assists with habitat assessments, protected species surveys and data analysis.	Reptile survey and bat survey
Becky Morris	Ecologist	PhD, DIC, MSc, BSc, MCIEEM Class 1 GCN Licence	Becky has 16 years' experience working as an Ecological Consultant, specialising in botanical surveys. She holds a great crested newt survey licence.	Reptile survey, bat survey and NVC survey
Ben Smurthwaite	Ecologist	MSc, BSc (Hons) Qualifying CIEEM Class 1 GCN Licence (NE) Class 1 Bat Licence (NE)	Ben has over four years' experience in ecological field surveys and consultancy, and is responsible for managing projects, undertaking habitat and protected species surveys and biodiversity net gain assessments, and is a	Reptile survey, bat survey and NVC survey

Ecologist	Position	Qualification/Licence	Experience	Role in Assessment
			licenced bat and great crested newt worker.	
Ellie Shearn	Ecologist	BSc (Hons), Qualifying CIEEM	Ellie is an ecologist at Ethos with relevant experience in ecological field survey. Ellie assists senior ecologists on site with protected species surveys including bat surveys and assessment.	Reptile survey,
Sarah Roberts	Assistant Ecologist	MSc, BA, Qualifying CIEEM Class licence WML-CL29 To survey for barn owl (<i>Tyto alba</i>)	Sarah has over three years' of consultancy and biodiversity project management experience. Sarah assists with fieldwork and report-writing for habitats and protected species. She specialises in ornithology and ecological provisions for urban developments.	Reptile survey and bat survey
Kate Downes	Assistant Ecologist	MSc, BSc (Hons), Qualifying CIEEM	Kate is an assistant ecologist at Ethos with a special interest and relevant field survey experience in ornithology. Kate assists with fieldwork and report-writing for habitats and protected species.	Reptile survey and bat survey
Katie Munday	Assistant Ecologist	MSc, BSc (Hons)	Katie has experience with a variety of ecological field surveys, including protected species surveys and habitat assessments. She assists with bat call data analysis and report-writing.	Reptile survey

3.17.2 The following details the personnel who undertook the site surveys in 2018 and their qualifications at the time: All surveys were led by Rachel Godden, BSc (Hons) ACIEEM who was assisted by George Clutterbuck. Rachel is a qualified ecologist with five years' experience of practical field ecology and George is an assistant ecologist with 3 years' experience of field ecology. The reptile surveys were carried out by Sian Musgrave, MCIEEM and a detailed NVC survey was carried out by Sharon Pilkington MSc, CEnv, MCIEEM who is a botanist, bryologist and vegetation ecologist at Vegetation Survey & Assessment Ltd with 17 years' experience. The survey team have worked together on numerous similar projects and have a complimentary range of skills and experience which are considered to have provided a robust ecological appraisal of the site.

4 BASELINE ECOLOGICAL CONDITIONS

4.1 Designated Sites

Statutory Designated Sites

- 4.1.1 The site was located 1.26km from the Cwn Glo A Glyndyrys Site of Special Scientific Interest (SSSI) and 1.15km from the Cwn Taf Fechan Woodlands Local Nature Reserve (LNR). The site was located 6km from Cwn Cadlan SSSI and Special Area for Conservation (SAC). These sites are considered to be of a sufficient distance to be impacted by the development, therefore, they are not considered further in this assessment.

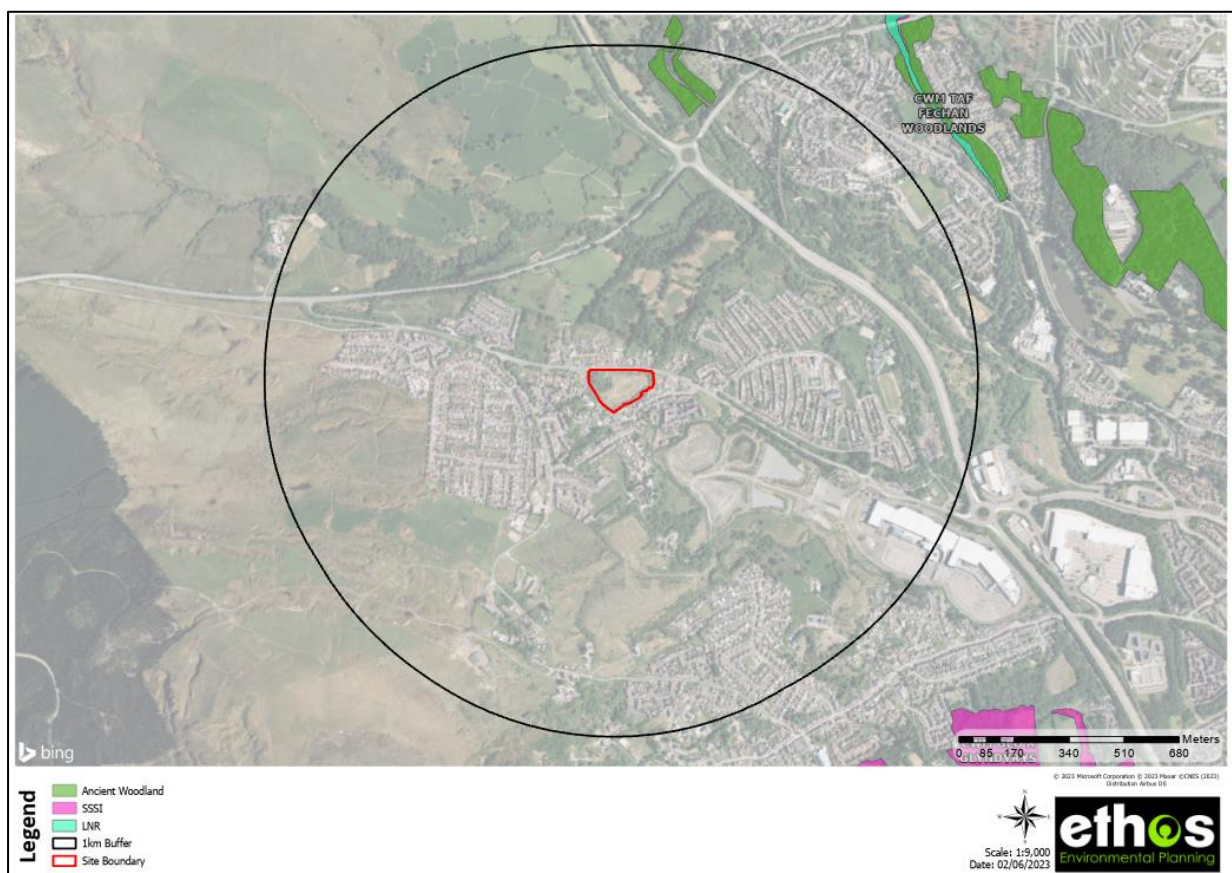


Figure 3 Statutory designated sites

Non-Statutory Designated Sites

- 4.1.2 There were eight non-statutory designated sites within 1km of the site comprising seven Sites of Importance for Nature Conservation (SINC), one Regionally Important Geodiversity Site (RIGS) and one B-Lines site. The non-statutory designated sites are shown in Figure 4 and described in Table 3.

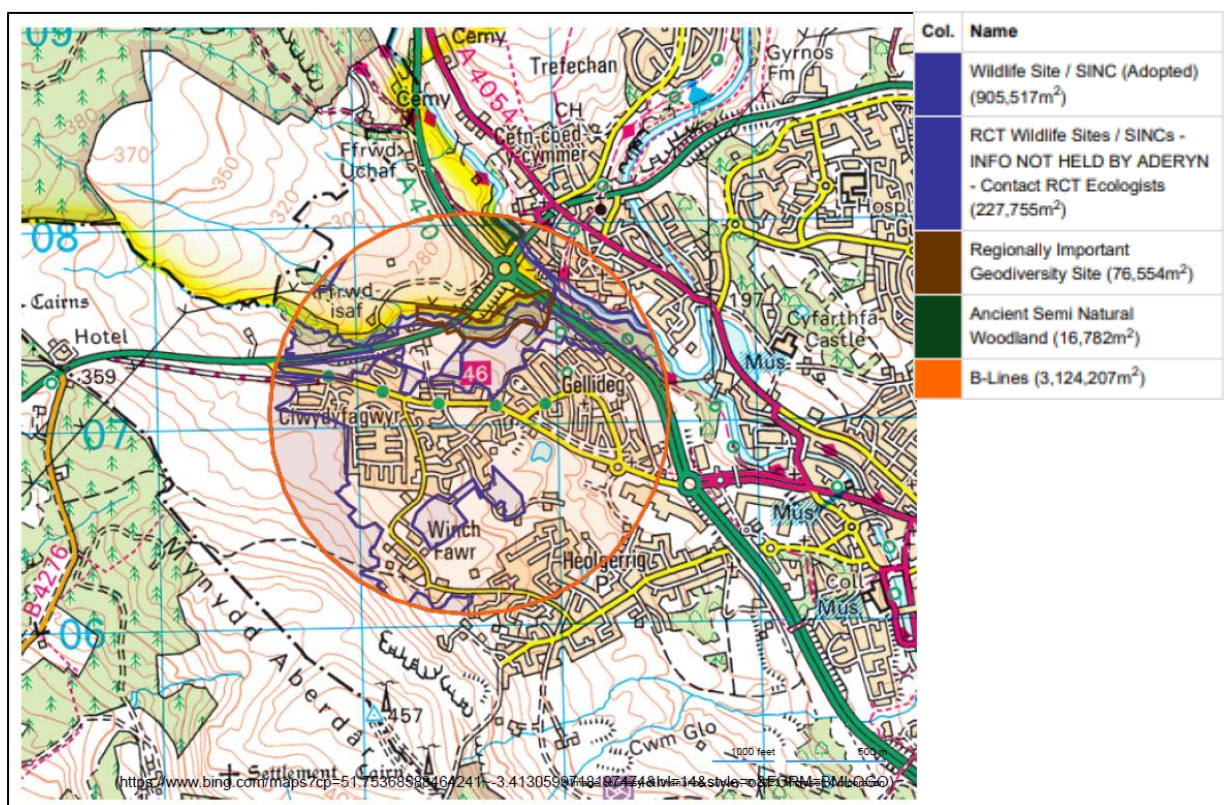


Figure 4 Non-statutory designated sites within 1km (SEWBReC)

