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Preliminary Ecological Appraisal

Land to the east of the A48 and Land to the south west of Tycroes

April 2020

(To be read in conjunction with the Preliminary Ecological Appraisal for the proposed cable route (Report no: WOR-1184.4))

A report by

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Report details

Site name:	Land to the east of the A48 and Land to the south west of Tycroes
Grid reference:	Site 1: SN 599 095 Site 2: SN 592 095 Site 3: SN 574 093
Survey date:	13th May 2019
Report date:	29th April 2020
Report author:	Colin Hicks BSc (Hons) MCIEEM
Report no:	WOR-775.3

Declaration of compliance

BS 42020:2013
This study has been undertaken in accordance with British Standard 42020:2013 Biodiversity, Code of practice for planning and development.

Code of Professional Conduct
The information which we have prepared is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

Validity of survey data and report

The findings of this report are valid for 24 months from the date of survey. If work has not commenced within this period, an updated survey by a suitably qualified ecologist will be required.

Revisions

Date	Report no:	Approved by:	Comment
13/05/2019	WOR-775.1	CDH	Original report
20/03/2020	WOR-775.2	CDH	Updated following comments of CCC and NRW
29/04/2020	WOR-775.3	CDH	Final report with new site numbering and correct boundaries

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Non-technical summary

Western Ecology has been commissioned to complete a Preliminary Ecological Appraisal of Land to the east of the A48 and Land to the south west of Tycroes. The proposed development is installation of a ground mounted Photo Voltaic (PV) solar farm development. This report should be read in conjunction with the Preliminary Ecological Appraisal for the proposed cable route (Report no: WOR-1184.4).

The three sites (Site 1, Site 2 and Site 3) comprise improved grassland managed for its agricultural value, enclosed by woodland with internal hedgerow boundaries.

To ensure compliance with nature conservation legislation and planning policy, the following recommendation is made with regards to habitats:

Intact hedge, species rich; woodland

All hedgerow and woodland habitat should be protected from accidental damage during the construction phase by a suitable buffer, detailed in Section 5.1 of this report. This protection zone should be maintained for the duration of the works, and there should be no access, storage of materials, ground disturbance, burning or contamination within the fenced areas.

A small section of hedgerow will be removed at the access of Site 2 for the period of the development to provide site access. To maintain habitat extent, following development the lost section of hedgerow should be replanted with shrubs of local provenance.

This should be detailed within a Construction and Environment Management Plan (CEMP) for this Site.

Running water

Watercourses should be protected from accidental damage during the construction phase by suitable fencing placed at least 7 metres from the habitat edge. This protection zone should be maintained for the duration of the works, and there should be no access, storage of materials, ground disturbance, burning or contamination within the fenced areas.

This should be detailed within a CEMP for this Site, which also takes into account the Environment Agency's Pollution Prevention Guidelines. This will provide the appropriate techniques and practices to avoid impact on watercourses.

To ensure compliance with nature conservation legislation and planning policy, the following recommendation is made with regards to species:

Badgers

There is potential that Badgers may become trapped within the Site during the construction and operational phases. To prevent this, the following is recommended:

- Hedgerow protection and site security fencing along the boundaries should leave an appropriate gap between the fence and hedgebank/hedgerow.

- Any trenches left open at night should have some means of escape for Badgers, such as the placement of a scaffolding board at one end;
- Any site security fences present during the operational phase should have a suitable gate to allow Badgers to exit the Site should they gain entry. These should align with existing Badger pathways.

Construction may affect the Badger sett entrance in Site 1, or animal within it, in a way that could be considered an offence. It is considered likely that provided a 20 metre buffer is left, within which no panels, cable trenches or other structures are constructed, it is unlikely that this sett or animal within it will be impacted in a way that is likely to be an offence.

Bats

If lighting is required during the construction phase, this should be directed into the site and not onto enclosing hedgerows and woodland.

Dormice

Potential Dormice habitats associated with boundary hedgerows and woodland should be protected from accidental damage during the construction phase by a suitable buffer zone, detailed in Section 5.2 of this report.

Nesting birds

Potential bird nesting habitats associated with boundary hedgerows and woodland should be protected from accidental damage during the construction phase by a suitable buffer zone.

No recommendations are made with regards to Statutory Nature Conservation Sites to ensure compliance with nature conservation legislation and planning policy.

Further survey work

Badgers - Should permission to develop be successful, a further Badger survey should be completed as near as practicable to the start of site development. This will ensure the assessment and resultant mitigation to be adopted during construction will be based on the most recent distribution of sett entrances likely to be affected.

Biodiversity enhancement

Outline biodiversity enhancement are given in Section 7 of the report.

1. Introduction

1.1. Background

1.1.1. Western Ecology has been commissioned to complete a Preliminary Ecological Appraisal of Land to the east of the A48 and Land to the south west of Tycroes.

1.2. Proposed development

1.2.1. The proposed development is a ground mounted Photo Voltaic (PV) solar farm development (Map 1).

1.2.2. Permission would be required for 40 years and the installation would have the design capacity for between 36-40MW of electricity generation.

1.2.3. Together with associated infrastructure and housings, the development is comprised of the following main elements:

- PV panels mounted on fixed metal frames with support posts driven into the ground to a depth of approximately 1.5m, avoiding the use of concrete foundations. The panels are laid out in east-west orientated rows in order to optimise solar gain. The lowest edge of the panels would be approximately 0.8m above ground level with the highest edge being approximately 3.5 m above ground. The rows are spaced approximately 4-5m apart to avoid one row of panels shading the next. The panels are non-reflective (i.e., to prevent glint or glare) and angled at approximately 20- 25° to horizontal. Inverter technology, which converts direct current (DC) into alternating current (AC). These are likely to be string inverter (80 cm by 1m) affixed beneath the PV panels to the PV mounting system.
- There will be approx. 24 cabinets containing electrical equipment such as switchgear and transformers housed within flat roofed pre-fabricated units no higher than 3m and with a footprint of approximately 5m x 2.5m.
- An on-site sub-station.
- Security fencing (most likely deer fencing) to a height of 2.4m along with infra-red security cameras which will feature around the perimeter of the development; directed inward only.
- There will be no external lighting.
- Each of the three parcels of land benefits from an established vehicular access directly from both the A48 and the A483 suitable for the delivery vehicles required to deliver the equipment proposed to be installed at the site. Existing gateways and tracks will be used to access the site itself, the surfaces of which would be improved by way of providing additional gravel.

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Legend

Site 1

Site 2

Site 3

0 500 1000 m

N

Map data: Google Earth, Digital Globe

Title: Plan 1. Location of Site 1, Site 2 and Site 3

Project: Land to the east of the A48 and Land to the south west of Tvcroes

Checked by: CDH Version: 02
Date: 29/04/2020

1.3. Survey aims

1.3.1. The survey and this report identify features of conservation importance that could constitute a constraint to the proposals for this site. Where appropriate, recommendations for impact avoidance, mitigation and post-development enhancement are made to ensure compliance with wildlife legislation and relevant planning policy.

1.3.2. This survey has been prepared in accordance with the 'Guidelines for Preliminary Ecological Appraisal' produced by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2017).

1.4. Site location

1.4.1. The site comprises three parcels of land to the west of Tycroes, a village in Carmarthenshire.

2. Survey methodology

2.1. Desktop survey

2.1.1. The desktop survey collated existing biological records for the site and adjacent areas and identified any nature conservation sites that may be affected by the proposals. This comprises an important part of the assessment process, providing information on ecological issues that may not be apparent during the site survey.

2.1.2. Consultees for the data search included:

- West Wales Biodiversity Records Centre - records of protected/notable species and non-statutory nature conservation sites within 4km of a central point of the three parcels of land.
- Natural Resources Wales datasets – Location of statutory nature conservation sites within 4km.

2.1.3. Species data was examined for protected and notable species records. An assessment was then made, based on known habitat preferences, as to whether these species might be present within the site and how they might be affected by the proposal.

2.1.4. The location of nature conservation sites was examined to determine their ecological and landscape relationships with the proposed site. An assessment was then made of how the sites may be affected by the proposal, taking into account these relationships, and the species and/or habitat types for which the nature conservation site was chosen.

2.1.5. SSSI Impact Risk Zones are areas where the proposed planned change to the environment could either create significant damage to a local SSSI, or might require additional planning and consultation in order to avoid impacting such sites. The assessments are made according to the particular sensitivities of the features for which the SSSI is notified, and specifies the types of development that have the potential for adverse impacts.

2.1.6. In compliance with the terms and conditions relating to its commercial use, the full desk study data is not provided within this report.

