

PRELIMINARY ECOLOGICAL APPRAISAL

Model Farm (Land at Rhoose)

ECO02103 Model Farm
Preliminary Ecological
Appraisal (PEA)
B
February 2023

REPORT

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
A	Issue to client	Kate Davies	Mike Shewring	Mike Shewring	18/06/19
B	Issue to client	Alex Harper	Tim Oliver	Tim Oliver	31/01/23
C	Issue to client	Tim Oliver		Tim Oliver	15/02/2023

Approval for issue

Tim Oliver

15 February 2023

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1 INTRODUCTION

1.1 Background to the study

- 1.1.1 RPS were commissioned by Legal and General (Strategic Land) Ltd (the client) in May 2018 to undertake a Preliminary Ecological Appraisal (PEA) of a site named Model Farm north of Porthkerry, located in the Vale of Glamorgan.
- 1.1.2 In November 2022 a site walkover of the land within and adjoining the development footprint was undertaken to review the status of the single waterbody within the site and to assess if there had been any change to broad habitat types recorded in 2018.
- 1.1.3 RPS were subsequently instructed to update the desk study element of the PEA. This document reports on the findings of the 2019 PEA report with reference to 2022 walkover survey and updated data search.

1.2 Site Description

- 1.2.1 The site is located within the Vale of Glamorgan, north of Porthkerry and south of the A4226 and Port Road. The site can be located using a central grid reference of ST08026 67338. The client's total ownership extends to 109 ha, although the application site boundary extends to approximately 45 ha. The site is predominately comprised of pasture and arable fields intersected by hedgerows and areas of broadleaf woodland. The site includes two small watercourses; Whitelands Brook and Bullhouse Brook. Model Farm house and outbuildings are located within the north of the site.
- 1.2.2 The site is located to the west of Porthkerry Country Park, with the woodland in the south east of the site a continuation of woodland within the park intersected by a railway viaduct.
- 1.2.3 The wider landscape supports further arable and pasture farmland with patches of broadleaf woodland, as well as Cardiff Airport to the west and Barry to the east.

2 METHODS

2.1 Desk Study

- 2.1.1 The desk study completed in 2018 was updated in January 2023 with a new data request submitted to the South-East Wales Biological Records Centre (SEWBRcC)
- 2.1.2 The 2023 desk study was reviewed the statutory and non-statutory wildlife sites within 2 km of the site as well presenting the records of protected or notable species within a 2km area around the site from the last 10 years.
- 2.1.3 In addition, available online resources were also reviewed including:
- Multi-Agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk, Defra.
 - Joint Nature Conservation Committee www.jncc.defra.gov.uk, JNCC.
- 2.1.4 The following designated sites were included in the data search:
- Ramsar
 - Special Marine Conservation Areas
 - Special Areas of Conservation concern (SACs)
 - Special Protected Areas (SPAs)
 - Sites of Special Scientific Interest (SSSIs)
 - National Nature Reserves (NNR)
 - Local Nature Reserves (LNR)
 - Sites Important for Nature Conservation (SINC)

2.2 Field Survey

- 2.2.1 The original site walkover survey was undertaken on 16th May 2018, in accordance with The Handbook for Phase I Habitat Survey (JNCC, 2010) and guidelines on Preliminary Ecological Appraisal (IEEM 2012). Field survey work was completed by Kate Davis (GradCIEEM) and Mike Shewring (CEcol, MCIEEM).
- 2.2.2 Habitats within the site and (where possible) immediately adjacent were classified, mapped and described in terms of their structure and broad floristic composition. Where they were encountered, invasive non-native plant species listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended in 2010) were recorded, but a comprehensive search was outside of the survey scope given the size and complexity of the site.
- 2.2.3 The habitats within the site were assessed for their potential to support legally protected or otherwise notable flora and fauna. Where species are not specifically mentioned, this indicates that no habitat of potential value for these species was identified during the survey.
- 2.2.4 A site visit was undertaken by Stephen Devereaux in November 2022 to review the status of the single waterbody within the site and to check the broad habitat types within the development footprint (Appendix E).

3 RESULTS

3.1 Desk Study

3.1.1 Designated Sites

- 3.1.1 No internationally designated sites were located within the site boundary or 2 km search buffer. A total of three SSSIs were located within 2 km of the site; Barry Woodlands, Cliff Wood and Fferm Walters, further information regarding these sites can be found in Table 1.

Table 1: SSSIs located within 2 km of the site

Site name	Approximate distance from site (m)	Size of site (ha)	Reason for designation
Barry Woodlands	235	120.7	Semi-natural broadleaved woodland
Cliff Wood – Golden Stairs	265	13.4 ha	Good example of mixed woodland with pedunculate oak, ash, maple and yew.
Fferm Walters	2,000	24.87 ha	Species-rich neutral grassland.

- 3.1.2 A total of 23 SINCs were identified within the search buffer, four of which were located within the site boundary, these were North West Bullhouse Brook, North Bullhouse Brook, West of the Old Rectory and South West of Church Farm. Further information regarding these four sites and additional sites located adjacent to the site can be found in Table 2. Further information regarding sites located within the 2 km search buffer can be found in Appendix 1.