Table 3 Non-statutory designated sites within 1km

Site name	Designation	Description	Distance and direction from site
Coed Meirig Pastures	SINC	Small group of horse-grazed fields supporting a mosaic of marshy grassland and semi-improved acid grassland. The marshy areas are mostly species-rich with bordering rush pastures. An area of fen meadow in the east of the site supports the regionally scarce plants. There are also small areas of species-rich neutral grassland and bramble scrub. Mature broadleaved trees are present along field boundaries and several small streams cross the site.	150m West
Gellideg North Fields	SINC	Series of fields containing species-rich rhos pastures, acid grasslands, marshy grasslands, neutral grasslands and areas of bracken, together with scattered mature trees and sections of dry acid oak woodland and wet alder woodland alongside a small stream. The grasslands support a wide range of regionally scarce insect species.	60m north
Cwm Ffrwd	SINC	Valley habitats along the Nant Ffrwd, a large stream draining from the uplands in a largely unmodified course, passing through narrow	170m north

Site name	Designation	Description	Distance and direction from site
		gorges in places. The woodlands have a rich ground flora supporting many ancient woodland indicator species. Regionally rare plant species frequent the steep woodlands, several nationally scarce bryophytes and lichens have also been recorded.	
Winchfawr West	SINC	Extensive area of mostly upland habitats, comprising a complex mosaic of moorland and ffridd habitats on the eastern slopes of the Bryn y Gwyddel/Bryn y Badell/Mynydd Aberdar hill system. The wet and dry heathlands are partly developed on old colliery spoil tips and are the most extensive heathlands in the County Borough. Other habitats of note include marshy grasslands and unimproved acid grasslands, acid flushes and grass heaths. Outlying areas support semi-improved acid and neutral grasslands and scrub. Numerous ponds are present supporting a small population of Great Crested Newts, along with small streams and some sections of outcropping sandstone. Extremely diverse series of habitats supporting many species of interest.	500m west
Winchfawr East & Clwydyfagwyr	SINC	Semi-upland area of spoil mounds supporting a mosaic of dry heathland and acid grassland, along with marshy grassland and acid flushes in depressions and areas of neutral grassland. The eastern part of the site supports areas of species-rich marshy grassland and wet heath, along with a series of ponds along a small stream and areas of scrub.	250m south
Cwm Taf Fields & Cefn Coed Tip	SINC	Linear series of fields between the Afon Taf Fawr and the A470, also containing areas of semi-natural woodland and a re-vegetated limestone slag tip from the former Cyfarthfa Ironworks as well as smaller areas of semi-improved acid grassland, scrub, bracken slopes and dry heathland. The fields are a mosaic of damp and dry neutral grasslands with species-rich areas. The woodlands are variable in character, including areas of wet willow woodland, acid oak woodland and some base-rich ash woodland near the calcareous tip. The thin soils on the tip plateau support a unique type of calcareous grassland.	650m north-east
Cwm Taf Fawr	SINC	Section of major river tributary of the Afon Taf. The river extends into Brecon Beacons National Park to the north. Includes adjacent woodlands,	700m north

Site name	Designation	Description	Distance and direction from site
		which are relatively undisturbed in the upper reaches and more urban in character further downstream. The upper reaches are of high ecological value, comprising limestone gorge woodland with a rich ground flora. Numerous rare plant species occur here. Further south the riverside woodland is more acid in character, but nevertheless supports a relatively diverse ground. The site also includes some adjacent areas of species-rich calcareous, neutral and acid grasslands. The calcareous grasslands support numerous species which are scarce in the County Borough. Otter ranges along the Afon Taf Fechan, which also supports a range of native fish species including salmon.	
Nant Ffrwyd	RIGS	This site forms a unique landscape feature in a tributary of the Taff valley which may have been initiated with the fluctuating climate during the Late Glacial Interglacial Transition at the end of the last (Devensian) Ice Age and has continued to develop during the Holocene.	350m north

- 4.1.3 All non-statutory designated sites were assessed to be of **County importance** for nature conservation. Coed Meirig Pastures, Gellideg North Fields and Cwm Ffrwd are considered to be in close enough proximity to be considered further in this assessment.
- 4.1.4 The remaining SINC's are considered to be disconnected from the site and unlikely to be impacted by the development and are therefore not considered further in this assessment. The development is not expected to impact the geological features present at Nant Ffrwyd so this has also been scoped out of the assessment.
- 4.1.5 The site is located within the Buglife B-Line Network, that are designated as 'insect pathways' which are prioritised for restoring and creating a series of wildflower-rich habitat steppingstones. They link existing wildlife areas together, creating a network that will weave across the UK landscape.

4.2 Habitats

General Site Description – 2018 Surveys

- 4.2.1 Species-poor neutral grassland occupies the upper, undulating plateau of the site, giving way to a thicket of mature scrub and Japanese Knotweed *Fallopia japonica* in the north-western corner. To the south, the tip falls away steeply to houses and gardens below. There is also a substantial area of actively eroding colliery spoil on this face.

- 4.2.2 To the north, the tip slopes down toward a road and this area supports a form of dry mature heathland with scattered trees and scrub. Acid grassland occupies the remainder of the slope where it has an easterly aspect. The site was previously a landfill site which has now grown over and is largely used by dog walkers and for horse grazing. Signs of a small recent fire were seen during the fieldwork on top of the tip.
- 4.2.3 The site is located west of Merthyr Tydfil, surrounded by a semi-urban combination of residential dwellings, agricultural fields and hedgerows. The wider environment included the town of Merthyr Tydfil to the east and the Brecon Beacons National Park.

NVC Survey - 2018

- 4.2.4 Figure 5 shows the key habitats classified by the botanical NVC survey. Descriptions of the habitats are provided in the following section. The NVC species lists can be found in Appendix 1.
- 4.2.5 The updated 2023 UKHab habitat parcel labels have been added onto the 2018 survey labels to allow cross-identification of habitats.

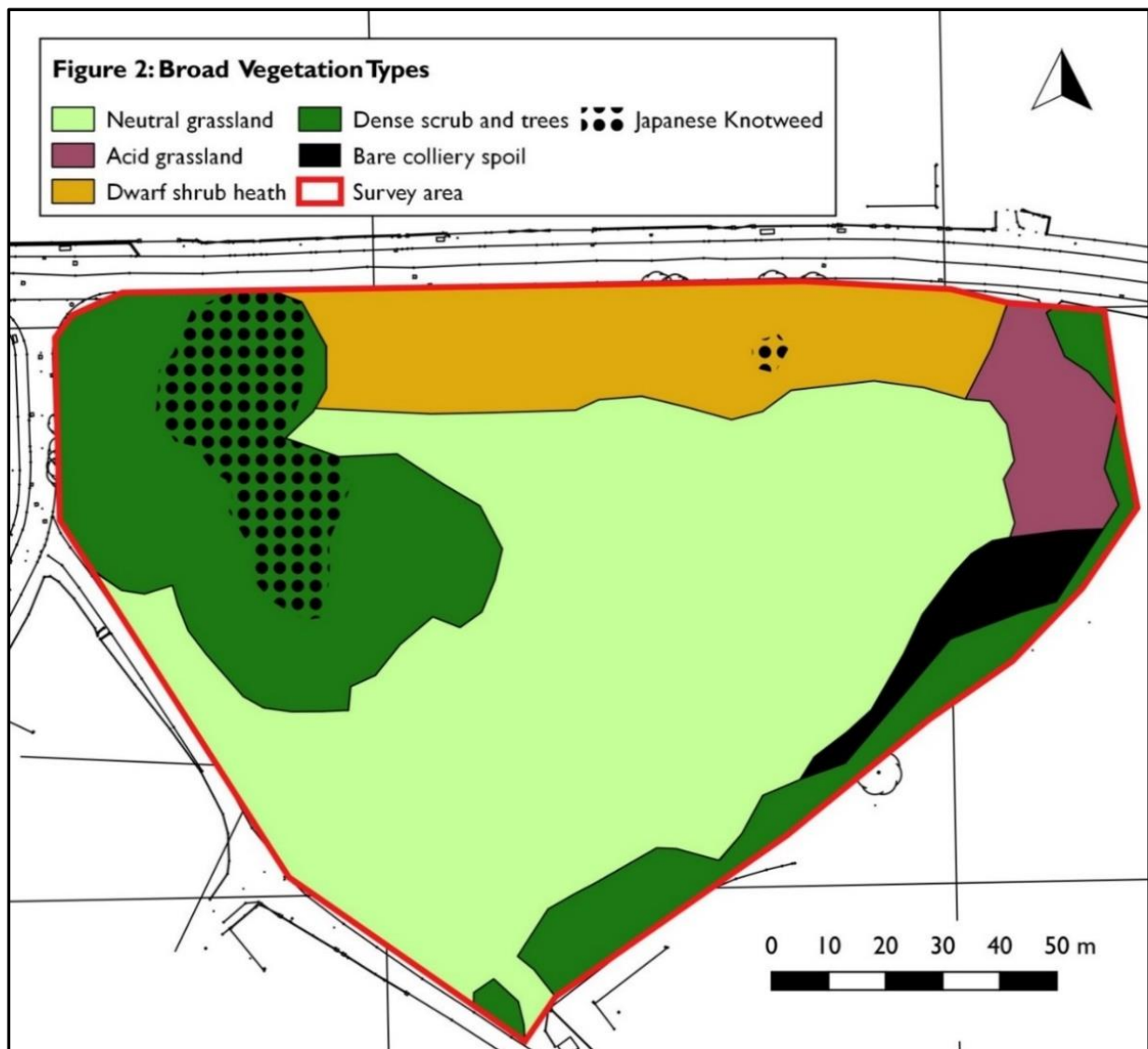


Figure 5 NVC Habitat survey - 2018

Neutral grassland (Other neutral grassland)

