

HAFAN Y MÔR HOLIDAY PARK

NEW MASTERPLAN PROPOSALS

ECOLOGICAL IMPACT ASSESSMENT : TERRESTRIAL ECOLOGY

TECHNICAL REPORT

OCTOBER 2019



BOURNE
LEISURE
LIMITED

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CLIENT: Bourne Leisure Ltd

AUTHOR: Peter Tattersfield MCIEEM CEnv PhD
Consultant Ecologists
Bar Cottage
Bar Road
Baslow
Bakewell
DE45 1SF

DATE: October 2019

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1 Introduction

This technical survey report has been prepared to support a planning application by Bourne Leisure Ltd for further improvements at Hafan y Môr Holiday Park, near Pwllheli, Gwynedd. The findings inform the Environmental Statement that is submitted with the application.

The proposals follow and build on the developments and enhancements that have been completed under a 2011 planning consent (C10D/0141/40/LL), which set out a 'vision' for the holiday park until 2020. The new proposals are intended to maintain momentum in the development of the Park as a first class holiday facility, into the 2020s and beyond.

1.1 The Proposals

The proposals are shown on Bratherton Park Design's Illustrative Masterplan (October 2017 Job 1087/39/1 rev. Q). New development proposals, which are the subject to these surveys and assessments, are referred to as Parcels A-J.

These land parcels are the same as those referenced in the EIA Scoping Opinion submitted to Gwynedd Council. However, Parcel A (redevelopment of former Stables complex) no longer forms part of the proposals, and Parcels D and F (Llyn Village chalet area) have been amalgamated (now referred to as Parcel F). Parcels K and L refer to developments approved under C10D/0141/40/LL, which are to be constructed in the near future.

Surveys have therefore been restricted to the remaining eight parcels, all of which are situated to the south of the Criccieth-Pwllheli railway line.

Parcel B **Lakeside West** - land to the west of the South (fishing) Lake

Parcel C **Secondary sales area**

Parcel E **Area west of existing staff accommodation**

Parcel F **The Beachside Site** - comprising several chalet blocks in Llyn Village, and land to south-east that is mainly amenity grassland

Parcel G **East of previous sewage treatment plant** - comprising two fields (North and South fields) of coastal grasslands to the north of the current Holiday Park boundary

Parcel H **Site of former Sewage Treatment Works (STW)**

Parcel I **Site north of proposed beach cafe** - land north west of former sewage treatment plant. This includes part of the area referred to as Parcel D3 under the 2011 consent, and which is now partly developed with static caravans.

Parcel J **Coastal Defences** - This parcel contains a clay maritime cliff and an area of agricultural grassland, which are assessed in this report. It also contains littoral and marine habitats whose nature conservation status are covered in reports by the specialist marine ecologists (ABPmer).

1.2 Scope of Assessment

This report describes the current ecological status of the eight development parcels. It also describes the ecological status further areas of land at Hafan y Môr that may be used to help mitigate for potential development effects. These are:

- Area of grassland (G1) between the South/fishing Lake and coast.
- A disused car park area north of the A497.
- Several agricultural fields of grassland to east of the new sewage treatment works. These are referred to as the Afon Wen meadows.

The assessment is based on the results of a desk based study and a suite of detailed ecological surveys that have been appropriately scoped and designed to provide a comprehensive understanding of the main ecological issues relevant to the project.

The report evaluates these areas' biodiversity value and also explains the legal status and conservation significance of important species, especially in relation to those listed under Section 7 of the Environment (Wales) Act 2016. The scope of the assessment has been discussed and agreed with Gwynedd Council's Senior Biodiversity officer, and in summary includes assessments of habitats and vegetation, protected and priority species, and designated nature conservation sites (statutory and non-statutory). This scope of assessment was also confirmed by Gwynedd Council in their formal scoping opinion letter (11/1/19), which stated (in relation to landside, terrestrial ecology¹) that the following should be included in the EIA:

- Protected Sites - including European (SAC/SPA), UK (SSSI) and local Candidate Wildlife Sites
- Protected species - otter, bats, reptiles and barn owls²

Gwynedd's scoping letter also highlights that a biosecurity risk assessment in respect of potentially invasive, non-native species should be undertaken, so these species have been included in the habitat/vegetation survey.

The species/species groups covered in this report are, therefore:

- Reptiles
- Grassland birds
- Otter
- Water vole
- Badger
- Bats
- The Large Mason Bee, and other aculeate Hymenoptera (bees and wasps) associated with soft coastal cliffs
- Non-native invasive plant species

¹ there are additional scoping requirements in relation to marine ecology and coastal processes.

² subsequently it has been agreed with Gwynedd Council Biodiversity Officer that a barn owl assessment can be omitted, because the proposals that would affect a known barn owl roost have been removed from the scheme, and there are very unlikely to be any effects on barn owl foraging or dispersal.

This technical survey report is provided in support of the formal EIA that is to be submitted with the planning application.

1.3 Evaluation of Ecological Resources

The biodiversity evaluation draws on the methodology set out in the Chartered Institute of Ecology and Environmental Management's (CIEEM) *Guidelines for Preliminary Ecological Appraisal* (CIEEM, 2017), British Standard BS 42020 on *Biodiversity - Code of practice for planning and development* (BSI 2013) and the CIEEM's *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018).

CIEEM's *Guidelines for Ecological Impact Assessment* (2018) sets out the recommended approach for 'establishing the ecological baseline conditions, which are those that exist in the absence of the proposed activity'. It also recommends an approach for valuing ecological features (including habitats, species, ecosystems and their functions/processes), and for assessing the effects of proposed activities on them; it notes that ecological features can be important for a variety of reasons, for example the quality or extent of habitats, the rarity or threat to habitats or species, or the functioning of habitat units as 'stepping stones' that contribute to ecological networks.

The *Guidelines* state that the importance of an ecological feature should be considered within a defined geographical context, and recommends that the following frame of reference be used (or adapted to suit local circumstances):

- International and European
- National
- Regional
- Metropolitan, County, vice-county, or other local authority-wide area
- River Basin District
- Estuarine system/Coastal cell
- Local

In this case, a further category, 'Negligible', has also been adopted for features that hold virtually no biodiversity value.

Conservation (SAC), Special Protection Areas (SPA) etc.) are generally straightforward to evaluate as they have already been assigned a level of nature conservation value, and many statutory sites also have published conservation objectives.

The approach taken tends to vary more at the local level, although within Gwynedd a series of Wildlife Sites (WS) and Candidate Local Wildlife Sites (cWS) have been identified.

Evaluation of other habitats and species needs to take into consideration a range of criteria, such as their rarity, diversity levels, population sizes and trends, whether they are replaceable or 're-creatable' (for habitats) etc. Appropriate criteria are proposed and discussed in various documents, such as in *A Nature Conservation Review* (Ratcliffe 1977), *Guidelines for the selection of biological SSSIs* (JNCC 1989), *Local Sites* (Wales

Biodiversity Partnership, 2008), and also in local and national BAPs, including Species and Habitat Action Plans (SAPs and HAPs).

The UK BAP and Section 42 lists of priority species and habitats have now been superseded by the lists of species and habitats considered to be 'of key significance to sustain and improve biodiversity in relation to Wales', as defined under Section 7 of the Environment (Wales) Act 2016); these are referred to as 'Section 7 species/habitats'. CIEEM (2018) provides further guidance on the various characteristics that can be used to identify important ecological features.

1.4 Ecological Surveyors

The field surveys included in this assessment have been designed and undertaken by Peter Tattersfield, Consultant Ecologist, and other professional and experienced ecologists, as follows:

Peter Tattersfield BA, PhD, MCIEEM, CEnv - general survey scoping, design and implementation of habitat, flora and badger surveys.

Jon Guarnaccio BSc, MSc, MCIEEM - mammal surveys including bats, water voles, otter and badger. Jon has also been assisted by experienced colleagues during some nocturnal bat surveys.

Neil Griffiths - breeding birds and reptiles, but survey design by Peter Tattersfield.

Liam Olds (Colliery Spoil Biodiversity Initiative) - aculeate Hymenoptera and other invertebrate records

Peter has provided ecological advice for many previous projects at Hafan y Môr, including the preparation of the EclA for a previous 'Masterplan' planning application that was consented in 2011 (C10D/0141/40/LL). From this experience he has gained much firsthand knowledge about the species, habitats and ecological issues on the site and in the wider area.

2 Desk Based Study

2.1 Information Sources

The desk based study draws on information from the following sources:

- Data search undertaken by Cofnod, the North Wales Environmental Information Service, for designated sites, ancient woodland sites and priority species and habitats. The search area was defined as a polygon enclosing all proposed development areas plus a buffer extending for 1km around them. In addition, bat records were supplied from a wider 5km buffer area around the site.
- Surveys undertaken previously at Hafan y Môr Holiday Park in connection with other development proposals.
- Information from Gwynedd Council biodiversity officers
- NRW information (including web based sources), especially relating to statutory sites.
- Miscellaneous information from various web-based and local sources, for example, the NBN Atlas.

2.2 Designated Nature Conservation Sites

Designated sites on and in the vicinity of the Holiday Park are shown on Figures³ 1a and 1b. These comprise both statutory and non-statutory sites.

2.2.1 Statutory Nature Conservation Sites (National and European)

2.2.1.1 Lanllynnau a Glannau Pen ychain I Gricieth SSSI and the Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC (Special Area of Conservation)

These UK and European sites are the only statutory sites of potential relevance (Fig. 1a) to the proposals. There is a further UK site, Morfa Abererch SSSI (also identified on Fig. 1a), to the west of the holiday park which contains coastal heath and other habitats. However, it is well separated from the development proposals and would not be affected so has been scoped out of the assessment.

Lanllynnau a Glannau Pen ychain I Gricieth SSSI is designated for its geological interest and for its intertidal habitats. The geological features of interest include excellent examples of kettle hole glacial landforms, and sediment sequences formed as a result of glacial and post-glacial processes exposed in coastal cliffs and foreshore. The site contains the largest extent, variety and natural range of intertidal habitats and species associated with moderately exposed mixed rock and sediment shoreline in Cardigan Bay. A variety of specialised animals and algae occur including nationally important populations of marine worm and bivalve species.

Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC is designated primarily for its habitats (estuaries, sandbanks, coastal lagoons, inlets and

³ All Figures (1 to 7) are bound separately

bays and reefs). Three species – bottlenose dolphin, grey seal and otter are listed in the citation as qualifying features, although they are not primary reasons for the SAC's designation.

2.2.2 Non-Statutory Wildlife Sites

Information from Cofnod confirms that there are 15 Wildlife Sites or Candidate Wildlife Sites within 1km of the proposed development site. These are (see Fig. 1b):

0490: Bryn Bachau Farm (Candidate site)

0515: Bryntirion

0516: Llynnoedd Afonwen

0517: Pen y Bryn (Candidate site)

0519: By Butlins

0520: Pont Llwyn-gwyn

0521: Pen-y-bryn

0523: Lon Drwsdeugoed (Candidate site)

0533: Butlins 2 (Candidate site)

0534: Porth Fechan coastal grassland (Candidate site)

0535: Butlins 3 (Candidate site)

0536: Penychain (Candidate site)

0538: Morfa Abererch (Candidate site)

0607: Butlins 1

0608: Afon Wen

Of the above 15 sites, only two (Butlins 1 and Butlins 2) are close enough to any of the proposed development areas to have any relevance to the proposals; the assessment therefore focuses on these two sites. The other 13 Wildlife Sites are situated further away, and most are also separated (and therefore, to a degree, buffered) from the proposed development areas by the railway, main road or the rest of the holiday park.

2.2.2.1 Butlins 1 Wildlife Site

This Wildlife Site lies on the north side of the railway line opposite Parcel G (Fig. 1c). The Cofnod data provides little detail, but the site is described as 2.9ha and containing 'acid grassland and semi-improved neutral grassland'.



Figure 1c Butlins 1 Wildlife Site (as provided by Cofnod)

2.2.2.2 Butlins 2 Candidate Wildlife Site

This site comprises three areas within Hafan y Môr Holiday Park (Fig. 1d). It totals 5.4ha and contains the areas of open water, the North/boating Lake and South/fishing Lake (standing water), plus broadleaved and coniferous woodland habitats. It is understood from the Gwynedd Biodiversity Officers that all three components of this site are designated as a Candidate Wildlife Sites because they have not been surveyed in detail and their biodiversity value is not fully understood.

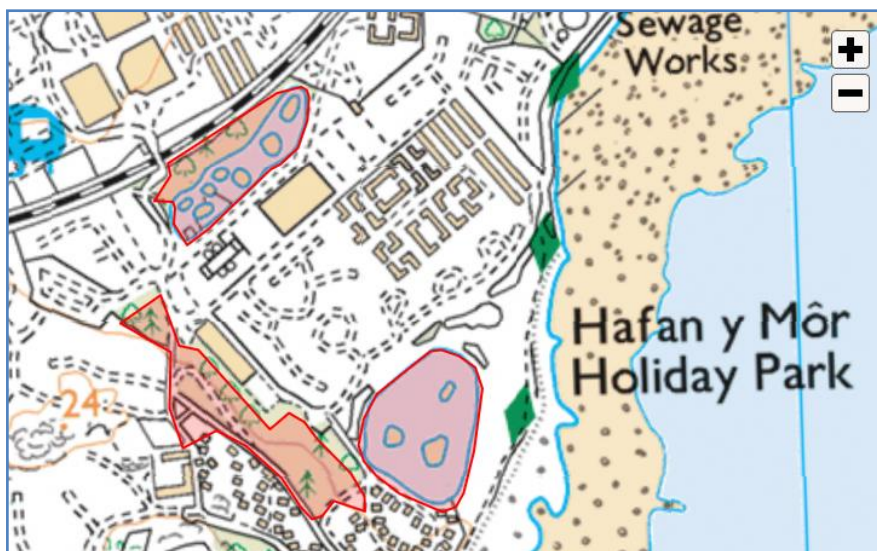


Figure 1d Three component parts of Butlins 2 Candidate Wildlife Site (as provided by Cofnod)

All three parts of this Wildlife Site are situated close to or slightly within at least one of the proposed development Parcels.

2.3 Species Records

The Cofnod data identifies 115 species' records⁴ within the area of search (summarised on Table 2.1 and Fig. 1e). Most of these were from the statutory designated sites and there were only four records from a polygon that encloses the proposed development parcels. These were for eel (from the North (boating) lake)), an eyebright species (Parcel G coastal grassland), adder and slow worm (south of South lake) and soprano pipistrelle bat (also near South/fishing Lake).

Other records of potential relevance include a reasonably long list of bird species, although most are wetland/coastal species (these are considered in the marine section of the assessment). Of more relevance to the landside habitats were records of skylark (Section 7 species) and stonechat from the coastal meadows to the north east of the park.

Cofnod also reported various reptile records (slow worm, common lizard and adder), all of which are UK protected and Section 7 species. Advice from the Gwynedd Biodiversity team and information other sources (eg. NBN Atlas) indicated that great crested newts are very unlikely to occur in the area, so these have been scoped out.

The desk study has identified several mammal records from the area, including bats, badger, otter and water vole.

2.3.1 Bats

The Cofnod information contains records for seven bat species from the 1km area of search. These are common and soprano pipistrelle, Daubenton's, brown long-eared, noctule, whiskered/Brandt's and lesser horseshoe. Further information and analysis of bat records is provided in Section 7.

2.3.2 Badger

The National Biodiversity Network Atlas indicated that the badger (*Meles meles*) is a widespread animal in the area and this was confirmed by the Gwynedd Biodiversity team. The Cofnod data returned several badger records, most of which were associated with the A497 road corridor, and were presumably road casualties. There were no badger records returned from within Hafan y Môr Holiday Park itself.

2.3.3 Otter and Water Vole

The Gwynedd Biodiversity team advised that otter and water vole are known to occur in the general area, with signs of both reported to the west of the holiday park. Cofnod reported nine otter and one water vole records from the 1km area of search, in particular from Morfa Abererch SSSI (both species) and along the Afon Wen watercourse (otter) to the north east of the holiday park.

2.3.4 Other Mammals

There were no records of other mammal species in the Cofnod data. However, based on general distribution and the NBN Atlas it seems

⁴ species with formal conservation status (eg. Section 7) or legal protection only

Table 2.1 Plant and Animal Species reported from the Cofnod areas of search, and their conservation and legal Status

English Name	Scientific Name	Legal/Conservation Status
BIRDS		
Arctic Tern	<i>Sterna paradisaea</i>	BDir1, Bern, UKBA, WBR, LBAP[ANG, CON, GWY]
Barn Owl	<i>Tyto alba</i>	Bern, CITES, WBA, WCA1.1, WCA9, LBAP[ANG, CON, DEN, FLI, GWY, SNP, WRE]
Bar-tailed Godwit	<i>Limosa lapponica</i>	BDir1, BDir2.2, S7, UKBA, WBR, LBAP[CON, GWY]
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	BDir2.2, S7, UKBA, WBR, LBAP[GWY]
Black-necked Grebe	<i>Podiceps nigricollis</i>	Bern, UKBA, WBA, WCA1.1
Black-tailed Godwit	<i>Limosa limosa</i>	BAP, BDir2.2, UKBR, WBA, WCA1.1, LBAP[CON, GWY]
Black-throated Diver	<i>Gavia arctica</i>	BDir1, Bern, UKBA, WBA
Common Gull	<i>Larus canus</i>	BDir2.2, UKBA, WBR
Common Scoter	<i>Melanitta nigra</i>	BDir2.2, S7, UKBR, WBA, WCA1.1, LBAP[ANG, CON, DEN, FLI, GWY]
Cormorant	<i>Phalacrocorax carbo</i>	WBA, LBAP[CON, GWY]
Cuckoo	<i>Cuculus canorus</i>	S7, UKBR, WBR, LBAP[CON, DEN, FLI, GWY]
Curlew	<i>Numenius arquata</i>	BDir2.2, S7, UKBR, WBR, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Dipper	<i>Cinclus cinclus</i>	Bern, UKBA, WBA, LBAP[CON]
Dunlin	<i>Calidris alpina</i>	Bern, UKBA, WBR, LBAP[CON, GWY]
Duncock	<i>Prunella modularis</i>	BAP, Bern, S7, UKBA, LBAP[CON]
Gadwall	<i>Anas strepera</i>	BDir2.1, UKBA, WBA, LBAP[CON, GWY]
Gannet	<i>Morus bassanus</i>	UKBA, WBA, LBAP[CON, GWY]
Golden Plover	<i>Pluvialis apricaria</i>	BDir1, BDir2.2, S7, WBR, LBAP[CON, FLI, GWY, SNP]
Goldeneye	<i>Bucephala clangula</i>	BDir2.2, UKBA, WCA1.2, LBAP[CON]
Great Black-backed Gull	<i>Larus marinus</i>	BDir2.2, UKBA, WBR
Great Northern Diver	<i>Gavia immer</i>	BDir1, Bern, UKBA, WBA, WCA1.1, LBAP[CON, GWY]
Green Woodpecker	<i>Picus viridis</i>	Bern, WBA, LBAP[CON, DEN, FLI, GWY, SNP]
Grey Plover	<i>Pluvialis squatarola</i>	BDir2.2, UKBA, WBR, LBAP[CON, GWY]
Guillemot	<i>Uria aalge</i>	UKBA, WBA, LBAP[CON]
Herring Gull	<i>Larus argentatus</i>	BAP, BDir2.2, S7, UKBR, WBR, LBAP[CON, GWY]
House Martin	<i>Delichon urbicum</i>	Bern, UKBA, WBA, LBAP[CON]
House Sparrow	<i>Passer domesticus</i>	S7, UKBR, WBA, LBAP[CON, FLI, GWY]
Kestrel	<i>Falco tinnunculus</i>	Bern, CITES, S7, UKBA, WBR, LBAP[ANG, CON, DEN, FLI, GWY]
Knot	<i>Calidris canutus</i>	BDir2.2, UKBA, WBA, LBAP[CON, GWY]
Lesser Black-backed Gull	<i>Larus fuscus</i>	BDir2.2, UKBA, WBA, LBAP[CON, GWY, SNP]
Linnet	<i>Linaria cannabina</i>	Bern, S7, UKBR, WBR, LBAP[ANG, CON, DEN, FLI, GWY]
Little Gull	<i>Hydrocoloeus minutus</i>	BDir1, Bern, WBA, WCA1.1, LBAP[CON]
Long-tailed Tit	<i>Aegithalos caudatus</i>	WBA
Mallard	<i>Anas platyrhynchos</i>	BDir2.1, UKBA, WBA, LBAP[CON, GWY]
Manx Shearwater	<i>Puffinus puffinus</i>	Bern, UKBA, WBA, LBAP[CON, GWY]
Meadow Pipit	<i>Anthus pratensis</i>	Bern, UKBA, WBA, LBAP[CON]
Mediterranean Gull	<i>Larus melanocephalus</i>	BDir1, Bern, UKBA, WBA, WCA1.1, LBAP[CON]
Mute Swan	<i>Cygnus olor</i>	BDir2.2, UKBA, WBA, LBAP[CON]
Oystercatcher	<i>Haematopus ostralegus</i>	BDir2.2, UKBA, WBA, LBAP[CON, GWY]
Red-breasted Merganser	<i>Mergus serrator</i>	BDir2.2, WBA, LBAP[CON]
Redshank	<i>Tringa totanus</i>	BDir2.2, UKBA, WBA, LBAP[ANG, CON, GWY]
Red-throated Diver	<i>Gavia stellata</i>	BDir1, Bern, WBA, WCA1.1, LBAP[CON, GWY]
Reed Bunting	<i>Emberiza schoeniclus</i>	Bern, S7, UKBA, WBA, LBAP[CON, DEN, FLI, GWY]
Ringed Plover	<i>Charadrius hiaticula</i>	Bern, S7, UKBR, WBA, LBAP[CON, GWY]
Roseate Tern	<i>Sterna dougallii</i>	BDir1, Bern, S7, UKBR, WBR, WCA1.1, LBAP[ANG, GWY]
Sand Martin	<i>Riparia riparia</i>	Bern, WBA, LBAP[CON, DEN, FLI, GWY]
Sanderling	<i>Calidris alba</i>	Bern, UKBA, WBA, LBAP[CON]
Sandwich Tern	<i>Sterna sandvicensis</i>	BDir1, Bern, UKBA, WBA, LBAP[ANG, CON, GWY]
Shag	<i>Phalacrocorax aristotelis</i>	Bern, UKBR, LBAP[CON, GWY]
Shelduck	<i>Tadorna tadorna</i>	Bern, UKBA, WBA, LBAP[CON, GWY]
Showeler	<i>Anas clypeata</i>	BDir2.1, CITES, UKBA, WBA, LBAP[ANG, CON, GWY]
Skylark	<i>Alauda arvensis</i>	BDir2.2, S7, UKBR, WBA, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Snipe	<i>Gallinago gallinago</i>	BDir2.1, UKBA, WBA, LBAP[ANG, CON, DEN, FLI, GWY]
Song Thrush	<i>Turdus philomelos</i>	BAP, BDir2.2, Bern, S7, UKBR, WBA, LBAP[ANG, CON, DEN, FLI, GWY, SNP, WRE]
Starling	<i>Sturnus vulgaris</i>	BAP, BDir2.2, Bern, S7, UKBR, WBR, LBAP[CON, FLI, GWY]
Stonechat	<i>Saxicola rubicola</i>	Bern, LBAP[ANG, CON, DEN, FLI, GWY]
Swallow	<i>Hirundo rustica</i>	Bern, WBA, LBAP[ANG, CON, GWY]
Swift	<i>Apus apus</i>	UKBA, WBA
Teal	<i>Anas crecca</i>	BDir2.1, CITES, UKBA, WBA, LBAP[ANG, CON, DEN, FLI, GWY]
Tufted Duck	<i>Aythya fuligula</i>	BDir2.1, WBA, LBAP[CON]
Turnstone	<i>Arenaria interpres</i>	Bern, UKBA, WBA, LBAP[CON, GWY]
Water Rail	<i>Rallus aquaticus</i>	BDir2.2, Bern, LBAP[CON, DEN, FLI, GWY]
Wheatear	<i>Oenanthe oenanthe</i>	Bern, WBA, LBAP[CON]
Whimbrel	<i>Numenius phaeopus</i>	BDir2.2, UKBR, WBA, WCA1.1, LBAP[CON, GWY]
Whitethroat	<i>Sylvia communis</i>	WBA, LBAP[CON]
Wigeon	<i>Anas penelope</i>	BDir2.1, CITES, UKBA, WBA, LBAP[CON, GWY]
Willow Warbler	<i>Phylloscopus trochilus</i>	UKBA, WBR, LBAP[CON]
Yellow Wagtail	<i>Motacilla flava</i>	BAP, Bern, S7, UKBR, WBR, LBAP[CON, DEN, FLI]
FISH		
Eel	<i>Anguilla anguilla</i>	RD1(UK)CR, S7, LBAP[CON, GWY]
Mackerel	<i>Scomber scombrus</i>	S7, LBAP[GWY]
Plaice	<i>Pleuronectes platessa</i>	S7, LBAP[CON, GWY]