Table 2: SINCs located within the site and 2 km search buffer

Site name	Approximate distance from site (m)	SINC description	UK BAP Priority Habitat	SINC Site Selection Criteria
North West Bullhouse Brook	Within	Ancient semi-natural broadleaved woodland	Lowland mixed deciduous woodland	H1:3 Native woodlands
North Bullhouse Brook	Within	Predominantly ancient semi-natural broadleaved woodland	Lowland mixed deciduous woodland	H1:3 Native woodlands
West of the Old Rectory	Within	Ancient semi-natural broadleaved woodland	Lowland mixed deciduous woodland	H1:3 Native woodlands

South West of Church Farm	Within	Species-rich unimproved neutral grassland	Lowland meadows	H5:1 Lowland meadows
Porthkerry	Adjacent to site	Semi-natural broadleaved woodland on an ancient woodland site	Lowland mixed deciduous woodland	H1:3 Native woodlands
Knock Man Down Wood	Adjacent to site	Predominantly semi-natural broadleaved woodland with some broadleaved plantation on an ancient woodland site	Lowland mixed deciduous woodland	H1:3 Native woodlands

3.1.3 Two LNRs were located within 2 km of the site, these were Cliff Wood – Golden Stairs and Cwm Talwg Woodlands. Further information regarding these sites can be found in Table 3.

Table 3 LNRs located within 2 km of the site

Site name	Approximate distance from site (m)	Reasons for designations ¹
Cliff Wood – Golden Stairs	250	(Located within Cliff Wood – Golden Stairs SSSI)
Cwm Talwg Woodlands	1990	

3.1.2 Priority and Protected Species

3.1.1 Records of priority and protected species were also requested from the local records centre. Table 4 gives a summary of the most recent (within the last ten years) records for each species identified within the site or 2 km search buffer. Further details regarding any species of conservation concern or locally important species can also be found in Appendix 1.

¹ No information available regarding reasons for designations for either site

Table 4 Summary of priority and protected species within site or 2 km search buffer

Species	Scientific Name	Legal/conservation status ²	No. of Records	Location of closest record (m)	Year of most recent record
Bats					
Pipistrelle bat species	<i>Pipistrellus</i>	EPS, HDir, WCA5, S7, Bonn, Bern, RD2 (UK), LBAP	2 maternity roost	94	2020
Noctule	<i>Nyctalus noctula</i>	EPS, HDir, WCA5, S7, UKBAP, Bonn, Bern, RD2 (UK), LBAP	7	205	2020
Whiskered Bat	<i>Myotis mystacinus</i>	EPS, HDir, WCA5, Bern, RDB2 (UK)	5	205	2020
Natterer's bat	<i>Myotis nattereri</i>	EPS, HDir, WCA5, Bern, RDB2 (UK)	2	205	2020
Serotine	<i>Eptesicus serotinus</i>	EPS, HDir, WCA5, Bern, RDB2 (UK)	1	1,444	2019
Daubenton's Bat	<i>Myotis daubentonii</i>	EPS, HDir, WCA5, Bern, RDB2 (UK)	1	1,444	2019
Brown Long-eared bat	<i>Plecotus auritus</i>	EPS, HDir, WCA5, S7, Bern, RDB2 (UK), LBAP	3	861	2020
Other Mammal Species					
Brown Hare	<i>Lepus europaeus</i>	S7, UKBAP, Bern, LBAP (VoG)	2	On-site	2022
Eurasian Badger	<i>Meles meles</i>	BA, Bern	9	On-site	2022
Eurasian Otter	<i>Lutra lutra</i>	EPS, HDir, WCA5, S7, Bern, 12 CITES, RDB2 (UK), LBAP		22	2022

² Summary table of the conservation and legislation pertaining to species can be found in Appendix 1

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Harvest Mouse	<i>Micromys minutus</i>	S7, LBAP	1	1,978	2019
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Hazel Dormouse	<i>Muscardinus avellanarius</i>	EPS, HDir, WCA5, S7, Bern, 1 RDB2 (UK), LBAP		1,230	2013
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Polecat	<i>Mustela putorius</i>	HDir, S7, UKBAP, Bern, RD2 (UK), LBAP	3	775	2019
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Weasel	<i>Mustela nivalis</i>	NRW, Bern, LBAP	1	194	2015
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European Hedgehog	<i>Erinaceus europaeus</i>	S7, UKBAP, Bern, LBAP	27	2	2022
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Reptiles

Adder	<i>Vipera berus</i>	WCA5, S7, UKBAP, Bern, LBAP	40	272	2022
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Grass Snake	<i>Natrix helvetica</i>	WCA5, S7, Bern	9	272	2021
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Slow Worm	<i>Anguis fragilis</i>	WCA5, S7, UKBAP, Bern, LBAP	46	On-site	2021
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Amphibians

Common Frog	<i>Rana temporaria</i>	HDir, WCA5, Bern, LBAP	8	166	2020
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Common Toad	<i>Bufo bufo</i>	WCA5, S7, UKBAP, Bern, LBAP	10	On-site	2020
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Great Crested Newt	<i>Triturus cristatus</i>	EPS, HDir, WCA5, S7, UKBAP, Bern, RD1 (UK), RD2 (UK), LBAP	3	1,594	2021
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Palmate Newt	<i>Lissotriton helveticus</i>	WCA5, Bern, LI(BIS)	4	192	2022
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Smooth Newt	<i>Lissotriton vulgaris</i>	WCA5, Bern	4	155	2014
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Birds