- 4.2.6 A poor form of neutral grassland occupies the top of the tip, where there is undulating ground criss-crossed by a number of informal walker's paths. Where soils are sufficiently deep and fertile, the grassland is characterised by high combined cover of false oat grass (*Arrhenatherum elatius*), red fescue (*Festuca rubra*) and Yorkshire fog (*Holcus lanatus*). Forbs are limited in number although common knapweed (*Centaurea nigra*), ribwort plantain (*Plantago lanceolata*) and birds foot trefoil (*Lotus corniculatus*) are occasional.
- 4.2.7 In other parts of the plateau the grassland is dominated by populations of crested dog's tail (*Cynosurus cristatus*), perennial rye grass (*Lolium perenne*) and spreading meadow grass (*Poa humilis*).
- 4.2.8 The grassland has the appearance of having been sown originally onto a soil cap and currently has floristic affinities to both MG6 *Lolium perenne* – *Cynosurus cristatus*

grassland and MG1 *Arrhenatherum elatius* grassland NVC types. It supports no species of recognised conservation importance and is of low intrinsic botanical value. This habitat was considered to have no particular importance for nature conservation and is not considered further within the assessment.



Photo 1: Neutral grassland



Photo 2: Neutral grassland



Photo 3: Neutral grassland



Photo 4: Neutral grassland

Scattered scrub (Mixed scrub)

- 4.2.9 Scattered scrub was present to the west and south of the site. The habitat had low botanical diversity, being dominated by bramble (*Rubus fruticosus*), rose (*rosa spp.*), common nettle (*Urtica dioica*), willowherb (*Epilobium spp.*) and umbellifer species. Large areas of the scrub at the west of the site was dominated by Japanese knotweed.



Photo 5: Scattered scrub



Photo 6: Scattered scrub



Photo 7: Scattered scrub



Photo 8: Scattered scrub

Acid grassland (Lowland dry acid grassland)

- 4.2.10 Acid grassland occupies the steeply sloping eastern face of the tip. Generally, the vegetation is relatively sparse with plenty of bare ground although in places large *Pleurocarpus* mosses have high cover. Sheep's-fescue (*Festuca ovina*), mouse-ear hawkweed (*Hieracium pilosella*), Sheep's sorrel (*Rumex acetosella*), early hair-grass (*Aira praecox*) and cats ear (*Hypochaeris radicata*) are all prominent, together with *Hieracium argillaceum* – a hawkweed species. Sprawling mats of moss include *Rhytidiadelphus squarrosus*, *Pleurozium schreberi*, *Dicranum scoparium*, *Hypnum lacunosum* and *Hylocomium splendens*.
- 4.2.11 This grassland has clear floristic affinities with U1 *Festuca ovina* – *Agrostis capillaris* – *Rumex acetosella* grassland (a widespread form of lowland acid grassland). It can be regarded as a Section 7 Priority Habitat in Wales (Lowland acid grassland). The acid grassland was assessed as being of County importance and is considered further in this assessment.



Photo 9: Bryophyte-rich acid grassland

Colliery spoil (Inland rock outcrop and scree habitats)

- 4.2.12 The south-east of the site is actively eroding, exposing the colliery spoil. This area is bare of any vegetation growth. The area slopes down steeply to houses and gardens below.



Photo 10: Exposed colliery spoil

Dwarf shrub heath (Lowland heath)

- 4.2.13 Dry heathland has developed on the northern face of the tip. Mature to degenerate stage heather (*Calluna vulgaris*) is common, alongside locally abundant bilberry (*Vaccinium myrtillus*). Neither species forms continuous cover and there are grassier patches with wavy hair grass (*Deschampsia flexuosa*), sheep's fescue (*Festuca ovina*) and common bent (*Agrostis capillaris*). Mosses are very common and prominent species include *Rhytidiadelphus squarrosus*, *Pleurozium schreberi* and *Hylocomium splendens*. The common montane moss *Racomitrium lanuginosum* is frequent at the eastern end of the slope.
- 4.2.14 The floristic composition of the heath indicates it is likely to be a form of H12 *Calluna vulgaris* – *Vaccinium myrtillus* heath, a relatively common kind of dry dwarf shrub heath in sub-montane areas. This is a Section 7 priority habitat in Wales (Upland

heathland) and therefore is of County importance for nature conservation. It is apparently unmanaged and only in fair condition; a recent burn has damaged a small area, it is suffering from scrub and sapling encroachment and is also threatened by the spread of Japanese knotweed from the west. The dwarf heathland was assessed as being of County importance and is considered further in this assessment.



Photo 11: Dwarf shrub heath, note burnt ground on upper slope.

Parkland/scattered trees – broadleaved (Other woodland; broadleaved)

- 4.2.15 Broadleaved trees were scattered across the centre and north of the site. The majority of the trees along the northern boundary were self-seeded saplings, dominated by silver birch (*Betula pendula*). A mature selection of trees was present to the west of the site with species such as blackthorn (*Prunus spinosa*), willow (*Salix*), aspen (*Populus tremula*) and further silver birch. The woodland was assessed as being of local importance for nature conservation.



Photo 12: Scattered trees



Photo 13: Scattered trees

Parkland/scattered trees – Mixed (Other woodland; mixed)

- 4.2.16 A section of scattered trees was present on the west boundary. The section contained a mix of coniferous and deciduous trees comprised of Leyland cypress (*Cupressus × leylandii*), blackthorn, willow, aspen and Bay (*Laurus nobilis*).



Photo 14: Scattered trees

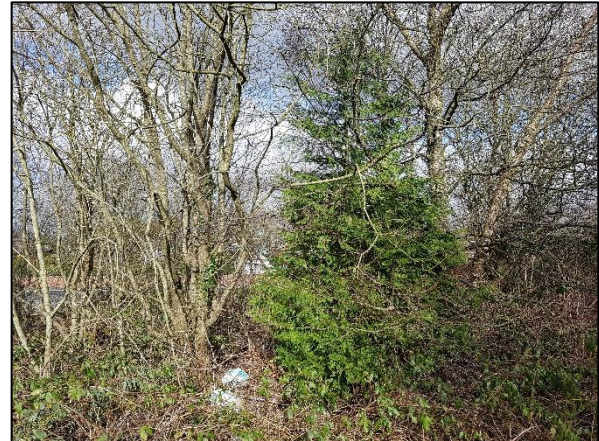


Photo 15: Scattered trees



Photo 16: Scattered trees



Photo 17: Scattered trees

Japanese knotweed

- 4.2.17 Two distinct areas of Japanese knotweed were present at the site. The first was on the north boundary within scrub habitat, with a smaller stand within the dwarf shrub at the north of the site. The knotweed had appeared to have been treated, however fresh growth was still present.



Photo 18: Japanese knotweed

2023 UKHab Survey

- 4.2.18 An updated UKHab survey has been undertaken in 2023 and determined that the habitats on site are the same as when they were surveyed in 2018. The map below demonstrates the habitats present on site. The updated UKHab habitat names are referenced above.
- 4.2.19 Large stands of Japanese knotweed are present on the site in the woodland along the western boundary of the site.



Figure 6 Updated UKHab map

4.3 Section 7 species

- 4.3.1 The background data search returned eight records of hedgehog recorded between 2001 and 2020. The exact locations of several of the records were not provided, but the closest known record was located 300m to the south of the site.
- 4.3.2 The data search returned one record of brown hare within 1km of the site. This was recorded in 2007 and was located 900m south-west of the site. There was a significant amount of unsuitable brown hare habitat between the site and the record, so it was not considered to be suitably connected to the site.
- 4.3.3 The site was dominated by a variety of species-rich grasslands and areas of woodland and scrub which provide good potential foraging habitats and cover opportunities for hedgehog. It is also connected to the wider network of valuable foraging habitats to the north. Overall, it was considered that the site is utilised for hedgehog foraging, commuting and potentially nesting.
- 4.3.4 Whilst hedgehog is listed as a Species of Principal Importance for the conservation of biodiversity in Wales, the site is not considered to be of significant importance to the species and they are therefore only considered further on a precautionary basis during construction.

- 4.3.5 The site was considered unsuitable for harvest mouse, brown hare and polecat due to a lack of suitable habitat and the proximity of the site to urban development. These species are therefore considered likely absent from the site and are not considered further in this assessment.

4.4 Badger

- 4.4.1 Two records of badger from 2022 were returned by the data search, located 550m north of the site.
- 4.4.2 No evidence of badger was identified on site during the surveys.
- 4.4.3 The site contained a variety of grasslands which were heavily grazed, reducing the value of the habitat for badger. The site was also bordered on three sides by residential dwellings. Given the abundance of more valuable badger habitats in the wider environment to the north, and the lack of evidence of badger on site, it is considered that they are likely absent and are not considered further in this assessment.

4.5 Hazel Dormouse

- 4.5.1 No records of hazel dormouse within 1km of the site were returned by the data search.
- 4.5.2 The boundary woodland and scrub did not contain a suitable range of species to support hazel dormouse and the connectivity of the site with the wider environment was limited for this species. It was therefore assessed that hazel dormouse are likely absent from the site and are not considered further in this assessment.