PLANTS (HIGHER & LOWER)		
Pillwort	<i>Pilularia globulifera</i>	RD1(UK)NT, RD2(UK)NS, RD2(UK)S, S7, LBAP[ANG, CON, FLI, GWY], LI[VC49, VC51, VC52]
Sea Spleenwort	<i>Asplenium marinum</i>	LI[VC48, VC49]
Bluebell	<i>Hyacinthoides non-scripta</i>	WCA8, LBAP[ANG, CON, FLI, SNP]
Cinquefoil	<i>Potentilla erecta x anglica = P. x suberecta</i>	LBAP[GWY], LI[VC48, VC49, VC50]
Eelgrass	<i>Zostera (Zostera) marina</i>	Bern, RD1(UK)NT, LBAP[GWY], LI[VC49, VC52]
Eyebright	<i>Euphrasia arctica subsp. borealis</i>	RD1(UK)DD, RD1(Wales)NT, LBAP[GWY], LI[VC48, VC49]
Gorse	<i>Ulex europaeus x gallii</i>	LBAP[GWY], LI[VC48, VC49, VC50]
Heath Dog-violet	<i>Viola canina</i>	RD1(UK)NT, LBAP[CON, GWY], LI[VC49]
Long-bracted Sedge	<i>Carex extensa</i>	LBAP[CON], LI[VC49, VC50, VC51]
Prickly Saltwort	<i>Salsola kali subsp. kali</i>	RD1(UK)VU, S7, LBAP[GWY], LI[VC48, VC51, VC52]
Rat's-tail Fescue	<i>Vulpia myuros</i>	LBAP[GWY], LI[VC49, VC52]
Red Fescue	<i>Festuca rubra subsp. juncea</i>	LBAP[GWY], LI[VC49]
River Bristle-moss	<i>Orthotrichum rivulare</i>	RD1(Wales)LC, LI[VC49]
Sea Radish	<i>Raphanus raphanistrum subsp. maritimus</i>	LBAP[GWY], LI[VC48, VC49, VC50, VC52]
Sea-buckthorn	<i>Hippophae rhamnoides</i>	INNS, RD2(UK)NS, RD2(UK)S, LBAP[CON]
Sea-kale	<i>Crambe maritima</i>	LBAP[ANG, CON], LI[VC48, VC49, VC50, VC51]
Sharp-leaved Fluellen	<i>Kickxia elatine</i>	LBAP[CON, GWY], LI[VC48, VC49, VC50, VC51, VC52]
Welsh Poppy	<i>Meconopsis cambrica</i>	RD2(UK)NS, RD2(UK)S, LBAP[CON, DEN], LI[VC48, VC49]
INVERTEBRATES		
A beetle	<i>Opatrum sabulosum</i>	RD2(UK)NB, RD2(UK)S
A beetle (weevil)	<i>Tychius squamulatus</i>	RD2(UK)NB
Dark Green Fritillary	<i>Argynnis aglaja</i>	LBAP[FLI, GWY]
Grayling	<i>Hipparchia semele</i>	RD1(UK)VU, S7, LBAP[GWY]
Peus's Long-back Spider	<i>Mecopisthes peusi</i>	S7, LBAP[GWY]
Small Heath	<i>Coenonympha pamphilus</i>	RD1(UK)NT, S7, LBAP[GWY]
Small Pearl-bordered Fritillary	<i>Boloria selene</i>	RD1(UK)NT, S7, LBAP[CON, DEN, FLI, GWY, SNP]
Cinnabar	<i>Tyria jacobaeae</i>	S7, LBAP[GWY]
Thrift Clearwing	<i>Pyropteron muscaeformis</i>	LBAP[GWY]
Flea Bee-fly	<i>Phthiria pulicaria</i>	RD2(UK)N
Scarce Orange Legionnaire	<i>Beris clavipes (a soldier fly)</i>	RD2(UK)N
REPTILES		
Adder	<i>Vipera berus</i>	Bern, S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Common Lizard	<i>Zootoca vivipara</i>	Bern, S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Slow-worm	<i>Anguis fragilis</i>	Bern, S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
MAMMALS		
BATS		
Brown Long-eared Bat	<i>Plecotus auritus</i>	Bern, EPS, HDir, RD2(UK), S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	Bern, Bonn, EPS, HDir, RD2(UK), S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Daubenton's Bat	<i>Myotis daubentonii</i>	Bern, EPS, HDir, RD2(UK), WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	Bern, EPS, HDir, RD2(UK), S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP, WRE]
Noctule Bat	<i>Nyctalus noctula</i>	Bern, EPS, HDir, RD2(UK), S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]
Pipistrellus Bat Species	<i>Pipistrellus</i>	EPS, WCA5, LBAP[ANG, DEN, FLI, SNP]
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Bern, EPS, HDir, RD2(UK), S7, WCA5, LBAP[ANG, DEN, FLI, GWY, SNP]
Unknown Bat	<i>Chiroptera</i>	EPS, S7, WCA5, LBAP[ANG, DEN, FLI, SNP]
Whiskered/Brandt's Bat agg.	<i>Myotis mystacinus/brandtii agg.</i>	Bern, Bonn, EPS, HDir, WCA5, LBAP[ANG, CON, DEN, FLI, SNP]
OTHER MAMMALS		
Badger	<i>Meles meles</i>	Bern, PBA, LBAP[CON, DEN, FLI, WRE]
Otter	<i>Lutra lutra</i>	Bern, CITES, EPS, HDir, RD2(UK), S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP, WRE]
Water Vole	<i>Arvicola amphibius</i>	S7, WCA5, LBAP[ANG, CON, DEN, FLI, GWY, SNP]

Abbreviations

ANG	Anglesey County Council Local Biodiversity Action Plan
BAP	UK Biodiversity Action Plan
BDir1	EU Birds Directive Annexe 1
BDir2.1	EU Birds Directive Annexe 2.1
BDir2.2	EU Birds Directive Annexe 2.2
Bern	Bern Convention on the Conservation of European Wildlife and Natural Habitats
Bonn	Bonn Convention on the Conservation of Migratory Species of Wild Animals
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CON	Conwy County Borough Council Local Biodiversity Action Plan
DEN	Denbighshire County Council Local Biodiversity Action Plan
EPS	European Protected Species
FLI	Flintshire County Council Local Biodiversity Action Plan
GWY	Gwynedd County Council Local Biodiversity Action Plan
HDir	EU Habitats Directive
INNS	Invasive Non-native Species
LBAP	Local Biodiversity Action Plan species for the listed area
LI	Locally Important within the listed area
NRW	Natural Resources Wales Priority Species
PBA	Protection of Badgers Act 1992
RD1(UK)	Red Data Book listing for the UK based on IUCN guidelines

RD1(Wales)	Red Data Book listing for Wales based on IUCN guidelines
RD2(UK)	Red Data Book listing for the UK not based on IUCN guidelines
S7	Environment (Wales) Act 2016 (Section 7)
SNP	Snowdonia National Park Local Biodiversity Action Plan
UKBA	RSPB UK Birds Amber List (not based on IUCN criteria)
UKBR	RSPB UK Birds Red List (not based on IUCN criteria)
WBA	RSPB Welsh Birds Amber List (not based on IUCN criteria)
WBR	RSPB Welsh Birds Red List (not based on IUCN criteria)
WCA1.1	Wildlife & Countryside Act 1981 Schedule 1.1 (Birds which are protected at all times)
WCA1.2	Wildlife & Countryside Act 1981 Schedule 1.2 (Birds which are protected at certain times)
WCA5	Wildlife & Countryside Act 1981 Schedule 5 (Animals protected from killing and taking, possession, disturbance & sale)
WCA8	Wildlife & Countryside Act 1981 Schedule 8 (Plants which are protected)
WCA9	Wildlife & Countryside Act 1981 Schedule 9 (Non-native animals and plants which are established in the wild)
WRE	Wrexham County Council Local Biodiversity Action Plan
WVP	IUCN Threat Listing of Welsh Vascular Plants

reasonably likely that hedgehog and brown hare (both Section 7 species) may occur, although none have been seen during survey work.

2.3.5 Invertebrates

The Cofnod data records for invertebrate eleven species, with all being from either Morfa Abererch SSSI (to the west of the park) or sites to the north of the A497 near Chwilog. All these records are therefore well separated from any of the proposed development parcels.

Based on the know habitat associations of these eleven species, the only species considered reasonably likely to occur within habitats affected by the proposed developments (mainly the coastal grasslands in Parcel G) are cinnabar moth and small heath.

3 Habitats and Plant Species

3.1 Introduction

Figure 2 shows the areas covered in the habitat surveys, the proposed development Parcels and the proposed ecological mitigation areas. Figures 3a-3j show the detailed habitat maps.

3.2 Methods

The habitat survey covered the proposed development sites, immediately adjacent areas and the proposed ecological mitigation areas. It was undertaken during several visits in July, August and September 2017, April and May 2018, and June 2019. These are suitable times of the year to undertake such surveys. Additional information on habitats was also collected during other site visits.

Habitat types were coded using Phase 1 (JNCC, 2010) methods, adapted to suit local conditions as necessary. Dominant plant species within each habitat unit were recorded, and Phase 1 habitat maps have been produced (Figs. 3a-3j). Plant species lists were compiled (Appendix 2), with species abundance estimated using the qualitative 'dafor' scale (dominant, abundant, frequent, occasional, rare). Notes were made on habitat structure, and noteworthy species or other features of interest were 'target noted'. Dominant plant species are also identified for many of the vegetation units, and these are identified on the habitat maps using standard Phase 1 species abbreviations (Appendix 3).

Special attention was paid to recording the presence of non-native and potentially invasive species, especially those listed on Schedule 9 of the Wildlife & Countryside Act 1981. The locations of any such species are identified using target notes on the habitat maps.

There are no linear habitat features within the proposed development areas that could be described as hedgerows, so it has not been necessary to apply the Hedgerow Regulations 1997. However, there are several lengths of clawdd that define existing or former land parcel boundaries. These have biodiversity and cultural value and some of them support scattered trees or shrubs.

3.3 Survey Results

3.3.1 Parcel B, Lakeside West - South (Fishing) Lake (Fig. 3a)

The survey covered habitats within Parcel B to the west of the Lake, and also the wider area around and to the east of the Lake including an area proposed for ecological mitigation. Vegetation types within the proposed static caravan development area (Parcel B) comprise plantation woodlands, ruderal tall herb and the scrub dominated riparian fringes of the South Lake.

3.3.1.1 Parcel B

T1A and T1D are areas of broad-leaved plantation, c. 15m tall, with abundant ash and common alder, silver birch, sycamore, willow species,

hawthorn and Norway maple. The understory contains rhododendron, blackthorn, elder, hazel, guelder rose and bramble, and there is a damp influenced ground flora containing male and broad-buckler ferns, soft rush and creeping buttercup, and a carpet of ivy. T1D merges into an area of grey willow scrub along the lake shore.

T1C is a stand of dense young (c. 12m) planted trees dominated by grey willow, but also with silver birch (lf) and Scot's pine (o), and a dense field layer of bramble thicket and common nettle.

T1B Further west, there is an area of mature but partly derelict coniferous plantation dominated by spruce (typically about 25m tall), but also containing leylandii and Scot's pine. The area generally has a dense understory/field layer of common nettle, ivy, bramble, elder, sycamore saplings and herbs including ferns, soft rush, red campion, creeping thistle etc. There are many wind thrown trees and overgrown clearings dominated by dense bramble, cleavers, common nettle and other ruderal tall herbs, especially at the south end of the woodland (**TH1**), extending into the proposed development area.

3.3.1.2 Adjacent Land and Proposed Ecological Mitigation Area

Outside the proposed development area, the South Lake (**WB2**) has earth margins supporting patches of grey willow and common alder and a range of marginal wetland herbs including yellow flag, water mint, great willowherb, soft rush, greater bird's-foot trefoil and bulrush. Some areas of scrub, and especially along the north-west shore, are routinely cut to a height of about 2m to maintain views for adjacent caravan owners.

There are fishing pegs around the lake and several large fish (including carp) were recorded during the surveys. The three islands (habitat survey undertaken using binoculars) are mainly dominated by dense grey willow scrub, with larger trees including pine. Further away from the lake shore, beyond the fringing scrub/trees, the area contains areas of grassland (G1A-C to the east of the lake) and scrub.

Grasslands G1 form a belt up to about 50m wide between the lake and the coastal soft cliffs. Their sward is moderately species-rich, especially in sub unit G1B, and these areas have been classified as unimproved grassland. **G1A** contains a tall sward generally dominated by false oat grass with frequent sharp-flowered rush and other damp grassland herbs such as meadowsweet, yellow iris, silverweed, greater birds-foot trefoil and a little sneezewort. To the north, **G1B** contains an area of shorter, more uniform and more diverse grassland dominated by fine leaved grasses (fescues, common bent and sweet vernal grass) also containing abundant glaucous sedge, with creeping cinquefoil, oval sedge, compact rush, square-stemmed St-John's-wort, self heal, common birds-foot trefoil and red clover. Common knapweed is abundant throughout this area. The Wales Coast Path runs along the east edge of G1, and beyond that there is an eroding clay coastal cliff, with patches of unmanaged grassland (**G1C**), with stands of blackthorn, grey willow and gorse scrub, and patches of bracken and bramble growing over the cliff.

3.3.1.3 Non-native Species

A small colony (c. 1m²) of *Crococsmia x crocosmiiflora* (Montbretia), which is an invasive species listed on Schedule 9 of the Wildlife & Countryside Act, was recorded in the clearing area at the south end of TH1 (target note **TN1**).

3.3.1.4 Evaluation

The plantations within and around Parcel B are all secondary woodland and no plant species indicative of higher value ancient woodland were recorded. T1A, T1C and T1D are relatively young stands whereas T1B contains older trees, although it is dominated by non-native conifer species and significant areas suffer from disturbance (eg. TH1). These factors significantly reduce the potential biodiversity interest of all these habitats, and all the plantations all assessed to hold **Local** value. Parcel B does not contain any Section 7 priority habitats.

TB1 lies within Butlins 1 Candidate Wildlife Site, although its 'Candidate' status indicates that the designation is provisional pending detailed survey. Based on the current survey this plantation does not appear to merit Wildlife Site status.

Outside but adjacent to Parcel B, the South Lake is a significant area of open, freshwater. It is relatively undisturbed and supports a range of riparian plants and animals (including otter, see Section 7). It is included in the Butlins 1 Candidate Wildlife Site and based on the current survey would appear to merit this designation. As an area of eutrophic standing water it is a Section 7 Priority habitat under the Environment (Wales) Act 2016. This waterbody is assessed to hold **County** biodiversity value. To the east of the lake, and well away from Parcel B, the grasslands G1A-C and the maritime soft cliff habitats are features of **County** value, and they are also Section 7 priority habitats (Lowland Meadow and Maritime Cliff & Slopes) .

3.3.2 **Parcel C, Secondary Sales Area (Fig. 3b)**

Parcel C is an area of hard standing surrounded by belts of planted and mainly non-indigenous tree and shrub species. **T3** is a stand of more or less mature sycamore plantation woodland; it has an understory of bramble and common nettle with occasional shrubs (including box, Japanese privet and buddleia), and a carpet of ivy in the field layer. Areas **E1** and **E2** are ornamental shrub and tree planting, typically about 6m tall, although there is a low (c. 1.25m) ornamental hedgerow to the south. Some of these areas contain a few grey willow.

3.3.2.1 Non-native Species

None recorded.

3.3.2.2 Evaluation

This parcel is dominated by hard standing and apart from small areas of sycamore woodland (T3) and ornamental planting contains very little vegetation. The dominance of non-native sycamore in T3 reduces its potential value, but it probably provides habitat for widespread bird species so is assessed to hold **Local** value. The ornamental planting (E1 and E2) hold **Negligible** biodiversity value.

3.3.3 **Parcels F, The Beachside Site - Llyn Village Chalets and area to South East (Fig. 3c)**

Parcel F contains four lines of holiday apartments (**B1-B4**) separated by species poor amenity grassland (ie mown lawn) and a few scattered, mainly ornamental, trees and shrubs. These chalet blocks are described and assessed in relation to bats in Section 6. To the south-east of the chalets,

there is an area of species-poor amenity grassland that is mown as a lawn. The area also contains a few trees (poplar, cherry).

The scattered trees and shrubs are listed and described on Fig. 3c; none hold any potential for bat roosting.

3.3.3.1 Non-native Species

None recorded.

3.3.3.2 Evaluation

The artificial, intensively managed and species-poor habitats (ie planted ornamental trees and species poor amenity grassland) in this parcel hold **Negligible** biodiversity value.

3.3.4 **Parcel E, area West of existing staff accommodation (Fig. 3d)**

This Parcel and adjacent land contains the following habitats:

3.3.4.1 Grasslands

G2A is an unmanaged, tall, semi-improved grassland containing abundant Yorkshire fog, sweet vernal grass, common bent, perennial rye-grass, creeping bent and rough meadow grass. It has a moderately rich grassland sward and extends northwards around the staff accommodation blocks. The forb component contains a range of species typical of damp grassland including greater bird's-foot trefoil, hairy and oval sedges, lesser stitchwort, marsh thistle, rushes and square-stemmed St-John's-wort.

G2B is separated from G2A by a belt of bramble thicket, also containing a few scattered broad-leaved trees and shrubs, and patches of suckering cherry. It contains a broadly similar damp grassland community, although it is locally very disturbed and partially situated on compacted soils.

G2C was formerly (when examined in 2016) a tall unmanaged grassland, but the area was disturbed by the installation of a surface water sewer in 2018. As a result, at present, only fragments of the former grassland remain around the perimeter of the area. The remaining sward is unmanaged and tall, and rather similar in character to G2A. It contains abundant Yorkshire fog, rough meadow grass and sweet vernal grass, and patches of sharp flowered rush, pendulous and remote sedges. Forbs include silverweed, creeping buttercup, red campion and hedge woundwort and taller more competitive species including broad-leaved dock, common nettle, hogweed and cleavers. The central part of this area is largely bare, with only about 5% vegetation cover of mainly ruderal species (toad rush, curled dock) in early June 2019.

G2D Mown and species-poor amenity grassland, although very disturbed and partly bare ground.

3.3.4.2 Tree Belts and Ornamental Planting

The area contains parts of three belts of planted trees and/or shrubs (**T2A**, **T2B**), and there are several small blocks of ornamental shrub planting within the car park.

T2A is a belt of mature/semi-mature trees that extend north-east from the central part of the site. It is composed mainly of Scot's pine, with a few broad-leaved species (ash, alder, elder).

T2B runs along the railway boundary and consists of a line of tall, mature poplar trees, which are fringed by a belt of ornamental shrubs (**E3**).

3.3.4.3 Buildings

B5 is a single story building with a pitched slate roof. This building is discussed in detail in relation to bats in Section 7.

The survey area also includes several two-story chalet blocks that are used for staff accommodation. Previous surveys have confirmed that they are used by bats but they lie outside Parcel E and would not be affected by the New Masterplan proposals so they are not considered further here.

3.3.4.4 Non-Native Invasive Species

No non native potentially invasive species (including species listed on Schedule 9 of the Wildlife & Countryside Act 1981) were recorded on the site.

3.3.4.5 Non-native Species

None recorded.

3.3.4.6 Evaluation

Grassland G2A is moderately rich and large in extent, but G2B and G2C are very disturbed, unmanaged and have low to moderate diversity levels. Although not highly improved, these factors detract from their interest and they are all assessed to hold **Local** value. The species-poor and very disturbed G1D has **Negligible** value.

The plantation woodlands (T2A and T2B) provide habitat and potential dispersal routes for widespread animal species, but their relatively recent origins, non-indigenous species (eg. conifers) and small extents limit their value to **Local**.

Parcel E does not contain any Section 7 priority habitats.

3.3.5 **Parcel G Coastal grasslands (Figs. 3g)**

Parcel G consists of two agricultural fields ('North' and 'South' fields) that are separated by a belt of plantation woodland that has recently been coppiced/pollarded. Part of the South field also falls into Parcel J.

3.3.5.1 North Field - Grasslands

The grassland in this field (G6) was classified as semi-improved neutral grassland when assessed for a previous planning application in 2009 (Tattersfield, 2010), but it has been modified in several ways since then (as described below). As a result, this field exhibits considerable variation as indicated on Fig. 3g. The main areas of more or less intact grassland are identified as sub areas G6A-G6D.

Most of the area was ploughed in autumn/winter 2016, and, at the time of the July 2017 survey it was found to contain about 50% bare ground, with a sparse regenerating sward of grasses and forbs (eg. common bent, sweet vernal grass, common sorrel, silverweed etc) plus a variety of ruderal herbs that were taking advantage of the open and disturbed conditions. The north corner of the field retained an unploughed area of marshy grassland (**G6D**), dominated by rush species, which extended as a narrow strip between a low clawdd (**CW3**) and the field edge along the north east field boundary.