Bullfinch	<i>Pyrrhula</i>	S7, UKBAP, WBR(RSPB), LBAP (VoG), UKBR(RSPB)	16	367	2021
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Curlew	<i>Numenius arquata</i>	BDir22, S7, UKBAP, Bonn, RD1 (UK), WBR(RSPB),	1	506	2017
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LBAP, LI(VC43),
UKBAm(RSPB)

Dunnock	<i>Prunella modularis</i>	S7, UKBAP, Bern, LBAP, UKBAm(RSPB)	16	On-site	2020
Fieldfare	<i>Turdus pilaris</i>	BDir22, WCA1.1, WBAm(RSPB), UKBR(RSPB), UKBAm(RSPB)	6	On-site	2019
Grey Partridge	<i>Perdix perdix</i>	BDir21, S7, UKBAP, WBR(RSPB), LBAP (VoG), LI(VC43), UKBR(RSPB)	1	545	2015
Hoopoe	<i>Upupa epops</i>	WCA1.1, Bern	1	1,763	2015
House Sparrow	<i>Passer domesticus</i>	S7, UKBAP, Bern, LBAP, WBAm(RSPB), UKBR(RSPB)	14	On-site	2022
Kestrel	<i>Falco tinnunculus</i>	S7, Bonn, Bern, CITES, WBR(RSPB), LBAP, LI(VC43), UKBAm(RSPB)	5	On-site	2022
Kingfisher	<i>Alcedo atthis</i>	BDir1, WCA1.1, Bern, LBAP, WBAm(RSPB), UKBAm(RSPB)	1	On-site	2021
Lapwing	<i>Vanellus vanellus</i>	BDir22, S7, UKBAP, Bonn, WBR(RSPB), LBAP, LI(VC43), UKBAm(RSPB)	4	1,284	2013
Lesser Redpoll	<i>Acanthis cabaret</i>	S7, UKBAP, WBR(RSPB), LBAP (CON), LBAP, UKBAm(RSPB)	1	1,770	2016
Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>	S7, UKBAP, Bern, WBR(RSPB), LBAP, LI(VC43), UKBR(RSPB)	1	337	2013
Linnet	<i>Linaria cannabina</i>	S7, Bern, WBR(RSPB), LBAP, LBAP, UKBR(RSPB)	10	On-site	2022
Long-tailed Duck	<i>Clangula hyemalis</i>	BDir22, WCA1.1, Bonn, RD12 (UK), WBAm(RSPB), UKBR(RSPB), UKBAm(RSPB)		1,601	2014
Mediterranean	<i>Larus</i>	BDir1, WCA1.1, Bonn, Bern, LBAP, WBAm(RSPB),	1	1,763	2018

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Gull	<i>melanocephalus</i>	UKBAm(RSPB)			
Nightjar	<i>Caprimulgus europaeus</i>	BDir1, S7, UKBAP, Bern, LBAP, WBAm(RSPB), LI(VC43), UKBR(RSPB)	1	1,738	2013
Peregrine	<i>Falco peregrinus</i>	BDir1, WCA1.1, Bonn, Bern, 8 CITES, LBAP, LI(VC43), UKBAm(RSPB)		On-site	2020
Redwing	<i>Turdus iliacus</i>	BDir22, WCA1.1, LBAP, WBAm(RSPB), UKBR(RSPB), UKBAm(RSPB)	10	750	2022
Reed Bunting	<i>Emberiza schoeniclus</i>	S7, UKBAP, Bern, LBAP (VoG), WBAm(RSPB), UKBR(RSPB)	4	1,461	2021
Skylark	<i>Alauda arvensis</i>	BDir22, S7, LBAP, WBAm(RSPB), UKBR(RSPB)	14	Onsite	2021
Song Thrush	<i>Turdus philomelos</i>	BDir22, S7, UKBAP, Bern, LBAP, WBAm(RSPB), UKBR(RSPB)	15	155	2022
Spotted Flycatcher	<i>Muscicapa striata</i>	S7, UKBAP, Bonn, Bern, WBR(RSPB), LBAP, UKBR(RSPB)	2	On-site	2021
Starling	<i>Sturnus vulgaris</i>	BDir22, S7, UKBAP, Bern, WBR(RSPB), LBAP, UKBR(RSPB)	10	On-site	2022
Whimbrel	<i>Numenius phaeopus</i>	BDir22, WCA1.1, Bonn, LBAP, WBAm(RSPB), UKBR(RSPB), UKBAm(RSPB)	2	1,907	2017
Yellowhammer	<i>Emberiza citrinella</i>	S7, UKBAP, Bern, WBR(RSPB), LBAP, UKBR(RSPB)	6	On-site	2020

Fish

European Eel	<i>Anguilla anguilla</i>	S7, UKBAP, RD1 (UK), LBAP	3	187	2015
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Invertebrates

Dingy Skipper	<i>Erynnis tages</i>	S7, UKBAP, RD1 (UK), LBAP, LI(SEWBReC)	4	378	2017
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Flora

Bluebell	<i>Hyacinthoides non-scripta</i>	WCA8, LBAP	2	184	2021
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3.2 Field Survey

3.2.1 Habitats

3.2.1 A map of the broad habitats identified during the field survey is present is presented as Figure 1.

Broadleaved Semi-Natural Woodland

3.2.2 The site supports a number of small blocks of broadleaf semi-natural woodland as well as two streams which are lined by woodland. The most westerly located woodland block (TN2) supports mature trees dominated by ash *Fraxinus excelsior*, with intermittent Scot's pine *Pinus sylvestris*, hawthorn *Crataegus monogyna*, hazel *Corylus avellana* and field maple *Acer campestre*. The ground flora is heavily shaded by the mature canopy with frequent dog's mercury *Mercurialis perennis* and enchanter's nightshade *Circaea lutetiana*, as well as buckler fern *Dryopteris sp.*, bluebell *Hyacinthoides non-scripta*, lesser celandine *Ranunculus ficaria*, hart's-tongue fern *Asplenium scolopendrium*, speedwell *Veronica sp.* and lords and ladies *Arum maculatum*. Intermittent patches of dense scrub understory are also present dominated by bramble *Rubus fruticosus* agg. The source of a tributary of the Bullhouse Brook is also located within this block.