4.6 Riparian Mammals

- 4.6.1 Twelve records of otter were identified in the data search. These records were returned between 1988 and 2021 along the River Taff around 750m to the north-east of the site. One record of water vole was identified in the data search from 2002 at Pen-yr-heolgerrig.
- 4.6.2 The site contained no ponds or riparian habitat. Pwll Annie, a tributary of the River Taff was recorded as being located 200m west of the site, and another one located 50m east of the site. Whilst otters are known to be a far-ranging species, the site was bordered on all boundaries by urban development and a road, therefore providing limited foraging opportunities on site. The site did not form a terrestrial link between other water bodies in the wider environment. Given the abundance of more valuable foraging habitats available offsite, it is considered that otter are likely absent from the site and are not considered further in this assessment.
- 4.6.3 Due to the lack of suitable habitat on site for water vole, lack of evidence of the species on site and lack of desk study records, water vole are considered likely absent from the site and are not considered further in this assessment.

4.7 Bats

Data Search

- 4.7.1 Fifty-one records of bats were identified by the data search between 2002 and 2022. Species recorded included common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Daubenton's bat (*Myotis daubentonii*), unidentified myotis bat, unidentified pipistrelle bat, brown long-eared bat (*Plecotus auritus*), greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*), the latter of which is an Annex II species. The majority of the lesser horseshoe bat records were located approximately 900m to the north-east of the site. Three of the records were of bat roosts, with the most recent dating from 2021.

Habitats and Site Context

- 4.7.2 The habitats on site were dominated by species-rich grasslands and boundary woodland and scrub which provides some foraging and commuting opportunities for bats.
- 4.7.3 Whilst the site is surrounded on three sides by urban development, and road on the other, it is also located close to several SINC's. These SINC's form a network of ecologically valuable habitats, as shown in Figure 5, which could provide commuting corridors for bats. In particular, there is woodland directly to the north-east of the site which provides connectivity with Nant Ffrwd stream.
- 4.7.4 Overall, considering the urban context, habitats present and links to wider habitats, it was assessed that the site provided 'low potential' for bats in line with BCT survey guidelines.

Trees for Bats

- 4.7.5 A survey of the trees in site for potential roosting features was undertaken during the 2018 surveys. During the preliminary ground level assessment, it was considered that all the trees provided 'negligible' potential.
- 4.7.6 Therefore, no trees offering roosting potential for bats were present on site, therefore roosting bats in trees are not considered further in this assessment.
- 4.7.7 Given the foraging and commuting opportunities present on site and the proximity to other valuable habitats within the wider landscape, it is considered that the site supports an assemblage of bats which are of Local importance for nature conservation.

Commuting and Foraging Activity

- 4.7.8 The full results of the bat activity and static detector surveys are provided in Appendix 1 and summarised below.

- 4.7.9 Low levels of bat activity were surveyed during the activity surveys with only common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*) recorded foraging on site. Foraging activity was predominately recorded near the scrub and the woodland.
- 4.7.10 Twelve species of bat were recorded on the static detectors over 15 recording nights, namely common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle (*Pipistrellus nathusii*), noctule bat (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), brown long-eared bat (*Plecotus auritus*), Brandt's bat (*Myotis brandtii*), Natterer's bat (*Myotis nattereri*), greater horseshoe and lesser horseshoe bat. Common pipistrelle were the most frequently recorded species, comprising 54.7% of total bat passes. Greater horseshoe bats comprised 0.05% of the total bat passes within the survey period and lesser horseshoe bat comprised 0.4%.
- 4.7.11 The key features for bats were the scrub and woodland with foraging bats recorded using these habitats. Low numbers of Lesser horseshoe bats were recorded throughout the static monitoring period on both static detectors. Greater horseshoe bats were only recorded in June on static 1.

Summary and assessment of nature conservation importance

Horseshoe Bats

- 4.7.12 No horseshoe bats were recorded on site during the activity surveys however low numbers of greater and lesser horseshoe bats were identified during the static monitoring surveys. Lesser horseshoe bats were recorded predominantly on location 1 with 20 recordings in June 2023. 3 passes were recorded on location 2 in May and then again in July. Greater horseshoe bats were only recorded at location 1 in June 2023.
- 4.7.13 In general, greater horseshoe bats predominantly forage over permanently-grazed pastures, interspersed blocks of deciduous woodland or substantial hedgerows. The three main prey items for greater horseshoe bats are cockchafer (*Melolontha melolontha*), dung beetles (Coleoptera scarabaeidae) and moths (Lepidoptera). The invertebrate surveys undertaken on site did not record any cockchafers or dung beetles however, 13 records of lepidoptera were identified.
- 4.7.14 Lesser horseshoe bats primarily forage over broadleaf woodland, however will also forage along hedgerows and water courses. Lesser horseshoe bats predominantly forage on smaller invertebrate species such as Diptera and Lepidoptera. The invertebrate survey identified 20 species of diptera and 13 species of Lepidoptera.
- 4.7.15 Despite the presence of known dietary resources for both GHS and LHS bats, as well as suitable foraging habitat, the bat survey results indicate that the site is used sporadically by GHS and LHS bats likely for commuting, using the southern boundary on site for moving through the landscape. Numbers of both species are not considered to be high, commuting is assessed to be infrequent throughout the season, with a peak

in activity recorded in June. The habitats on site are therefore assessed to be of **Local importance** for commuting LHS and GHS bats.

- 4.7.16 The survey results indicate that the site is unlikely to be an important foraging resource for either LHS or GHS bats. Whilst the habitats on site were largely dominated by other neutral grassland which had formed rough tussocks. Foraging is likely to be restricted to opportunistic as bats move through the landscape using the southern hedgerow. On the basis, the site is assessed to be of **local importance** for foraging LHS and GHS bats.

Other Bat Species

- 4.7.17 Activity on site was dominated by common pipistrelle bats (54.7% of passes recorded on the static detectors). The key features for this species were the scrub and woodland, all of which were used by foraging and commuting common pipistrelle, with the majority of recordings occurring at location 1 (1895 counts).
- 4.7.18 Low numbers of soprano pipistrelle, Nathusius's, noctule, Leisler's, serotine, brown long-eared bat, Brandt's bat, Daubenton's bat (*Myotis daubentonii*) and Natterer's bat were recorded during the static surveys. Due to low levels of activity recorded, the populations of other bat species recorded are not assigned any scale of importance for nature conservation.

4.8 Birds

- 4.8.1 Two hundred and four bird records were returned by the data search. The exact locations of most of the records were withheld, but several were located within Coed Meirig pastures within which the site is included. The species record within the pastures were greenfinch (*Chloris chloris*), meadow pipit (*Anthus pratensis*), song thrush (*Turdus philomelos*) and swallow (*Hirundo rustica*). Greenfinch and mistle thrush are species on the Royal Society of the Protection of Birds' (RSPB) red list of Birds of Conservation Concern and meadow pipit, redstart and song thrush are on the amber list of Birds of Conservation Concern.
- 4.8.2 Records of species listed within Schedule 1 of the Wildlife and Countryside Act 1981 included corncrake (*Crex crex*), fieldfare (*Turdus pilaris*), hen harrier (*Circus cyaneus*), kingfisher (*Alcedo atthis*), peregrine (*Falco peregrinus*), red kite (*Milvus milvus*), redwing (*Turdus iliacus*) and barn owl (*Tyto alba*).
- 4.8.3 The site contained a variety of species-rich grasslands which were grazed by horses, and poached by dog walkers, which significantly limited opportunities for ground nesting birds, considering this disturbance and the lack of evidence of ground nesting birds observed during site visits, it is assessed that ground nesting birds are absent.
- 4.8.4 The areas of woodland and scrub could provide potential breeding habitats for common and widespread species of birds.

- 4.8.5 Whilst the data search returned several notable species of bird within the Coed Meirig pastures SINC in which the site is located, the section of the SINC present on site is heavily disturbed and only provides nesting potential for the more common species. It is therefore considered that the assemblage of birds present on site is not of significant importance for nature conservation and will only be considered further on a precautionary basis.

4.9 Reptiles

- 4.9.1 One slow worm (*Anguis fragilis*) record was returned in 2016 and one common lizard (*Zootoca vivipara*) record was returned with two records attached, recorded between 1977 and 2012. The slow worm record was located 800m northeast of the site and the common lizard record did not have a precise location.
- 4.9.2 The site was dominated by a variety of grassland communities, which can provide good foraging habitat for reptiles, however this was reduced because of the presence of grazing horses. The key features on site were assessed as the more tussocky areas of grassland and the scrub. The site was not well connected to suitable reptile habitat in the wider environment given the residential development and road surrounding the site.
- 4.9.3 Presence / absence surveys were undertaken at the site in 2018 and 2023 to identify use of the site by reptiles. The targeted surveys during 2018 returned a nil result for reptiles, however, the surveys undertaken within 2023 recorded low numbers of slow worms.
- 4.9.4 Results of targeted reptile surveys are provided below in table 4. Overall a max of three slow worms were recorded on site.

Table 4 2018 and 2023 Reptile survey results

Visit no.	Date	Weather	Temperature (C°)	Time	Reptile encounters
1	28.06.18	Sunny with breeze.	23	10:00am	Nil
2	03.07.18	Sunny with breeze	21	10:00m	Nil
3	06.07.18	Sunny with cool breeze	18	9:00am	Nil
4	17.07.18	Cloudy with breeze after recent rain	16	9:30am	Nil
5	20.07.18	Cloudy with sunny intervals	16	9:00am	Nil
6	30.07.18	Cloudy with intermittent showers during day	17	9:30am	Nil
7	07.08.2018	Cloudy with breeze	16	10:30am	Nil
8	19.04.2023	Cloudy	11	09:30am	One adult female
9	03.05.2023	Sunny with cool breeze	17	10:30am	One frog

10	24.05.2023	Cloudy with breeze	16	14:30pm	One female and one deceased male.
11	15.06.2023	Cloudy with breeze	15	10:00am	Nil
12	06.07.2023	Sunny with cool breeze	16	15:00pm	Two adult females
13	19.07.2023	Sunny with breeze.	18	14:30pm	Two adult females and one adult male
14	29.08.2023	Sunny with breeze	14	11:00am	2 juveniles and 1 adult female.