In mid-August 2017 this field (apart from the unploughed marshy grassland areas and clawdd) was re-sown as wildflower grassland, by cultivating to a seed bed and spreading 'green hay' taken from a local unimproved meadow. These habitat reinstatement works were agreed with Gwynedd's Senior Biodiversity Officer. The sward was found to be developing well when examined in November 2017.

In 2018/19, this field was affected by works associated with the construction of the replacement sewage treatment works, and part of it was also used to deposit silt arisings from the dredging of the boating lake. A stone surfaced access road, to service the new sewage works to the north, was constructed around the NE and SE boundaries, although the clawdd and marshy grassland along the NE boundary (G6D) were unaffected. Other parts of the field were used for storage of construction materials and spoil, and other areas were disturbed by the installation of an underground electricity supply to the new sewage works, and also by the tipping of mown grass arisings. The affected areas currently (as at June 2019) contain varying quantities of bare or semi-bare ground, with scattered colonising ruderal or grassland herbs. Overall, these activities have resulted in the removal or significant disturbance to roughly 80-90% of the resown wildflower grassland.

As of June 2019, three areas of less disturbed semi-improved grassland (in addition to the marshy grassland) remain. **G6A** is a small, grass dominated area of undisturbed grassland containing abundant cock's-foot, sweet vernal grass and Yorkshire fog, with frequent common sorrel and silverweed. **G6B** is largely undisturbed although locally suffers from compaction caused by vehicle movements. Its sward is moderately rich, containing abundant yellow rattle and ribwort plantain, and other species typical of unimproved grassland such as eyebright, lesser stitchwort, black knapweed common bird's-foot trefoil and common cat's-ear. This area has presumably established as a result of the re-sowing of the field with green hay. Area **G6C** has been very disturbed and contains deep vehicle ruts and compacted ground. However, it retains about 70% grassland cover and supports several species that have either recovered from the former sward, or been reintroduced via green hay; these include sharp-flowered rush, yellow rattle, eyebright, lesser stitchwort and common cat's-ear.

The marshy grassland **G6D** appears to be the only part of G6 that has not been significantly disturbed. At the time of the June 2019 survey this area was locally flooded. Its sward contains abundant meadow foxtail, creeping bent, red fescue and rough meadow grass, with forbs typical of wet grassland including marsh bedstraw, lady's smock, silverweed, meadowsweet, common spike-rush, several rush species and greater bird's-foot trefoil.

3.3.5.2 North Field - Plantation Woodlands

G6 is surrounded by quite dense **plantation woodland (T6)**, with trees typically about 15m tall (**T6A**). Section **T6B** of this plantation has been coppiced/pollarded and contained bramble thicket and re-growing trees and shrubs when examined in June 2019. The south west section of T6A contains an old stone faced clawdd (**CW2**); it runs parallel with watercourse WC1 and supports over mature hawthorn and four beech trees.

Ash, sycamore and common alder are frequent in T6, along with a pine and silver birch. There is a shrubby understory, often dominated by dogwood and common hawthorn, and the field layer is dominated by bramble, with a sparse scattering of ferns (lady, broad-buckler and male) and common herbs such as ragwort, cleavers, creeping thistle and ivy. Small sections of plantation have been removed to provide access, and to install the electricity supply to the new sewage treatment plant to the north.

3.3.5.3 South Field - Grasslands

This parcel of agricultural grassland is dominated by **semi-improved sheep-grazed pasture (G7)**. The field is bounded by soft cliffs to the south-east, the coppiced plantation woodland T6B to the north-west, flowing watercourse WC1 to the south-west and a clawdd (**CW4**) to the north-east. The Wales Coast Path (an un-surfaced grass path) runs through this field, above the cliffs, across grasslands G7A and G7C.

The main area (**G7A**) contains a reasonably dense sward with abundant common bent and Yorkshire fog, and a forb component including eyebright, common and greater bird's-foot trefoil, common cat's-ear and creeping cinquefoil. Locally, there is variation in sward structure and/or composition, including **G7B**, which has a denser sward with locally abundant characteristic damp grassland species such as silverweed, sharp-flowered rush and meadowsweet. **G7C** has a taller sward, which merges with a belt of bramble thicket along the south-west boundary. **G7D** supports a very small but strongly contrasting patch of unimproved acidic grassland (c. 7 x 5m), dominated by heath grass, with tormentil, eyebright, common bird'-foot trefoil and common cat's-ear.

D1 identifies the course of a ditch or possibly a former fluvial channel that is poorly drained and now dominated by soft rush, meadowsweet and silverweed, with locally frequent sharp-flowered rush, and tall grasses (false-oat grass). At its north end the ditch opens up into an area dominated by silverweed (**G7F**).

Running parallel and immediately to the south of D1 there is an area **ruderal tall herb (TH2)** dominated by common nettle and creeping thistle, where horticultural prunings and grass clippings have been tipped. This area contains several non-indigenous species, including false Virginia creeper, fuchsia and a bridewort, probably *Spiraea x pseudosalicifolia* (see target notes).

3.3.5.4 Non-native Species

TN7 *Fuchsia magellanica*. Also other exotic herbs from tipping.

TN8 False Virginia creeper, c. 3 x 3m. Also a bridewort, probably *Spiraea x pseudosalicifolia*

3.3.5.5 Evaluation

The grasslands in the North field (G6) have been damaged and there is ongoing disturbance, and parts of G7 have also been disturbed. This limits the current value of these grasslands. However, several species indicative of unimproved conditions are present (eg. eyebright, yellow rattle, common cat's-ear, bird's-foot trefoils, heath grass and tormentil), and the small areas of marshy grassland (G6D and D1) also indicate that agricultural management has not been intensive. As such, grasslands G6 and G7 are both assessed to be semi-improved neutral grassland, and are classified as

Section 7 priority habitat ('Lowland Meadows') under the Environment (Wales) Act 2016. Such grasslands have diminished greatly across the country⁵ and are recognised as holding high conservation value; they are Priority habitats and targets have been defined for their maintenance and restoration. The 2016 State of Natural Resources Report (SoNaRR) (NRW, 2016) estimates a total of 78,000ha of Priority (Section 7) grassland habitat remaining in Wales, of which an estimated 42,900ha falls in the Lowland Meadow category. Within Gwynedd, Jones et al (2003) estimate a total of 30ha of Lowland Meadow habitat⁶. Because of these declines and the scarcity of this grassland type in both Gwynedd and Wales, these grasslands are assessed to hold **County** importance.

The plantation woodland habitats (T6A, T6B) contribute to overall habitat diversity and connectivity in the general area, and are used by a variety of widespread animals. However, their relatively recent origin and presence of non-indigenous species limits their wider importance and they are assessed to hold **Local** value.

The flowing watercourse (WC1) and sections of clawdd (CW3, CW4) also hold **Local** value; the cloddiau also have cultural interest.

No protected or uncommon plant species were recorded in Parcel G during the survey, and none are listed on the Section 7 list of Priority Species in the Environment (Wales) Act.

3.3.6 Parcel H - Former Sewage Treatment Plant (STP) (Fig. 3f)

This plant has been decommissioned and demolished and all infrastructure (tanks, buildings) has now been removed. As at June 2019, most of the site consists of bare and barely vegetated ground, although peripheral habitats remain in the northern part of the site (Fig. 3f).

Woodland **T5A** is a stand of semi-mature to mature broad-leaved plantation dominated by sycamore, and **T5C** and **T5D** are more recently established, mainly native, planting containing hazel, silver birch, ash, hawthorn, common alder and other species. Deep within plantation woodland T5A, along the north-east boundary of the compound and running parallel with the deeply incised flowing watercourse (**WC1**), there is an overgrown stone faced clawdd (**CW1**). There is also a fragment of coniferous (pine) (**T5B**) woodland along the south edge, and a few isolated pine trees in the centre of the site.

Other vegetation types present include areas of bramble and tall ruderal herb (common nettle and broad-leaved dock), and a stand of grey willow about 3-4m tall. There are two areas of unmanaged grassland remaining in the east part of the site. **G3A** is dominated by red fescue and Yorkshire fog and has become established on a substrate of broken slate. It contains a variety of short grassland forbs including common centaury, silverweed, self-heal, cut-leaved cranesbill, Smith's pepperwort and lesser trefoil. **G3B** is a very small patch of tall, dense grassland dominated by Yorkshire fog and common bent with tall herbs and bramble.

Although G3A, G3B and T5C are within the former STP fence so have been covered in this section, they technically lie within Parcel J on the Masterplan.

⁵ estimated 97% decline in semi-natural grasslands across Wales between 1930-84 (NRW, 2016)

⁶ Comprising grasslands assigned to NVC communities MG4, MG5 or MG8.

3.3.6.1 Non-native Species

Stand of sea buckthorn (fruiting) at **TN5**, and a couple of plants of montbretia at **TN9**.

3.3.6.2 Evaluation:

No protected, uncommon or Section 7 plant species were recorded in Parcel H.

The woodlands are all relatively recent plantations and small in extent. T5A and T5B are dominated by non-indigenous sycamore and conifers, which detracts from potential interest. The stone faced clawdd CW1 holds cultural value. Grasslands (G3A and G3B) are very small in extent, unmanaged and relatively species-poor.

These remaining habitats hold limited biodiversity interest and they are all assessed to hold **Local** value.

3.3.7 **Parcel I Land to north west of former sewage treatment plant (Fig. 3e)**

Figure 3e shows the habitats on Parcel I as at June 2019, and these are described below. However, much of the remaining habitat will be removed before October 2019, under provisions made in planning permission C10D/0141/40/LL, and as explained below.

3.3.7.1 Ecological issues associated with Planning Permission C10D/0141/40/LL

This area benefits from planning permission for static caravan development under C10D/0141/40/LL (where it referred to as Parcel D3). Nineteen caravan bases and associated infrastructure were constructed in winter 2018/19 and a further nine bases are proposed for construction in winter 2019/20. Parcel I is the residual part of D3 that will not have been developed by the end of winter 2019/20.

The main ecological issue affecting development on D3 has been the presence of a significant population of reptiles (including slow worm, common lizard, adder and grass snake). An *Ecological Mitigation and Enhancement Plan* (EMEP), which sets out a reptile mitigation scheme, has been prepared and approved by GCC under planning condition. The scheme, which involved the removal and translocation of reptiles from the area to a specially prepared receptor site, was completed in June 2019. A reptile fence around the receptor site has been maintained to prevent reptiles from attempting to return to D3.

Completion of reptile removal operations has been agreed with Gwynedd Council (GCC). The remaining vegetation on D3, including all of Parcel I, will now be stripped and the ground made unsuitable for reptiles (following the end of the bird nesting season). These measures have been agreed with GCC to prevent possible recolonisation of the area by reptiles.

Thus, for the purposes of this assessment it is assumed that all habitats and species within Parcel I have been removed, and the area therefore contains **Negligible** value.

3.3.7.2 Habitats

Figure 3e shows the status of habitats in Parcel I, and also in the remainder of Parcel D3, in June 2019.

An unnamed **flowing watercourse (WC1)** in a relatively wide (c. 5m), deep (c. 1.7m) and very steep sided channel runs along the north west and north east sides of this area. The channel contains stands of flote grass, watercress and soft rush, and the banks support patches of grey willow and hawthorn with bramble thicket, unmanaged grassland and tall herbs such as common nettle and greater willowherb. A section of about 100m, adjacent to the recent 19 base development, has been modified to form a berm that can be used for maintenance access; this re-graded area is currently (June 2019) largely bare ground, although grassland is likely to colonise rapidly.

Unmanaged Grassland G4A is dominated by false-oat grass, with abundant Yorkshire fog and cock's-foot, and patches of finer grasses such as red fescue and common bent. The sward is species-poor and the area contains some extensive stands of ruderal tall herbs including rosebay willowherb, docks, creeping thistle, common nettle and ragwort. In NVC terminology, this is false oat grass mesotrophic grassland (MG1). There are extensive patches of dense bramble thicket around the margins of G4A, and beyond these there are stands of grey willow scrub, also with some buddleia.

To the south-east of G4A there is an area of tall ruderal herb vegetation (**TH4A**) containing species including cleavers, bellbine, common nettle, thistles, docks and Himalayan balsam. Inorganic (block work, soil, rubble etc) and organic (prunings, grass clippings etc) material has previously been tipped in this area.

There is a large area of **disturbed, compacted largely bare ground** further to east, between the former sewage treatment works and recent caravan development. This area is mounded and has been frequently accessed by large mobile plant.

Plantation woodland T4A (c. 12-15m tall), to the north and north east of the watercourse, contains predominantly native species - ash, hazel, hawthorn, dogwood, common alder, silver birch, rowan, elder, sycamore and Scot's pine. The understory consists of elder and dogwood, and there is a field layer of bramble with ferns and mosses, and very locally a carpet of ivy. A small section of this plantation and clawdd has been removed to install an electricity supply to new sewage works. There is a further, smaller block of **plantation woodland T4B** containing mainly non-indigenous species (sycamore) at the south end of Parcel I.

3.3.7.3 Non-native Species

- TN2** Extensive stands of Himalayan balsam along watercourse.
- TN3** False Virginia creeper c. 3 x 4 m.
- TN4** Tutsan
- TH6** A few Himalayan balsam plants along track margins

3.3.7.4 Evaluation

See above. It is assumed that all vegetation will have been removed from Parcel I, and that site will be maintained in such a condition until development takes place. Therefore the baseline conditions are assumed to be a bare site, and Parcel I's habitats are assumed to hold **Negligible** biodiversity value.

3.3.8 Parcel J Coastal Defences (Fig. 3h)

Parcel J extends across parts of the grassland in the South coastal field, (G7A, G7C and part of cloddiau CW4), which have been assessed under Parcel G. Similarly, G3A, G3B and T5C also lie within Parcel J, but have been described and assessed under Parcel H because they lie within the fence of the former sewage treatment plant.

Terrestrial habitats confined to Parcel J, and which are assessed here, comprise unmanaged grassland G7E, about 200 metres of soft maritime cliff and part of grassland G8.

G7E is a narrow belt of dense and unmanaged grassland, above an **eroding coastal clay (soft) cliff**. It is fenced off by a post and wire fence from the adjacent sheep pasture in G7A and G7C. False oat grass, common bent and cock's-foot are frequent to abundant in G7E, plus a small stand of marram grass. The forb component is generally rather poor, and mainly dominated by competitive species such as hogweed, ribwort plantain, common sorrel, creeping thistle and common horsetail. There are also scattered patches of bramble, blackthorn and grey willow.

The maritime soft cliff is more or less vertical, mostly open (ie not covered by scrub), approximately 2m tall and formed in clay. It is evidently subject to ongoing erosion and where sections have collapsed, there are patches of grassland and a little scrub (dog rose, bramble) at the base of the cliff. These areas contain a similar flora to G7E, although they are perhaps richer, also containing a variety of leguminous species such as bird's-foot, common vetch, smooth tare, broad-leaved everlasting pea and locally abundant common bird's-foot trefoil.

3.3.8.1 Non-native Species

The coastal cliff contains colonies of broad-leaved everlasting pea.

3.3.8.2 Evaluation & Interpretation

No protected, uncommon or Section 7 plant species were recorded in Parcel J. However, grasslands G7A and G7C hold **County** value and clodd CW4 has **Local** (and cultural) value (see Parcel G for detailed evaluation of these habitats, para. 3.3.5).

The soft maritime cliff is a Section 7 priority habitat ('Maritime Cliff & Slopes') under the Environment (Wales) Act 2016, and it holds **County** value. It also supports a County value aculeate (bee and wasp) fauna (see Section 9).

3.3.9 Disused Car Park North of A497 (proposed ecological mitigation area) (Fig. 3i)

This area was surveyed on 29 April 2019. It is a former car parking area and is covered with crushed slate and granite (**EP1** on Fig. 3i). It has evidently not been used for parking for some time and now supports an open and sparse cover (about 5-20% vegetation cover overall). The area contains a large number of plant species, including both annual and perennial species, that are exploiting the varying soil conditions. Frequent species include buck's-horn and greater plantains. common bird's-foot trefoil, self-heal, common vetch, English stonecrop, procumbent pearlwort, sheep's sorrel and lesser trefoil.

A stone wall with patches of grey willow scrub runs along the south edge of the area, and there is a broad belt of dense grey willow, common gorse and/or mixed (hawthorn and blackthorn dominated) scrub along the north part of the site.

There are two small areas of closed grassland. **G11** is unmanaged cock's-foot dominated grassland. Its sward includes tall competitive species such as hogweed and bramble, and also shorter forbs such as common bird's-foot trefoil, common vetch, common cat's-ear, perforate St-John's-wort and ribwort plantain.

G12 is a open lens between belts of scrub. It is dominated by a *Cladonia* lichen species, and a *Polytrichum* moss, along with frequent wood sage and has been classified as acidic grassland.

Three juvenile slow worms were recorded in the north west part of the former car park during the survey (target note **TN11**)

3.3.9.1 Evaluation & Interpretation

The impoverished and infertile skeletal soils and crushed rock substrates on this area have encouraged the development of a sparse but reasonably rich variety of plants to colonise. Whilst not currently representing an area of high conservation value, these infertile ground/soil characteristics represent good conditions to create rich and ecologically valuable habitats.

3.3.10 **Afon Wen Fields (proposed ecological mitigation area) (Fig. 3j)**

These comprise three agricultural enclosures (G8, G9 and G10) to the east of the new sewage treatment works. The following accounts are based on surveys in 2017. When surveyed in 2011 these fields contained a rather different grassland community with abundant yellow rattle and eyebright throughout.

These fields have previously been stocked regularly with sheep, but grazing frequency and intensity appears to have declined considerably over recent years and this probably accounts for the observed changes, the sward having become denser over this period.

G8 supports a moderately rich semi-improved grassland. The sward is dominated by Yorkshire fog, sweet vernal grass and common bent, but also contains abundant/frequent ribwort plantain, common bird's-foot trefoil and eyebright with lesser quantities of yellow rattle and common cat's-ear. The sward is richer at the north end of G8 and is broadly similar to that in the adjacent field (G7A) to the south .

G9 contains a rather species-poor and homogeneous, semi-improved neutral grassland sward dominated by grasses (common bent, sweet vernal grass and Yorkshire fog). Ribwort plantain, silverweed and white clover are frequent but other forbs are generally sparse, although they include eyebright, common and greater bird's-foot trefoils, lesser stitchwort and a yellow rattle. There is some localised variation in G9, including what was probably once a fluvial channel that is now dominated by silverweed, and stands of creeping thistle along the field margins.

G10 is similarly rather poor and grass dominated (Yorkshire fog). Its forb component is not rich, and the more notable species are rare and localised, including common bird's-foot trefoil and eyebright.

Several cloddiau, mostly in reasonably good condition, are present between these fields and some support stands of rather old and leggy hawthorn.

Evaluation:

These areas are proposed for ecological mitigation so formal evaluation is not necessary. However, no protected, uncommon or Section 7 plant species were recorded.

Comparison of 2011 and 2017 surveys shows that the grassland community has changed, and this is almost certainly due to the removal/relaxation of grazing regimes. There is no indication that these grasslands have been improved agriculturally (for example, perennial rye grass is rare or absent) by, for example, resowing or applications of inorganic fertiliser. For this reason, it is very likely that valuable grassland community could be established via good management and inoculation with additional wildflower seed.

4 Reptiles

4.1 Historical Reptile Surveys

Previous surveys at Hafan y Môr, in 2009, 2016 and 2017, have shown that undeveloped areas on the holiday park can support reptile populations, with particularly suitable areas containing up to four species - common lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*), slow worm (*Anguis fragilis*) and adder (*Viperus berus*). These historical surveys provide useful information about the general status of reptiles on the site, including some areas currently being assessed.

In particular, a survey in 2009 confirmed populations of all four species on **Parcel I** (referred to as Parcel D3 under the 2011 planning consent), although the populations have now been translocated to a purpose built receptor site (as required under planning conditions) in order to make way for the consented development. As per the agreed mitigation strategy (Tattersfield, 2019), this site will be cleared and compacted later in 2019, to prevent reptile recolonisation and for the purposes of this assessment it is assumed to not support any reptile populations. Subsequent monitoring on the receptor site has shown that the populations have been successfully re-established.

A reptile survey in 2016 confirmed that very small areas of grassland in **Parcel H** (the former sewage treatment works site) supported a small population of slow worms, although, again, this was transferred to the receptor site prior to the relocation of the sewage treatment works in 2018.

The 2016 survey also identified a slow worm population and a single adder record in grassland in or close to **Parcel E**, and a survey in 2017 confirmed a small population of common lizards in denser grassland around the edge of coastal field G7 in **Parcels G and J**.

4.2 Scope of Reptile Assessment and Survey

Additional reptile surveys have been undertaken in potentially suitable habitat to support this assessment.

The following areas have been surveyed in 2019:

Parcel E - several areas of grassland in and around this parcel were assessed to be potentially suitable for reptiles. Reptile presence was confirmed in 2016 survey (see above), but there have been several changes in the area since then so new surveys have been undertaken to establish the current status of reptiles.

Parcels G and J - areas of denser grassland (G6A, G6C, G6D, G7B, G7C, G7E) are assessed to be potentially suitable, especially a strip of unmanaged grassland (G7E) along the top of the maritime soft cliff. The agricultural enclosures (G6 and G7) were formerly grazed or mown and therefore unsuitable for reptiles at that time, but they have been unmanaged over the past 12-18 months and the sward has thickened and become more suitable for reptiles.

Reptile surveys are not considered necessary in the following areas:

Parcel B, C and F - no significant areas of potential reptile habitat are present on these Parcels, although experience has shown that occasional reptiles may occur in low numbers almost anywhere at Hafan y Môr.

Parcel H and I - reptiles have been translocated from these areas prior to development and they are now deemed to be reptile free (see above).

4.3 Methods

The reptile survey was undertaken across potentially suitable habitats in June 2019 using methods recommended in Froglife (1999) and Gent & Gibson (1998). The objective was to detect any reptile species present in Parcels E and G/J.

A total of 164 artificial reptile refugia were distributed (Figs. 4a-4e) across the site on 15 June 2019, with 127 in the coastal fields (G6 and G7 in Parcel G) and 37 in and close to Parcel E. The refugia consisted of 0.5m x 0.5m approx. sheets of bituminous roofing felt. Reptiles are attracted to use these refugia for basking and may be found either beneath the refugia or on their upper surfaces. The density of refugia used in this survey is much higher than that recommended in Froglife (1999) and Gent & Gibson (1998), so this increases the chances of detecting any reptile populations present.

The refugia were allowed to 'bed in' for five days and then they were checked for reptiles on 11 occasions over seven days, between 20 June and 27 June 2019. Reptiles not associated specifically with the artificial refugia were also searched for by slowly walking across the site and examining potential basking sites (eg. piles of dried shrub prunings).

Weather conditions (Table 4.1) were suitable for reptile activity during each survey with low wind speeds and moderate cloud cover and temperatures.