2.2. Field survey

2.2.1. A Preliminary Ecological Appraisal of the site was completed by Colin Hicks BSc (Hons.) MCIEEM.

2.2.2. The survey was completed on 13th May 2019 between 09:00 and 16:00 with an air temperature of 15ºC, light winds, dry and 10% cloud.

2.2.3. Habitats were classified using the Phase 1 Habitat Survey methodology developed by the Joint Nature Conservation Committee (JNCC, 2010) and modified by the Institute of Environmental Assessment (IEA, 1995). The main plant species were recorded, and broad habitat types mapped. Habitats encountered are described

within the Results section, with a map included within the report. Plant species were identified according to Stace (1997).

2.3. Method for valuation of habitats

2.3.1. The ecological value of habitats present is provided in line with Guidelines for Ecological Impact Assessment (CIEEM, 2016), and those which are important in terms of legislation or policy are identified. Table 1 summarises this information and details the extent of each habitat recorded here.

2.3.2. The nature conservation value, or potential value, of the habitat is determined within the following geographic context:

- International importance (e.g. internationally designated sites such as Special Areas of Conservation, Special Protection Areas, Ramsar sites);
- National importance (e.g. nationally designated sites such as Sites of Special
  Scientific Interest or species populations of importance in the UK context);
- County importance (e.g. SNCI, habitats and species populations of importance in the context of Carmarthenshire);
- Local importance (e.g. important ecological features such as old hedges, woodlands, ponds);
- Site importance (e.g. habitat mosaic of grassland and scrub which may support a diversity of common wildlife species);
- Negligible importance. Usually applied to areas such as built development or areas of intensive agricultural land.

The examples are not exclusive and are subject to further professional ecological judgment.

2.4. Survey constraints

2.4.1. All areas of the site were readily accessible. Although some plant species would have not been visible during the survey period, within such a small, simple site comprising common and widespread habitat types, the timing of this survey is not a significant constraint to a robust initial site assessment.

2.4.2. It should be noted that habitats, and the species they may support, change over time due to natural processes and because of human influence. In line with current guidelines, the survey on which this report is based is only valid for two years, after which time it will need updating. This report is valid until 13th May 2021.

2.5. Study area

2.5.1. The study area of the biological records search is within a 1km radius of the site centre for notable species, local nature conservation sites, and 4km for bats and birds. The study area for statutory nature conservation sites was 4km. The study area for the Preliminary Ecological Appraisal was the footprint of the development, hereafter referred to as the ‘Site’, and its immediate boundaries. This is the area included within the line described as “Survey area” within the legend of Map 1.

3. Results

3.1. Background

3.1.1. Habitats have been classified using the Phase 1 Habitat Survey methodology, and are described below and detailed in Map 1, 2 and 3. Habitats which are important in terms of legislation or policy are identified. Plant species that characterise each of these habitats are identified, although this is for descriptive purpose, and comprehensive inventory is not provided.

3.1.2. All images were taken on 13th May 2019.

3.2. Site 1

3.2.1. Site 1 comprises improved grassland managed for its agricultural value enclosed by hedgerows (Map 1).

Improved grassland

3.2.2. Site 1 comprises grassland that has been improved to provide fodder and forage for livestock (Image 1) dominated by Perennial Rye-grass with Yorkshire Fog, Cocks' Foot, Meadow-grass *Poa* sp, and occasional Sweet Vernal Grass *Anthoxanthum odoratum* and Timothy *Phleum pratense*. Associated herbs included White Clover, Creeping Buttercup and Dandelion *Taraxacum officinale* agg.

3.2.3. This managed habitat is of negligible value for biodiversity.

Image 1. Site 1: Improved grassland

Intact hedge, species rich

3.2.4. The boundaries comprise species rich, managed hedgerows with diverse native woody shrubs and trees including Hazel, Hawthorn, Blackthorn, Common Ash, Holly, Rowan and native Oak. Associated with these woody shrubs are Dog Rose, Bramble, Ivy, Cleavers, Honeysuckle, Bluebell *Hyacinthoides non-scripta*, Hogweed *Heracleum sphondylium*, and Foxglove.

3.2.5. Hedgerows are listed under Section 7 of the Environment (Wales) Act 2016 and are a Local Biodiversity Action Plan priority habitat. The hedgerows would qualify as ecologically important for the purposes of the Hedgerow Regulations 1997.

Image 2. Site 1: Intact hedge, species rich

Running water

3.2.6. A small stream flows south in a cut along the western site boundary. The stream banks are vegetated with Angelica *Angelica sylvestris*, Wood Avens *Geum urbanum*, Great Willowherb *Epilobium hirsutum,* and common and widespread grasses including Yorkshire Fog with Creeping Buttercup and Soft Rush.

3.2.7. This habitat would be unlikely to qualify under Section 7 of the Environment (Wales) Act 2016 and is not a Local Biodiversity Action Plan priority habitat.

3.2.8. This habitat is of Site value for biodiversity.

Image 3. Site 1: Running water

3.3. Site 2

3.3.1. Site 2 comprises improved grassland managed for its agricultural value enclosed by hedgerows and a fence (Map 2).

Improved grassland

3.3.2. Site 2 comprises grassland that has been improved to provide fodder and forage for livestock (Image 1) dominated by Perennial Rye-grass with Yorkshire Fog and Cocks' Foot. Associated herbs included White Clove, Creeping Buttercup and Common Nettle.

3.3.3. This managed habitat is of negligible value for biodiversity.

Image 4. Site 2: Improved grassland

Intact hedge, species rich

3.3.4. The boundaries comprise species rich hedgerows with diverse native woody shrubs and trees including Hazel, Hawthorn, Holly, and native Oak. Associated with these woody shrubs are Dog Rose agg., Bramble agg., Ivy, Cleavers and Foxglove.

3.3.5. Hedgerows are listed under Section 7 of the Environment (Wales) Act 2016 and are a Local Biodiversity Action Plan priority habitat. The hedgerows would qualify as ecologically important for the purposes of the Hedgerow Regulations 1997.

3.3.6. This habitat is of Site value for biodiversity and provides nesting habitat for widespread and common birds.

3.4. Site 3

3.4.1. Site 3 comprises improved grassland managed for its agricultural value, enclosed by woodland with internal hedgerow boundaries (Map 3).

Improved grassland

3.4.2. Site 3 comprises grassland that has been improved to provide fodder and forage for sheep and cattle (Image 1) dominated by Perennial Rye-grass *Lolium perenne* with Yorkshire Fog *Holcus lanatus*, Annual Meadow-grass *Poa annua* and Cocks' Foot *Dactylis glomerata*. Occasional Meadow Foxtail *Alopecurus pratensis* and Soft Rush *Juncus effusus* were present. Associated herbs included White Clover *Trifolium repens*, Common Mouse-ear *Cerastium fontanum*, Creeping Buttercup *Ranunculus repens*, Common Nettle *Utica dioica* and occasional Cuckoo Flower *Cardamine pratensis* at the margin in the north of the site.

3.4.3. This managed habitat is of negligible value for biodiversity.

Image 5. Site 3: Improved grassland

Intact hedge, species rich

3.4.4. The internal boundaries comprise close-managed, species rich hedgerows with diverse native woody shrubs and trees including Hazel *Corylus avellana*, Hawthorn *Crataegus monogyna*, Holly *Ilex aquifolium*, European Gorse *Ulex europaeus*, Blackthorn *Prunus spinosa*, willow *Salix* sp,. Pedunculate Oak *Quercus robur* and Rowan *Sorbus aucuparia*. Associated with these woody shrubs are Honeysuckle *Lonicera periclymenum*, Dog Rose *Rosa canina* agg., Bramble *Rubus fruticosus* agg., Ivy *Hedera helix*, Cleaver *Galium aparine* and Foxglove *Digitalis purpurea*.

3.4.5. Hedgerows are listed under Section 7 of the Environment (Wales) Act 2016 and are a Local Biodiversity Action Plan priority habitat. The hedgerows would qualify as ecologically important for the purposes of the Hedgerow Regulations 1997.

3.4.6. This habitat is of Site value for biodiversity and provides nesting habitat for widespread and common birds.

Image 6. Site 3: Intact hedge, native species rich

Semi-natural broadleaved woodland

3.4.7. External boundaries to the site comprise semi-natural broadleaved woodland with Sycamore *Acer pseudoplatanus*, Birch *Betula* sp., Common Ash *Fraxinus excelsior*,

native Oak *Quercus* sp., and willow *Salix* sp. In places, an understorey of Hazel and Hawthorn are present with Holly, Bramble and Ivy.

3.4.8. This habitat would qualify as Lowland Mixed Woodland, a habitat listed under Section 7 of the Environment (Wales) Act 2016 and is a Local Biodiversity Action Plan priority habitat.