3.2.3 The central block of woodland (TN4) also supports a mature canopy of trees such as ash, oak *Quercus sp.*, sycamore *Acer pseudoplatanus* and hawthorn. The ground flora is a similar assemblage as above with enchanter's nightshade, bluebell, buckler fern, hart's-tongue fern and lesser celandine. Dense scrub is also present intermittently dominated by bramble with frequent common nettle *Urtica dioica*.

3.2.4 The largest and most easterly woodland block (TN5) again supports a mature assemblage of trees including oak, sycamore, hazel, field maple, ash, beech *Fagus sylvatica*, hawthorn, copper beech *Fagus sylvatica f. purpurea* and holly *Ilex aquifolium*. The ground flora consists of enchanter's nightshade, frequent hearts tongue fern, bucklers fern, bluebell and occasional lords and ladies. Dense bramble is less frequent in this area of woodland, with multiple intersecting walking paths and Whitelands Brook in the south west corner.

3.2.5 Further areas of semi-natural broadleaf woodland are present bordering Bullhouse Brook and Whitelands Brook (TN12 & 13). These linear stretches of woodland have a similar assemblage of plant species. The woodland bordering Whitelands Brook supports significant patches of scrub understory dominated by bramble and common nettle with occasional honeysuckle *Lonicera sp* (TN13).

Improved Grassland

3.2.6 The majority of the site is agricultural pasture supporting improved grassland. These improved grassland fields are dominated by perennial rye grass *Lolium perenne*, with occasional nettle *Urtica dioica*, broad leaved dock *Rumex obtusifolius*, cocks-foot *Dactylis glomerata*, meadow foxtail *Alopecurus pratensis*, white clover *Trifolium repens*, brome species. *Bromus sp.*, thistle species. *Cirsium spp.* and creeping buttercup *Ranunculus repens*.

Arable

- 3.2.7 There are nine fields across the survey area that are used as arable land for crop production covering approximately 31.62ha. These are primarily located within the development zone to the north of the site with one field located to the south-west.
- 3.2.8 In November 2022 the walkover confirmed there had been a notable change in the nature of crops produced in four of the arable fields which had been sown with wildflower seed for the production of wildflower seed. These fields had been primarily sown with four different flowering species (sainfoin *Onobrychis* sp., ox-eye daisy *Leucanthemum vulgare*, cornflower *Centaurea cyanus*, and knapweed *Centaurea nigra*). A number of other native herbaceous species were noted to be present at low frequency across these fields, plus the non-native cosmos *Cosmos bipinnatus*.

Running Water

- 3.2.9 The source of two watercourses lie within the site; Bullhouse Brook and Whitelands Brook. These watercourses are relatively small streams (~50 cm to 150 cm in the south of the site) which join in the south-east corner of the site. The headwaters of Bullhouse Brook are located within the most westerly forestry block (TN2), with the source of Whitelands Brook approximately 500 m north of the most easterly block of woodland. The majority of the length of the streams are bordered by broadleaved semi-natural woodland. The source of the Bullhouse stream was dry at the time of survey with the river channel being evident, the stream began to flow at the southerly extent of the forestry block.
- 3.2.10 Both channels had soft, steep sided banks heavily shaded by trees for the majority of their length with the exception of a short stretch of Whitelands Brook when running through one of the improved grassland fields (TN11). This stretch of the stream runs for approximately 150 m and has dense streamside vegetation either side for approximately 3 m throughout its length. This stretch of stream is also fenced off to prevent livestock access with two crossing points. Streamside vegetation is dominated by bramble, pendulous sedge *Carex pendula* and water dropwort *Oenanthe* sp. with frequent nettle, red campion *Silene dioica*, dock *Rumex* sp., dogwood *Cornus sanguinea*, honeysuckle, rosebay willow herb *Epilobium angustifolium*, soft rush *Juncus effusus*, thistle and vetch *Vicia* sp.
- 3.2.11 The stream beds were predominately either soft bank/silt or stone with little or no in channel vegetation.