The reptile survey was designed and coordinated by Peter Tattersfield PhD MCIEEM and undertaken by Neil Griffiths who has extensive experience in reptile monitoring.

<i>Date</i>	<i>Time Start</i>	<i>Time End</i>	<i>Temp. Start °C</i>	<i>Temp. End °C</i>	<i>Wind Speed (mph)</i>	<i>Wind direction</i>	<i>Cloud Cover</i>	<i>Mats warm?</i>	<i>Weather conditions</i>
20/6/19	13.00	13.00	17	16	6 - 10	SW	6/8	Y	
22/6/19	09.43	09.56	18	19	1 - 3	S	2/8	Y	Damp
22/6/19	11.25	11.38	19	19	2 - 4	SW	1/8	Y	
23/6/19	13.17	13.32	19	18	3 - 10	E	8/8	Y	Dry
23/6/19	14.57	15.10	19	19	2 - 8	E	7/8	Y	
24/6/19	11.00	11.13	19	19	0 - 4	E	8/8	Y	Wet
24/6/19	12.40	12.54	19	19	1 - 4	E	8/8	Y	
25/6/19	11.55	12.07	17	17	0 - 5	SW	8/8	Most Y	Wet
25/6/19	13.15	13.27	19	19	1 - 4	SW	8/8	Y	
26/6/19	10.00	10.13	19	19	2 - 6	N	2/8	Y	Damp
27/6/19	09.45	09.56	21	21	3 - 7	N	0/8	Y	Damp

Table 4.1 Dates and weather conditions during the reptile survey

4.3.1 Survey Constraints

Weather conditions were good during the survey and overall the survey results are considered to be both reliable and comprehensive.

Ideally, the visits could have been spread over a longer time frame, although the large number of records made demonstrates that the resident reptile populations rapidly adopted the refugia. Doubling up the visits on most days also achieved coverage across a wider range of weather conditions, thus also mitigating for this minor limitation.

4.4 Results

The total number of reptile records and their distribution is shown on Figs. 4a-4e.

4.4.1.1 Parcel E

One species, slow worm, was recorded, with all six records being restricted to grassland G2C, mainly in a belt parallel with the railway and all just outside the Parcel boundary. There are no barriers to dispersal between these records and potentially suitable habitats within Parcel E, so it is reasonably likely that slow worms may also utilise Parcel E (either at present or in the future). Slow worms are also likely to spread into areas adjacent to G2C as vegetation recolonises the areas that are currently bare ground. Only six records were made suggesting that the site supports a low population.

4.4.1.2 Parcels G and J

In total, 459 reptile records were made, comprising 1 adder, 2 common lizard, 4 grass snake and 452 slow worm records.

These results indicate that Parcel G/J supports a reasonably large slow worm population, especially in the unmanaged cliff top grassland G7E. Smaller numbers were recorded elsewhere in G7, and also in undisturbed grassland G6D at the north end of the North coastal field.

The single adder and two common lizard records were also made in the cliff top grassland G7E. This grassland probably supports a small resident lizard population. The single adder may also indicate a resident population, or perhaps more likely a dispersing animal that was utilising the denser cover provided by this unmanaged grassland. The four grass snake records in G7C are very likely to represent a single animal - all were of a male individual and the records were from just two refugia that were close to each other.

No formal reptile survey was undertaken in the disused car park north of A497, but three juvenile slow worms were found during the habitat survey, under debris, on 29/4/19 (see TN11 on Fig. 3i).

4.5 Interpretation and Evaluation

It is very likely that some of these records, and possibly many, represent the same individual, so the total counts provide only a relative indication of population status.

Froglife Advice Sheet 10 (1999, available on <http://www.froglife.org/FAS/FAS10.pdf>) provides advice on interpreting

reptile survey results, and suggests criteria for the identification of important reptile sites (known as 'Key Reptile Sites'). Using this framework, reptile populations are assigned to 'Low', 'Good' and 'Exceptional' populations depending on the maximum number of adults seen by observation and/or under tins (placed at a density of up to 10 per hectare), by one person in one day⁷. Low, Good and Exceptional populations score 1, 2 and 3 points respectively. Table 4.2 shows the evaluation based on this method.

Table 4.2 Evaluation of reptile faunas on Parcels E and G using Key Reptile Site criteria. No records seen on one day in brackets.

Parcel	Adder	Common Lizard	Grass Snake	Slow Worm	Total Points
Parcel E				Low (2)	2
Parcel G/J	Low (1)	Low (1)	Low (2)	Exceptional (103)	6

The slow worm population in Parcel G/J is classified as 'Exceptional' (count > 20) and all of the other species' populations were classified as 'Low' (count < 5).

Using the Froglife (1999) evaluation criteria, Parcel G/J would merit classification as a *Key Reptile Site* based on its overall reptile assemblage point count of 6 (a total score of at least 4 points is required), and also because it supports three species.

The slow worm population recorded adjacent to Parcel E has Low value.

All four reptile species recorded are Section 7 species of principal importance in Wales.

In terms of the IEEM (2006) evaluation framework, the small slow worm population on Parcel E is assessed to hold **Local** value, whereas the larger populations of four species in Parcel G/J are valued at the **County** level.

However, it is also important to recognise that these reptile colonies represent members of a wider reptile 'metapopulation' that occupies patches of suitable habitat, both within and outside the holiday park. There is likely to be interchange of individual reptiles between areas of suitable habitat, so the colonies on Parcels E and G/J contribute to the value of this wider metapopulation which may also be regarded as holding County value.

4.5.1 Legislation

The slow-worm and adder are afforded partial protection under Section 9(1) of the Wildlife & Countryside Act 1981, as amended. This makes it an offence to intentionally kill or injure these species of reptile. The Act also provides a defence against these offences if the action was 'the incidental result of a lawful action that could not reasonably have been avoided'.

There is no licensing system to derogate the intentional killing or injuring of reptiles for the purpose of development and therefore due caution is required to avoid/reduce the risk of mortality/injury to reptiles during site clearance.

⁷ application of the Froglife evaluation method needs to be done tentatively because the survey methods used here departed from those recommended by Froglife (in particular, a higher density of refugia were placed). However, this evaluation method does provide a simple way of comparing and assessing the reptile populations.

5 Breeding Birds

5.1 Objectives

The main objective of the bird survey was to establish the status of grassland bird species such as skylark, meadow pipit etc on the two coastal fields in Parcels G and J (G6 and G7). Skylark and several other farmland bird species have declined strongly across the UK in recent years and their conservation importance has been recognised by their inclusion in the Section 7 list, and also on the BTO's list of Birds of Conservation Concern (BOCC) (<https://www.bto.org/science/monitoring/psob>).

5.2 Methods

Parcels G and J, which comprise two fields (G6 and G7), were covered in the survey (Figure 5). The survey drew on various published methodologies including that of the Breeding Bird Survey (BBS) that was devised by the British Trust for Ornithology (BTO), Royal Society for the Protection of Birds (RSPB) and the Joint Nature Conservancy Council (JNCC) (Gilbert *et al.* 1998), and species specific methods for skylark (Gilbert *et al.* 1998). These methodologies typically require up to four visits to be made between late March and early July, with each visit being at least two to four weeks apart. However, in this case three visits were considered to be sufficient and surveys were undertaken in good conditions in April, May and June 2019. This number and spread of surveys is considered appropriate to meet the general objectives defined above.

Surveys were undertaken in the morning and at least one hour after sunrise under good weather conditions (Table 5.1).

Date	Time (start)	Temp °C	Wind	Cloud Cover
27/4/19	08.20	11	East, 2-5 mph	8/8
11/5/19	06.40	7	East, 2-4 mph	1/8
6/6/19	06.40	11	West, 0-3 mph	5/8

Table 5.1 Dates and weather conditions during the bird surveys

All bird species were recorded, and the following were noted:

- bird numbers, species, age and sex;
- habitats being used; and
- bird behaviour, e.g. singing, feeding, paying particular attention to evidence of breeding.

The site was surveyed by following a predetermined route at a slow walking pace, with longer periods of observation being made at strategic points. Sightings were registered on a base map using standard BTO species codes.

5.2.1 Survey Limitations

It is recognised that the methods adopted do not strictly meet those recommended for formal BBS. However, the fieldwork undertaken is considered adequate to address the primary objectives of the survey, which was to establish the presence and likely status of any grassland or farmland bird species.

5.3 Results

In total 19 bird species were recorded across the wider survey area (Table 5.2), although five of these (carrion crow, kingfisher, magpie, sand martin and swallow) were solely recorded flying over the site, and the Canada geese were clearly only passing through and/or feeding in the northern field (G6). If these species are excluded, the total is therefore 13 species, of which three (common whitethroat, meadow pipit and dunnock) are Amber listed Birds of Conservation Concern, and the dunnock is also on the Section 7 list of species of principal importance in Wales.

Meadow pipit, which is a grassland nesting bird species, were assessed to be probably nesting at the north end of G7, in the vicinity of clawdd CW4 (see Fig. 3h). Apart from this species, no other grassland nesting birds were recorded during the survey.

5.4 Interpretation & Evaluation

The survey shows that neither field supports a significant breeding grassland bird fauna and there are several reasons why these areas are probably relatively unattractive to ground nesting birds. The North coastal field (G6) has been very disturbed by a construction access route and storage areas, and silt arisings from lake dredging operations were spread across part of it in winter 2018/19 (see Section 3.3.5.1). In its current very disturbed state it is unlikely to be attractive to ground nesting grassland birds and none were recorded in it.

The South coastal field (G7) contains more intact grassland, but is also suffers from some disturbance caused by the tipping or plant matter (grass mowings and shrub prunings), and also because of the proximity of the coastal path that is used by pedestrians and dog walkers. However, this area does support a small number (probably one or two pairs) of meadow pipit, which as a species is suffering from moderate declines nationally and, as such, is an Amber listed bird of conservation concern. G7 also supports probably breeding common whitethroat (probably two pairs), which is also an Amber listed species. As a result, this field's bird fauna is assessed to hold **Local** biodiversity value.

Other species of note include up to ten sand martins, which were seen flying in vicinity of, and many have been nesting in, the soft clay cliffs below grassland G7E. A kingfisher (Amber listed) was noted where the small watercourse (WC1) exits onto the beach at the north end of G7. The plantation belts are used by a range of widespread and common species, including dunnock, which is an Amber listed species.

All nesting birds are protected under the Wildlife & Countryside Act 1981 (see Appendix 1)

Species	Conservation Status	Grassland G6 & surrounding plantation belts			Grassland G7 & boundaries (apart from NE)			Assessed Breeding Status	Notes
		27/04/2019	11/05/2019	06/06/2019	27/04/2019	11/05/2019	06/06/2019		
Blackbird		1	2 + 1	2	2	1	1	Probable breeder	Scrub/trees around boundaries
Blackcap		2	1	1				Possible breeder	
Blue tit		1	1	1				Possible breeder	
Canada goose		2 + 3FO	6						Feeding and passing through only
Carrion crow			1FO						Flyover only
Chaffinch					1	1		Possible breeder	
Chiffchaff		2	2 + 1	1				Probable breeder	Plantation belts
Common whitethroat	Amber list				2	2		Probable breeder G7	Associated with grassland G7B
Duncock	Amber list; Section 7	1							
Great spotted woodpecker			1						
Great tit		1	1	1				Possible breeder	
Kingfisher	Amber list					1FO			Around exit of watercourse to beach
Magpie		3FO	2FO						
Meadow pipit	Amber list				2	2 + 1	2	Probable breeder G6	North end of G7A, close to clawdd
Robin		1	1	1				Probable breeder	
Sand martin					10FO	4FO		Possible breeder	Several holes in soft maritime cliffs
Stonechat							1		Scrub in G7E (probably nesting on reptile receptor site)
Swallow	Amber list						2FO		Flying over only
Wren		1 + 1	2	1	1 + 1	1	1	Probable breeder	

TABLE 5.2 Results of the 2019 breeding bird survey Key: red = singing birds; FO = flying over site.

Notes: Amber and Red lists: *Birds of Conservation Concern 4*: https://www.bto.org/sites/default/files/shared_documents/publications/birds-conservation-concern/birds-of-conservation-concern-4-leaflet.pdf. Section 7 list of species of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales, Environment (Wales) Act 2016.

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6 Bats

6.1 Introduction

Previous surveys at Hafan y Môr Holiday Park (eg. Tattersfield, 2010) have identified several bat species and roosts.

Bat surveys for the current proposals have focussed on establishing the presence of roosts in the affected buildings, the roosting potential of trees on the site, and the general levels and patterns of bat activity associated with habitats across the development parcels.

6.2 Methods

6.2.1 Scoping Survey

A preliminary scoping survey of the site was carried out on 18 July 2017, to identify habitats and features within the development Parcels with the potential to support bats, particularly buildings and trees. This information was then used to develop an appropriate and targeted bat survey methodology.

The scoping survey identified the following habitats and features within the proposed development areas that were assessed to hold the potential to support bats:

- four blocks of holiday chalets in Llyn Village (B1-B4 on Fig. 3c);
- various plantation woodland habitats (see habitat maps Figs. 3a-3h).

Subsequent surveys therefore focused on these areas/features as they were considered most likely to support the target species. Daytime and nocturnal surveys were carried out as appropriate, and wider bat activity surveys supported by results from static bat detectors were also undertaken.

6.2.2 Field Surveys

6.2.2.1 Daytime Inspection Survey

Inspection surveys of the Llyn Village chalets B1-B4 were carried out during daylight hours between 30 August 2017 and 28 June 2019⁸ following the methodology outlined in the *Bat Mitigation Guidelines* (Mitchell-Jones 2004) and *Bat Surveys Good Practice Guidelines* (Collins 2016). The survey involved systematically searching the exterior of the buildings for bats and their field signs with the aid of ladders, endoscope (ProVision 300), close-focusing binoculars (Opticron Countryman BGA 8x42) and a powerful torch (Clulite 1M candle-power). Such signs may include insect remains, droppings, grease marks, urine stains and smoothing or lack of cobwebs. Buildings were assigned to a roost potential category based on the criteria presented in Table 6.1 (Collins 2016).

Additionally, an initial ground level roost assessment of trees within the development zones was undertaken. This involved an inspection of the

⁸ The chalets were also subject to external inspection during the scoping survey

exterior of trees from the ground to look for potential roost features (PRFs). Trees were assigned to a roost potential category using the same criteria as buildings.

Table 6.1 Bat Roost Assessment Criteria

Roost Potential Category	Description of Roosting Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

6.2.2.2 Nocturnal Surveys

The inspection surveys were followed up by a series of dusk emergence and dawn re-entry surveys carried out between 8 August and 19 September 2017 with update surveys carried out between 9 and 28 May 2019. Dusk surveys aimed to record bats exiting target features and started 15 minutes before sunset and finished 90 minutes after sunset (Mitchell-Jones 2004, Collins 2016). Dawn surveys aimed to record bats entering features and started 90 minutes before sunrise and ended at sunrise. The chalets were subject to between two and three surveys depending on their roost potential category.

During the surveys, surveyors were positioned in strategic locations to ensure that potential roosting features could be viewed clearly. The surveys were undertaken using time expansion (Echometer Touch 2) bat detectors. The time of exit/entry and the number of bats and species (if identifiable) were recorded; whilst any bat activity in the general area was also noted.

6.2.2.3 Activity Transect Surveys

Three bat activity transect surveys of the site were undertaken between 8 August and 19 September 2017. These surveys were targeted at identifying the type and intensity of bat activity, both spatially and temporally, as well as the bat species present. This survey technique also gives estimates of the relative abundance of species and the importance of different habitat features/areas.

Surveys were carried out along a pre-determined transect route (see Figs. 6a-c), devised to encompass most habitat types within the assessment

area including woodland edge, hedgerow, grassland and aquatic habitats. However, the emphasis was on recording bat activity in potentially bat important habitats such as around the two lakes and woodland in the east of the site.

The transect route was interspaced by 12 'listening station' stops or 'point counts', where surveyors would pause for five minutes to record levels of bat activity, including the number and species of bat, number of bat passes (discrete bursts of echolocation) of each species, and activity types i.e. commuting, foraging and/or social calling. Notes of bat activity and species encountered were also made when walking between point counts, including direction of bat travel and bat use of features in the landscape. Notes on weather conditions and survey times were also recorded. In all instances, surveys were undertaken during suitable weather conditions i.e. $>10^{\circ}\text{C}$, dry and light winds.

Transect surveys typically commenced within 20 minutes of sunset and ended approximately two hours after, thus coinciding with the peak period of bat activity. Surveys were carried out using an Echometer Touch 2 bat detector coupled with an iPad.

6.2.2.4 Static Detector Survey

Two automated bat detectors (Anabat Express) were stationed in two separate areas of plantation woodland in the east of the site between 10 August and 15 September 2017 (see Figure 6a). The locations were in plantation woodland T6A along the unnamed watercourse WC1 corridor, and in the boundary plantation at the north end of field G6.

The aim was to gain further information on the species of bats present in this area with a focus on detecting lesser horseshoe bat activity. The detectors were programmed to turn on at sunset and off at sunrise. The main advantage of this approach is that a greater level of survey intensity can be achieved than compared to manual bat detector surveys, and with minimal survey effort.

Table 6.2 Summary of Bat Inspection and Roost Survey Times and Weather Conditions

Survey	Dates	Timings	Weather Conditions
Nocturnal Surveys of Chalet Buildings			
External inspection	18/07/2017, 20/09/2017, 28/05/2019, 28/06/2019	NA	NA
Dawn re-entry	10/08/2017	04:20 – 05:50 (sunrise: 05:50)	Dry, light breeze, 12°C, 0% cloud cover
Dawn re-entry	31/08/2017	04:55 – 06:24 (sunrise: 06:24)	Dry, calm, 12°C, 75% cloud cover
Dusk Emergence	20/09/2017	19:07 – 20:52 (sunset: 19:22)	Light rain, strong gusts, 100% cloud cover.
Dusk Emergence	09/05/2019	19:43 – 22:28 (sunset: 20:58)	Dry, calm, 10°C, 20% cloud cover
Dawn re-entry	28/05/2019	03:36 – 05:04 (sunrise: 05:04)	Dry, calm, 10°C, 100% cloud cover
Bat Activity Transects			
Dusk	09/08/2017	21:14 – 23:28 (sunset 20:57)	Dry, light breeze, 13°C, 0% cloud cover.
Dusk	30/08/2017	20:34 – 22:50 (sunset 20:12)	Dry, calm, 14 - 13°C, 50% cloud cover.
Dusk	19/09/2017	19:32 – 22:35 (sunset 19:24)	Dry, light breeze, 15 - 14°C, 100% cloud cover.

6.2.2.5 Personnel

All surveys were led by Jon Guarnaccio MCIEEM. Jon has 16 years experience as an ecological consultant and has held a Natural Resources Wales (previously CCW) bat survey licence since 2005 (75243:OTH:CSAB:2017). Jon was assisted by several other skilled and suitably experienced and licensed bat surveyors during the nocturnal bat surveys.

6.2.2.6 Survey Constraints

All surveys were carried out at an appropriate time of year (Mitchell-Jones 2004) and under suitable weather conditions (see Table 6.2). Furthermore, access was possible to most parts of the site although internal access was not possible to the chalet buildings. Nocturnal surveys are however considered to have mitigated for this limitation.

6.3 Results and Interpretation

6.3.1 Desk Study

COFNOD provided numerous records of bats within the search area, the records dating back to 1986. At least six species of bat have been recorded, including: common and soprano pipistrelle, brown long-eared, noctule, Natterer's, and lesser horseshoe. The records mainly comprised roost sites including maternity roosts.

In respect of lesser horseshoe bat roosts, one (23 bats in 2005) is known about 1km to the northeast of the holiday park and there is another well recorded larger roost about 2km to the northwest (several records with the most recent in 2003). Further lesser horseshoe roosts are known 4-5km to the north and north east of the holiday park.

Previous bat surveys of the site carried out in 2009 and 2011 have recorded a number of bat roosts within the holiday park, mainly in timber clad holiday chalets which support a roving common pipistrelle maternity colony. During bat surveys of a building unrelated to the current proposals, a common pipistrelle maternity roost was located in a holiday chalet within Llyn Village with many of the surrounding chalets also being used by lower numbers of bats. Non-breeding lesser horseshoe and brown long-eared bat roosts have also been recorded in derelict farm buildings within the holiday park while soprano pipistrelle, Daubenton's, whiskered and noctule bats have been recorded foraging within the site.

6.3.2 Daytime Inspection Survey

No evidence of bats was recorded during the inspection surveys although the chalet buildings were assessed as having moderate – high roost potential. None of the trees surveyed support potential roosting features for bats and these have therefore not been included within Table 6.3 to avoid unnecessary repetition (i.e. given the large number of trees within the survey area).

Table 6.3 Daytime Inspection Survey Results

Building	Description	Roosting Opportunities & Signs of Bat Use	Roost Potential
Chalet B1	Two storey holiday chalet of 1970s/80s origin. Constructed from partially rendered concrete block walls with timber panelling on all elevations (except <1 m). The roof is pitched and clad with interlocking cement/asbestos tiles. Timber soffits run around the perimeter of the building with asbestos fascia boards.	Roof tiles and weatherboarding are all tight fitting providing no access points for bats. However, there are numerous missing and warped timber panels resulting in numerous potential access points for bats. The chalet supports artificial lighting along its sides which remains lit throughout the night.	High
Chalet B2	Identical to above	As above	High
Chalet B3	Very similar to above but entirely clad in panelling and of slightly more recent origin.	Similar to above although considerably fewer gaps behind timber panelling and no boards missing.	Moderate
Chalet B4	Very similar to above but entirely clad in panelling and of slightly more recent origin.	Similar to above although considerably fewer gaps behind timber panelling and no boards missing.	Moderate

6.3.3 Nocturnal Survey

No bats were observed entering the chalet buildings during the dawn surveys. Individual common pipistrelle bats were however recorded emerging from chalets B1 and B2 during a dusk survey on 20/09/2017 while a soprano pipistrelle bat emerged from chalet B2 during the dusk survey in May 2019. These observations therefore confirm that these chalets contain bat roosts. All bats emerged from behind timber panelling either on the northern gable end of chalet B1 or southern gable end of chalet B2 (Fig. 6d).

Based on the number of bats observed exiting the buildings coupled with an absence of bat droppings, it is considered likely that chalets B1 and B2 are used as summer day roosts by low numbers (<5) of male and/or non-breeding female pipistrelle bats⁹. Bats are roosting behind timber cladding on the exterior of the buildings. It is acknowledged that internal inspection surveys were not carried out, but nocturnal surveys are likely to have mitigated for this limitation while the roof spaces of the buildings are inaccessible to bats.

The findings are not consistent with those of maternity roost sites which generally display numerous droppings outside/below access points while numerous bats are typically encountered emerging. Similarly, the buildings do not provide the cool, stable temperatures and humid conditions required for hibernation although the presence of solitary bats during the winter months cannot be completely ruled out.