3.4.9. This habitat is of local value for biodiversity.

Standing water

3.4.10. A small group of ponds are present adjacent to the site. These ponds have been managed to provide waterfowl habitat, are shaded, with no emergent vegetation, and poor water quality.

3.4.11. These habitats have negligible value for biodiversity and would not support breeding populations of amphibians.

Scrub

3.4.12. Occasional Bramble and European Gorse scrub is present within grassland margins.

Ditch

3.4.13. A small ditch runs along the north eastern field boundary and supports common ferns along with occasional Soft Rush and Brooklime *Veronica beccabunga*.

3.4.14. This habitat is of Site value for biodiversity.

Table 1. Habitat extent within development footprint and ecological value

Habitat type	Area	Ecological value
Site 1		
Improved grassland	21.8ha	Negligible
Site 2		
Improved grassland	2.1ha	Site
Site 3		
Improved grassland	19.9ha	Negligible

3.5. Desktop survey

3.5.1. The biological records search found a number of notable species. Due to the broad scale of many records, it is not possible to determine if they relate to the Site.

Amphibians

3.5.2. There are 12 records for Common Frog, three for Common Toad and one for Palmate Newt within 4km.

Badgers

3.5.3. There are 22 records for Badger within 4 km of the Site.

Bats

3.5.4. There are 71 records for bats within 4km of the Site. The species recorded are detailed in Table 2. The nearest record for a known bat roost is 1.4km and describes a Lesser Horseshoe roost in 1986.

Table 2. Bat records within 4km

Common name	Number of records
Bat	7
Brown Long-eared	8
Common Pipistrelle	17
Daubenton's	2
Greater Horseshoe	1
Myotis sp.	3
Noctule	4
Nyctalus sp.	1
Pipistrelle sp.	16
Serotine	1
Soprano Pipistrelle	11

Birds

3.5.5. There are 332 bird records within 4km and these are detailed in Table 3.

Table 3. Bird records within 4km

Common name	Conservation status	Count
Blackbird	BDir22, S7, WBR[RSPB], UKBAm[RSPB]	16
Black-headed Gull	Bern	1
Blue Tit	WCA1.1	37
Brambling	S7, WBR[RSPB], LBAP[CE,PE], UKBAm[RSPB]	1
Bullfinch	Bern, WBAm[RSPB]	12
Coal Tit	Bern, LBAP [GWY], UKBAm[RSPB]	11
Common (Mealy) Redpoll	WBAm[RSPB]	2
Cormorant	S7, WBR[RSPB], UKBR[RSPB]	2
Cuckoo	Bern, WBAm[RSPB], UKBAm[RSPB]	2
Dipper	S7, Bern, UKBAm[RSPB]	1
Dunnock	BDir22, WCA1.1, WBAm[RSPB], UKBR[RSPB]	11
Fieldfare	WBAm[RSPB]	2
Garden Warbler	Bern, WBAm[RSPB]	2
Goldcrest	Bern	6
Goldfinch	BDir22	7
Goosander	S7, WBR[RSPB], UKBR[RSPB]	3
Grasshopper Warbler	Bern	4
Great Spotted Woodpecker	Bern	6
Great Tit	WCA1.1, Bern, UKBAm[RSPB]	18
Green Sandpiper	Bern, LBAP[PE], WBAm[RSPB]	3
Green Woodpecker	Bern	5
Greenfinch	Bern, UKBR[RSPB]	1
Grey Wagtail	BDir22, S7, WBR[RSPB], UKBR[RSPB]	2
Herring Gull	Bern, WBAm[RSPB], UKBAm[RSPB]	4
House Martin	S7, WBAm[RSPB], UKBR[RSPB]	2
House Sparrow	BDir22, S7, WBR[RSPB], LBAP[PE], UKBR[RSPB]	12

Lapwing	BDir22, LBAP[PE], WBAm[RSPB], UKBAm[RSPB]	16
Lesser Black-backed Gull	S7, WBR[RSPB], LBAP [DEN, POW, VOG], UKBR[RSPB]	2
Lesser Redpoll	S7, Bern, WBR[RSPB], LBAP[CE,PE], LBAP [CON, GWY], UKBR[RSPB]	1
Linnet	WCA1.1, Bern	2
Little Ringed Plover	WBAm[RSPB]	3
Long-tailed Tit	BDir21, WBAm[RSPB], UKBAm[RSPB]	5
Mallard	Bern, WBAm[RSPB], UKBAm[RSPB]	4
Meadow Pipit	BDir22, Bern, UKBR[RSPB]	4
Mistle Thrush	BDir1, S7, Bern, LBAP[CE,PE], WBAm[RSPB], UKBAm[RSPB]	5
Nightjar	Bern	1
Nuthatch	BDir22, WBAm[RSPB], UKBAm[RSPB]	16
Oystercatcher	Bern	1
Pied Wagtail	BDir22, WCA1.1, WBAm[RSPB], UKBR[RSPB]	7
Redwing	S7, Bern, LBAP[CE,PE], WBAm[RSPB], UKBAm[RSPB]	5
Reed Bunting	Bern, WBAm[RSPB]	7
Sand Martin	BDir22, S7, LBAP[CE,PE], WBAm[RSPB], UKBR[RSPB]	4
Skylark	BDir21, WBAm[RSPB], UKBAm[RSPB]	4
Snipe	BDir22, S7, Bern, LBAP[CE,PE], WBAm[RSPB], UKBR[RSPB]	4
Song Thrush	S7, Bern, WBR[RSPB], LBAP[CE,PE], UKBR[RSPB]	12
Spotted Flycatcher	BDir22, S7, Bern, WBR[RSPB], UKBR[RSPB]	1
Starling	Bern, LBAP[PE], LBAP [CON, GWY]	5
Stonechat	Bern, WBAm[RSPB]	6
Swallow	WBAm[RSPB], UKBAm[RSPB]	10
Swift	BDir21, CITES, WBAm[RSPB], UKBAm[RSPB]	1
Teal	S7, Bern, WBAm[RSPB], UKBR[RSPB]	3
Tree Pipit	S7, WBR[RSPB], LBAP[CE,PE], UKBR[RSPB]	2
Tree Sparrow	Bern	2
Treecreeper	BDir22, S7, CITES, WBR[RSPB], UKBR[RSPB]	4
Turtle Dove	Bern, WBAm[RSPB]	1
Wheatear	WBAm[RSPB]	3
Whitethroat	S7, Bern, WBR[RSPB], LBAP [CON, GWY], UKBR[RSPB]	4
Willow Tit	WBR[RSPB], UKBAm[RSPB]	4
Willow Warbler	BDir21, WBAm[RSPB], UKBR[RSPB]	3
Woodcock		7

Key to Conservation status
BDir1 = EC Birds Directive Annex 1 Species
BDir21 = EC Birds Directive Annex 2.1 Species
BDir22 = EC Birds Directive Annex 2.2 Species
Bern = The Bern Convention on the Conservation of European Wildlife and Natural Habitats
Bonn = The Bonn Convention on the Conservation of Migratory Species of Wild Animals Species
CITES = Convention on International Trade in Endangered Species
EPS = European Protected Species
HDir = EU Habitats Directive Species
LBAP (xxx) = Local Biodiversity Action Plan Species (see key below)
LI (BIS) = Locally Important Species (as identified by local specialists) in BIS* area.
LI (SEWBReC) = Locally Important Species (as identified by local specialists) in SEWBReC area.
LI (VC##) = Locally Important Species (as identified by local specialists) in Vice County ##

LI (VC##, EX) = Extinct in Vice County ##
LI (VC##, LR) = Locally Rare in Vice County ##
LI (VC##, LS) = Locally Scarce in Vice County ##
LI (VC##, UR) = Under Recorded in Vice County ##
NRW = Natural Resources Wales Priority Species
RD1 (UK) = UK Red Data Book listing based on IUCN guidelines
RD1 (Wales) = Welsh Red Data Book listing based on IUCN guidelines
RD2 (UK) = UK Red Data Book listing not based on IUCN guidelines (Nationally Rare and Scarce)
S42 = Natural Environment and Rural Communities Act 2006 (Section 42)
S7 = Environment Act (Wales) Section 7 Species
UKBAm (RSPB) = RSPB UK Amber listed birds (not based on IUCN criteria)
UKBAP (R) = UK Biodiversity Action Plan Priority Species (Research only species)
UKBAP = UK Biodiversity Action Plan Priority Species
UKBR (RSPB) = RSPB UK Red listed birds (not based on IUCN criteria)
WBAm (RSPB) = RSPB Welsh Amber listed birds (not based on IUCN criteria)
WBR (RSPB) = RSPB Welsh Red listed birds (not based on IUCN criteria)
WCA1.1 = Wildlife and Countryside Act Schedule 1 Part 1 Species
WCA5 = Wildlife and Countryside Act Schedule 5 Species
WCA8 = Wildlife and Countryside Act Schedule 8 Species
WCA9 = Wildlife and Countryside Act Schedule 9 Species
WSG.C = Guidelines for the Selection of Wildlife Sites in South Wales - Contributory species
WSG.P = Guidelines for the Selection of Wildlife Sites in South Wales - Primary species

Common Dormouse

3.5.6. The biological record search returned 166 records for Dormouse within 4km of the Site and includes records along the A64 highway to the west of Site 3.