4.9.5 Froglife Advice Sheet 10 contains an assessment of population size for reptile species. In line with this guidance, the populations of slow worm are assessed to be 'low', as less than five adults were recorded for both species. As reptile presence has been determined on site, they will be considered further within this assessment.

4.9.6 As slow worms are a Species of Principal Importance, they have been determined to be of **local importance** for nature conservation. As reptile presence has been determined on site, they will be considered further within this assessment.

4.10 Amphibians

Data Search

4.10.1 The data search returned twenty-five records of GCN, five records of common frog (*Rana temporaria*) and three records of common toad (*Bufo bufo*) from between 1994 and 2011. The GCN records with exact locations provided were all located to the south-west of the site and were separated from the site by urban development.

Habitat Assessment

4.10.2 The site consisted of a mosaic of grasslands and woodland and scrub. Although the habitats were heavily disturbed due to horse-grazing which reduces the suitability of terrestrial habitats for amphibians, the scrub and areas of tussocky grass provided some cover opportunities for amphibians. The key features on site were therefore assessed to be the areas of tussocky grassland and scrub which provide suitable cover and foraging opportunities for amphibians.

4.10.3 Overall connectivity of suitable GCN habitat in the local area was poor. Urban development was present to the east, south and west of the site, which would be unlikely to contain suitable habitat for GCN. The land to the north of the site was separated from the wider environment due to the presence of a main road, the A4102, which is considered to be a significant barrier to amphibian movement.

4.10.4 A search for ponds within 500m identified four ponds within 500m of the site (Figure 8), however they were determined to not be connected to the site, as an A road or residential development separates the site from the ponds, and these are considered barriers to movement for amphibians and therefore there is no suitable wet habitat on site. Amphibians are therefore not considered further in this assessment.



Figure 7 Ponds within 500m of the site

4.11 Invertebrates

4.11.1 One hundred and eight invertebrate records were returned by the data search which included moths, butterflies, dragonflies, beetles, bees and true flies. There were several records of species listed under Section 7 of the Environment (Wales) Act 2016 as 'species of principal importance for conservation of biological diversity in Wales', such as dark brocade (*Mniotype adusta*), small pearl-bordered fritillary (*Boloria selene*), small heath (*Coenonympha pamphilus*), cinnabar (*Tyria jacobaeae*), grayling (*Hipparchia semele*) and broom moth (*Ceramica pisi*).

4.11.2 The site comprised a mosaic of acid grassland, dwarf shrub, bramble, areas of woodland and neutral grassland. Habitat mosaics are important for invertebrates as many require two or more habitats to complete their lifecycle. The variety of habitats present therefore allows the site to support a wide range of invertebrate groups.

4.11.3 During the targeted invertebrate surveys a total of 312 invertebrate species were recorded on site with 21 species assessed as being of conservation status. Of those 21 species three species were identified as being nationally scarce. These species included;

- Potter spider wasp (*Auplopus carbonarius*)
- Millipede (*Leptoiulus belgicus*)
- Hornet hoverfly (*Volucella zonario*)

4.11.4 Overall, it has been determined that the site contains a wide variety of invertebrate species, 21 of these were of any nature conservation importance and three were nationally scarce. The key habitats for invertebrates, the grassland, scrub, acid and sedge peats, and woodland will be lost to facilitate development. Overall it was assessed that the site provides County importance for nature conservation.

4.12 Invasive Species

4.12.1 Forty-eight records of plant species listed in Schedule 9 of the Wildlife and Countryside Act 1981 and invasive, non-native species were returned by the data search. The species recorded included cotoneaster (*Cotoneaster sp.*), Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) and montbretia (*Crocsmia x crocosmiiflora*). The closest record was located on site.

4.12.2 Large stands of Japanese knotweed have been recorded on site and will need to be removed by professionals.

4.13 Summary

4.13.1 The important ecological features of relevance to this assessment and their importance are summarised in Table 5.

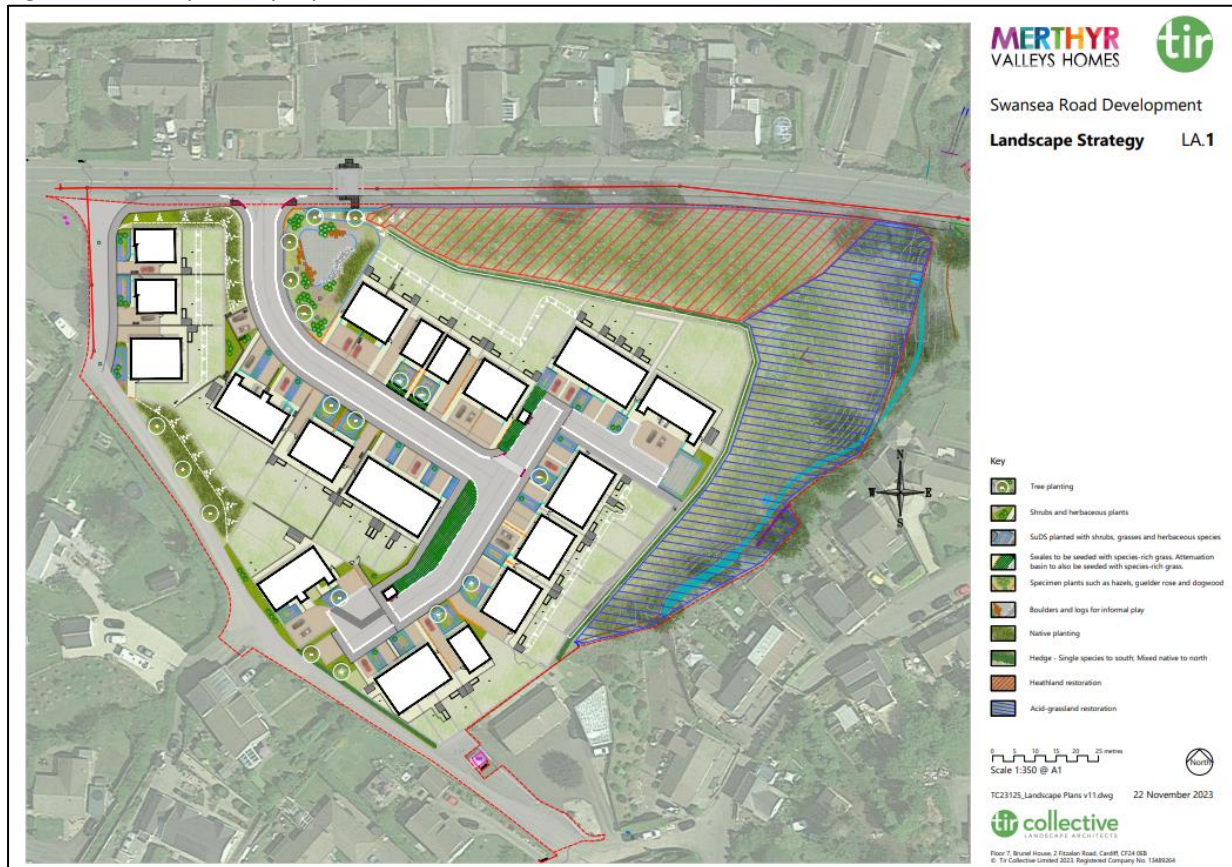
Table 5 Summary of important ecological features

Important Ecological Features	Scale of Importance
Designated nature conservation sites - Coed Meirig Pastures - Gellideg North Fields - Cwm Ffrwd	County
Acid grassland/Lowland dry acid grassland	County
Dwarf shrub heath/Lowland heathland	County
Woodland/Other woodland; broadleaved and mixed	Local
Section 7 Species - Hedgehog	Precautionary
Birds	Precautionary
Lesser horseshoe and greater horseshoe bats	Local
Invertebrates	County
Reptiles	Local

5 DESCRIPTION OF THE PROPOSED DEVELOPMENT

- 5.1 The development proposals comprise the construction of 39 residential dwellings with associated access, as shown in Figure 8. The total size of the redline of the site is 1.5 ha.
- 5.2 The site is located within close proximity to several SINC's, including Coed Meirig Pastures, Gellideg North Fields and Cwm Ffwd.
- 5.3 The layout of the development requires major land and stabilisation works, which in turn negates any feasible means of retaining existing habitats on site. The scheme will however deliver the following:
- Creation of a new native hedge comprising of native species such as, gorse (*Ulex europaeus*), birch, hawthorn (*Crataegus monogyna*) and rowan (*Sorbus aucuparia*).
 - Provision of urban street trees within the proposed development.
 - Removal of the Japanese knotweed on site.
 - Areas of acid grassland restoration on the eastern slopes of the site.
 - Areas of heathland restoration on the northern slopes of the site.

Figure 8 Development proposals



6 ASSESSMENT OF IMPACTS AND MITIGATION MEASURES

6.1 Designated Nature Conservation Sites

Coed Meirig Pastures

- 6.1.1 The site is located within 150m of the Coed Meirig Pastures SINC, however the site is not open and accessible to the public, and therefore the development will not create any significant impact on the SINC as a result of construction or operational impacts.

Gellideg North Fields

- 6.1.2 This SINC is located to the north of the site, separated by Swansea Road, the A4102. Impacts from construction are considered to be minimal as damage or pollution can be avoided through construction fencing on site and through the implementation of an effective Construction and Environmental Management Plan (CEMP) to be secured by planning condition.
- 6.1.3 This SINC has no footpaths or public access, therefore recreational impacts are also considered unlikely. It is therefore considered that there will be no significant effect on this SINC as a result of the construction or operational impacts of the proposed development.