Hedgerows

- 3.2.12 The majority of the agricultural field boundaries were lined with native hedgerows. Although many of the hedgerows support in excess of seven woody species in total, these are often occasional and over distances greater than 30 m and as such have been classified as being generally species-poor.
- 3.2.13 The majority of the hedgerows within the site are intact and intensively managed (i.e. cut each year). Many were dominated by hawthorn with frequent blackthorn *Prunus spinosa*, elder *Sambucus nigra*, honeysuckle, hazel and dogwood. Many hedgerows also had occasional holly, field maple, willow *Salix* sp, beech, ash, oak and sycamore. Many of the hedgerows also had frequent bramble.
- 3.2.14 The majority of hedgerows were supported by a ground flora dominated by bramble and nettle with occasional dock, goosegrass *Galium aparine*, vetch and creeping buttercup.
- 3.2.15 Hedgerows with trees are frequent within the south of the site, particularly the northern and south-eastern border. This border backs on to a strip of broadleaf trees which borders the viaduct (TN8) and a private property which also has a strip of broadleaf trees around its border. This hedgerow is managed (cut) along the edge bordering the site, however it merges with the broadleaf trees to the back. Other hedgerows with trees were located occasionally throughout the site, species compositions were broadly similar to that previously listed for native species poor hedgerows with the addition of scattered mature tree species such as oak, ash, alder field maple and sycamore. In

addition, the hedgerow to the north west of the site, adjacent to the airport also supported a Whitebeam *Sorbus sp.*

Dense Continuous Scrub

- 3.2.16 Several generally small patches of bramble and dense continuous scrub was present within the site. The largest area of bramble is located in the corner of an improved pasture in the east of the site where the field slopes down toward a woodland block. Occasional common nettle, thistle species and honeysuckle were noted within the bramble.

Scattered Trees

- 3.2.17 Scattered broadleaf trees were present intermittently throughout the site, these usually consist of individual trees or a small group within the agricultural fields. The majority of the trees were mature, comprising pedunculate oak, ash, sycamore, and field maple. Mature hazel, and hawthorn shrubs were also present.
- 3.2.18 In addition, there are two lines of trees located within the south of the site; connected to woodland bordering Whitelands Brook.

Pond

- 3.2.19 The only pond within the site, lies on the northern boundary adjoining the farmyard (TN23). It is a small man-made concrete structure to provide a source of water for cattle.
- 3.2.20 The surface of the pond in 2023 is a continuous layer of common/least duckweed. A patch tall emergent (reed sweet-grass *Glyceria maxima*) has colonised the western bank below the water line. The margins of the pond are overhung by bramble and heavily shaded with bare concrete on the southern side where cattle access the water.

3.3 Protected/notable Species

Bats

- 3.3.1 No direct evidence of bats was identified during the survey; however, the site supports habitats that provide potential roost sites as well as foraging and commuting habitat. All of the woodland blocks and smaller areas of broadleaf woodland (TN2, 4, 5, 13) provide moderate potential to support roosting bats along with a number of scattered trees within the site. The farm buildings to the north of the site and viaduct which borders the south of the site also provide habitat of moderate bat roost potential (TN6 & 22).
- 3.3.2 The network of hedgerows, woodland and stream corridors on site connected in the wider landscape through the rail corridor also provide suitable commuting corridors and foraging habitats for bats. These habitats also provide connectivity between the woodland (County Park) to the south of the site to that in the north.
- 3.3.3 The desk study identified a range of bat species using the site and the surrounding area. In particular, a pipistrelle maternity roost is located approximately 100 m to the south of the site.

Hazel Dormouse

- 3.3.4 No direct evidence of dormouse was identified during the survey. However, the site supports suitable summer and winter habitat for the species. The hedgerows, scrub and woodland blocks all contain habitats and tree/plant species suitable to support dormouse. The frequent honeysuckle also provides good nest making material.
- 3.3.5 The desk study identified a single dormouse record c1.3km to the north east of the site.

Badger

- 3.3.6 The whole site also provides suitable foraging habitat as well as suitable habitat to support badger setts. The thick areas of scrub within the site and woodland understory could have obscured any badger setts present due to the time constraints to undertake a comprehensive survey.

Otter

- 3.3.9 No direct evidence of otter *Lutra lutra* was identified during the survey. However, the site supports suitable habitat to support commuting otter as well as areas to support resting places such as within the woodland bordering the watercourses.
- 3.3.10 There were 12 records of otter occurring within 2km of the site in the desk study. The closest record located was from a section of Whitelands Brook outside but adjacent to the southern boundary of the survey area.

Water Vole

- 3.3.11 No evidence of water vole was identified during the survey. A small section of Whitelands Brook provides marginally suitable habitat to support water vole (TN11), however this is isolated from further extents of suitable habitat and no records were identified during the desk study.

Reptiles

- 3.3.12 The agricultural fields (improved pasture and arable land) provides low habitat suitability for common reptile species. The hedgerow field boundaries and margins of the brook provide greater areas of cover and have higher potential value for grass snake and slow worm.
- 3.3.13 Desk study records indicate use of the wider area by reptile species including adder, common lizard, grass snake and slow worm. There is a single slow worm record from an area of dense scrub in the southern part of the survey area, outside of the development zone.

Nesting Birds

- 3.3.14 The whole site provides suitable nesting habitat for breeding birds, with the hedgerows and field boundaries holding high suitability for a number of species. During the survey a number of species were either seen or heard including chiffchaff *Phylloscopus collybita*, blackcap *Sylvia atricapilla*, blue tit *Cyanistes caeruleus*, great tit *Parus major*, wren *Troglodytes troglodytes*, robin *Erithacus rubecula*, blackbird *Turdus merula* and buzzard *Buteo*. A woodpigeon *Columba palumbus* carcass was also identified within the most westerly forestry block which was identified as a kill from either a sparrowhawk *Accipiter nisus* or goshawk *Accipiter gentilis*, the latter of which is listed under Schedule 1 of the WCA.
- 3.3.15 Desk study included records of 25 priority and/or Schedule 1 protected species from within 2 km of the site from the last ten years. These included bullfinch, curlew, dunnock, fieldfare, grey partridge, hoopoe, house sparrow, kestrel, kingfisher, lapwing, lesser redpoll, lesser spotted woodpecker, linnet, long-tailed duck, Mediterranean gull, nightjar, peregrine, redwing, reed bunting, skylark, song thrush, spotted flycatcher, starling, whimbrel and yellowhammer.
- 3.3.16 In addition, a total of 25 species of conservation concern were also identified within 2 km of the site during the desk study.