Table 6.4 Nocturnal Survey Results

Survey	Dates	Results
External inspection	18/07/2017, 20/09/2017, 15/06/2018, 28/05/2019, 28/06/2019	No evidence of bats recorded.
Dawn re-entry	10/08/2017	No bats recorded entering the building but low numbers of common and soprano pipistrelle bats foraging around buildings.
Dawn re-entry	31/08/2017	No bats recorded entering the building but low numbers of common and soprano pipistrelle bats foraging around buildings.
Dusk Emergence	20/09/2017	One common pipistrelle recorded emerging from chalet B1 and one common pipistrelle recorded emerging from chalet B2.
Dusk Emergence	9/05/2019	One soprano pipistrelle recorded emerging from chalet B2. Noctule bats commuting and foraging high above the site.
Dawn re-entry	28/05/2019	No bats recorded entering the buildings but low numbers of common and soprano pipistrelle bats foraging around buildings.

6.3.4 Activity Transect Surveys

Individual point count data taken along transect routes are summarised in Table 6.5. Data from non-point count locations have not been presented in this way as they are not standardised i.e. the surveyor would stay in the same location and count passes for as long as it took them to write down

⁹ Other known maternity roosts located in chalets within the holiday park all display numerous droppings on the exterior of the buildings

their observations. However, a subjective assessment was made on whether bat activity was considered to be low, moderate or high based on the number of bats encountered and if bats appeared to be constantly foraging (see Figures 6a-c).

At least six species of bat were recorded using the habitats within the assessment area, including: common pipistrelle, soprano pipistrelle, noctule, brown long-eared, Daubenton's and a *Myotis* sp. However, common and soprano pipistrelle bats represented most of the bat activity recorded, with only several *Myotis* spp., brown long-eared and noctule passes while Daubenton's bats were more frequently recorded but they were restricted to the north and south lakes (see Figures 6a-c).

Bat activity was encountered across most of the survey route although it was notably higher around aquatic habitats where group foraging by several species was recorded. Sheltered woodland edge habitats were also favoured foraging areas, such habitats being likely to support higher densities of insects (Walsh and Harris 1996) than other habitats within the site. Bats were also recorded commuting across the site, although no particularly well used routes or features were identified. Bats were typically encountered shortly after sunset indicating the presence of roosts within Hafan y Môr Holiday Park. The first activity transect survey on 8 August 2017 showed the highest level of bat activity, with bat activity gradually declining over the next two surveys.

It should be noted that where no bat activity was encountered, this is not necessarily an indication that bats do not use an area. Instead, it may be the result of the particular route followed by surveyors, the time when surveyors passed the area, or the prevailing weather conditions experienced. Nevertheless, there is confidence in the judgements made regarding the degree of use of particular areas by bats.

Table 6.5 Monthly Variation in Bat Activity at Point Count Locations

Point Count no.	8/8/17	30/8/17	19/9/17	Overall Total no passes	% of Overall Passes
	Total no passes	Total no passes	Total no passes		
1	5	3	2	10	1.7
2	3	17	11	31	5.3
3	11	4	0	15	2.6
4	0	4	3	7	1.2
5	2	2	29	33	5.6
6	6	9	17	32	5.5
7	1	11	0	12	2.0
8	30	23	12	65	11.1
9	48	40	3	91	15.5
10	1	1	1	3	0.5
11	110	50	16	176	30.0
12	52	30	30	112	19.1
Total	269	194	124	587	100%

6.3.5 Static Detector Monitoring

Table 6.6 and Figure 6e summarise the number of bat passes recorded per species at each static detector location. Within the plantation woodland strip T6A that borders the unnamed watercourse WC1, *Myotis* spp. represented 50% of the total number of calls recorded which is a very high proportion of calls and much more than would typically be expected. This could suggest that the woodland is a key foraging area for *Myotis* spp. bats although it

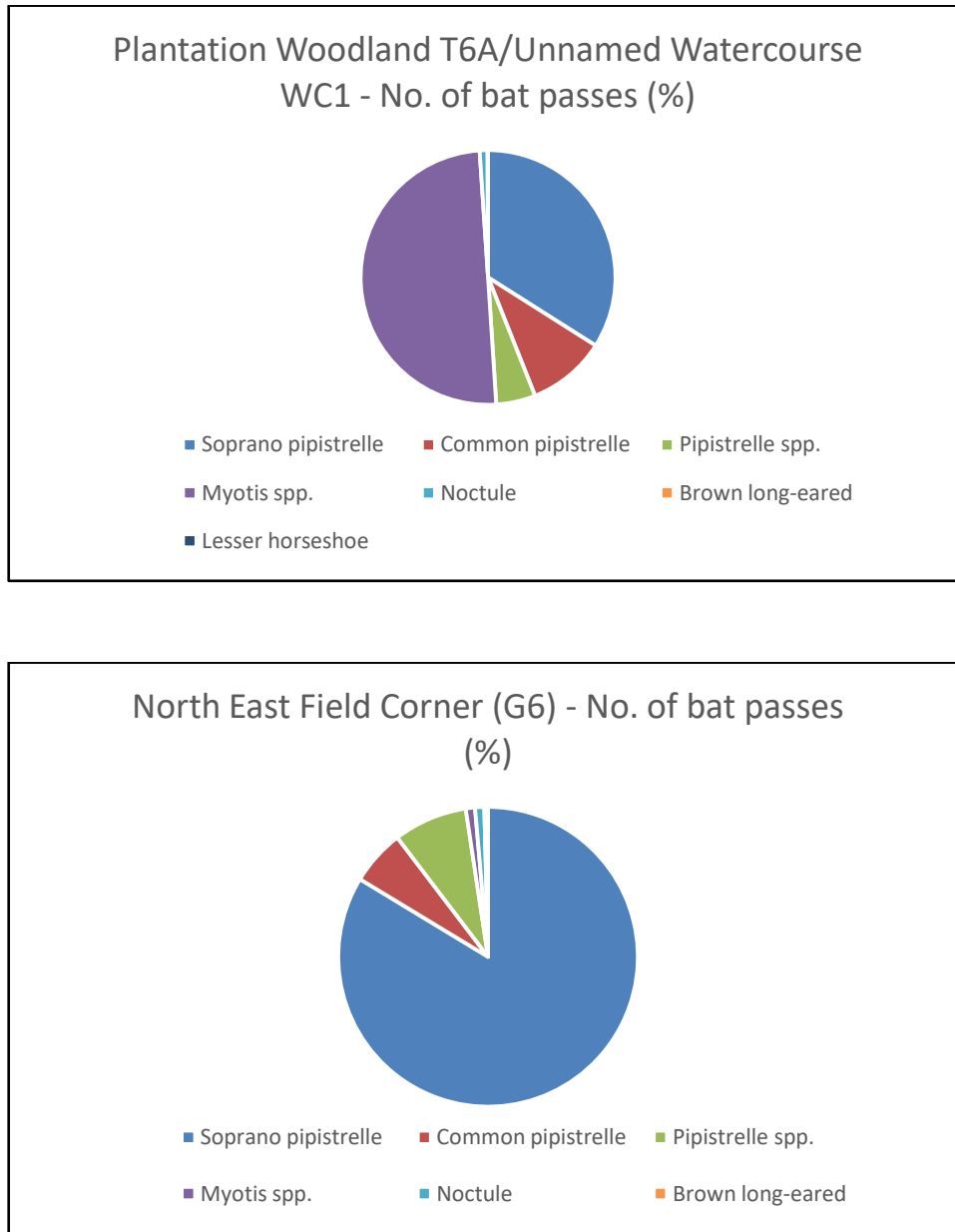
should be noted that there are limitations associated with static monitoring data because there is no observational context. For instance, 1000 bat passes could be one bat passing 1000 times or 1000 bats passing once. Many of the *Myotis* calls were recorded over an hour after sunset suggesting that a roost site is not located close by. Only one lesser horseshoe bat was recorded indicating that the woodland is not frequently used by this species.

Soprano pipistrelle was the dominant species recorded in the north east field (G6) corner. This may be explained by the fact that this location is characterised by marshy grassland (G6D) and wet areas of woodland, such habitats being favoured by soprano pipistrelle bats.

. Table 6.6 Static Recording Results

Species	No of passes (%) per species at static detector locations	
	Woodland Strip	North East Field Corner
Soprano pipistrelle	34	84
Common Pipistrelle	10	6
Pipistrelle spp.	5	8
<i>Myotis</i> spp.	50	1
Noctule	1	1
Brown long-eared	0.04	0.4
Lesser horseshoe	0.02	0

Fig 6e Static Bat Detector Recording Results



6.3.6 Evaluation

All species of bat are European and UK protected species (see summary of legislation in Appendix 1).

The following bat species were recorded during the survey and are listed as Section 7 priority species: lesser horseshoe, noctule, common and soprano pipistrelle and brown long-eared bats.

Based on the above information the site is assessed as being of **County** value to bats. This is based on the use of the site for foraging/dispersal by seven species, including five that are listed on Section 7. The evaluation is

however qualified due to the fact that only small non breeding pipistrelle roosts are present, and also because most of the habitats within the site are of limited value to the local bat population.

Of the various types of bat roost, daytime non-breeding roosts comprising low numbers of common species such as common pipistrelle are of low conservation importance (Mitchell-Jones 2004). Woodland T6A does, however, appear to be a well-used foraging area for *Myotis* spp. bats.

7 Otter & Water Vole

7.1 Introduction

7.2 Methods

7.2.1 Scoping Survey

A preliminary scoping survey of the site was carried out on 18 July 2017. The aim was to identify affected aquatic and riparian habitats, and other features, with the potential to support otters and/or water voles. This information was used to develop an appropriate, targeted survey methodology.

The scoping survey identified a two lakes (the North/Boating Lake and the South/Fishing Lake), a small unnamed watercourse (WC1), the coastline and areas of woodland/scrub as potential habitats for otters and/or water voles. Subsequent surveys therefore focused on these areas/features as they were considered most likely to support the target species.

7.2.2 Field Survey - Otter

Otter surveys focused on two lakes within the site as well as an approximately 1 km stretch of coastline and a small unnamed watercourse (WC1) that flows through the eastern half of the site and into the sea. These habitats are identified on the habitat maps (Figs. 3a-3h).

The survey involved a search for otter field signs including lying up sites, spraint (droppings), footprints, pathways/slides, sign heaps and feeding remains. The surveys were aided using a boat so that islands within the two lakes could be accessed. Watercourse WC1 was surveyed on numerous occasions between 19 September 2017 and 28 May 2019 (whenever camera traps were checked), while the two lakes were surveyed on 7 April 2018. The coastline was surveyed on 10 May 2018 and 10 May 2019. While surveys principally focused on aquatic habitats, a large area of scrub north of the assessment area (between the railway line and caravan touring area) was searched for otter signs on 13 November 2018.

7.2.3 Field Survey - Water Vole

Evidence of water voles was also searched for while conducting the otter surveys. The water vole survey methodology followed Strachan *et al.* (2011) and involved a search for signs indicative of water vole presence including: burrows; latrines/droppings; footprints; runs; feeding remains; and feeding 'lawns'. Habitat factors considered during the survey included: water course dimensions (including bank slope); depth of water; and vegetation composition. The presence of mink and rat was also noted since these species can influence the likelihood of water vole presence, especially the former species.

7.2.4 Camera Monitoring

Watercourse WC1 was monitored for use by otters over several periods between September 2017 and June 2019 (Table 7.1). The aim was

establish if the watercourse was being used by breeding female otters. Monitoring involved the use of remote camera trapping. An Acorn A5210a camera trap was initially placed within WC1's channel on 19 September 2017 (see Figure 7a). Monitoring continued until January/February 2018 before two cameras¹⁰ were deployed between May and July 2018. Additional camera trap monitoring took place between April and June 2019 again mainly using two cameras. The cameras were inspected regularly to check for footage of otters (and other wildlife).

Table 7.1 Summary of Otter Camera Trap Monitoring

Dates	No. of cameras	Location(s)	Notes
19/9/2017 – Jan/Feb 2018	1	Facing downstream in watercourse channel, 10m upstream of the former sewage treatment works culvert	Camera had become dislodged/submerged and was not recording from 11/01/2018 onwards
10/05/2018 – 25/05/2018	2	Camera 1 facing H2 within watercourse channel, camera 2 120m upstream opposite H7	
25/05/2018 – 15/06/2019	2	Camera 1 facing H2 within watercourse channel, camera 2 upstream of railway crossing	
15/06/2018 – 10/07/2018	1	Facing H2 within watercourse channel	
28/05/2019 – 12/07/2019	2	Camera 1 facing H1 within watercourse channel, camera 2 adjacent H2 facing downstream	No data for camera 1 between 11/6/19 and 3/7/19

7.2.5 Personnel

All surveys were undertaken by Jon Guarnaccio MCIEEM, who has 16 years' experience as an ecological consultant and is an experienced otter and water vole surveying, having studied these species for his BSc and MSc theses.

7.2.6 Survey Constraints

All surveys were carried out at an appropriate time of year and under suitable weather conditions. Unfortunately the camera traps were submerged by water on one occasion in January 2018, and two cameras were stolen in April/May 2019. Although this resulted in interruptions in the camera survey, the overall duration and coverage is considered to be sufficient for the purposes of the assessment.

7.3 Results and Interpretation

7.3.1 Desk Study - Otter

Otters are frequent on the Llŷn peninsula (coastal and freshwater habitats) and Cofnod provided seven records within the area of search. According to NRW (2018)¹¹, otters are widespread throughout Pen Llŷn a'r Sarnau SAC, both on the open coast and within the estuaries of the SAC as well as

¹⁰ Distianert trail cameras with Infrared Night Vision

¹¹ Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau Special Area of Conservation. Advice provided by Natural Resources Wales in fulfilment of Regulation 37 of the Conservation of Habitats and Species Regulations 2017. March 2018

adjacent areas. The distribution of otters is known primarily from spraint records in the SAC and adjacent areas, including on the foreshore, on access points from watercourses, along watercourses and river and estuarine locations. Whilst it may be considered that otters are more commonly found in and around the estuaries of the SAC, recent surveys have shown that otters have extended their range to other coastal areas around Pen Llŷn. A study of the Llŷn Peninsula in 2002 found otter signs within 1km of the shore at 8 out of 10 sites surveyed and concluded that it is reasonable to assume that otters may be found in any of the coastal areas of the SAC. The report goes on to state that otters are known to breed and rest within the SAC but there is little information on numbers and locations. The coast around the SAC is well supplied within rivers and streams and it is highly likely that they travel from one watercourse to another along the coast (NRW 2018).

7.3.2 Desk Study - Water Vole

COFNOD provided one water vole record dating from 1999. The record is from a watercourse 1km to the west of the holiday park.

7.3.3 Field Surveys - Otter

Otter signs including resting sites, spraint sites and feeding remains were frequent along WC1 and the South/fishing lake in 2017 and 2018 although no signs of otters were recorded along the coast or the North/boating lake during this period. However, no evidence of otters was recorded along WC1 during 2019 suggesting otters have not used this watercourse since winter 2018. Figures 7a and 7b show the location of otter field signs within the site, while Table 7.2 below provides details on the resting sites recorded. A total of seven resting sites were recorded along WC1 (H1 – H7) while one (H8) was recorded on an island within the southern lake.

In summary, H1-H7 are typically located under undercut banks along WC1 although some have tunnels extending into the bank (probably old rabbit burrows). H7 collapsed in summer 2018 while H1 appears to have been excavated sometime between summer 2018 and spring 2019 as it was not used prior to this period. H8 is located on an island within the southern lake and comprises a tunnel leading into the bank. Fish (carp) carcasses eaten by otters were found around the southern lake, and these are likely to represent a key foraging resource to otters.

No evidence of otters was recorded along the coast. However, otters are likely to forage and commute along the coastline (see desk study results), probably at night when human activity is scarce. Indeed, the sea is particularly shallow (NRW 2018) along the surveyed stretch of coastline therefore providing optimal foraging habitat for otters (Kruuk 1995), while artificial bank protection in the form of large dimension boulders with cavities in between provide potential lying-up habitat. An absence of otter field signs around the northern lake is probably a true reflection of otter use of this feature given that it is subject to very high levels of human disturbance and until recently (see below) has had poor water quality resulting in minimal fish populations. The waterbody was, however, drained and re-filled in winter 2018/19 so water quality should have improved, which in turn may lead to larger fish populations and an increase in otter activity around the lake.

Table 7.2 Otter Resting Sites

Resting Site	Description and Evidence of Otter Use
H1	The holt discovered for the first time in April 2019 and comprises an old rabbit burrow within the west bank of WC1. The entrance was marked with old spraint throughout spring and summer 2019 while the substrate was friable suggesting infrequent use.
H2	Deeply undercut bank on east side of channel with tunnel leading into bank at rear. A pathway leads up to the holt from the watercourse. The resting site was frequently marked with spraint and between 2017 and 2018 but showed no signs of use in 2019 with only very old spraint recorded. The entrance was however rarely smooth and well-worn, suggesting it is not used frequently by otters.
H3	Shallow overhang on east bank with old rabbit hole at rear. Spraint was occasionally recorded but there were never any well-worn pathways.
H4	C-shaped cavity under eastern bank. Spraint was recorded throughout 2017 and 2018 with some large spraint piles recorded in May 2018 although the earth was never smooth or well worn.
H5	Old rabbit burrow in east bank, only occasionally marked with spraint and friable earth indicating infrequent use.
H6	As above
H7	Mammal burrow at bank top with pathway leading from channel. No spraint was ever recorded outside this hole which collapsed in summer 2018.
H8	Tunnel leading into bank of island. The holt was marked with spraint and smooth/well worn earth suggests frequent use by otter.

Otter spraint was regularly recorded in association with WC1 resting sites between 2017 and 2018 although no recent or fresh signs were recorded between April and July 2019 as corroborated by the camera trapping results (see below). Although otters may occasionally rest up in some of the features identified, it is likely that in the case of WC1, otters are only occasionally utilising these resting sites for short periods of the night and/or for sprainting.

Throughout the entire survey period, no spraint was found upstream of a railway line which crosses the watercourse 400 m upstream of its confluence with the sea. However, a relatively well used mammal pathway extends up and over the railway line at this location, suggesting that otters may be exiting the watercourse and crossing the railway line as opposed to swimming through a small dimension culvert under the line. No signs of otters were however detected upstream of the railway despite there being a large are of scrub which provides potential otter breeding habitat as well as foraging opportunities e.g. amphibians.

No evidence of breeding was recorded during the survey and there have been no reports of otter cubs within the vicinity of the holiday park. However, without the use of radio-tracking, it is extremely difficult to locate breeding sites/natal dens which are usually safe from disturbance and frequent flooding, and may be some distance (>1 km) from water with females taking care not to leave any signs of their presence (Kruuk 1995). Sites used by female otters with mobile cubs tend to more noticeable and can be detected through the use of camera trapping techniques while Liles (2002) comments on the presence of particular field signs such as latrines and play areas at such sites. No such field signs were recorded within the study area.

Most of the habitats within the survey area are considered to represent unsuitable breeding habitat as while they are close to a good food supply (southern fishing lake and sea, including associated watercourses) and

safe from flooding, they are likely to be frequented by male otters which can predate otter cubs (Kruuk 2006). Additionally, the islands within the southern lake support high numbers of Canada geese which can be aggressive to potential predators like otters. As such, it is considered that breeding female otters are likely to avoid these areas.

As mentioned above, WC1 provides connectivity between the coast and an approximately 3 ha area of dense scrub and tall vegetation to the north of the railway line. This area is assessed as providing suitable breeding habitat as it is located away from the likely main areas of otter activity, does not flood, provides good undisturbed cover and is likely to support amphibian prey: these are all pre-requisites for an optimal breeding site. The watercourse is also flanked by a strip of semi-mature planted woodland along its eastern and north bank (T6A on the habitat map Fig. 3e). However, this woodland lacks a dense understory so it provides negligible cover for otters, although it is undisturbed and may occasionally be used for above ground resting and/or commuting (e.g. terrestrial shortcut to access large area of scrub to north).

7.3.3.1 Camera Trap Surveys

Otters were captured on film in November 2017 and May 2018. The November 2017 footage was of a probable adult male otter spraint marking several metres downstream of H1. Another otter (young male or adult female) was recorded on 13 and 15 May 2018 in the early hours of the morning. The otter was seen walking upstream and climbing out of the watercourse and heading towards H7.

7.3.4 **Evaluation - Otter**

In light of the above information, the site is assessed as being of **County** value to otters given that the species is abundant throughout the Llŷn peninsula and no evidence of breeding was recorded.

The otter is listed as a qualifying feature in the citation for the Pen Llŷn a'r Sarnau /Lleyn Peninsula and the Sarnau Special Area of Conservation, although it is not a primary reason for the SAC's designation.

The otter is a UK and European protected species (see summary of legislation in Appendix 1. It is also a Section 7 priority species under the Environment (Wales) Act 2016.

7.3.5 **Field Surveys - Water Vole**

No evidence of water vole was recorded during the surveys despite the presence of suitable habitat. For instance, steep and well vegetated earth banks along the slow flowing WC1 provide optimal water vole habitat while similar habitats exist around the North and South lakes. Throughout 2018 and 2019 there were reports (and photos) of mink around the northern lake, and the presence of this predator is likely to be the primary reason for an absence of water voles within the assessment area. Additionally, there were no desktop records of water voles from any of the development parcels, and the only historical record was to the west of the holiday park, dating from 1999. Based on this evidence it is considered most likely that the water vole is almost certainly absent.

8 Badger

8.1 Introduction and Scope

The desktop survey results returned several badger records (or badger signs), especially along the A497 road corridor. Badgers are also known to occur in the vicinity of Hafan y Môr Holiday Park from previous surveys, so a survey for setts and badger signs was undertaken in all the proposed development areas between 2017 and 2019.

8.2 Methods

Methods recommended in the National Badger Survey (Cresswell *et al.*, 1990) and by the Mammal Society (described in the booklet *Surveying Badgers* (Harris, Cresswell and Jefferies, 1989) were used. It involved searching for badger signs, including setts, latrines, foraging marks, badger hairs, trails and footprints. When found, setts and other signs were marked on maps or aerial photographs. The surveys were mainly undertaken during the habitat surveys. They covered all development Parcels plus areas of potentially suitable adjacent habitat.

8.3 Results

No setts were found during the badger surveys.

However, badger footprints were found in an area of bare ground in grassland G6C in Parcel G (See Fig. 3g) in winter 2018, and in bare mud in the former sewage works (just south of plantation T5A, Fig. 3f) in June 2019. Animal paths, probably made by badgers, crossing the railway into the north coastal field (ie grasslands G6) have also been recorded in the past although they were not re-found when the area was re-surveyed in June 2019.

Additionally, a badger was recorded on a trail camera set up to monitor otters along watercourse WC1 (adjacent to Parcel I), in June 2018.

8.4 Interpretation and Evaluation

These observations confirm that badgers use parts of Hafan y Môr for dispersal and probably foraging, but there is no evidence that they reside on the site. No setts were located during any of the surveys.