Otter

3.5.7. The biological record search returned 16 records for Otter within 4km of the Site.

Water Vole

3.5.8. The biological record search returned 1 record for Water Vole within 4km of the Site.

Reptiles

3.5.9. The biological record search returned 6 records for Slow Worm, 5 records for Grass Snake, 3 record for Adder and 17 records for Common Lizard within 4km of the Site.

Invertebrates

3.5.10. The biological record search returned records for a number of notable invertebrates within 4km including a large number of records for Marsh Fritillary and a range of Environment Act (Wales) Section 7 Species. These are listed in Table 4.

Table 4. Notable invertebrate records within 4km

Latin name	Common Name	Conservation status	Number of records
Acronicta psi	Grey Dagger	S7	1
Acronicta rumicis	Knot Grass	S7	9
Adscita statices	Forester	S7	3
Agrochola helvola	Flounced Chestnut	S7	1
Allophyes oxyacanthae	Green-brindled Crescent	S7	1
Apamea remissa	Dusky Brocade	S7	5
Arctia caja	Garden Tiger	S7	6
Atethmia centrago	Centre-barred Sallow	S7	1
Boloria selene	Small Pearl-bordered Fritillary	S7, RDB1 [UK] - NT	4

Brachylomia viminalis	Minor Shoulder-knot	S7	6
Caradrina morpheus	Mottled Rustic	S7	2
Ceramica pisi	Broom Moth	S7	12
Chiasmia clathrata	Latticed Heath	S7	6
Chiasmia clathrata clathrata	Latticed Heath	S7	1
Cirrhia icteritia	Sallow	S7	3
Coenonympha pamphilus	Small Heath	S7, RDB1 [UK] - NT	14
Conops vesicularis	Conops vesicularis	RDB2 [UK] - N	2
Cupido minimus	Small Blue	WCA5, S7, RDB1 [UK] - NT, LBAP[PE]	2
Diarsia rubi	Small Square-spot	S7	9
Ecliptopera silaceata	Small Phoenix	S7	14
Ennomos erosaria	September Thorn	S7	3
Ennomos fuscantaria	Dusky Thorn	S7	1
Erynnis tages	Dingy Skipper	S7, RDB1 [UK] - VU	7
Eudonia delunella	Pied Grey	RDB2 [UK] - NB	2
Euphydryas aurinia	Marsh Fritillary	HDir2, WCA5, S7, Bern, RDB1 [UK] - VU, LBAP[CE,PE]	416
Hemaris tityus	Narrow-bordered Bee Hawk-moth	S7, LBAP[CE]	1
Hepialus humuli	Ghost Moth	S7	1
Hipparchia semele	Grayling	S7, RDB1 [UK] - VU	2
Hoplodrina blanda	Rustic	S7	4
Hydraecia micacea	Rosy Rustic	S7	4
Hydrelia sylvata	Waved Carpet	LBAP[CE]	1
Lasiommata megera	Wall	S7, RDB1 [UK] - NT	2
Leucania comma	Shoulder-striped Wainscot	S7	4
Lycia hirtaria	Brindled Beauty	S7	3
Macaria wauaria	V-moth	S7	1
Malacosoma neustria	Lackey	S7	2
Melanchra persicariae	Dot Moth	S7	7
Microplontus campestris	Microplontus campestris	RDB2 [UK] - NB	1
Mythimna turca	Double Line	LBAP[CE]	3
Orthonama vittata	Oblique Carpet	S7	3
Orthosia gracilis	Powdered Quaker	S7	5
Scotopteryx chenopodiata	Shaded Broad-bar	S7	2
Spilosoma lubricipeda	White Ermine	S7	18
Spilosoma lutea	Buff Ermine	S7	12
Timandra comae	Blood-Vein	S7	11
Tyria jacobaeae	Cinnabar	S7	18
Watsonalla binaria	Oak Hook-tip	S7	4

Xanthorhoe ferrugata	Dark-barred Twin-spot Carpet	S7	5
Xestia agathina	Heath Rustic	S7	2
Xestia agathina agathina	Heath Rustic	S7	1
Xestia castanea	Neglected Rustic	S7	2

Plants

3.5.11. The biological record search returned records for a number of notable plants. These are listed in Table 5.

Table 5. Notable plant records within 4km

Latin name	Common name	Conservation status	*Count*
Althaea officinalis	Marsh-mallow	RDB2 [UK] - S	*1*
Buxus sempervirens	Box	RDB1 [UK] - DD, RDB2 [UK] - R	*2*
Cyperus longus	Galingale	RDB1 [UK] - NT, RDB2 [UK] - S	*1*
Euphorbia exigua	Dwarf Spurge	RDB1 [Wales] - NT, RDB1 [UK] - NT	*1*
Euphrasia officinalis subsp. pratensis	Eyebright	S7	*5*
Euphrasia rostkoviana subsp. rostkoviana	Eyebright	RDB1 [UK] - VU	*1*
Genista anglica	Petty Whin	RDB1 [UK] - NT	*3*
Gentiana pneumonanthe	Marsh Gentian	RDB1 [Wales] - VU, RDB2 [UK] - S	*1*
Gymnadenia borealis	Heath Fragrant-orchid	S7, RDB1 [Wales] - DD	*2*
Gymnadenia conopsea	Fragrant Orchid	S7	*7*
Hippuris vulgaris	Mare's-tail	RDB1 [Wales] - NT	*1*
Hyacinthoides non-scripta	Bluebell	WCA8	*44*
Lamiastrum galeobdolon subsp. montanum	Yellow Archangel	WCA9	*1*
Lepidium latifolium	Dittander	RDB2 [UK] - S	*1*
Meconopsis cambrica	Welsh Poppy	RDB2 [UK] - S	*1*
Menyanthes trifoliata	Bogbean	CITES	*4*
Ophrys apifera	Bee Orchid	CITES	*6*
Rorippa islandica	Northern Yellow-cress	RDB2 [UK] - S	*3*
Senecio paludosus	Fen Ragwort	WCA8, RDB1 [UK] - CR, RDB2 [UK] - R	*1*
Spergula arvensis	Corn Spurrey	RDB1 [Wales] - NT, RDB1 [UK] - VU	*2*
Tephroseris palustris	Marsh Fleawort	RDB1 [UK] - EX	*1*
Wahlenbergia hederacea	Ivy-leaved Bellflower	RDB1 [UK] - NT	*1*

Statutory Nature Conservation Sites

3.5.12. There are 10 Sites of Special Scientific Interest (SSSI) within 4km of the proposed development. These are detailed in Table 6, along with a summary of their interest features and distance (nearest point) from Site. These sites are of National importance.

Table 6. Sites of Special Scientific Interest within 4km

SSSI name	Summary of interest features	Distance
Broad Oak and Thornhill Meadows	Unimproved grasslands containing an abundance of the umbelliferous plants	1.9km to north east of Site 3
Cae Gwynfryn	Unimproved grasslands	1.3km to north east of Site 3
Caeau Afon Gwili	Grassland with colony of Marsh Fritillary	Multiple units, nearest of which is 30m to south east of Site 3
Caeau Blaenau-Mawr	Unimproved species-rich damp grassland. Marsh fritillary and marbled white butterflies have been recorded at the site	2.3km to north of Site 1
Caeau Capel Hendre	Unimproved grassland. The site supports a colony of the marbled white butterfly	1.9km to north of Site 1
Caeau Ffos Fach	Unimproved species-rich grassland with large colony of Marsh Fritillary	2.1km to north of Site 3
Caeau Lotwen	Unimproved grasslands	1.3km to north of Site 3
Felin Fach Meadows, Cwmgwili	Unimproved grasslands with marbled white butterflies	Multiple units, nearest of which is 130m to south east of Site 3
Graig Fawr, Pontardulais	Dry acidic grassland of upland areas	2.1km to south east of Site 1
Gweunydd Glan-Y-Glasnant	Unimproved grasslands	2.5km to north west of Site 3

3.5.13. Broad Oak and Thornhill Meadows SSSI, Caeau Ffos Fach SSSI and Caeau Lotwen SSSI are component sites of Caeau Mynydd Mawr Special Area of Conservation (SAC). This site has been selected for:

Annex II species that are a primary reason for selection of this site:

Marsh fritillaries *Euphydryas aurinia* occur over a wide area of traditionally-managed purple moor-grass *Molinia caerulea* pastures in south-east Carmarthenshire. The extent of suitable habitat, contained within more than 30 enclosures at Caeau Mynydd Mawr, suggests that this is one of the largest metapopulations in Wales.