Cwm Ffrwd

- 6.1.4 The Cwm Ffrwd SINC is located along the Nant Ffrwd stream located to the east and north of the site. Potential impacts from construction could occur from water run off or pollution during construction activities. Impacts can be avoided through standard good practice pollution management during construction, specific details of this will need to be set out within the CEMP.
- 6.1.5 This SINC has no footpaths or public access, therefore recreational impacts are also considered unlikely. It is therefore considered that there will be no significant effect on this SINC as a result of the construction or operational impacts of the proposed development.

6.2 Acid Grassland (Lowland Dry Acid Grassland)

Construction phase

- 6.2.1 The site is located within an old colliery spoil site and therefore to facilitate the residential development and to provide a stable foundation, Extensive re-profiling of the entirety of the site is necessary. As a result, it is therefore impossible to retain and protect the acid grassland located on the eastern slopes of the site.

- 6.2.2 Although impacts on the grassland cannot be avoided through construction pressures, an area of land has been identified within the development scheme as an acid grassland restoration area. An insert from “Save our magnificent meadows” states *“Acid grassland can be restored and recreated where the soil chemistry is suitable. Usually, natural regeneration is used to restore dry acid grassland”*. It is therefore recommended that a management strategy is set out within the LEMP detailing the proposed management of the grassland to restore it.

6.3 Dwarf Shrub Heath (Lowland Heathland)

Construction phase

- 6.3.1 As a result of the extensive landscaping works on site it is not possible to retain and protect the dwarf shrub heath located on the northern slopes of the site.
- 6.3.2 Although impacts on the heathland cannot be avoided through construction pressures, an area of land has been identified along the northern boundary of the development scheme as shrub heath restoration area. Natural regeneration from the soil seed bank will be encouraged and managed to re-establish the heathland. It is therefore recommended that a management strategy is set out within the LEMP detailing the proposed management of the grassland to restore it.

6.4 Woodland (Other Woodland; Broadleaved and Mixed)

Construction phase

- 6.4.1 The development proposals include the removal of all of the woodland and scrub on site to facilitate the proposed development and its access road. In the absence of mitigation, the loss of the woodland may incur negative, short-term impacts.
- 6.4.2 The woodland areas to be lost on site are small and have large stands of Japanese knotweed within them; given this, and the local abundance of woodland in better condition, it has been determined that the loss of woodland on site will not have a significant, negative ecological impact at a local area, and therefore will not require compensation.
- 6.4.3 Two areas of Japanese knotweed were identified at the site within the wooded areas. Knotweed is an invasive weed which is listed on schedule 9 of the Wildlife and Countryside Act for which it is an offence to allow the spread of this plant. Recommendations for the management and eradication of the Japanese knotweed at the site is made in section 9.

6.5 Section 7 Species – Hedgehog

Construction phase

- 6.5.1 The development proposals include the removal of and impacts on Section 7 species, specifically hedgehogs. Mitigation will be required to ensure that no harm is incurred to any potential individuals utilising the site.
- 6.5.2 It is recommended that habitat clearance is undertaken in accordance with a precautionary working method statement and this will be detailed within a CEMP to be secured by planning condition.
- 6.5.3 To mitigate potential impacts to hedgehog on the construction site, it is recommended that general safe working practices are followed to prevent the construction site from becoming suitable for nesting and hibernating hedgehog. These will be detailed in the CEMP.

Operational phase

- 6.5.4 To ensure the site remains permeable to hedgehog post-construction, any non-permeable fencing used (e.g. close-boarded fencing between residential gardens) will contain suitable holes at the base to ensure hedgehog can continue to commute and forage across the site. This will be detailed in a LEMP to be secured by planning condition.

6.6 Birds

- 6.6.1 The proposed development will require the removal of areas of breeding bird habitat on site, and therefore will require mitigation and compensation.

Construction phase

- 6.6.2 Nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), so it will be necessary to avoid damage to, or destruction of, nests, or disturbance of nesting birds, during the construction phase.
- 6.6.3 In order to mitigate impacts to breeding birds, any clearance of suitable habitat (e.g. woodland and scrub) will either be undertaken outside of the nesting season (March to August inclusive) or be subject to a pre-works check by a suitably qualified ecologist. The method statement for ensuring the protection of nesting birds will be detailed within the CEMP.

Operational phase

- 6.6.4 To ensure the site remains suitable for breeding birds post-construction, bird boxes should be installed on new residential housing or remaining trees to ensure potential

for breeding birds is retained. This will be detailed in a LEMP to be secured by planning condition.

6.7 Bats

Horseshoe bats

- 6.7.1 The development proposals (see section 5) have been designed to avoid impacts, as far as possible on commuting LHS and GHS bats. This has focused on the retention of the southeastern hedgerow as dark corridors to enable continued commuting through the site and wider landscape.
- 6.7.2 In order to achieve a logical layout to housing and ancillary facilities, some impacts are unavoidable. This includes the loss of the woodland, scrub, grassland and heath shrub.
- 6.7.3 The detailed landscape plans for the scheme shows an area of open space to be incorporated into the scheme and to be used for acid grassland and heath restoration. Details of this will be set out within a Landscape and Ecology Management Plan (LEMP).

Other Bats

- 6.7.4 Activity on site was low and dominated by common bat species such as common pipistrelle although light-sensitive *Myotis* and long-eared bats were also recorded. Majority of the bat activity was recorded on static 1 which was located on the southeastern boundary. Bat activity was concentrated on the southern hedgerow on site which have been discussed above and it is considered that the mitigation for horseshoe bats using the site will also benefit other bat species. It is therefore considered that there will be **no significant effect** on these bat species.

Construction phase

- 6.7.5 There is potential for disruption to foraging and commuting bats from construction lighting, particularly for potential Annex II species utilising the site which are light-sensitive species, namely lesser and greater horseshoe bats.
- 6.7.6 Therefore, it is recommended that lighting during construction is turned off at night and any essential security lighting be set on a timer to prevent disturbance to nocturnal mammals. This can be detailed in the CEMP.

Operational phase

- 6.7.7 There is potential for disturbance to foraging and commuting bats from light spill from the new residential dwellings. Ecological buffers have been proposed along the eastern and southern boundaries to maintain commuting corridors for bats during the operational phase along the north and eastern boundaries of the site.

Summary

- 6.7.8 Overall, with the mitigation measures outlined for the construction phase and the provision of ecological buffers, no significant effects on the site's assemblage of commuting and foraging bats are predicted as a result of the development.

6.8 Invertebrates

- 6.8.1 Of the 312 invertebrate species recorded during the surveys undertaken in 2023, 21 were deemed to be of conservation status. This included three species which are nationally scarce. The invertebrate surveys recorded 11 out of 21 species of conservation importance along the northern slope of the site and therefore the dwarf heathland present within this area was identified as a key feature in relation to invertebrate species.
- 6.8.2 The proposed development will result in the removal of this habitat and therefore resulting in the loss of the key area/ habitat. Discussions with Christian Owen of Christian Owen Bio- surveys concluded that although the heathland will be restored post development, the works will result in a significant short-term impact to invertebrate species on site. It was assessed that more mobile species, including the three nationally scarce species recorded, would likely move off site, however smaller populations of invertebrates species, most notably Formicidae, would likely be lost.
- 6.8.3 As impacts to invertebrates are inevitable, recommendations will focus on compensation for the loss of habitat. It is recommended that post development, invertebrate monitoring surveys are undertaken on site and a management strategy is produced to enhance the sites value for invertebrates. The results of the monitoring surveys will inform the need for further remedial actions and allow a tailored strategy. The management of the heathland shrub will be detailed in a LEMP to be secured by planning condition.

6.9 Reptiles

Construction phase

- 6.9.1 A low population of slow worm were recorded on site, mainly around the scrub and transitional habitats. The proposals will necessitate the removal of all habitats on site therefore resulting in the loss refugis and terrestrial habitat for reptiles. It is therefore recommended that given the low population, reptile exclusion fencing will be deployed around the site boundary and a low-scale 15 -day reptile translocation of the site will be undertaken prior to any vegetation clearance. Due to the extent of the proposed works on site any reptiles found will be moved off site to a location agreed with the LPA or within the ownership of MVH.
- 6.9.2 Reptiles are protected against intentional killing or injury under the Wildlife and Countryside Act 1981 (as amended). In order to ensure there is no impact on reptiles

during the clearance of the scrub, the works will be overseen by the ECoW, to comprise sensitive clearance of vegetation.

6.9.3 A detailed approach to this will be set out in the CEMP to be secured by planning condition.

6.9.4 The proposed habitats to be created post development will provide ample opportunity for providing enhanced habitat for reptile species, through the provision of areas of tussocky grassland and hibernacula. This would allow slow worms to naturally re-colonise the site post development. Details of these areas and their management will be set out in the LEMP to be secured by planning condition.

6.10 Summary

6.10.1 A summary of the predicted significance of any effects, as well as the proposed mitigation/compensation measures and how these may be secured are outlined in table 5.