The badger and badger setts are protected under the Protection of Badgers Act 1992, although the species is widespread and relatively common in Wales.

For the purposes of the impact assessment the badger is assigned to the **Local** value category.

9 Large Mason Bee and other Aculeate Hymenoptera

9.1 Background & Objectives

The Large Mason Bee (*Osmia xanthomelana*) was once relatively widespread in southern Britain but it has declined markedly over the last 100 years and is now seemingly restricted to just two UK sites (Porth Ceiriad and Porth Neigwl), both of which are on the Llŷn Peninsula. The bee is typically associated with soft cliff exposures, and the sections of this habitat type in Parcel J have been identified as potentially suitable habitat for this species and other solitary mining bee species. Accordingly, a specialist survey has been commissioned to investigate the status of the establish the Large Mason Bee and other aculeate Hymenoptera (ie bees and wasps).

The survey was undertaken by Mr Liam Olds, who is an expert hymenopterist. The primary aim was to determine the presence or absence of the endangered Large Mason Bee, and the secondary aim was to assess the 'conservation interest' of aculeate faunas in three sections of coastline at Hafan y Môr.

9.2 Results

9.2.1 Aculeate Hymenoptera

The aculeate survey report is provided in full in Appendix 4. However, in summary, no evidence of the Large Mason Bee was found although, overall, the bee and wasp fauna was found to be quite diverse. In total, 37 species of aculeate Hymenoptera were recorded during the survey, including 13 species of conservation interest, all categorised as nationally Local¹². Based on this, the aculeate fauna associated with the soft maritime cliff in Parcel J is assessed to hold **County** value.

9.2.2 Black oil beetle

Other invertebrate records were made during the aculeate survey, of which the most significant is the black oil beetle (*Meloe proscarabaeus*), which was recorded from soft coastal cliffs and grassland habitats in Parcel J, and also further along the coast north eastwards towards the Afon Wen watercourse. This beetle is found in lowland areas throughout Britain but has undergone a severe decline and is considered a priority species for conservation in Wales as a Section 7 priority species, and across the UK – see http://jncc.defra.gov.uk/_speciespages/2421.pdf. In Wales, it is largely coastal with core populations found on the Gower Peninsular, Llŷn Peninsula and Pembrokeshire coast. Its larvae are parasitic on solitary bees of various genera including *Andrena*, *Melitta* and *Panurgus* – it is therefore reliant on healthy populations of its solitary bee hosts. In view of

¹² **Local** = Species which, whilst fairly common, are evidently less widespread than truly common species, but also not qualifying as Nationally Notable having been recorded from over one hundred, but less than three hundred, ten-kilometre squares of the UK National Grid.

this species' conservation status (especially Section 7), this species is also assessed to hold **County** value.

10 Abbreviations

BAP	Biodiversity Action Plan
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
Cofnod	The Local Environmental Records Centre for North Wales
CRoW	Countryside and Rights of Way
EU	European Union
HAP	Habitat Action Plans
JNCC	Joint Nature Conservation Committee
LDP	Local Development Plan
MAGIC	Multi-Agency Geographic Information for the Countryside
NBN	National Biodiversity Network
NERC	Natural Environment and Rural Communities
NRW	Natural Resources Wales
SAC	Special Area of Conservation
SAP	Species Action Plans
SBI	Site of Biological Importance
SPA	Special Protection Areas
STP	Sewage Treatment Plant
UDP	Unitary Development Plan
SSSI	Sites of Special Scientific Interest
WCA	Wildlife and Countryside Act
WS	Wildlife Site

11 References

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FIGURES

(See Appendix G of the Main Environmental Statement for these figures)

APPENDICES

- 1 Summary of legislation and policy relevant to bats, reptiles, otters and breeding birds
- 2 Plant species lists
- 3 Phase 1 Species codes and abbreviations
- 4 Survey of the Large Mason Bee and other Aculeate Hymenoptera

APPENDIX 1

Summary of legislation and policy relevant to bats, reptiles, otters and breeding birds

SUMMARY OF THE LEGISLATION RELATING TO BATS (WALES)

All wild species of bat are protected under the Wildlife and Countryside Act (WCA) 1981, which has also been amended by later legislation including the Countryside and Rights of Way (CROW) Act 2000 and the Conservation of Habitats and Species Regulations 2017, and this legislation is applicable to England and Wales. Bats are listed on Schedule 5 of the WCA and are therefore subject to some the provisions of Section 9 which, with the amendments, make it an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection (S9:4b).
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a bat (S9:4c).

There are additional offences in relation to buying and selling (S9:5) any live or dead animal of this species or anything derived from them.

Bats species are also listed under Annexes IIa and IVa of EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, also known as the 'Habitats Directive'. Inclusion on Annex IVa means they are consequently identified as European Protected Species (EPS) and protected under the Conservation of Habitats and Species Regulations 2017.

The Conservation of Habitats and Species Regulations 2017 states that a person commits an offence if they:

- (a) deliberately capture, injure or kill any wild animal of a European protected species,
- (b) deliberately disturb wild animals of any such species, in such a way as –
 - (i) to impair their ability to survive, to breed or reproduce, or to rear their young, or
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate, or
 - (iii) to affect significantly the local distribution or abundance of the species to which they belong;
- (c) deliberately take or destroy the eggs of such an animal, or
- (d) damage or destroy a breeding site or resting place of such an animal.

Under these Regulations it is an offence to damage or destroy a breeding site or resting place, whether the animal is in occupation or not, and protection extends to all life stages of the animal in question. There are additional offences relating to possession, control and sale of a live or dead bat or part of such an animal.

In addition, seven native British bat species, including the soprano pipistrelle (*Pipistrellus pygmaeus*) and the brown long-eared bat (*Plecotus auritus*), that are frequently found in buildings, are listed as 'Priority Species' under the 2012 UK Post-2010 UK Biodiversity Framework¹. These Priority Species are also referred to as 'species of principal importance' for the conservation of biodiversity in Wales within Section 7 of the Environment (Wales) Act 2016. More broadly, the Environment Act (Wales) Part 1 sets out Wales' approach to planning and managing natural resources at a national and local level with a general purpose linked to statutory 'principles of sustainable management of natural resources' defined within the Act. Section 6 of the Act places a duty on public authorities to 'seek to maintain and enhance biodiversity' so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to 'promote the resilience of ecosystems'. The duty replaces the section 40 duty in the Natural Environment and Rural Communities Act 2006 (NERC Act 2006), in relation to Wales, and applies to those authorities that fell within the previous duty. Section 7 replaces the duty in section 42 of the NERC

¹ <http://jncc.defra.gov.uk/page-5170>

Act 2006. The Welsh Ministers will publish, review and revise lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales.

The Nature Recovery Plan for Wales aims to address the underlying causes of biodiversity loss by:

- putting nature at the heart of our decision-making;
- increasing the resilience of our natural environment; and
- taking specific action for habitats and species.

It sets out how Wales will deliver the commitments of the UN Convention on Biological Diversity and the EU Biodiversity Strategy to halt the decline in biodiversity by 2020 and then reverse that decline.

Please note: the above text provides a brief summary of the legislation in relation to bats for England and Wales and the original Acts, Regulations and any amendments should be referred to for the precise wording.

SUMMARY OF THE LEGISLATION RELATING TO REPTILES

All six of the native British reptile species are afforded varying degrees of protection under the Wildlife and Countryside Act (WCA) 1981, as amended by various later legislation, and this legislation is applicable to England and Wales. All six species are listed on Schedule 5 of the WCA.

The four widespread species, common lizard (*Zootoca vivipara*), slow-worm (*Anguis fragilis*), grass snake (*Natrix natrix*) and adder (*Vipera berus*) are afforded part protection under Section 9(1), making it an offence to intentionally kill or injure any of these species of reptile. The two rarer species, sand lizard (*Lacerta agilis*) and smooth snake (*Coronella austriaca*), are subject to a greater degree of protection under Section 9(4) which, with the amendments, make it (in brief) an offence to:

- Intentionally or recklessly disturb a sand lizard or smooth snake while it is occupying a structure or place used for shelter or protection (S9:4b); or
- Intentionally or recklessly obstruct access to any structure or place a sand lizard or smooth snake uses for shelter or protection (S9:4c).

All six species are afforded protection from buying, selling or exchange under Section 9(5) of the WCA.

Sand lizard and smooth snake are also listed under Annexes IIa and IVa of EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, also known as the 'Habitats Directive'. Inclusion on Annex IVa means they are consequently identified as European Protected Species (EPS) and protected under the Conservation of Habitats and Species Regulations 2010.

The Conservation of Habitats and Species Regulations 2010 state that a person commits an offence if they:

- (a) deliberately capture, injure or kill any wild animal of a European protected species,
- (b) deliberately disturb wild animals of any such species, in such a way as –
 - (i) to impair their ability to survive, to breed or reproduce, or to rear their young, or
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate, or
 - (iii) to affect significantly the local distribution or abundance of the species to which they belong;
- (c) deliberately take or destroy the eggs of such an animal, or
- (d) damage or destroy a breeding site or resting place of such an animal.

Under these Regulations it is an offence to damage or destroy a breeding site or resting place whether the animal is in occupation or not, and protection extends to all life stages of the animal in question. There are additional offences relating to possession, control and sale of a live or dead sand lizard or smooth snake or part of such an animal.

In addition, all six reptile species are listed as 'Priority Species' under the UK Biodiversity Action Plan (UKBAP). UKBAP Priority Species are also referred to as 'species of principal importance' for the conservation of biodiversity in England within Section 74 of the CRoW Act 2000, Section 41 (England) of the Natural Environment and Rural Communities (NERC) Act 2006, and Section 7 in the Environment (Wales) Act 2016 (this lists species considered to be 'of key significance to sustain and improve biodiversity in relation to Wales'). Under the Environment (Wales) Act 2016 (Section 6), public authorities must seek to maintain and enhance biodiversity so far as consistent with the proper exercise of their functions, and have regard to the species included on the Section 7 list of species of principal importance for Wales.

Section 11 of the National Planning Policy Framework (NPPF, in England) states that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible. The NPPF also includes the requirement to contribute to the Government's commitment to halt the overall decline in biodiversity and to promote the reservation, restoration and re-creation of priority habitats, ecological networks and the

protection and recovery of priority species populations, linked to national and local targets. Reference is made to Circular 06/2005 *Biodiversity and Geological Conservation - Statutory Obligations and Their Impact within the Planning System* in respect of statutory obligations for biodiversity and geodiversity conservation.

Local authorities in England are required to ensure that where significant harm resulting from development cannot be avoided (through locating on alternative sites with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, planning permission is refused. The commitment to preserving, restoring or enhancing biodiversity is further emphasised for England and Wales in Section 40 of the NERC Act 2006, and under Section 6 of the Environment (Wales) Act 2016.

Please note: the above text provides a brief summary of the legislation in relation to reptiles for England and Wales and the original Acts, Regulations and any amendments should be referred to for the precise wording.

SUMMARY OF THE LEGISLATION RELATING TO OTTERS

Otters (*Lutra lutra*), also known as European otters, are protected under the Wildlife and Countryside Act (WCA) 1981, which has also been amended by later legislation including the Countryside and Rights of Way (CROW) Act 2000 and the Conservation of Habitats and Species Regulations 2017, and this legislation is applicable to England and Wales. Bats are listed on Schedule 5 of the WCA and are therefore subject to some of the provisions of Section 9 which, with the amendments, make it an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection (S9:4b).
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a bat (S9:4c).

There are additional offences in relation to buying and selling (S9:5) any live or dead animal of this species or anything derived from them.

Otters are also listed under Annexes IIa and IVa of EC Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora, also known as the 'Habitats Directive'. Inclusion on Annex IVa means they are consequently identified as European Protected Species (EPS) and protected under the Conservation of Habitats and Species Regulations 2017.

The Conservation of Habitats and Species Regulations 2017 states that a person commits an offence if they:

- (a) deliberately capture, injure or kill any wild animal of a European protected species,
- (b) deliberately disturb wild animals of any such species, in such a way as –
 - (i) to impair their ability to survive, to breed or reproduce, or to rear their young, or
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate, or
 - (iii) to affect significantly the local distribution or abundance of the species to which they belong;
- (c) deliberately take or destroy the eggs of such an animal, or
- (d) damage or destroy a breeding site or resting place of such an animal.

Under these Regulations it is an offence to damage or destroy a breeding site or resting place, whether the animal is in occupation or not, and protection extends to all life stages of the animal in question. There are additional offences relating to possession, control and sale of a live or dead bat or part of such an animal.

Otters are listed as 'Priority Species' under the 2012 UK Post-2010 UK Biodiversity Framework. In Wales they are also referred to as 'species of principal importance' for the conservation of biodiversity within Section 7 of the Environment (Wales) Act 2016. Section 7 replaces the duty in section 42 of the NERC Act 2006. The Welsh Ministers will publish, review and revise Section 7 lists of living organisms and types of habitat in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. The Welsh Ministers must also take all reasonable steps to maintain and enhance the living organisms and types of habitat included in any list published under this section, and encourage others to take such steps.

The Nature Recovery Plan for Wales aims to address the underlying causes of biodiversity loss by:

- putting nature at the heart of our decision-making;
- increasing the resilience of our natural environment; and
- taking specific action for habitats and species.

It sets out how Wales will deliver the commitments of the UN Convention on Biological Diversity and the EU Biodiversity Strategy to halt the decline in biodiversity by 2020 and then reverse that decline.

Please note: the above text provides a brief summary of the legislation in relation to otters for England and Wales and the original Acts, Regulations and any amendments should be referred to for the precise wording.

SUMMARY OF THE LEGISLATION RELATING TO BREEDING BIRDS

All wild species of breeding birds and their nests are protected under Part 1 of the Wildlife and Countryside Act (WCA) 1981, as amended by later legislation including the Countryside and Rights of Way (CRoW) Act 2000. This legislation applies in England and Wales.

Part 1 (Section 1:1) of the WCA states that:

'If any person intentionally,

- (a) kills, injures or takes any wild bird;
- (b) takes, damages or destroys the nest of any wild bird while that nest is in use or being built; or
- (c) takes or destroys an egg of any wild bird,

he shall be guilty of an offence.'

Part 1 (Section 1:5) of the WCA (amended by the CRoW Act 2000) refers to specific birds listed on Schedule 1 of the WCA, and states that:

'If any person intentionally or recklessly,

- (a) disturbs any wild bird included in Schedule 1 while it is building a nest or is in, on or near a nest containing eggs or young; or
- (b) disturbs dependent young of such a bird,

he shall be guilty of an offence and liable to a special penalty.'

Schedule 1 includes birds such as barn owl (*Tyto alba*), black redstart (*Phoenicurus ochruros*), wood lark (*Lullula arborea*) and Cetti's warbler (*Cettia cetti*). Please refer to the WCA for a complete list of Schedule 1 species.

Some provisions are made to allow the killing and taking of certain species under certain circumstances, as follows:

- Birds listed on Schedule 2 (Part 1) of the Act may be taken or killed outside of the 'close season' for each individual species (the 'close season' is defined by the Act). This includes various wild duck and geese species.
- Birds listed on Schedule 2 (Part 2) of the Act may be killed or taken by authorised persons at all times. This includes species such as carrion crow (*Corvus corone*), black-billed magpie (*Pica pica*), feral pigeon (*Columba livia*) and greater Canada goose (*Branta canadensis*). An 'authorised person' is defined as a person who has written authorisation to undertake the act from the relevant statutory authority. The written authority is in the form of a licence, either a general licence which covers a number of the more typical 'pest' species, or an individual licence for other individual species. In England these licences are issued by Natural England and in Wales by the Welsh Assembly Government.

Please note: the above text provides a brief summary of the legislation in relation to breeding birds in England and Wales and the original Act and any amendments should be referred to for the precise wording.

APPENDIX 2

Plant species lists

Appendix 2 Plant species lists for selected grassland habitats

Latin Name	English Name	G1A-C	G6	G7A-D	G7E	G8	G9	G10
GRASSES								
<i>Agrostis capillaris</i>	Common bent	a	a	a	a	a	a	a
<i>Agrostis stolonifera</i>	Creeping bent	lf	lf				r	
<i>Alopecurus pratensis</i>	Meadow foxtail		la					
<i>Amophila arenaria</i>	Marram grass				r-lf			
<i>Anthoxanthum odoratum</i>	Sweet vernal-grass	a	a	a	o	a	a	a
<i>Arrhenatherum elatius</i>	False oat-grass	la	la	r	ld			
<i>Bromus hordeaceus</i>	Soft brome					o		
<i>Cynosurus cristatus</i>	Crested dog's tail	o	r					
<i>Dactylis glomerata</i>	Cock's-foot	o	la	o	lf	o	r	o
<i>Danthonia decumbens</i>	Heath-grass			r				
<i>Deschampsia caespitosa</i>	Tufted hair-grass		r					
<i>Festuca rubra</i>	Red fescue	o-a	lf	lf		lf	r	la
<i>Holcus lanatus</i>	Yorkshire fog	a	ld	lf	lf	a	a	a
<i>Holcus mollis</i>	Creeping soft-grass		r					
<i>Lolium perenne</i>	Perennial rye-grass	lf					r	
<i>Poa pratensis</i>	Smooth meadow-grass	o		o	o	o	o-lf	r
<i>Poa trivialis</i>	Rough meadow-grass		f	o	o			
OTHER HERBACEOUS SPECIES								
<i>Achillea millefolium</i>	Yarrow	lo			o			
<i>Achillea ptarmica</i>	Sneezewort	lo						
<i>Anagallis arvensis</i>	Scarlet pimpernel		r					
<i>Athyrium filix-femina</i>	Lady fern	o						
<i>Calystegia sepium</i>	Hedge bindweed	lo						
<i>Carex arenaria</i>	Sand sedge				r			
<i>Carex flacca</i>	Glaucous sedge	la						
<i>Carex nigra</i>	Common sedge		lo					
<i>Carex ovalis</i>	Oval sedge	o	lo					
<i>Centaurea nigra</i>	Common knapweed	a	o					
<i>Cerastium fontanum</i>	Common mouse-ear	lf	r	o	o	o	r	o
<i>Chamerion angustifolium</i>	Rosebay willowherb		r	r				
<i>Cirsium arvense</i>	Creeping thistle	la		lf	o	r	lo	
<i>Cirsium vulgare</i>	Spear thistle		o					
<i>Crepis capillaris</i>	Smooth hawk's-beard		o-f	o			r	o
<i>Digitalis purpurea</i>	Foxglove		r					
<i>Dryopteris felix-mas</i>	Male fern	r						
<i>Eleocharis palustris</i>	Common spike-rush		la					
<i>Epilobium hirsutum</i>	Great willowherb	r	lo	lo				
<i>Epilobium parviflorum</i>	Hoary willowherb							
<i>Equisetum arvense</i>	Field horsetail	r			r			
<i>Equisetum palustre</i>	Marsh horsetail		lo					
<i>Euphrasia arctica ssp. borealis</i>	Eyebright		a	o-lf		f	o	r
<i>Filipendula ulmaria</i>	Meadowsweet	r	r	lf				
<i>Galium aparine</i>	Cleavers	r						
<i>Galium palustre</i>	Common marsh-bedstraw		la	o				
<i>Heracleum sphondylium</i>	Hogweed	o			o			
<i>Hypericum tetrapterum</i>	Square stemmed St-John's	lo						
<i>Hypochaeris radicata</i>	Common cat's-ear		o	lf	o	o	r	
<i>Iris pseudacorus</i>	Yellow flag	lo						
<i>Isolepis setacea</i>	Bristle club-rush		r					
<i>Juncus acutiflorus</i>	Sharp-flowered rush	o-lf	lo	lf			lf (edges)	
<i>Juncus articulatus</i>	Jointed rush		r					
<i>Juncus bufonius</i>	Toad rush		lf					
<i>Juncus conglomeratus</i>	Compact rush	la	o-lf					
<i>Juncus effusus</i>	Soft-rush	o-f	o-lf	lf				
<i>Lathyrus latifolius</i>	Broad-leaved everlasting pe	r						
<i>Lathyrus pratensis</i>	Meadow vetchling	f	o	r				
<i>Leontodon autumnalis</i>	Autumnal hawkbit						r	
<i>Lepidium didymum</i>	Lesser swine-cress		r					
<i>Lotus corniculatus</i>	Common bird's-foot trefoil	f-a	o	lf-la		lf-la	o	r
<i>Lotus pedunculata</i>	Greater bird's-foot trefoil	la	lo	o	r		r	
<i>Luzula campestris</i>	Field woodrush		r	o	o		r	
<i>Oenanthe crocata</i>	Hemlock water-dropwort		r					
<i>Plantago lanceolata</i>	Ribwort plantain	f-a	lf	lf	lf	a	a	f
<i>Polygonum sp.</i>	A bistort		r					
<i>Potentilla anserina</i>	Silverweed		lf	la	r	r	f-lf	o-f
<i>Potentilla erecta</i>	Tormentil			r				
<i>Potentilla reptans/anglica</i>	Creeping cinquefoil	o	r	o-f				

Latin Name	English Name	G1A-C	G6	G7A-D	G7E	G8	G9	G10
<i>Prunella vulgaris</i>	Selfheal	o	r					
<i>Ranunculus sceleratus</i>	Celery leaved buttercup		r					
<i>Ranunculus acris</i>	Meadow buttercup	f	o	t			r	
<i>Ranunculus flammula</i>	Lesser spearwort		r					
<i>Ranunculus repens</i>	Creeping buttercup	o	la					
<i>Rhinanthus minor</i>	Yellow Rattle		la			r	+	
<i>Rhytiadelphus squarrosus</i>	A moss			r				
<i>Rorippa nasturtium-aquaticum</i> agg.	Watercress		lo					
<i>Rubus fruticosus</i> agg.	Bramble	r		r	r-lf			
<i>Rumex acetosa</i>	Common sorrel	o	lf	o				
<i>Rumex acetosella</i>	Sheep's sorrel				lo			
<i>Rumex crispus</i>	Curled dock	r						
<i>Rumex obtusifolius</i>	Broad-leaved dock	r	r	r				
<i>Senecio jacobaea</i>	Ragwort	o	r	o	r		r	
<i>Sonchus arvensis</i>	Perennial sow-thistle				r			
<i>Sonchus</i> sp.	A sow thistle		o	o				
<i>Stachys palustris</i>	Marsh woundwort	lo		r				
<i>Stellaria graminea</i>	Lesser stitchwort	r	r	r	lf		r	r
<i>Taraxacum officinale</i> agg.	Dandelion	o	lo				o	
<i>Trifolium pratense</i>	Red clover	lf	lo				r	
<i>Trifolium repens</i>	White clover	r	o-lf	r-f		f	o-lf	f
<i>Urtica dioica</i>	Common nettle	r		lf			lf (edges)	
<i>Vicia cracca</i>	Tufted vetch	a	o	r				
WOODY SPECIES								
<i>Alnus glutinosa</i>	Common alder	r						
<i>Buddleja davidii</i>	Butterfly bush		la					
<i>Fuchsia magellanica</i>	Fuchsia			r				
<i>Prunus spinosa</i>	Blackthorn			r	r			
<i>Salix cf. viminalis</i>	Osier?	r						
<i>Salix cinerea</i>	Grey willow	o	r		r-o			
<i>Sorbus</i> sp.	Whitebeam seedling				+			
<i>Ulex europaeus</i>	Gorse	r	r		r			