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)

3.5.14. This site is of International importance.

western ECOLOGY

1 Geffery Close
Landrake
Saltash
Cornwall
PL12 5HA

Tel: 0800 622 6828
email: office@westernecology.co.uk

Badger sett entrance

Badger latrine

Legend

- Target note
- Intact hedge, native species rich
- Fence
- Survey area (Approximate)
- Mammal pathway
- Track
- Improved grassland

0 50 100 150 200 m

N

Title: Map 1. Phase 1 Habitat Survey, Site 1

Project: Land to the east of the A48 and Land to the south west of Tycroes

Checked by: CDH Version: 02
Date: 29/04/2020

western ECOLOGY

1 Geffery Close
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email: office@westernecology.co.uk

Legend

- Intact hedge, native species rich
- Fence
- Survey area (Approximate)
- Improved grassland

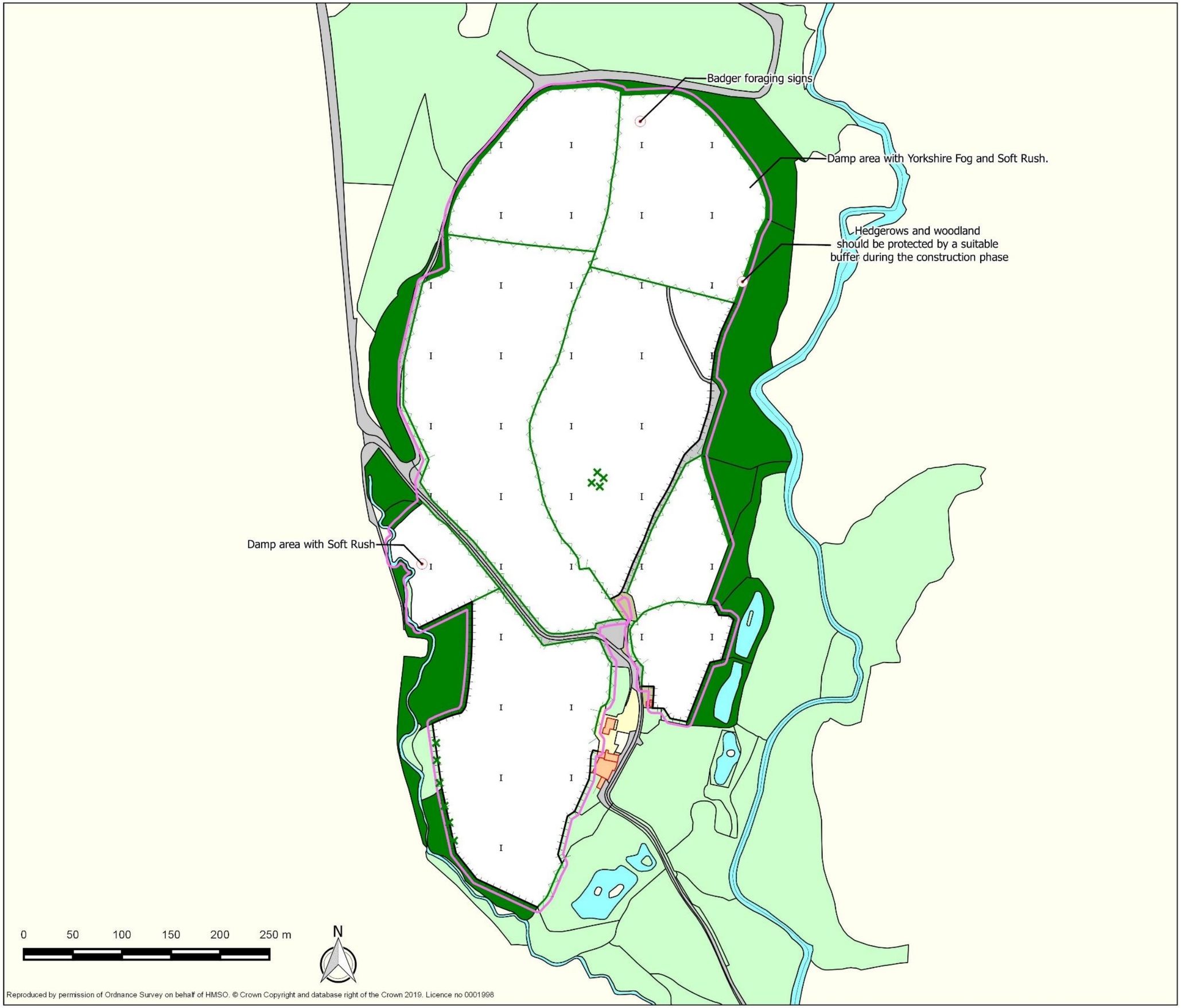
0 50 100 m

N

Title: Map 2. Phase 1 Habitat Survey, Site 2

Project: Land to the east of the A48 and Land to the south west of Tycroes

Checked by: CDH Version: 02
Date: 29/04/2020



western ECOLOGY

1 Geffery Close
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Legend

- Target note
- Scattered scrub
- Intact hedge, native species rich
- Fence
- Survey area (Approximate)
- Semi-natural broadleaved woodland
- Improved grassland

Title: Map 3. Phase 1 Habitat Survey, Site 3

Project: Land to the east of the A48 and Land to the south west of Tycroes

Checked by: CDH Version: 04
Date: 29/04/2020

3.6. Potential for species of nature conservation importance

3.6.1. Habitats have been assessed from the results of the field survey for their potential to support the following protected species. Where there is no potential for a species or species group to be present within the site, or where habitats with the potential to support this species or species group will not be impacted by the proposals, they may be scoped out at this stage.

Amphibians

3.6.2. There are no records for Great Crested Newt within 4km of this site. Ponds to the east of Site 3 are unsuitable for breeding amphibians due to the presence of significant number of waterfowl, lack of emergent vegetation and poor water quality. Waterbodies with potential for amphibians are lacking from Site 2 and Site 1.

3.6.3. It is unlikely that Great Crested Newt are present in this area, whilst the proposed solar array will be limited to agriculturally improved grassland, with little value for common and widespread amphibians. Amphibians are unlikely to adversely impact by the proposed development and do not need to be considered further.

Badger

3.6.4. Evidence of Badgers foraging is present in the north of Site 3, whilst an active sett entrance and well-worn Badger pathways are present in Site 1.

Bats

3.6.5. No suitable features for roosting bats were present within the footprint of the proposed solar PV array. Trees associated with boundaries enclosing Site 3 and Site 2 are largely early mature and would not provide much in the way of bat roosting habitat, although occasional larger trees are present that would have potential roosting features. Boundaries enclosing Site 1 have little in the way of larger trees with potential for roosting bats.

3.6.6. The boundary features at all three sites will be used by foraging bats.

3.6.7. Research into habitat preferences of bats in Britain (Walsh and Harris, 1996) found that although bats could be found in almost all habitats, they showed clear preference for woodland edges and water bodies along with treelines and hedgerows. Strong avoidance was seen for a number of habitats, including improved grassland, and this was common in all landscapes.

3.6.8. Improved grassland at this site is unlikely to be an important resource for local bat species.

Birds

3.6.9. Common bird species will nest within the boundary habitats.

3.6.10. Improved grassland habitats within the solar PV array footprint have little value for ground nesting birds due to their grazing and foraging regime.

Common Dormice

3.6.11. Dormice are arboreal and are found within species-rich woodland, hedgerow and woody fruiting scrub. The improved grassland habitat within the solar PV array footprint would not support this animal.

3.6.12. However, enclosing habitats (woodland and species rich hedgerows) have potential for Dormice, whilst a number of records are present in the surrounding landscape, in particular around Site 3.

3.6.13. Although the internal boundaries of Site 3 and Site 1 are sub-optimal due their close-management which would result in limited fruiting shrubs being available to forage, the external boundaries at Site 3 are likely to support Dormice, and there is low potential for them to be present in the external boundaries of Site 1, in particular to the north east. Internal boundaries would be unlikely to support a permanent population of Dormice, although they would be occasionally present when certain low shrubs such as Bramble and honeysuckle are flowering/fruiting.

Hedgehog

3.6.14. It is possible that an occasional Hedgehog might be associated with habitats within and bounding the Site.

Reptiles

3.6.15. Boundary habitats have some potential for Grass Snake and Common Lizard although the managed improved grassland habitat within the footprint at all three sites would be unlikely to support reptiles.