Table 6 Summary of residual effects and mitigation/compensation

Ecological feature	Mitigation/compensation	Mechanism for securing delivery	Residual effects
Acid grassland (Lowland dry acid grassland)	- Management measures to reduce residential pressures. - Recolonisation of acid grassland along the eastern slopes of the site	LEMP secured by condition Post construction NVC monitoring surveys	Major adverse
Dwarf shrub heath (Lowland heathland)	- Management measures to reduce residential pressures. - Recolonisation of dwarf shrub heathland along the northern slopes of the site	LEMP secured by condition Post construction NVC monitoring surveys	Major adverse
Woodland (Other woodland; broadleaved and mixed)	- Provision of protective tree fencing during construction. - Management of retained woodland and scrub. - Provision of ecological buffers.	CEMP secured by condition LEMP secured by condition	Major adverse
Section 7 species - Hedgehog	- Precautionary working method statement during site clearance. - General safe working construction measures. - Measures to ensure site remains permeable post-construction.	CEMP secured by condition LEMP secured by condition	None

Ecological feature	Mitigation/compensation	Mechanism for securing delivery	Residual effects
Breeding birds	• Precautionary working method statement during vegetation clearance. • Compensation measures in the form of bird boxes installed post-construction	CEMP secured by condition LEMP secured by condition	None
Bats	• Sensitive lighting during construction. • Sensitive lighting design adjacent to site boundaries. • Provision of ecological buffers.	CEMP secured by condition Lighting strategy secured by condition	None
Invertebrates	• Sensitive lighting design adjacent to site boundaries.	LEMP secured by planning Invertebrate monitoring surveys post development	Minor adverse
Reptiles	• 15 day reptile translocation. • Precautionary construction measures. • Provision of ecological buffers.	CEMP secured by condition	None

6.11 Cumulative Effects

6.11.1 The desk study identified several small-scale developments within 1km of the site, such as single storey side extensions, which are expected to have negligible impacts on wildlife. It is therefore considered that there will be no cumulative effects on the important ecological features identified within this assessment as a result of the development.

7 ENHANCEMENTS

7.1 The proposals will include several enhancements for biodiversity which are as follows:

- New tree planting throughout the development to provide habitat for species such as invertebrates and birds.
- Integrated bat boxes within the residential dwellings on site. Bat provisions will be suitable for crevice-dwelling species such as pipistrelle bats.
- Integrated bird boxes to be installed on new residential dwellings.
- Hibernacula will be created within the eastern slopes.
- Bee bricks on new residential properties and two insect hotels within the development footprint.
- Addition of deadwood along the eastern boundary which will provide valuable habitat for a range of invertebrate species.

8 MONITORING

- 8.1 The mitigation measures set out in Section 6 which will be supervised by an Ecological Clerk of Works (ECoW) will be recorded as a 'site note' by the ECoW, and if required made available to the LPA.
- 8.2 The provision of the ecological enhancements as set out in Section 7 will be subject to an ecological compliance report undertaken by the ECoW.

9 CONCLUSIONS

- 9.1 The proposed development will result in the loss of all habitats on site to facilitate extensive ground works. The key habitats identified by the NVC will be allowed to natural recolonise post development along the northern and eastern slope.
- 9.2 The heathland restoration area and the acid grassland restoration area will be actively managed and all works will be overseen by MVH with details to be provided within a LEMP.
- 9.3 The proposals provide opportunity for ecological enhancements through the provision of integrated bird and bat boxes, reptile hibernacula, invertebrate hotels and additional native planting.
- 9.4 The development layout has provided a habitat buffer along the retained boundary eastern woodland to minimise impacts on commuting and foraging bats from the wider area.
- 9.5 Mitigation measures for protected species including bats, reptiles, hedgehog and birds have been provided, which are focused on avoiding impacts during the construction phase.
- 9.6 The mitigation and enhancement measures described could be secured by way of appropriately worded planning conditions.
- 9.7 There are two large stands of Japanese knotweed on site that will need to be appropriately managed and removed by suitably qualified professionals.

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APPENDIX 1 2018 NVC SPECIES LIST

Neutral Grassland

Species	Common name	Abundance (DAFOR)
<i>Agrostis capillaris</i>	Common Bent	F
<i>Alchemilla mollis</i>	Soft Lady's-mantle	R
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	O
<i>Arrhenatherum elatius</i>	False Oat -grass	A
<i>Calluna vulgaris</i>	Heather	R
<i>Carex flacca</i>	Glaucous Sedge	R
<i>Carex hirta</i>	Hairy Sedge	O
<i>Centaurea nigra</i>	Common Knapweed	O
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O
<i>Cirsium arvense</i>	Creeping Thistle	R
<i>Cirsium palustre</i>	Marsh Thistle	R
<i>Conopodium majus</i>	Pignut	R
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Cynosurus cristatus</i>	Crested Dog's-tail	F
<i>Dactylis glomerata</i>	Cock's-foot	F
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	O
<i>Dicranum scoparium</i>	a moss	R
<i>Epilobium hirsutum</i>	Great Willowherb	R
<i>Epilobium montanum</i>	Broad-leaved Willowherb	R
<i>Festuca ovina</i>	Sheep's-fescue	O
<i>Festuca rubra</i>	Red Fescue	F
<i>Holcus lanatus</i>	Yorkshire-fog	A
<i>Hypochaeris radicata</i>	Cat's-ear	R
<i>Juncus effusus</i>	Soft-rush	R
<i>Juncus tenuis</i>	Slender Rush	R
<i>Lolium perenne</i>	Perennial Rye-grass	LA
<i>Lonicera nitida</i>	Wilson's Honeysuckle	R
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	F
<i>Ononis repens</i>	Common Restharrow	R
<i>Plantago lanceolata</i>	Ribwort Plantain	F
<i>Poa humilis</i>	Spreading Meadow-grass	F
<i>Poa pratensis/trivialis</i>	Smooth/Rough Meadow-grass	O
<i>Potentilla reptans</i>	Creeping Cinquefoil	R
<i>Rhytiadelphus squarrosus</i>	a moss	A
<i>Rubus idaeus</i>	Raspberry	R
<i>Rumex acetosa</i>	Common Sorrel	R
<i>Rumex obtusifolius</i>	Broad-leaved Dock	R
<i>Senecio jacobaea</i>	Common Ragwort	O
<i>Sonchus asper</i>	Prickly Sowthistle	R
<i>Vicia hirsuta</i>	Hairy Tare	R
<i>Vicia sativa</i>	Common Vetch	O

Acid Grassland

Species	Common name	Abundance (DAFOR)
<i>Agrostis capillaris</i>	Common Bent	F
<i>Aira praecox</i>	Early Hair-grass	F
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	O
<i>Arrhenatherum elatius</i>	False Oat -grass	R
<i>Calluna vulgaris</i>	Heather	O
<i>Centaurea nigra</i>	Common Knapweed	O
<i>Corylus avellana</i>	Hazel	R
<i>Dactylis glomerata</i>	Cock's-foot	R
<i>Deschampsia flexuosa</i>	Wavy Hair-grass	O
<i>Dicranum scoparium</i>	a moss	F
<i>Digitalis purpurea</i>	Foxglove	R
<i>Festuca ovina</i>	Sheep's-fescue	A
<i>Galium saxatile</i>	Heath Bedstraw	R
<i>Hedera hibernica</i>	Atlantic Ivy	R
<i>Hieracium argillaceum</i>	a hawkweed	A
<i>Holcus lanatus</i>	Yorkshire-fog	R
<i>Hylocomium splendens</i>	a moss	A
<i>Hypnum cupressiforme</i> var.	a moss	F
<i>lacunosum</i>		
<i>Hypnum jutlandicum</i>	a moss	O
<i>Hypochaeris radicata</i>	Cat's-ear	F
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	O
<i>Malus pumila</i>	Apple	R
<i>Ononis repens</i>	Common Restharrow	R
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	A
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Pleurozium schreberi</i>	a moss	A
<i>Poa humilis</i>	Spreading Meadow-grass	O
<i>Polytrichum piliferum</i>	a moss	O
<i>Potentilla erecta</i>	Tormentil	R
<i>Pseudoscleropodium purum</i>	a moss	R
<i>Ptilidium ciliare</i>	a liverwort	O
<i>Quercus robur</i>	Pedunculate Oak	R
<i>Racomitrium ericoides</i>	a moss	O
<i>Racomitrium lanuginosum</i>	a moss	O
<i>Rhytidiadelphus squarrosus</i>	a moss	A
<i>Rosa canina</i>	Dog Rose	R
<i>Rumex acetosella</i>	Sheep's Sorrel	F
<i>Senecio jacobaea</i>	Common Ragwort	R
<i>Sorbus aucuparia</i>	Rowan	O

Dwarf Shrub Heath

Species	Common name	Abundance (DAFOR)
<i>Agrostis capillaris</i>	Common Bent	A
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	O
<i>Arrhenatherum elatius</i>	False Oat -grass	R
<i>Calluna vulgaris</i>	Heather	A
<i>Campylopus introflexus</i>	a moss	R
<i>Centaurea nigra</i>	Common Knapweed	O
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O
<i>Corylus avellana</i>	Hazel	R
<i>Crataegus monogyna</i>	Hawthorn	O
<i>Deschampsia flexuosa</i>	Wavy Hair-grass	A
<i>Dicranum scoparium</i>	a moss	F
<i>Digitalis purpurea</i>	Foxglove	R
<i>Diplophyllum albicans</i>	a liverwort	R
<i>Fallopia japonica</i>	Japanese Knotweed	R
<i>Festuca ovina</i>	Sheep's-fescue	A
<i>Galium saxatile</i>	Heath Bedstraw	R
<i>Hieracium argillaceum</i>	a hawkweed	LA
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Hylocomium splendens</i>	a moss	A
<i>Hypnum jutlandicum</i>	a moss	O
<i>Lotus corniculatus</i>	Common Bird's-foot-trefoil	O
<i>Pilosella officinarum</i>	Mouse-ear Hawkweed	R
<i>Plantago lanceolata</i>	Ribwort Plantain	O
<i>Pleurozium schreberi</i>	a moss	A
<i>Polypodium vulgare</i>	Polypody	R
<i>Polytrichastrum formosum</i>	a moss	R
<i>Polytrichum piliferum</i>	a moss	O
<i>Potentilla erecta</i>	Tormentil	F
<i>Ptilidium ciliare</i>	a liverwort	R
<i>Quercus robur</i>	Pedunculate Oak	R
<i>Racomitrium lanuginosum</i>	a moss	LF
<i>Rhytidiadelphus squarrosus</i>	a moss	A
<i>Rosa canina</i>	Dog Rose	R
<i>Rubus fruticosus</i> agg.	Bramble	R
<i>Rumex acetosa</i>	Common Sorrel	R
<i>Rumex acetosella</i>	Sheep's Sorrel	R
<i>Sorbus aucuparia</i>	Rowan	O
<i>Trifolium medium</i>	Zigzag Clover	R
<i>Vaccinium myrtillus</i>	Bilberry	LA