Based on surveys on:

28/06/2017

23/08/2017

11/07/2018

15/10/2018

12/06/2019

APPENDIX 3

Phase 1 Species codes and abbreviations

Phase 1 Species Codes

Ac	Acer	campestre
Ap	Acer	pseudoplatanus
Ah	Aesculus	hippocastanum
Aeu	Agrimonia	euphatoria
At	Agrostis	capillaris
Agc	Agrostis	curtisii
Agt	Agrostis	stolonifera
Aip	Aira	praecox
Ajr	Ajuga	reptans
Aa	Alchemilla	alpine
Alu	Allium	ursinum
Ama	Ammophila	arenaria
An	Anemone	nemorosa
As	Angelica	sylvestris
Ao	Anthoxanthum	odoratum
Asy	Anthriscus	sylvestris
Auu	Arctostaphylos	uva-ursi
Ae	Arrhenatherum	elatius
Av	Artemisia	vulgaris
Ast	Aster	tripolium
Aff	Athyrium	filix-femina
Apr	Avenula	pratensis
Apb	Avenula	pubescens
Bet	Betula	sp(p)
Bpe	Betula	pendula
Bpu	Betula	pubescens
Bsp	Blechnum	spicant
Bp	Brachypodium	pinnatum
Bs	Brachypodium	sylvaticum
Bm	Briza	media
Be	Bromus	erectus
Bxs	Buxus	sempervirens
Ce	Calamagrostis	epigejos
Cac	Calamagrostis	canescens
Cv	Calluna	vulgaris
Cap	Caltha	palustris
Cx	Carex	sp(p)
Cxaa	Carex	acuta
Cxac	Carex	acutiformis
Cxar	Carex	arenaria
Cxb	Carex	bigelowii
Cxe	Carex	elata
Cxf	Carex	flacca
Cxl	Carex	laevigata
Cxn	Carex	nigra

Cxo	Carex	otrubae
Cxpa	Carex	paniculata
Cxrm	Carex	remota
Cxri	Carex	riparia
Cxro	Carex	rostrata
Cxv	Carex	vesicaria
Cb	Carpinus	betulus
Cs	Castanea	sativa
Cn	Centaurea	nigra
Cha	Chamerion	angustifolium
Cop	Chrysosplenium	oppositifolium
Cl	Circaea	lutetiana
Cirs	Cirsium	sp(p)
Car	Cirsium	arvense
Ch	Cirsium	helenioides
Cp	Cirsium	palustre
Civ	Cirsium	vulgare
Cim	Cadium	mariscus
Com	Conium	maculatum
Cva	Clematis	vitalba
Cos	Comus	sanguinea
Ca	Corylus	avellana
Cot	Cotoneaster	sp(p)
Cm	Crataegus	monogyna
Crc	Crepis	capillaris
Cyc	Cynosurus	cristatus
Cys	Cytisus	scoparius
Dg	Dactylis	glomerata
Dd	Danthonia	decumbens
Dc	Deschampsia	cespitosa
Df	Deschampsia	flexuosa
Dp	Digitalis	purpurea
Do	Dryas	octopetala
Dr	Dryopteris	sp(p)
Ddl	Dryopteris	dilatata
El	Elymus	sp(p)
Ef	Elymus	farctus
En	Empetrum	nigrum
Ep	Epilobium	sp(p)
Eq	Equisetum	sp(p)
Eqf	Equisetum	fluviatile
Eqs	Equisetum	sylvaticum
Ec	Erica	cinerea
Et	Erica	tetralix
Erio	Eriophorum	sp(p)

Phase 1 Species Codes

Era	Eriophorum	angustifolium
Ev	Eriophorum	vaginatatum
Ee	Euonymus	europaeus
Fs	Fagus	sylvatica
Fo	Festuca	ovina
Fp	Festuca	pratensis
Fr	Festuca	rubra
Fu	Filipendula	ulmaria
Fv	Fragaria	vesca
Fa	Frangula	alnus
Fe	Fraxinus	excelsior
Gl	Galeobdolon	luteum
Gap	Galium	aparine
Gsx	Galium	saxatile
Gp	Geranium	pratense
Gro	Geranium	robertianum
Gs	Geranium	sylvaticum
Gu	Geum	urbanum
Gh	Glechoma	hederacea
Gf	Glyceria	sp(p) except maxima
Gm	Glyceria	maxima
Hp	Halimione	portulacoides
Hh	Hedera	helix
Hc	Helianthemum	charnaecistus
Hsp	Heracleum	sphondylium
Hr	Hippophae	rhamnoides
Hx	Holcus	sp(p)
Hi	Holcus	lanatus
Hn	Hyacinthoides	non-scripta
Hyp	Hypericum	perforatum
Ia	Ilex	aquifolium
Ig	Impatiens	glandulifera
Ip	Iris	pseudacorus
Ju	Juncus	sp(p)
Ja	Juncus	acutiflorus
Jar	Juncus	articulatus
Je	Juncus	effusus
Ji	Juncus	inflexus
Jm	Juncus	maritimus
Jsq	Juncus	squarrosus
Js	Juncus	subnodulosus
Jt	Juncus	trifidus
Jc	Juniperus	communis
Lx	Larix	sp(p)
Lxd	Larix	deciduas
Le	Lemna	sp(p)

Lv	Leucanthemum	vulgare
Liv	Ligustrum	vulgare
Lvu	Limonium	vulgare
Lnv	Linaria	vulgaris
Lp	Lolium	perenne
Lpc	Lonicera	periclymenum
Lzp	Lazula	pilosa
Ls	Luzula	sylvatica
Lmm	Lysimachia	nummularia
Md	Malus	domestica
Maq	Mentha	aquatica
Mp	Mercurialis	perennis
Mc	Molinia	caerulea
Mym	Mycelis	muralis
Mg	Myrica	gale
Ns	Nardus	stricta
Nos	Narthecium	ossifragum
Noth	Northofagus	sp.
NuN	Nuphar/Nymphaea	sp(p)
Nl	Nuphar	lutea
Na	Nymphaea	alba
Odv	Odontites	verna
OI	Oreopteris	limbosperma
Oxa	Oxalis	acetosella
Pas	Pastinaca	sativa
Pet	Petasites	hybridus
Pha	Phalaris	arundinacea
Phl	Phleum	pratense
Pc	Phragmites	australis
Px	Picea	sp(p)
Pia	Picea	abies
Pin	Pinus	sp(p)
Psyl	Pinus	sylvestris
Pl	Plantago	lanceolata
Pm	Plantago	major
Po	Poa	sp(p)
Pbis	Polygonum	bistorta
Pop	Populus	tremula
Pot	Populus	tremula
Pom	Potamogeton	sp(p)
Pans	Potentilla	anserine
Ppal	Potentilla	palustris
Psn	Poterium	sanguisorba
Pv	Prunella	vulgaris
Pa	Prunus	avium
Pap	Prunus	avium/padus

Phase 1 Species Codes

Pnc	Prunus	cerasus
Pdn	Prunus	domestica
Pp	Prunus	padus
Ps	Prunus	spinosa
Pgm	Pseudotsuga	menziesii
Pt	Pteridium	aquilinum
Puc	Puccinellia	sp(p)
Py	Pyrus	sp(p)
Qu	Quercus	sp(p)
Qr	Quercus	robur
Rs	Ranunculus	sp(p)
Rfm	Ranunculus	flammula
Rr	Ranunculus	repens
Rll	Reseda	luteola
Rj	Reynoutria	japonica
RI	Racomitrium	lanuginosum
Rc	Rhamnus	catharticus
Rhin	Rhinanthus	minor
Rp	Rhododendron	ponticum
Ros	Rosa	sp(p)
Rch	Rubus	chamaemorus
Rf	Rubus	fruticosus
Ri	Rubus	idaeus
Rx	Rumex	sp(p)
Ra	Rumex	acetosella
Sal	Salicornia	sp(p)
Sx	Salix	sp(p)
Sxa	Salix	alba
Sxar	Salix	arbuscula
Sxau	Salix	aurita
Sxc	Salix	caprea
Sxi	Salix	cinerea
Sxf	Salix	fragilis
Sxh	Salix	herbacea
Sxl	Salix	lapponum
Sxm	Salix	mysinities
Sxp	Salix	pentandra
Sxpu	Salix	purpurea
Sxr	Salix	repens
Sxt	Salix	triandra
Sxv	Salix	ciminalis
Sn	Sambucus	nigra
Sang	Sanguisorba	officinalis
Sne	Sanicula	europaea
Saa	Saxifraga	aizoides
Sl	Schoenoplectus	lacustris
Zo	Zostera	sp(p)
Sl	ssp	lacustris
St	ssp	tabernaemontani
Sc	Schoenus	nigricans

Sv	Scilla	verna
Sm	Scirpus	maritimus
Sno	Scrophularia	nodosa
Sr	Sedum	rosa
Sj	Senecio	jacobaea
Sea	Sesleria	albicans
Sia	Silene	acaulis
Sdi	Silene	dioica
Sd	Solanum	dulcamara
Soa	Sonchus	arvensis
Sa	Sorbus	aria
Sac	Sorbus	aucuparia
Se	Sparganium	erectum
Sp	Spartina	sp(p)
Sph	Sphagnum	sp(p)
Sme	Stellaria	media
Sf	Suaeda	fruticosa
Sup	Succisa	pratensis
Tb	Taxus	baccata
Tsn	Teucrium	scorodonia
agg.	Til	Tilia
Tic	Tilia	cordata
Tip	Tilia	phlatyphyllos
Tiv	Tilia	vulgaris
Tc	Trichophorum	cespitosum
Tr	Trifolium	repens
Tff	Tussilago	farfara
Ty	Typha	sp(p)
Ta	Typha	angustifolia
TI	Typha	latifolia
Ul	Ulex	sp(p)
Ue	Ulex	europaeus
Ug	Ulex	gallii
Umi	Ulex	minor
Um	Ulmus	sp(p)
Umg	Ulmus	glabra
Ump	Ulmus	procera
Ud	Urtica	dioica
Vm	Vaccinium	myrtillus
Vv	Vaccinium	vitis-idaea
Vd	Valerian	dioica
Vth	Verbascum	thapsus
VI	Viburnum	lantana
Vop	Viburnum	opulus
Zoa	Zostera	angustifolia
Zon	Zostera	noltii

APPENDIX 4

Survey of the Large Mason Bee and other Aculeate Hymenoptera

ACULEATE SURVEY OF THE SOFT-ROCK CLIFFS AT AFON WEN, PWLLHELI



Mr. Liam Olds

June 2019

**This report was produced by Liam Olds (Colliery Spoil Biodiversity Initiative)
for Peter Tattersfield Consultant Ecologists**

**Liam Olds | Entomologist
Email: collieryspoil@gmail.com
Mob: +44 (0)7398 106443**

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APPENDIX

Appendix 1. Soft-rock cliff habitat in section A-B.

Appendix 2. Flower-rich grassland along the soft-rock cliffs in section B-C.

Appendix 3. Scrub encroachment having resulted in the loss of soft-rock cliff nesting habitat in section D-E.

1.0 INTRODUCTION

1.1 Introductory comments

Liam Olds (Colliery Spoil Biodiversity Initiative) was commissioned by **Peter Tattersfield** (on behalf of Bourne Leisure Ltd) to undertake a survey of aculeate Hymenoptera (bees and wasps) along three sections of coastline near Afon Wen, Pwllheli, Gwynedd. The three sections (A-B, B-C and D-E) are indicated in Map 1. The primary aim of these surveys were to determine the presence or absence of the endangered Large Mason Bee (*Osmia xanthomelana*) (Figure 1) – a species that was once relatively widespread in southern Britain but has declined markedly over the last 100 years and is now seemingly restricted to just two UK sites (Porth Ceiriad and Porth Neigwl), both of which are on the Llŷn Peninsula. The secondary aim of the survey was to determine the presence of any species of ‘conservation interest’ in these three sections of coastline (i.e. species considered Nationally Local, Nationally Scarce or Nationally Rare, and/or listed under Section 7 of Environment (Wales) Act 2016 as species of principal importance in Wales).



Figure 1. Large Mason Bee (*Osmia xanthomelana*), the primary target for the survey © Liam Olds.

This report details the results of that survey, which was conducted over two daytime visits in June 2019. It is anticipated that the results presented in this report will help inform the proposed planning application which may impact parts of this coastline.

1.2 Site description

The survey site (hereinafter referred to as Afon Wen) comprises a stretch of coastline covering a total distance of approximately 1.13km or 0.7 miles from the mouth of the Afon Wen river westwards to the Forest Lodge section of Hafan y Môr Holiday Park (see Map 1). An approximate central grid reference for the survey site is SH437367.



Map 1. Satellite image of Afon Wen coastline divided into the three survey sections: A-B (in green), B-C (in yellow) and D-E (in blue). Image © Google 2018.

A description of each of the three sections of coastline is given below.

Section A-B (green): This section of coastline covers a distance of approximately 0.21 miles or 0.34 km. To the east comprises numerous exposed soft-rock cliffs supporting excellent nesting habitat for aculeates (see Appendix 1) – these soft-rock cliffs are continuous with the western side of section B-C. Areas of scrub and flower-rich grassland are also evident. West of the former sewage works, the coast is dominated by coastal sea defences (i.e. large rocks placed at the sea edge as a defence against flooding and erosion) that were deemed to be of no value to aculeates.

Section B-C (yellow): This section of coastline covers a distance of approximately 0.23 miles or 0.38km. To the east comprises the mouth of the Afon Wen river with fringing sandhills. To the west, numerous exposed soft-rock cliffs are evident supporting excellent nesting habitat for aculeates – these soft-rock cliffs are continuous with the eastern side of section A-B. A flower-rich grassland sward borders much of these soft-rock cliffs providing good forage opportunities for aculeates and other insects (Appendix 2).

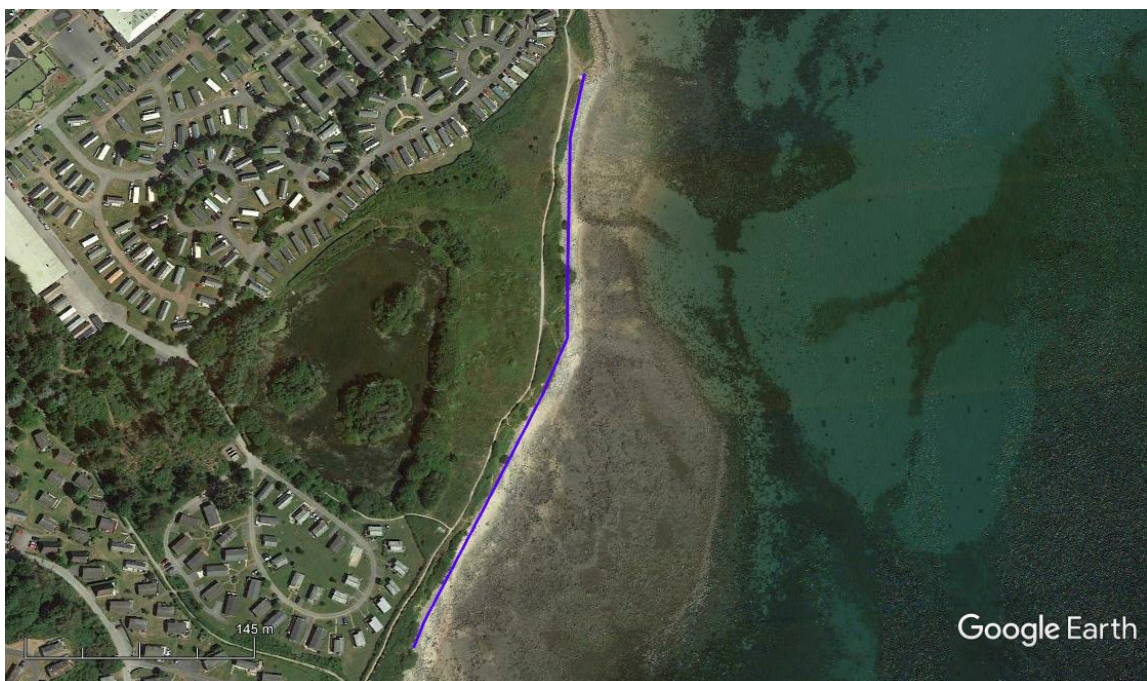
Section D-E (blue): This section of coastline covers a distance of approximately 0.26 miles or 0.41km roughly north to south along the eastern edge of Hafan y Môr Holiday Park. Much of this coastline is heavily wooded or dominated by scrub (Appendix 3) and deemed to be of relatively little value to aculeates (particularly for nesting), however some areas of exposed soft-rock cliffs are evident along with seemingly suitable habitat for *Osmia xanthomelana*. This is discussed further in section 4.



Map 2. Satellite image of Afon Wen coastline showing the location of section A-B (in green). Image © Google 2018.



Map 3. Satellite image of Afon Wen coastline showing the location of section B-C (in yellow). Image © Google 2018.



Map 4. Satellite image of Afon Wen coastline showing the location of section D-E (in blue). Image © Google 2018.

1.3 Survey limitations

Due to a period of prolonged, cool and wet weather from late May to late June, the survey of Afon Wen commenced some 3-4 weeks behind schedule. This meant that the survey fell outside of the period of 'peak activity' for many solitary bees (particularly those in the genera *Andrena* and *Nomada*), which may explain why just 4 *Andrena* and 4 *Nomada* species

were recorded. Invertebrate activity is also significantly affected by the weather so the unusually cool, wet weather may too have caused a decline in aculeate numbers. This may explain why several common species that would presumably be present at Afon Wen, and which are active in June, were not encountered during the survey. Some caution needs to be taken, therefore, when interpreting the results of this report as there will undoubtedly be further species (especially solitary bees) present at Afon Wen that have not been accounted for. Despite this, I am of the impression, that good coverage of the target taxa (bees and wasps) was achieved and the later than anticipated survey dates are not likely to significantly alter the overall conclusions drawn here. The survey was conducted in suitable weather conditions and fell within the flight period of the primary target – *Osmia xanthomelana* – and many other aculeates (particularly solitary wasps).

2.0 SAMPLING

2.1. Survey dates

The survey was conducted over two visits in June 2019 - the first of these visits was made on 20th June 2019, with the second and final visit on 21st June 2019. Surveying was conducted during warm and sunny conditions - it is at this time that aculeates are most active. Average survey time for each visit was 5-6 hours. Weather conditions on the survey dates are provided in **Table I**.

Table I. Weather conditions on the survey dates.

Survey Date	Survey Time	Activity	Weather conditions
20 th June 2019	6 hours, 30 mins	Familiarisation with habitats present by walking around survey area. A survey of aculeate Hymenoptera (inc. <i>Osmia xanthomelana</i>) in sections A-B and B-C.	Warm, sunny intervals. Maximum air temperature of 15°C. Occasional strong breeze, with wind speeds of 14-17 MPH (miles per hour) and coming from a south-westerly direction.
21 st June 2019	5 hours	Repeat survey of aculeate Hymenoptera (inc. <i>Osmia xanthomelana</i>) in sections A-B and B-C to account for any missed species. A survey for <i>Osmia xanthomelana</i> in section D-E.	Warm, sunny intervals. Maximum air temperature of 16°C. Light breeze, with wind speeds reaching a maximum of 8 MPH and coming from a south-westerly direction.

2.2 Sampling methodology

The survey was carried out by direct searching in areas considered of value to aculeates. Floristically-rich areas were searched regularly during the day so as to record any flower-visiting aculeates. Bare and sparsely vegetated ground (including soft-rock cliffs, bare sand and footpaths) were also readily observed for nesting aculeates. When encountered, individual insects were caught (where appropriate) using a 40cm diameter net mounted on a meter long pole. Where possible, individuals were identified to species-level in the field using a hand lens. Due to the difficulties in species identification, a limited number of specimens were collected for subsequent identification. All specimens were identified by the author (Liam Olds) using a x20-x40 binocular microscope and compared against the reference collections at Amgueddfa Cymru - National Museum Wales (Cardiff) for validation.

3.0 RESULTS

3.1 Overview

A total of **37** aculeate species were positively identified during the survey at Afon Wen - this included **22** bee species and **15** wasp species (**Table 1**). An additional **26** other invertebrate species were also incidentally recorded during the survey (**Table 2**). Despite extensive searching, **no *Osmia xanthomelana* individuals were seen** in sections A-B, B-C and D-E.

Status

- **Local** = Species which, whilst fairly common, are evidently less widespread than truly common species, but also not qualifying as Nationally Notable having been recorded from over one hundred, but less than three hundred, ten-kilometre squares of the UK National Grid.
- **S7** = Listed under Section 7 list of the Environment (Wales) Act 2016 as a species of 'principal importance for the conservation of biological diversity in Wales'.

Table 1. A list of aculeate species (i.e. bees and wasps) positively identified during surveys at Afon Wen and the sections in which they were recorded (A-B, B-C and D-E). **Key:** + = recorded, - = not recorded.

Species	Section			National Status & Notes
	A-B	B-C	D-E	
CHRYSIDIDAE				
<i>Chrysis ignita</i> agg.	+	+	+	Common.
<i>C. viridula</i>	+	+	+	Local. Cleptoparasite of <i>Odynerus spinipes</i> .
<i>Hedychridium ardens</i>		+	+	Local. Cleptoparasite of <i>Tachysphex pompiliiformis</i> .