Otter

3.6.16. It is likely that occasional Otter are foraging within the small watercourse associated with western boundary of Site 3, although it is unlikely to support resting habitat due to the small size of this feature and the adjacent highway. The watercourse associated with Site 1 is unlikely to support Otter.

Water Vole

3.6.17. Watercourses associated with these sites are unsuitable for Water Vole and they do not need to be considered further.

Invertebrates

3.6.18. Habitats at this Site are likely to support common and widespread invertebrates.

3.6.19. Grassland does not provide sufficient diversity of flowering plants to support invertebrates of restricted distribution, such as marsh fritillary and marbled white butterflies.

Plants

3.6.20. Habitats at this Site have little value for notable plants, although the boundary woodland and hedgerows may support plants of a more restricted distribution.

3.7. Invasive Non-native Species

3.7.1. No plant listed as Invasive Non-native under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) with respect to England and Wales was present within the Site.

4. Evaluation of ecological features and potential impacts

4.1. Background

4.1.1. Ecological features that have the potential to be present have been assessed in light of current nature conservation policy, planning policy and wildlife legislation by an experienced ecologist (see Appendix 1). Where necessary, the ecological value of an ecological feature is given along with the potential effect of the proposed development.

4.1.2. If it is considered that the proposed development is likely to have no effect on features that have been identified as present, or potentially present, they may be scoped out at this stage.

4.2. Habitats of nature conservation importance

4.2.1. Protected habitats - Habitats are protected under international and national legislation including The Conservation of Habitats and Species Regulations 2017, and Wildlife and Countryside Act 1981 (as amended). These have been formulated into policy measures, with many examples protected under formal site designations such as SSSIs and SACs.

4.2.2. No habitats of European Community Importance as defined within The Conservation of Habitats and Species Regulations 2017 were present within this site. Protected habitats of this type are not a consideration for this project.

4.2.3. Notable habitats - Fifty-five habitats are listed as being of key significance to sustain and improve biodiversity in relation to Wales. Under section 7 of the Environment (Wales) Act there is a need for these habitats to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity. These habitats are the subject of National and Local Biodiversity Action Plans. Hedgerows are given particular protection under the Protection of Hedgerows Act 1997.

Intact hedge, species rich

4.2.4. Both internal and external hedgerows at all three sites would qualify as a Local Biodiversity Action Plan Priority Habitat and a Habitat of Principal Importance. Approximately 3 metres of hedgerow will be removed to provide access into Site 2, and mitigation for this habitat loss should be adopted. Elsewhere these features will remain intact and no mitigation for habitat loss is required. However, mitigation should be adopted to avoid accidental damage during the construction phase.

Semi-natural broadleaved woodland

4.2.5. Woodland enclosing Site 3 would qualify as a Local Biodiversity Action Plan Priority Habitat and a Habitat of Principal Importance. These features will remain intact and no mitigation for habitat loss is required. However, mitigation should be adopted to avoid accidental damage during the construction phase.

Running water

4.2.6. The small water course present at the western boundary of Site 3 would qualify as a Local Biodiversity Action Plan Priority Habitat and a Habitat of Principal Importance. This feature will remain intact and no mitigation for habitat loss is required. However, mitigation should be adopted to avoid accidental damage during the construction phase.

4.3. Species of nature conservation importance

4.3.1. Overview - Many native wild plants and animals are protected by law with the two main legal instruments being the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017. The latter consolidates amendments to the Conservation (Natural Habitats, &c) Regulations 1994 which transposed into UK Law the EU Habitats Directive.

4.3.2. A range of species of fungi, plant or animal are listed in Section 7 of the Environment (Wales) Act 2016 as being of principal importance for the purposes of conserving biodiversity. There is a need for these species to be taken into consideration by a public body when performing any of its functions with a view to conserving biodiversity. These species are the subject of National and Local Biodiversity Action Plans.

Badger

4.3.3. Badgers are protected from persecution or ill-treatment under the Protection of Badgers Act 1992. Under the Act, it is an offence to:

- wilfully kill, injure or take, or attempt to kill, injure or take, a badger;
- damage a badger sett or any part of it;
- destroy a badger sett;
- obstruct access to, or any entrance of, a badger sett;
- cause a dog to enter a badger sett; or
- disturb a badger when it is occupying a badger sett.

4.3.4. Badgers are foraging in the north of Site 3, and are foraging in Site 1, with a single sett entrance associated with a hedgerow in Site 1 also.

4.3.5. Although habitat loss would not impact local Badger populations, there is potential for Badgers to get trapped within the Site during the construction/operational phase, whilst construction may affect the Badger sett entrance in Site 1, or any animals within it, in a way that could be considered an offence. Mitigation against this is recommended.

Bats

4.3.6. Bat species, and their breeding or resting places (roosts), are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017. They are identified as European Protected Species. Under these laws it is an offence to:

- capture, kill, disturb or injure bats (on purpose or by not taking enough care);
- damage or destroy a breeding or resting place (even accidentally);
- obstruct access to their resting or sheltering places (on purpose or by not taking enough care); or
- possess, sell, control or transport live or dead bats, or parts of them.

4.3.7. Seven species of bat are listed as species “of principal importance for the purpose of conserving biodiversity”.

4.3.8. The construction and operation of the proposed solar PV array would not result in the capture, killing or injuring of bats, nor damage or destroy a breeding or resting place, or obstruct access to a resting place. However, if panels are installed immediately adjacent to mature trees associated with adjacent woodland, there is potential for short term disturbance during the driving of panel support pins, were bats to be roosting within these features. Mitigation is recommended against disturbance effects during panel installation.

4.3.9. The current improved grassland habitats have limited value for foraging bats. Management of the operational solar farm will likely include grazing at low stocking levels with no silage cuts, and no biocide or fertiliser inputs. Over the life of the solar PV array, beneath-panel plant diversity will increase along with associated diversity, and numbers, of flying insects. This would have a beneficial effect for local foraging bat populations. No mitigation for habitat loss beneath the solar PV array is recommended.

4.3.10. Hedgerows and enclosing woodland are likely to provide good foraging habitat for a range of local bats. These habitats will largely remain intact beyond the solar PV array and bats can continue to forage, and commute, here for the operational period. However, lighting associated with the construction phase may adversely impact light averse bat species. Mitigation against adverse lighting effects during the construction phase is recommended.

Birds

4.3.11. All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended) from being killed, injured or captured whilst their nests and eggs are protected from being damaged, destroyed or taken. Birds which are listed under Schedule 1 of the Act are given additional protection against disturbance.

4.3.12. A number of species of bird are listed as species “of principal importance for the purpose of conserving biodiversity”.

4.3.13. Boundary habitats will support widespread and common nesting bird species. Any activities which impact these habitats have potential to adversely impact nesting birds and is likely to require mitigation for nesting birds.

4.3.14. Any activities that expose invertebrates, such as earth worms and grubs, will provide an additional food resource for local birds and will have a positive temporary effect, particularly when adults are feeding nested chicks.

4.3.15. Habitats within the proposed solar PV array comprise improved grassland managed for forage and fodder production. This habitat is not optimal for ground nesting birds, including Lapwing. Ground nesting birds are not a consideration for this project.

Common Dormouse

4.3.16. Common (or Hazel) Dormice, and their breeding and resting places, are protected under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017). They are identified as a European Protected Species. Under these laws, it is an offence to:

- Capture, kill, disturb or injure Common Dormice (on purpose or by not taking enough care);
- Damage or destroy a breeding or resting place (even accidentally);
- Obstruct access to their resting or sheltering places (on purpose or by not taking enough care); or
- Possess, sell, control or transport live or dead dormice, or parts of dormice.

4.3.17. Common Dormice are listed as a species "of principal importance for the purpose of conserving biodiversity".

4.3.18. Although the internal boundaries of Site 3 and Site 1 are sub-optimal due their close-management which would result in limited fruiting shrubs being available to forage, the external boundaries at Site 3 are likely to support Dormice, and there is low potential for them to be present in the external boundaries of Site 1.

4.3.19. The small section of hedgerow to be removed to allow access into Site 2 is close managed and has negligible potential for Dormice. No mitigation for this activity is required.

4.3.20. Hedgerows and woodland will remain intact, although there is potential for accidental damage to these habitats during the construction, and some potential for disturbance to these animals. Mitigation is required.

Hedgehog

4.3.21. Hedgehogs are partially protected under the Wildlife & Countryside Act and may not be trapped without a licence. Hedgehogs are listed as a species “of principal importance for the purpose of conserving biodiversity”.

4.3.22. There is potential for Hedgehog to be associated with boundary habitats. The proposed development will not affect these habitats and Hedgehog do not need to be considered further.