Dense Scrub and Trees

Species	Common name	Abundance (DAFOR)
<i>Acer pseudoplatanus</i>	Sycamore	R
<i>Agrostis capillaris</i>	Common Bent	R
<i>Arrhenatherum elatius</i>	False Oat -grass	F
<i>Atrichum undulatum</i>	a moss	R
<i>Betula pubescens</i>	Downy Birch	O
<i>Brachythecium rutabulum</i>	a moss	O
<i>Buddleja davidii</i>	Butterfly-bush	R
<i>Carex flacca</i>	Glaucous Sedge	O
<i>Carex hirta</i>	Hairy Sedge	R
<i>Centaurea nigra</i>	Common Knapweed	R
<i>Chamaecyparis lawsoniana</i>	Lawson's Cypress	R
<i>Chamerion angustifolium</i>	Rosebay Willowherb	O
<i>Cirsium arvense</i>	Creeping Thistle	R
<i>Cololejeunea minutissima</i>	a liverwort	R
<i>Corylus avellana</i>	Hazel	O
<i>Cotoneaster</i> sp.	a cotoneaster	R
<i>Crataegus monogyna</i>	Hawthorn	F
<i>Cryphaea heteromalla</i>	a moss	R
<i>Dactylis glomerata</i>	Cock's-foot	O
<i>Deschampsia cespitosa</i>	Tufted Hair-grass	R
<i>Dryopteris filix-mas</i>	Male-fern	R
<i>Epilobium hirsutum</i>	Great Willowherb	O
<i>Epilobium montanum</i>	Broad-leaved Willowherb	O
<i>Equisetum arvense</i>	Field Horsetail	R
<i>Eurhynchium striatum</i>	a moss	R
<i>Fallopia japonica</i>	Japanese Knotweed	LA
<i>Fraxinus excelsior</i>	Ash	F
<i>Frullania dilatata</i>	a liverwort	O
<i>Hedera helix</i>	Common Ivy	R
<i>Holcus lanatus</i>	Yorkshire-fog	O
<i>Homalothecium sericeum</i>	a moss	R
<i>Hypnum cupressiforme</i> agg.	a moss	O
<i>Isoetecium myosuroides</i>	a moss	R
<i>Juncus effusus</i>	Soft-rush	R
<i>Kindbergia praelonga</i>	a moss	O
<i>Lonicera nitida</i>	Wilson's Honeysuckle	R
<i>Lonicera periclymenum</i>	Wild Honeysuckle	R
<i>Metzgeria consanguinea</i>	a liverwort	O
<i>Metzgeria furcata</i>	a liverwort	R
<i>Orthotrichum affine</i>	a moss	R
<i>Orthotrichum lyellii</i>	a moss	R
<i>Orthotrichum pulchellum</i>	a moss	O
<i>Orthotrichum striatum</i>	a moss	R
<i>Poa trivialis</i>	Rough Meadow-grass	O
<i>Potentilla reptans</i>	Creeping Cinquefoil	R
<i>Prunus spinosa</i>	Blackthorn	R
<i>Quercus robur</i>	Pedunculate Oak	R
<i>Radula complanata</i>	a liverwort	R
<i>Ranunculus repens</i>	Creeping Buttercup	R

Species	Common name	Abundance (DAFOR)
Rubus fruticosus agg.	Bramble	A
Rubus idaeus	Raspberry	R
Rumex crispus	Curled Dock	R
Salix caprea	Goat Willow	R
Salix cinerea subsp. oleifolia	Grey Willow	F
Sciuro-hypnum populeum	a moss	R
Senecio erucifolius	Hoary Ragwort	R
Sorbus aucuparia	Rowan	O
Thamnobryum alopecurum	a moss	R
Trifolium pratense	Red Clover	R
Trifolium repens	White Clover	R
Ulota bruchii	a moss	R
Ulota phyllantha	a moss	R
Urtica dioica	Common Nettle	A

10 APPENDIX 1 – BAT SURVEY DATA

The following section details the results of the bat surveys at the site. Codes used in the description of bat species are as follows:

CP	Common pipistrelle (<i>Pipistrellus pipitrellus</i>)
SP	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)
NP	Nathusius's pipistrelle (<i>Pipistrellus nathusii</i>)
NOC	Noctule bat (<i>Nyctalus noctula</i>)
LEI	Leisler's bat (<i>Nyctalus leisleri</i>)
SER	Serotine bat (<i>Eptesicus serotinus</i>)
MYODAU	Daubenton's bat (<i>Myotis daubentonii</i>)
MYONATT	Natterer's bat (<i>Myotis nattereri</i>)
WHI/BRA	Whiskered/Brandt's bat (<i>Myotis mystacinus/ brandti</i>)
BLE	Brown long-eared bat (<i>Plecotus auritus</i>)
BARB	Barbastelle bat (<i>Barbastella barbastellus</i>)
LHS	Lesser horseshoe bat (<i>Rhinolophus hipposideros</i>)
GHS	Greater horseshoe bat (<i>Rhinolophus ferrumequinum</i>)

10.1 Emergence Survey Results

A summary of the bat emergence surveys is included below, and the environmental variables recorded during the surveys are shown in Table 7.

Table 7 Emergence surveys environmental variables

Date	2 nd May 2023		15 th July 2023		6 th July 2023	
Sunset/Sunrise	20:39		21:39		21:31	
Start / End time	20:39	22:39	21:39	23:39	21:33	23:33
Temperature (°C)	16.1	13.5	18	16	15	14
Humidity (%)	69.1	69.1	72	76	73	91
Cloud cover (oktas)	6	6	1	2	7	7
Avg. Wind speed (m/s)	0.6	0.9	1	1	1.2	1.4
Rain	None		None		None	

10.2 Activity Survey Results

2nd May 2023

- 21:02 CP foraging near LP4 HNS.
- 21:04 CP foraging near LP4 HNS.
- 21:05 – Cp foraging in gardens east of the site near LP4
- 21:10 – CP commuting near LP5. Bat HNS.
- 21:11 – CP foraging across the road towards the south of the site.
- 21:14 – NOC commuting high above the site.
- 21:20 – SP foraging over the woodland.
- 21:21 – SP foraging over the woodland canopy.
- 21:31 – CP HNS likely foraging near LP3.
- 21:33 – CP HNS likely foraging near garden.
- 21:36 – two Cp's foraging over gardens adjacent to site.
- 21:46 – SP foraging off site near streetlight.
- 21:47 – CP foraging off site near streetlight.
- 21:49- SP foraging at LP6.
- 22:11 – CP commuting near site HNS.
- 22:13 – CP commuting near site HNS.

Quite quiet survey mainly CP and SP foraging sporadically.

15th June 2023

- 21:52 – CP commuting south to north along the eastern boundary.
- 21:56 – 4X CP south to north along the eastern boundary.
- 22:11 – CP commuting HNS.
- 22:16 – CP commuted HNS very brief.
- 22:27 – CP commuting HNS very brief.
- 22:39 – SP HNS presumed to be foraging over the scrub west of the site.
- 22:41 – CP commuting HNS.
- 22:42 – CP commuting between LP1 and LP2.
- 22:49 – CP foraging at LP2.
- 23:01 – SP HNS very faint call at LP1.
- 23:21 – CP HNS foraging near LP4.

Fairly quiet survey. Only CP and SP recorded. Cp mainly foraging/commuting along the gulley to the east of the site and SP over the scrub to the west. Some cp over the scrub as well and occasionally through the centre of the site.

6th July 2023

- 21:41 - CP feeding flying north east over P2 followed by a second shortly after.
- 22:02 – CP HNS likely commuting.

- 22:05 – CP foraging near LP5.
- 22:30 – CP foraging HNS
- 22:37 – CP foraging off site between LP3 and LP4.
- 22:38 – Unknown bat heard near LP4.
- 22:50 – Unknown bat Heard near LP1.
- 22:55 – CP pass HNS near LP1

Very quite CP recorded only few passes around the site.

10.3 Static Bat Survey Data

Row Labels	Sum of Call
Myotis brandtii	77
Myotis daubentonii	14
Nyctalus noctula	61
Pipistrellus nathusii	36
Pipistrellus pipistrellus	2985
Pipistrellus pygmaeus	2203
Plecotus auritus	40
Rhinolophus hipposideros	26
Eptesicus serotinus	2
Nyctalus leisleri	5
Rhinolophus ferrumequinum	3
Myotis mystacinus	1
Grand Total	5453

Row Labels	Location 1	Location 2
Myotis brandtii	49	28
Myotis daubentonii	8	6
Nyctalus noctula	34	27
Pipistrellus nathusii	26	10
Pipistrellus pipistrellus	1895	1090
Pipistrellus pygmaeus	1598	605
Plecotus auritus	30	10
Rhinolophus hipposideros	20	6
Eptesicus serotinus	1	1
Nyctalus leisleri	4	1
Rhinolophus ferrumequinum	3	
Myotis mystacinus	1	
Grand Total	3669	1784

Row Labels	May	Jun	Jul
Myotis brandtii	11		23
Myotis daubentonii	3		6
Nyctalus noctula	13		27
Pipistrellus nathusii	7		5
Pipistrellus pipistrellus	1116		1067
Pipistrellus pygmaeus	652		573
Plecotus auritus	8		8
Rhinolophus hipposideros	3		3
Eptesicus serotinus			1

Nyctalus leisleri	4	1
Rhinolophus ferrumequinum	3	
Myotis mystacinus		1
Grand Total	1813	1925