Great Crested Newt

- 3.3.17 The closest record of this species is from a pond c1.5 km to the west of the site which is designated as a SINC because of the importance of breeding population of great crested newt.
- 3.3.18 The small area concrete lined pond with standing water is the only standing open water within the site located on the northern boundary between a roadside hedgerow and farmyard. Common/east duckweed completely covers the surface creating 100% shade of the open water. There is patchy macrophyte cover on the margins which is one of the few positive features.
- 3.3.19 The Habitat Suitability Index survey was carried out in November 2023 confirmed that the pond has Poor suitability for great crested newts based on its features and context and has negligible potential to support a breeding population.

Brown Hare

- 3.3.20 Desk study in 2023 included two records of brown hare in the northern part of the site.
- 3.3.21 A large proportion of the fields are heavily managed arable fields and improved grassland with low sward height. Cover is largely limited to the hedgerow field margins which are generally narrow and cultivated up to the base of the hedgerow. However, the extensive grassland habitats within Cardiff airport has high suitability for brown hare and it is assumed that individuals could regularly forage within the site.
- 3.3.22 Across the site there is an absence of extensive longer grassland/herbaceous vegetation limiting areas of dense cover and decreasing the likelihood of the presence of resting places and breeding sites within the development footprint.

Invasive Non-native Species

- 3.3.23 Two stands of Japanese knotweed *Reynoutria japonica* were noted during the survey (TN17 & 21). These were located within the property to the south of the site as well as one small stand within the hedgerow to the north.

4 DISCUSSION, EVALUATION & RECOMMENDATIONS

4.1 Designated Sites

- 4.1.1 Both Barry Woodlands SSSI and Cliff Wood SSSI are located 235 m and 265 m from the site respectively. Both sites are designated for the ancient woodland which they support. Due to the geographic separation of the proposed development to these designated sites, any direct significant impacts are considered unlikely.
- 4.1.2 The site also supports woodland habitat with some connectivity, particularly to Cliff Wood. This is likely to provide additional habitat resource, suitable movement corridors and ecological resilience to these statutorily protected sites. As such we would recommend retaining these areas as far as practicable.
- 4.1.3 The study site supports three SINC's; North West Bullhouse Brook, North Bullhouse Brook and West of the Old Rectory. These sites are designated for the ancient woodland which they support and should be retained and protected along with a suitable buffer.
- 4.1.4 A further designated site, South west of Church Farm SINC, lies to the south-west of the site. It is designated for species-rich unimproved neutral grassland. This site was surveyed during the site visit and was not identified as supporting this habitat and as such may have altered since first identified as a SINC.

4.2 Habitats

Broadleaved Semi-Natural Woodland

- 4.2.1 The areas of semi-natural broadleaf woodland are of high ecological value within the context of the site. Mixed deciduous woodland is a UK BAP priority habitat and is a habitat of principal importance in Wales, listed under Section 7 of the Environment (Wales Act) 2016.
- 4.2.2 During the survey a number of ancient woodland indicator species were identified including dogs-mercury, enchanter's nightshade and bluebell. Many of the main woodland blocks are also designated as SINC's for supporting ancient woodland. It is therefore recommended that these habitats are retained and protected within the proposed development, along with a suitable buffer.
- 4.2.3 The woodland also holds the potential to support a variety of protected species such as bats, badger, dormouse and breeding birds.

Improved Grassland

- 4.2.4 The improved grassland within the site is dominated by perennial rye-grass and has low ecological value.

Arable

- 4.2.5 The arable land across the northern part of the site is used for crop production for cereal crop production and oil seed rape and has low ecological value.
- 4.2.6 The site visit in November 2022 confirmed that the management of four of the arable fields had been modified since the 2018 survey. Although a recently sown commercial crop with sown wildflower crops have some biodiversity value and provide a food resource for pollinators which was not present during the original survey.

Running Water

- 4.2.7 Both streams intersect areas of ancient woodland and designated sites; North of Bullhouse Brook and West of the Old Rectory. The streams themselves would also classify as a UK BAP priority habitat and as habitats of principal importance in Wales, listed under Section 7 of the Environment

(Wales Act) 2016. These habitats should therefore be protected from potential impacts from the proposed development.

- 4.2.8 In the absence of mitigation or control measures surface water runoff and subsequent mobilisation of soils could cause pollution events, along with the use of machinery within the vicinity of the watercourses. However, the implementation of good working practices should protect the environment immediately around the working area and ultimately downstream. These would include habitat protection through appropriate buffers, pollution control measures and rapid remedial responses to potential polluting events.