Otter

4.3.23. Otter, and their breeding or resting places (holts and couches), are protected under the Wildlife and Countryside Act 1981 (as amended), and The Conservation of Habitats and Species Regulations 2017. They are identified as European Protected Species. Under these laws, it is an offence to:

- capture, kill, disturb or injure otters (on purpose or by not taking enough care)
- damage or destroy a breeding or resting place (deliberately or by not taking enough care)
- obstruct access to their resting or sheltering places (deliberately or by not taking enough care)
- possess, sell, control or transport live or dead otters, or parts of otters

4.3.24. Otter are listed as species "of principal importance for the purpose of conserving biodiversity".

4.3.25. It is likely that an occasional Otter is feeding along the watercourse on the western edge of Site 3. However, no holts were found and this area is unlikely to support Otter resting places due the small size of the water course and its location immediately adjacent to the highway. The proposed development will not create obstacles to Otter passing along this watercourses and Otter do not need to be considered further.

4.4. Statutory Nature Conservation Sites

National designations

4.4.1. There are 10 SSSIs within 4km of this Site (Table 6). Guidance is given within Section 118 of the National Planning Policy Framework for planning applications on land within or outside an SSSI likely to have an adverse effect on its notified special interest features. Within this guidance it is stated that:

> "*Where an adverse effect on the site's notified special interest features is likely, an exception should only be made* [to grant planning] *where the benefits of the development, at this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest*".

4.4.2. It is expected that the construction and operation of the proposed solar PV array and associated structures would have a negligible effect the interest features of these sites, due to separation distance and the habitat types within these SSSI's comprising unimproved grassland and upland acidic grassland, both of which are relatively robust. Furthermore, habitats within Site 3, B and C are unlikely to support populations of invertebrates, in particular marsh fritillary, associated with these protected sites, as their current management would result in the required food plants being absent. This is particularly likely at Site 3 where sheep grazing is widespread; sheep selectively fee on the caterpillar food plant of this butterfly and can eradicate it from a site.

4.4.3. Consultation with Natural Resources Wales (NRW) on 03/07/2019 states:

> *We consider it unlikely that the SSSI's will be significantly affected by the proposed development, as we do not consider there to be a pathway for an effect.*

4.4.4. No mitigation is recommended in relation to adverse effects on Nationally designated sites (SSSIs).

International designations

4.4.5. Areas of unimproved grassland within some SSSI units 1.6km to the north have been designated as part of Caeau Mynydd Mawr SAC for the presence of marsh fritillary butterfly.

4.4.6. Consultation with Natural Resources Wales (NRW) on 03/07/2019 states:

> *We cannot rule out a significant effect from the proposed development on the SAC as part of the site is within the Caeau Mynydd Mawr SAC Supplementary Planning Guidance (SPG) area.*
>
> *The SPG provides specific guidance in relation to the consideration of potential proposals impacting upon the Caeau Mynydd Mawr SAC and the need to establish a management strategy to ameliorate for the loss of and secure the ongoing and future management of habitat used by the Caeau Mynydd Mawr SAC Marsh fritillary butterfly metapopulation. The SPG focuses on the Caeau Mynydd Mawr SAC Marsh Fritillary core metapopulation area.*

4.4.7. Site 3, Site 2 and extreme north of Site 1 are within the SPG.

4.4.8. A Habitats Regulations Screening assessment has been undertaken for the project that concludes that likely significant effect is unlikely. On this basis, a developer contribution would not be required to mitigate against any adverse effects resulting from the proposed solar PV array on the interest features of this SAC, namely marsh fritillary.

4.4.9. Habitats within Site 3, Site 2 and Site 1 do not support suitable plant communities for marsh fritillary, although habitats to the immediate south of Site 2 comprise damp, *Molina* grasslands with potential. Mitigation is recommended.

5. Recommendations for mitigation and further surveys

5.1. Mitigation

5.1.1. Where there is potential that the proposed development will have a significant[1] effect on a valued ecological feature of nature conservation interest, recommendations for mitigation are made based on the mitigation hierarchy suggested in Paragraph 118 of the National Planning Policy Framework and detailed in Paragraph: 018 Reference ID: 8-018-20140306 of National Planning Practice Guidance;

- Avoidance –significant harm to wildlife species and habitats should be avoided through design.
- Mitigation – where significant harm cannot be wholly or partially avoided, it should be minimised by design, or by the use of effective mitigation measures that can be secured by, for example, conditions or planning obligations.
- Compensation – where, despite whatever mitigation would be effective, there would still be significant residual harm, as a last resort, this should be properly compensated for by measures to provide for an equivalent value of biodiversity.

5.1.2. Where the detail of a proposal is unknown, such as in outline planning applications, general mitigation will be suggested. This should be re-addressed once final plans are known.

Further survey work

5.1.3. Where further survey work is not recommended, this is because it is the professional judgement of the ecologist that adequate information is already available and further surveys would not make any material difference to the assessment provided.

5.1.4. Where the information within this report is insufficient to allow a full description of the nature conservation features of the site along with a robust assessment of the potential effects on these features, further survey work will be recommended.

5.2. Habitats of nature conservation importance

To ensure compliance with nature conservation legislation and planning policy, the following recommendations are made with regards to habitats:

Intact hedge, species rich; woodland

5.2.1. Site 1 - All hedgerow habitat should be protected from accidental damage during the construction phase by a suitable buffer zone of 7 metres on external boundaries, and 5 metres on internal boundaries. This protection zone should be delineated by a suitable fence and maintained for the duration of the works, and there should be no access, storage of materials, ground disturbance, burning or contamination within the fenced areas.

[1] For the purposes of this report, a practical approach has been taken to define the term 'significant'. If an effect is sufficiently important to be given weight in the planning process or to warrant the imposition of a planning condition, it is likely to be 'significant' in the context of the level under consideration (BSI, 2013).

5.2.2. Site 2 – A small section of hedgerow will be removed for the period of the development to provide site access. To maintain habitat extent, following development the lost section of hedgerow should be replanted with shrubs of local provenance.

5.2.3. All hedgerow habitat should be protected from accidental damage during the construction phase by a suitable buffer zone of 7 metres on external boundaries. This protection zone should be delineated by a suitable fence and maintained for the duration of the works, and there should be no access, storage of materials, ground disturbance, burning or contamination within the fenced areas.

5.2.4. Site 3 - All hedgerow and woodland habitat should be protected from accidental damage during the construction phase by a suitable buffer zone of 10 metres on external boundaries, and 7 metres on internal boundaries. This protection zone should be delineated by a suitable fence and maintained for the duration of the works, and there should be no access, storage of materials, ground disturbance, burning or contamination within the fenced areas.

5.2.5. This should be detailed within a Construction and Environment Management Plan (CEMP) for this Site.

Running water

5.2.6. Watercourses should be protected from accidental damage during the construction phase by suitable fencing placed at least 7 metres from the habitat edge. This protection zone should be maintained for the duration of the works, and there should be no access, storage of materials, ground disturbance, burning or contamination within the fenced areas.

5.2.7. This should be detailed within a CEMP for this Site, which also takes into account the Environment Agency's Pollution Prevention Guidelines. This will provide the appropriate techniques and practices to avoid impact on watercourses.

5.3. Protected species and species of nature conservation importance

To ensure compliance with nature conservation legislation and planning policy, the following recommendations are made with regards to species:

Badgers

5.3.1. There is potential that Badgers may become trapped within the Site during the construction and operational phases. To prevent this, the following is recommended:

- Hedgerow protection and site security fencing along the boundaries should leave an appropriate gap between the fence and hedgebank/hedgerow.
- Any trenches left open at night should have some means of escape for Badgers, such as the placement of a scaffolding board at one end;
- Any site security fences present during the operational phase should have a suitable gate to allow Badgers to exit the Site should they gain entry. These should align with existing Badger pathways.

5.3.2. Construction may affect the Badger sett entrance in Site 1, or animal within it, in a way that could be considered an offence.

5.3.3. This single entrance has small spoil heap, suggesting a short tunnel, whilst any animal present here is going to be normalised to certain levels of disturbance due to ongoing agricultural operations at this site. It is considered likely that provided a 20 metre buffer is left, within which no panels, cable trenches or other structures are constructed, it is unlikely that this sett or animal within it will be impacted in a way that is likely to be an offence.

5.3.4. Should permission to develop be successful, a further Badger survey should be completed as near as practicable to the start of site development. This will ensure the assessment and resultant mitigation to be adopted during construction will be based on the most recent distribution of sett entrances likely to be affected.

Bats

5.3.5. If lighting is required during the construction phase, this should be directed into the site and not onto enclosing hedgerows and woodland.