CRABRONIDAE				
<i>Crossocerus elongatulus</i>	+			Common.
<i>Oxybelus uniglumis</i>	+			Common. Nests in sandy habitat.
<i>Pemphredon lethifer</i>	+			Common.
<i>Tachysphex pompiliiformis</i>	+	+		Local.
EUMENIDAE				
<i>Odynerus spinipes</i>	+	+	+	Common. Builds mud nests on cliff faces.
POMPILIDAE				
<i>Anoplius concinnus</i>		+		Local. Occurs in damp habitats.
<i>Anoplius nigerrimus</i>		+		Local.
<i>Arachnospila trivialis</i>		+		Local. Most frequent on the coast.
<i>Episyron rufipes</i>	+			Local. Common in sandy areas.
<i>Evagetes crassicornis</i>	+	+		Local.
VESPIDAE				
<i>Dolichovespula sylvestris</i>	+			Common.
<i>Vespula germanica</i>	+			Common.
ANDRENIDAE				
<i>Andrena barbilabris</i>		+		Common,
<i>A. bicolor</i>	+			Common,
<i>A. cineraria</i>		+		Local.
<i>A. nigroaenea</i>	+	+		Common.
ANTHOPHORIDAE				
<i>Anthophora furcata</i>	+			Common. Nests in deadwood.
APIDAE				
<i>Bombus hortorum</i>	+			Common.
<i>B. lapidarius</i>	+	+	+	Common.
<i>B. pascuorum</i>			+	Common.
<i>B. terrestris</i>	+	+	+	Common.
<i>Nomada flava</i>	+			Common. Cleptoparasite of <i>Andrena scotica</i> primarily.
<i>N. goodeniana</i>	+	+		Common. Cleptoparasite of <i>Andrena nigroaenea</i> , <i>A. scotica</i> and <i>A. thoracica</i> .
<i>N. marshamella</i>	+			Common. Cleptoparasite of <i>Andrena scotica</i> .
<i>N. striata</i>		+		Local. Cleptoparasite of <i>Andrena wilkella</i> .
COLLETIDAE				

<i>Hylaeus brevicornis</i>	+			Local. Common in sandy habitats.
HALICTIDAE				
<i>Lasioglossum cupromicans</i>		+		Local.
<i>L. leucozonium</i>		+		Common.
<i>L. villosulum</i>		+		Common.
<i>Sphecodes eppipius</i>	+	+		Common. Cleptoparasite of <i>Lasioglossum</i> and <i>Halictus</i> species.
<i>S. geoffrellus</i>	+			Common. Cleptoparasite of <i>Lasioglossum</i> species.
<i>S. monillicornis</i>	+			Common. Cleptoparasite of <i>Lasioglossum</i> and <i>Halictus</i> species.
<i>S. pellucidus</i>		+		Local. Cleptoparasite of <i>Andrena barbilabris</i> .
MEGACHILIDAE				
<i>Megachile willugbiella</i>			+	Common. Nests in deadwood and various artificial cavities.
TOTAL SPECIES	24	21	8	

Table 2. Incidental records of non-target invertebrate taxa positively identified during surveys at Afon Wen.

Species/Family	Common Name (if applicable)	Status & Notes
COLEOPTERA		
<i>Cicindela campestris</i> (Carabidae)	Green Tiger Beetle	Common.
<i>Coccinella septempunctata</i> (Coccinellidae)	7-spot Ladybird	Common.
<i>Meloe proscarabaeus</i> (Meloidae)	Black Oil Beetle	Section 7 species. An abundance of triunguins (larvae) found on adult bees and wasps in sections A-B and B-C.
<i>Malachius bipustulatus</i> (Malachiidae)	Common Malachite Beetle	Common.
<i>Oedemera lurida</i> (Oedemeridae)	a flower beetle	Local.
<i>Oedemera nobilis</i> (Oedemeridae)	Swollen-thighed Beetle	Common.
<i>Phyllopertha horticola</i> (Rutelidae)	Garden Chafer Beetle	Common.
DIPTERA		
<i>Acrosathe annulata</i> (Therevidae)	Coastal Silver-stiletto Fly	Local. A frequent species of coastal dunes. Found on bare sand in section B-C.
<i>Chloromyia formosa</i> (Stratiomyidae)	Broad Centurion	Common.
<i>Dioctria rufipes</i> (Asilidae)	a robberfly	Local. A species of scrubby grassland, woodland edge and hedgerows.
<i>Episyrphus balteatus</i> (Syrphidae)	Marmalade Fly	Common.
<i>Eristalis pertinax</i> (Syrphidae)	a hoverfly	Common.

<i>Eristalis tenax</i> (Syrphidae)	a hoverfly	Common.
<i>Meredon equestris</i> (Syrphidae)	a hoverfly	Common.
<i>Philonicus albiceps</i> (Asilidae)	Dune Robberfly	Local. A frequent species of coastal dunes and fringing sandhills. Found in abundance on bare sand in section B-C.
<i>Volucella bombylans</i> (Syrphidae)	a hoverfly	Common.
HEMIPTERA		
<i>Coreus marginatus</i> (Coreidae)	Dock Bug	Common.
<i>Dolycoris baccarum</i> (Pentatomidae)	Hairy Shieldbug	Common.
<i>Piezodorus lituratus</i> (Pentatomidae)	Gorse Shieldbug	Common,
LEPIDOPTERA		
<i>Euclidia glyphica</i> (Erebidae)	Burnet Companion Moth	Common.
<i>Lycaena phlaeas</i> (Lycaenidae)	Small Copper	Common.
<i>Polyommatus icarus</i> (Lycaenidae)	Common Blue Butterfly	Common.
<i>Tyria jacobaeae</i> (Erebidae)	Cinnabar Moth	Common.
<i>Vanessa cardui</i> (Nymphalidae)	Painted Lady	Common.
<i>Zygaena filipendulae</i> (Zygaenidae)	6-spot Burnet	Common.
ORTHOPTERA		
<i>Chorthippus parallelus</i>	Meadow Grasshopper	Common.

3.2 Aculeate species of conservation interest

Of the **37** aculeate species recorded at Afon Wen, **13** are deemed to be of ‘**conservation interest**’ due to their Nationally Local status. Further information on these species is provided below. It should be noted that no Nationally Scarce, Nationally Rare or Section 7 listed aculeate species were encountered during the survey of sections A-B, B-C and D-E.

3.2.1 Nationally Local species

A total of **13** aculeate species recorded during the survey are designated as Nationally Local.

Chrysis viridula (a ruby-tailed wasp) is widespread in southern Britain north to north-east Yorkshire; in Wales, it is mostly confined to coastal areas. *C. viridula* is a cleptoparasite of the eumenid wasps *Odynerus spinipes* and *Odynerus melanocephalus* - the former of which is abundant throughout Afon Wen, especially in sections A-B and B-C. Though not listed as a priority species for conservation in the last published status review of bees, wasps and ants (Falk, 1991), evidence suggests that *C. viridula* could be in decline and its conservation status is in need of review. At Afon Wen, *C. viridula* is present in good numbers on soft-rock cliffs in sections A-B and B-C; it was also recorded in section D-E, though in fewer numbers.

Hedychridium ardens (a ruby-tailed wasp) is widespread throughout Britain in open sandy areas associated with the nesting habitat of its host; in Wales, it is mostly confined to coastal

areas. *H. ardens* is a cleptoparasite/parasitoid of *Tachysphex pompiliformis*. At Afon Wen, *H. ardens* was encountered in low numbers on soft-rock cliffs in sections B-C and D-E. Though not recorded in section A-B, it is anticipated that it is present here given the habitat continuity with section B-C.

Tachysphex pompiliformis (a solitary wasp) is widespread throughout Britain in sandy localities, both coastal and inland; in Wales, it is mostly confined to coastal areas. It preys upon the nymphs of grasshoppers (Acrididae) and nests are constructed in sloping sandy soil. At Afon Wen, *T. pompiliformis* was encountered in low numbers in sections A-B and B-C and was observed nesting into the soft-rock cliffs of the former.

Anoplius concinnus (a spider-hunting wasp) is widespread but local in Britain where it is typically encountered in wet habitats. It preys on spiders in the family Lycosidae and excavates its nest beneath stones. Though not listed as a priority species for conservation in the last published status review of bees, wasps and ants (Falk, 1991), the shortage of records suggests that the status of this species should be reviewed. At Afon Wen, this species was observed hunting spiders on soft-rock cliffs in section B-C.

Anoplius nigerrimus (a spider-hunting wasp) is widespread throughout Britain where it is often associated with dry grassland and scrub. It preys on spiders in various genera within the families Lycosidae, Gnaphosidae and Pisauridae. At Afon Wen, *A. nigerrimus* males were encountered at different locations on soft-rock cliffs in section B-C (seemingly hoping to encounter passing females).

Arachnospila trivialis (a spider-hunting wasp) is widespread but local in southern Britain where it is typically found in sandy habitats. It is most frequent on the coast, particularly in Wales. It preys on spiders in the genus *Xysticus* (Thomisidae) but it may also use spiders in the family Lycosidae. At Afon Wen, *A. trivialis* was observed hunting spiders along the soft-rock cliffs in section B-C.

Episyron rufipes (a spider-hunting wasp) is widespread throughout Britain in sandy localities, both coastal and inland; in Wales, it is mostly confined to coastal areas. It is a specialist hunter of orb-web spiders in the families Araneidae and Metidae and excavates its nest in loose sand. At Afon Wen, *E. rufipes* was observed constructing a nest in the soft-rock cliff in section A-B.

Evagetes crassicornis (a spider-hunting wasp) is widespread throughout Britain where it is most often encountered in sandy habitats; in Wales, it is mostly confined to coastal areas. It is a cleptoparasitic species (i.e. cuckoo) of other spider-hunting wasps, probably preying on various species of *Arachnospila*. At Afon Wen, *E. crassicornis* was observed on the soft-rock cliffs in sections A-B and B-C.

Andrena cineraria (Ashy mining bee) is a widespread and locally common species in Britain in a wide variety of habitats. It typically nests in south-facing slopes. At Afon Wen, *A. cineraria* was observed emerging from a nest burrow in soft-rock cliff in section B-C.

Nomada striata (Blunt-jawed nomad bee) is widespread throughout much of Britain but is very localised species; in Wales, it is rather scarce and predominately coastal. It is the specialist cleptoparasite (or cuckoo) of *Andrena wilkella*, a legume-loving bee species that gathers pollen from clovers, bird's-foot-trefoils, vetches, gorses and other legumes. At Afon Wen, *N. striata* was encountered host nest searching along soft-rock cliffs in section B-C.

Hylaeus brevicornis (Short-horned yellow face bee) is widespread and common throughout much of lowland Britain, though rather few records exist for Wales (where it may be under-recorded). It can be common where flowery early successional habitat is present alongside scrub and bramble patches, into which it creates its nests in the hollow bramble twigs and pithy stems. At Afon Wen, *H. brevicornis* was observed foraging on Asteracea around areas of scrub in section A-B.

Lasioglossum cupromicans (Turquoise furrow bee) is widely distributed in Britain in a variety of habitats, but is generally very scarce away from the English Midlands, northern England and North Wales. At Afon Wen, this species was encountered on the soft-rock cliffs in section B-C, presumably searching for a suitable nesting site.

Sphecodes pellucidus (Sandpit blood bee) is frequent in southern Britain in sandy habitats; in Wales, it is largely coastal. It is the specialist cleptoparasite (or cuckoo) of *Andrena barbilabris* (Sandpit mining bee), which nests in bare or sparsely vegetated sandy ground. At Afon Wen, *S. pellucidus* was observed around the nests of *A. barbilabris* in bare sand at the eastern end of section B-C (among the sandhills).

3.3 Other species of conservation interest

Of the other 26 invertebrate species recorded at Afon Wen, 5 are deemed to be of 'conservation interest' – this includes one Section 7 species and four Nationally Local species. Further information on these species is provided below.

3.3.1 Section 7 species

One species recorded during the survey is listed under Section 7 of the Environment (Wales) Act 2016 as a species of 'principal importance for the conservation of biological diversity in Wales'.

Meloe proscarabaeus (Black oil beetle) is found in lowland areas throughout Britain but has undergone a severe decline and is considered a priority species for conservation across the UK – see http://jncc.defra.gov.uk/_speciespages/2421.pdf. It is most commonly found on wildflower-rich coastal cliff tops and lowland, unimproved grasslands. In Wales, it is largely coastal with core populations found on the Gower Peninsular, Llŷn Peninsula and Pembrokeshire coast. Its larvae are parasitic on solitary bees of various genera including *Andrena*, *Melitta* and *Panurgus* – it is therefore reliant on healthy populations of its solitary bee hosts. The loss or degradation of suitable habitat for this oil beetle and its hosts is a major threat. Adults prefer Lesser celandine (*Ranunculus ficaria*) and soft grasses

(Poaceae) as food plants, but Dandelion (*Taraxacum officinale*) and Buttercups (Ranunculaceae) may also be important. The larvae (triungulins) are often found on Lesser celandine and Dandelion, but will use other flowers (especially if these are yellow).

3.3.2 Nationally Local species

A total of **4** species recorded during the survey are designated as Nationally Local.

Oedemera lurida (a beetle) is widespread throughout southern Britain where it may be encountered in open, flower-rich habitats where the larvae develop in dead herbaceous stems. At Afon Wen, *O. lurida* was encountered amongst the flower-rich vegetation bordering the soft-rock cliffs in sections A-B and B-C.

Acrosathe annulata (Coastal silver-stiletto fly) is a widespread and frequent species of coastal dunes in Britain where the larvae develop as predators in sandy ground. At Afon Wen, *A. annulata* was encountered on bare sand at the eastern end of section B-C (among the sandhills).

Dioctria rufipes (a robberfly) is a widespread and locally common robberfly in England and Wales. It frequents scrubby grassland, woodland edge and hedgerows where adults prey upon parasitic wasps, sawflies and empidid flies; the larvae are believed to develop as predators in soil. At Afon Wen, *D. rufipes* was encountered resting amongst vegetation along soft-rock cliffs in section B-C.

Philonicus albiceps (Dune robberfly) is widespread and frequent on coastal dunes and fringing sandhills around the British coastline. Adults feed upon various insects including other flies, true bugs, damselflies and grasshoppers; the larvae are predators in sand, typically among the roots of Marram Grass (*Ammophila arenaria*). At Afon Wen, *P. albiceps* was found to be abundant among the sandhills at the eastern end of section B-C.

4.0 DISCUSSION

4.1 *Osmia xanthomelana*

Despite targeted surveys for *Osmia xanthomelana* (Large Mason Bee) in sections A-B, B-C and D-E, **no individuals were encountered**. Though seemingly plentiful and suitable soft-rock cliff resting habitat was observed in sections A-B and B-C (e.g. see Appendix 1), a general absence of bird's-foot-trefoils (its primary forage plant) was evident. Efforts to increase the abundance of bird's-foot-trefoils (and general floral diversity) in land adjacent to sections A-B and B-C should help to create more favourable habitat for *Osmia xanthomelana*. Section D-E, though heavily wooded in some areas (see Appendix 3), was found to support several areas of good quality habitat seemingly suitable for *Osmia xanthomelana* – especially at SH4358936122 where large amounts of flowering *Lotus corniculatus* (Common bird's-foot-trefoil) was evident alongside suitable soft-rock cliff nesting habitat (Figure 2). Such areas should be monitored to ensure they are not lost to scrub encroachment. Efforts to clear

areas of dense scrub along section D-E and expose more soft-rock cliff nesting habitat could act as useful mitigation against the loss of any soft-rock cliffs in section A-B and/or B-C.



Figure 2. Seemingly suitable forage and nesting habitat for *Osmia xanthomelana* at SH4358936122 in section D-E.

4.2 Aculeate Hymenoptera

A total of **37** aculeate species (bees and wasps) were positively identified through the survey at Afon Wen. This figure represents a good species total (especially given the poor weather conditions in the previous weeks leading up to the survey) and is suggestive that the Afon Wen coastline supports **good habitat for aculeate (bee and wasp) species**. Of these 37 species, **13** are deemed to be of ‘conservation interest’ due to their Nationally Local status. It should be noted, however, that no Nationally Scarce, Nationally Rare or Section 7 listed aculeate species were encountered during the survey of sections A-B, B-C and D-E.

A total of **24** aculeate species were recorded in section A-B, and **21** species in section B-C. Just **8** species were positively identified in section D-E – this was a consequence of survey effort (which focused solely on *Osmia xanthomelana*) and is not reflective of habitat quality in this area, though several sections of this coastline are heavily wooded. Of the 24 aculeate species recorded in section A-B, **5** are considered of ‘conservation interest’; and of the 21 aculeate species recorded in section B-C, **11** are considered of ‘conservation interest’. It is general assumed, therefore, that section B-C is of greater value to aculeates – this is likely owing to the greater number of exposed soft-rock cliffs along this coastline and the more limited scrub in comparison to section A-B (section B-C is also longer). Given the continuity of habitat between these two sections, however, it is likely that they both support a similar aculeate fauna so caution needs to be taken when interpreting this finding.

The distribution of aculeate species of ‘conservation interest’ in sections A-B and B-C is shown in **Map 5**.



Map 5. Satellite image of Afon Wen coastline showing the locations at which species of ‘conservation interest’ were first encountered in sections A-B (in green) and B-C (in yellow).

On the basis of the results presented here - and the seeming absence of Nationally Scarce, Nationally Rare or Section 7 aculeate species - I am of the impression that the whole A-C section of coast is considered to be of **County value**. This is justified owing to the 35 aculeate species present in this relatively short section of coastline (13 of which are of ‘conservation importance’), and the good quality soft-rock cliff habitat which is present here (which is a priority habitat for conservation in itself, listed under Section 7 of Environment (Wales) Act 2016 as ‘Maritime cliff and slopes’). Effort should be made to avoid the loss of soft-rock cliff habitat wherever possible, and recreate it where it is lost.

4.3 Other invertebrate species

Though *Osmia xanthomelana* and other aculeates were the priority taxa for surveys at Afon Wen, recoding of other invertebrate groups occurred when encountered. A total of **26** other invertebrate species were recorded at Afon Wen, **5** of which are deemed to be of ‘conservation interest’.

The presence of *Meloe proscarabaeus* (Black Oil Beetle) is particularly important given its listing under Section 7 of the Environment (Wales). The larvae (triungulins) of this species were found on aculeates throughout sections A-B and B-C. Like many other oil beetles, it has experienced a severe decline in recent decades owing to the loss and fragmentation of wildflower-rich habitats and a decline in their host bee species. The requirements of this species, which are strongly linked to that of solitary bees, should therefore be considered in any planning proposals affecting this stretch of coastline.

Soft-rock cliffs, which provide nesting habitat for solitary bees at Afon Wen, should be conserved wherever possible. Where lost, these soft-rock cliffs should be created elsewhere through suitable habitat management of existing coastline (e.g. along section D-E) or artificially recreated further inland – this is discussed in section 5.0. The creation of flower-rich grassland for foraging and bare ground for nesting should also prove beneficial to solitary bees and *M. proscarabaeus*.

Efforts to expose more soft-rock cliff in section D-E in areas where it has been lost to scrub could be considered as mitigation for *M. proscarabaeus* (by creating more nesting habitat for its solitary bee hosts), though I am somewhat sceptical as to how successful this will be in this area largely to do the surfaced coastal footpath alongside section D-E. Practices such as surfacing paths are typically detrimental to oil beetles and their host bees by reducing the amount of bare ground for burrows. No suitable egg laying sites for *M. proscarabaeus* are seemingly present along this stretch of coast. Mitigation for *M. proscarabaeus* is best concentrated along sections A-B and B-C by seeking to create flower-rich habitat as forage for solitary bees, and bare ground habitat (such as bee banks) for nesting. Better management of adjacent semi-natural grassland to encourage a diverse, flower-rich sward would also prove beneficial.

5.0 RECOMMENDATIONS

Below are some suggested recommendations for habitat management and creation as part of mitigation for the potential loss of soft-rock cliff along sections A-B and B-C at Afon Wen.

- Wherever possible, avoid the loss of soft-rock cliff habitat through development, coast protection and cliff stabilisation schemes – this disrupts the natural processes of erosion and land slippage that maintain the habitats of vital importance to many invertebrates (the ecological interest of soft cliff cliffs is intrinsically linked to its rate of erosion).
- Where soft-rock cliff is lost, seek to recreate such habitats elsewhere. Habitat management in section D-E (in the form of scrub clearance to expose more soft-rock cliff) would provide further nesting habitat for aculeates and other invertebrates and act as suitable mitigation for the loss of soft-rock cliff habitat in section A-B. This should be targeted on cliffs of a southerly aspect given that it is these warmer aspects that are most favoured by aculeates.
- Habitat mitigation works (such as the 'relaxation' of the coastline to compensate for the loss of marine/littoral habitats in section A-B) should be avoided in section B-C wherever possible owing to the good quality soft-rock cliff habitat that is already present in this section. Instead, seek to manage other sections of the coast to expose more soft-rock cliff (as explained above) or seek to recreate soft-rock cliff habitat further inland (perhaps in the land immediately behind section B-C) – the latter may be achieved by using any soft-rock cliff substrate extracted from section A-B to sculpt mounds/cliffs. Such habitat creation should aim to create varied

topography such as a variety of slopes, banks, ditches and hummocks. Such habitat diversity helps to create a variety of niches with their own individual climate and aspect, thus supporting greater invertebrate diversity.

- Avoid the surfacing of the coastal footpath that runs behind the soft-rock cliffs in sections A-B and B-C in an east to west direction (if possible). This footpath is the likely nesting area of *Meloe proscarabaeus* – a Section 7 listed species. Should this path be surfaced, seek to create areas of bare ground either side of the footpath as nesting habitat for solitary bees and *M. proscarabaeus*.
- Seek to increase the abundance of bird's-foot-trefoils (and generally encourage floral diversity) in land adjacent to sections A-B and B-C through appropriate grassland management. Seek to sow *Lotus* seeds, and the seeds of other native wildflowers, should the local seed bank be impoverished or there is a risk of dominance by scrub, bracken or bramble that could prove invasive. This will create more favourable habitat for *Osmia xanthomelana* (which will be important should the currently restricted populations spread in future years) and forage for other aculeates. This will compensate for any loss of flower-rich grassland around the soft-rock cliffs.
- Around any inland developments, seek to create sparsely-vegetated, south-facing banks. These should ideally be created using low-nutrient substrates (such as sub-soil or quarry spoil) to ensure they remain open and sparsely-vegetated. Such 'bee banks' will provide additional nesting habitat for aculeates, while also attracting small mammals, the burrows of which provide important nesting habitats for several bumblebee species.
- Should any formal planting occur around inland developments, seek to use native plants wherever possible. Should tree planting or hedgerow creation be undertaken, spring blossoming scrubs such as willows, blackthorn and hawthorn are recommended as these are particularly important for emerging bumblebee queens and a variety of spring-flying solitary bees. Any other 'pollinator friendly' plants are advised.
- Bare ground habitat should be encouraged wherever possible as these areas are used by a range of invertebrates (especially aculeates) for nesting, hunting and basking.
- Incorporation of 'green roofs' into design plans for inland developments could be considered as a means of providing additional forage habitat for aculeates. It is important, however, that this is part of a wider mitigation scheme and not used in isolation.
- Consider the introduction of bee hotels around inland developments as additional nesting habitat for aculeates.

6.0 REFERENCES

Falk, S. J. (1991). A review of the scarce and threatened bees, wasps and ants of Great Britain. Research and Survey in Nature Conservation No. 35. Nature Conservancy Council, Peterborough.

APPENDIX



Appendix 1. Soft-rock cliff habitat in section A-B.



Appendix 2. Flower-rich grassland along the soft-rock cliffs in section B-C.



Appendix 3. Scrub encroachment having resulted in the loss of soft-rock cliff nesting habitat in section D-E.

Peter Tattersfield BA PhD MCIEEM CEnv *Consultant Ecologists*
Bar Cottage, Bar Road, Baslow, Bakewell DE45 1SF
T: 01246 583586 M 07967 503563 E: peter@petertat.demon.co.uk