Hedgerows

- 4.2.9 The majority of the agricultural fields on site are bordered by mature managed hedgerows. The majority of hedgerows on site supported at least seven woody species across their length and provide a network of woody habitat connectivity across the site likely to be of importance to a variety of faunal species. However, the lack of significant floral diversity over a shorter length (i.e. 30 m) resulted in them being classed as species-poor using JNCC phase 1 habitat criteria. Should the removal of hedgerows be required to facilitate the development further surveys may be required to identify whether any of the hedgerows present within the site are considered important under the Hedgerows Act 1997.
- 4.2.10 Hedgerows also provide important habitats and corridors for a number of protected species such as bats, dormice, reptiles and nesting birds in otherwise uniform landscapes such as improved grassland and arable agricultural fields. As such they should also be considered within the context of protected species within the site and retained as far as practicable within the future development.

Scattered Trees

- 4.2.11 The site supports a number of areas of scattered trees as well as individuals/ small stands scattered within the agricultural fields. The trees alone may be protected under tree protection orders and may also provide habitat for protected species such as bats and nesting birds. Scattered trees should therefore also be considered under the context of protected species and assessed for their suitability to support roosting bats.

Dense Continuous Scrub

- 4.2.12 The dense continuous scrub alone is of negligible ecological value. However, it holds the potential to support protected species such as dormouse, badger, reptiles and breeding birds.

4.3 Protected and Notable Species

Bats

- 4.3.1 Bats are protected by the Wildlife and Countryside Act 1981 (as amended) (WCA) and the Conservation of Habitats and Species Regulations 2017 the protection afforded under these acts makes it an offence to kill, injure, capture/take bats, disturb or harass bats, damage or destruct their roosts or to obstruct access to a breeding or resting place.
- 4.3.2 Suitable habitat to support roosting, foraging or commuting bats is present across the entirety of the site. During the desk study two pipistrelle maternity roosts were identified 100 m to the south of the site as well as records for noctule within the search buffer. A range of bat species is expected to occur within the site and wider area.
- 4.3.3 The woodland trees, individual mature trees and farm buildings have moderate potential to support roosting bat roosts along with the rail viaduct which runs adjacent to the site along the south-eastern boundary. Further survey would be required to identify the presence/absence of specific features which may support bat roosts and inform any further survey requirements.

- 4.3.4 In addition to the potential roosting habitat, the hedgerows and woodland within the site may provide suitable foraging and commuting habitat. Some of which may be important for movement to and from the maternity roost identified just south of the site. As identified by the BCT 2016³, common and soprano pipistrelle bats are likely to have a Core Sustainance Zone (CSZ) of 2 and 3 km respectively. This CSR refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. As two pipistrelle maternity roosts were identified to the south of the site, the whole site will fall within the CSZ of the roosts. With reference to planning and development the CSZ could be used to indicate:
- The area surrounding the roost within which development work can be assumed to impact the commuting and foraging habitats of bats using the roost, in the absence of information of local foraging behaviour. This will highlight the need for species specific survey techniques where necessary,
 - The area within which mitigation measures should ensure no net reduction in the quality and availability of foraging habitat for the colony, in addition to mitigations measures shown to be necessary following ecological survey work.
- 4.3.5 Further survey was undertaken to identify bat activity across the site through the use of static detectors and transect surveys.
- 4.3.6 Bat roosts were identified in buildings and trees within survey area. Further surveys of all mature trees will be required in advance of the phases of development to reassess presence/absence and determine the status of any roosts.
- 4.3.7 Where roosts will be unavoidably lost, a protected species development licence will need to be obtained from Natural Resources Wales to facilitate the works. The design and programme for mitigation and species protection would be aligned to the impacts relating to the individual development proposal.

Hazel Dormouse

- 4.3.8 Hazel dormouse is a European protected species provided full protection under the WCA and the Conservation of Habitats and Species Regulations 2017 making it an offence to deliberately capture, injure or kill, damage or destroy a resting or breeding place, deliberately or recklessly disturb whilst it's in a structure or place of shelter and block access to places of shelter.
- 4.3.9 The site supports relatively extensive habitat suitable for dormouse, including hedgerows, broadleaf woodland with a scrub understory and smaller patches of dense continuous scrub. These habitats provide food resources such as bramble and hazel as well as honeysuckle which is often utilised when available to construct nests. The site is also well connected through hedgerow networks and further broadleaf woodland. Dormouse is known to occur in the wider landscape with a desk study record from a location 1.3 km from the site boundary.
- 4.3.10 In order to assess the presence of dormice a nest tube survey within suitable habitat was completed in 2019 with no animals found. A Precautionary Dormouse Strategy has been prepared defining the protection measures and habitat creation measures that will promote the value of the wider site for dormice. The implementation of the protection measures in the strategy should be considered as part of the construction working methods and programme for each individual development project.
- 4.3.11 Should dormice be identified within development areas a protected species licence is likely to be required from NRW to undertake works along with the commitment to mitigate any potential impacts upon the species as a result of the development.

³ Bat Conservation Trust (BCT) 2016 Core Sustainance Zones: Determining Zone Size

Badger

- 4.3.12 Badgers are afforded protection under the Protection of Badgers Act 1992 which makes it an offence to intentionally capture, kill or injure a badger, damage, destroy or block access to their setts and disturb badgers within their setts.

- 4.3.14 It is recommended that a review is undertaken to assess the potential for the creation of an additional sett. The feasibility study should include surveys and mapping of activity and the costings for the construction of an additional badger sett in suitable habitat. Prior to each phase of development further surveys should be undertaken to identify any active setts in the vicinity of the development footprint.