Dormice

5.3.6. Site 3 - Potential Dormice habitats associated with hedgerows and woodland at Site 3 should be protected from accidental damage during the construction phase by a suitable buffer zone of 10 metres on external boundaries and 7 metres on internal boundaries. The adoption of this buffer would ensure that it is unlikely that any Dormice present within these habitats would be disturbed in a way that could be considered an offence during the construction phase.

5.3.7. Site 1 - Potential Dormice habitats associated with boundary hedgerows at Site 1 should be protected from accidental damage during the construction phase by a suitable buffer zone of 7 metres on external boundaries and 5 metres on internal boundaries. The adoption of this buffer would ensure that it is unlikely that any Dormice present within these habitats would be disturbed in a way that could be considered an offence during the construction phase.

5.3.8. Solar PV panels will not be constructed in Site 2 and no mitigation for dormouse habitat is required.

Nesting birds

5.3.9. Potential bird nesting habitats associated with boundary hedgerows and woodland should be protected from accidental damage during the construction phase by a suitable buffer zone (see 5.1 above).

5.3.10. If any activities affecting potential nesting habitats are required, these should be completed during the period September to February inclusive, outside the accepted bird nesting season. If this is not practicable, prior to the start of works these habitats should be thoroughly inspected by a suitably qualified person prior to disturbance or removal. If nesting birds are found, all activities likely to damage the immediate area should be delayed until chicks have fledged.

5.3.11. Any activities that expose invertebrates, such as earth worms and grubs, will provide an additional food resource for local birds and will have a positive temporary effect, particularly when adults are feeding nested chicks.

5.4. Statutory Nature Conservation sites

To ensure compliance with nature conservation legislation and planning policy, the following recommendations are made with regards to Statutory Nature Conservation Sites:

5.4.1. A Habitat Regulations Screening Assessment has been completed in relation to Caeau Mynydd Mawr SAC. The conclusion is:

> *Likely Significant Effect, alone or in-combination, on Caeau Mynydd Mawr SAC is screened out.*

5.4.2. This is provided under a separate cover. A developer contribution in relation to the Caeau Mynydd Mawr SAC SPG is not required.

5.5. Summary of net gains and losses

Table 7 provides a summary of net gains and losses to biodiversity resulting from the proposed development with mitigation, but without biodiversity enhancement.

Table 7. Summary of net gains and losses to biodiversity

Nature conservation feature	Potential impact	Proposed mitigation	Outcome/Comments
Hedgerow, woodland and running water habitats	Accidental damage during construction phase	Protection through a suitable buffer, and adoption of a suitable Construction Environment Management Plan (CEMP).	Impact avoided
Badgers	Becoming trapped within the site. Impact on a sett that could be considered an offence.	Proper design and placement of security fences. Escape routes provided. 20 metre buffer between sett entrance and the development.	Impact avoided Offence avoided
Bats	Degradation of habitats during construction phase	If lighting is required during the construction phase, this should be directed into the site and not onto enclosing hedgerows and woodland.	Impact avoided
Dormouse	Accidental damage to supporting habitats and disturbance during the construction phase	Hedgerows and woodland should be protected from accidental damage during the construction phase by a suitable buffer.	Impact avoided
Nesting Birds	Accidental damage to supporting habitats and disturbance during the construction phase	Hedgerows and woodland should be protected from accidental damage during the construction phase by a suitable buffer.	Impact avoided

	Direct harm or injury. Increased food items during construction.	Any activities affecting hedgerow and shrubs habitats should be completed during the period September to February inclusive, outside the accepted bird nesting season	Direct harm and injury avoided Temporary positive gain

6. Further survey work

6.1. Assessment of need for further survey work

6.1.1. Information within this report is sufficient to allow a robust assessment of the potential effects on the majority of ecological features associated, or potentially associated, with this site.

6.1.2. However, the following surveys are recommended:

Badgers - Should permission to develop be successful, a further Badger survey should be completed as near as practicable to the start of site development. This will ensure the assessment and resultant mitigation to be adopted during construction will be based on the most recent distribution of sett entrances likely to be affected.

7. Biodiversity enhancement

7.1. Background

7.1.1. Creating new habitats, enhancing existing habitats or providing new features, can all contribute towards biodiversity enhancement, and helping to rebuild habitat networks in the wider area improves ecological resilience and adaptation to climate change.

7.1.2. Enhancements are additional to any measures necessary to deal with potential impacts on site, as they are an opportunity to provide new benefits for biodiversity as a consequence of the proposals being implemented.

7.2. Creation of species rich grassland

7.2.1. The buffer areas adjacent to hedgerows and woodland could be managed with late season hay cuts and occasional cattle grazing at low stocking levels.

7.3. Bird nesting and bat boxes

7.3.1. A scheme of bat and bird nesting boxes will be designed for Site 3, to include a minimum of 20 woodcrete bat boxes and 20 woodcrete bird boxes suitable for birds that nest in cavities. This type of mitigation is unlikely to be very successful at Site 2 or Site 1 due to the habitat types present in the area.

8. References

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Institute of Environmental Assessment (IEA), 1995. *Guidelines for Baseline Ecological Assessment,* Institute of Environmental Assessment. E&FN Spon, aJn Imprint of Chapman and Hall. London.

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9. Appendix 1:

Legislation and Policy used to assess habitats and species

9.1.1. European Habitats and Species Directive (CEC, 1992)

The main aim of the Habitats Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.

9.1.2. European Red Data lists (IUCN, 2000)

International Union for Conservation of Nature (IUCN and the European Commission have been working together on an initiative to assess around 6,000 European species according to IUCN regional Red Listing Guidelines. Through this process they have produced a European Red List identifying those species which are threatened with extinction at the European level so that appropriate conservation action can be taken to improve their status.

9.1.3. European Council Birds Directive (CEC, 1979)

The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. An important part of this Directive is the identification and classification of Special Protected Areas (SPAs) to protected vulnerable bird species listed in Annex 1 of the Directive and regularly occurring migrating species.

9.1.4. The Wildlife and Countryside Act (WCA) 1981 (as amended)

This Act is the primary legislation that protects animals, plants and certain habitats in the UK.

9.1.5. The Conservation of Habitats and Species Regulations 2017

The Conservation of Habitats and Species Regulations 2017 consolidate and update the Conservation of Habitats and Species Regulations 2010, and transpose Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora ("the Habitats Directive") and elements of Directive 2009/147/EC on the conservation of wild birds ("the Birds Directive") in England, Wales, and to limited extent, Scotland and Northern Ireland.

The objectives of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species.

The Regulations place a duty on the Secretary of State to propose a list of sites which are important for either habitats or species. These sites form a network termed Natura 2000 and include Special Areas of Conservation and Special Protection Areas.

9.1.6. Protection of Badgers Act 1992

The Protection of Badgers Act 1992 consolidated and improved previous legislation. Under the Act it is an offence to kill, injure or take a Badger, or to damage or interfere with a sett used by a Badger unless a licence is obtained from a statutory authority.

9.1.7. The Hedgerow Regulations 1997

The Hedgerows Regulations 1997 protect certain hedgerows from being removed (uprooted or destroyed) if they meet certain criteria.

9.1.8. The Countryside and Rights of Way (CRoW) Act 2000

This Act increases measures for the management and protection for Sites of Special Scientific Interest (SSSI) and strengthens wildlife enforcement legislation.

9.1.9. Circular 06/2005 Biodiversity and geological conservation – statutory obligations and their impact within the planning system

This circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It complements the national planning policy in the National Planning Policy Framework and the Planning Practice Guidance.

9.1.10. Natural Environment and Rural Communities Act 2006

The Act made amendments to the both the Wildlife and Countryside Act 1981 and the Countryside and Rights of Way (CROW) Act 2000. For example, it extended the CROW biodiversity duty to public bodies and statutory undertakers.

9.1.11. UK Post-2010 Biodiversity Framework, 2012

The 'UK Post-2010 Biodiversity Framework', published in July 2012, succeeds the UK BAP and 'Conserving Biodiversity – the UK Approach', and is the result of a change in strategic thinking.

9.1.12. Planning (Wales Act) 2015

As of 6th July 2015, the Planning (Wales) Act 2015 came into force. This Act puts into place delivery structures, processes and procedures to create a modern delivery framework for the preparation of development plans and planning decisions, ruling that any statutory body carrying out a planning function must exercise those functions in accordance with the principles of sustainable development as set out in the Well-being of Future Generations (Wales) Act 2015.

9.1.13. Planning Policy Wales 2016 (Ninth Edition)

Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government, establishing a commitment towards sustainable development within the planning system. It envisions the planning system to recognise the threat of climate change,

and to reconcile the need of development and conservation; fundamental for sustainable development.

9.1.14. The natural choice: securing the value of nature (2011) (Natural Environment White Paper)

This White Paper outlines the Governments vision for the future of landscape and ecosystem services.