Otter

- 4.3.15 Otters are classified as a European Protected Species under Annex IV of the European Habitats Directive as well as being protected under the WCA 1981. They are also listed as a priority species under the UK post-2010 Biodiversity Framework.
- 4.3.16 Suitable habitat to support otter was identified during the field survey and the desk study showed records of otter using the nearby Whitelands Brook to the south of the survey area. It is anticipated that the section of brook bounding and within the site will be used by otters. Areas of woodland and scrub alongside the watercourse provide dense cover in which otters could lay-up.
- 4.3.17 With the sighting of otter in the survey area, otter activity should be surveyed in advance of each development that falls within 100m on the watercourse to confirm presence of resting places in the areas of woodland adjoining the brook.
- 4.3.18 As a mobile species otter holts and lay-up areas may change over time. It is recommended as a precautionary approach a targeted otter survey should be carried out for the individual projects requiring works within 200m metres of a watercourse as part of the reserve matters planning application to assess potential impacts and inform mitigation avoidance measures.

Reptiles

- 4.3.19 The widespread reptile species of the UK; common lizard, slow worm, grass snake and adder are protected under the WCA which protects them against killing and injury.
- 4.3.20 The northern half of the survey area has lower suitability for the widespread reptile species. The improved grassland and arable fields provide little foraging opportunities and lack areas in which reptiles can shelter.
- 4.3.21 Within the wider survey area, more favourable habitat is available on woodland and scrub margins which provide basking opportunities and will support invertebrate prey populations. The record of slow worm in dense scrub in the southern part of the survey area confirms the presence of a population.
- 4.3.22 The loss of reptile habitats should be considered under the individual developments. Where appropriate, new reptile habitat, suitable hibernacula and places of shelter should be incorporated into the landscaping proposals.

Nesting Birds

- 4.3.23 Nesting birds are protected under the WCA which makes it illegal to intentionally kill, injure or take a wild bird and take damage or destroy its nest or egg. In addition, some bird species are listed under Schedule 1 of the WCA which also makes it an offence to disturb them whilst they are building a nest, nesting or in or near a nest that contains their young as well as disturb their young. The Conservation of Habitats and Species Regulations 2017 also places a duty upon all

competent authorities to provide and protect habitat for wild birds and as such any planning submission will be assessed in this context.

- 4.3.24 The site is made up of a number of habitats with high potential to support breeding birds such as woodland and field margins/ hedgerows. The agricultural fields also offer some potential for breeding birds.
- 4.3.25 A breeding bird survey was undertaken in 2019 and identified a number of birds of conservation concern use the site. Habitat provision for bird species of principal importance should be incorporated into the development. This should include management of specific areas for ground nesting species, including skylark, and enhancement of the hedgerow network for farmland birds such as linnet, and yellowhammer.

Great Crested Newt

- 4.3.26 The pond/standing water located within the farmyard in the north of the site holds the potential to support great crested newt. Due to the presence of a SINC located ~1.5 km to the west of the site and the extensive presence of suitable terrestrial habitat within the site we would recommend further surveys to identify the presence/absence of great crested newt should the development impact the pond and/or the surrounding 500 m.
- 4.3.27 In order to identify the presence/absence of great crested newt we would recommend carrying out an eDNA survey of the pond. Following the 2018 recommendations, an eDNA survey was completed in 2019 and confirmed the absence of GCN in the pond.

Brown Hare

- 4.3.28 Brown hare is a Section 7 Species and is listed in the LBAP. Optimal habitat for brown hare is mixed farmland with arable and pasture and wide field margins with longer vegetation providing dense cover. Much of the survey area is sub-optimal for use by brown hare, but the woodland margins and areas of dense scrub outside of development area provide some cover in the southern half of the survey area.
- 4.3.29 It is recommended that habitat provisions for brown hare are made in the southern half of the survey area as part of the phases of development. These would include the establishment rough grassland field margins, through low intensity grassland management, along sections of the network of existing and new hedgerows and woodland edge habitat. This would increase the available habitat for sheltering hares and their young and increase the foraging opportunities for this species.

Other Notable Species

- 4.3.30 Japanese knotweed is listed under Schedule 9 of the WCA as an invasive plant species which makes it an offence to facilitate its spread. The site also has the potential to support further schedule 9 species.
- 4.3.31 Japanese knotweed was identified during the survey in two locations. We would recommend a suitable eradication strategy be developed and implemented as soon as possible at the site in order to both facilitate future development and prevent further spread. A commitment to eradication may form part of any planning obligations post consent.
- 4.3.32 In order to meet legal requirements further consideration would be required during any construction phase. This would likely consist of the following measures: no earthworks should be carried out within 10 m of the visible plants as they the area could contain live Japanese knotweed material. The area should be cordoned off with a no works exclusion zone to avoid facilitating its spread. Should any be identified within the vicinity of the proposed development a method statement would need to be approved prior to works in order to clear the area. Control options include herbicide applications (ideally injections) in mid / late summer and early autumn or controlled excavation and removal to a licensed waste facility.

5 CONCLUSIONS

- 5.1.1 This preliminary ecological appraisal in 2018 recorded the habitats present within the site and made an assessment for the potential presence of protected species. A walkover survey in 2022 confirmed that the status and extent of the habitats within the development footprint had remained unchanged.
- 5.1.2 The desktop study undertaken identifies the designated sites that may be adversely impacted by any future proposals of the site. Four Sites Important to Nature Conservation are located within the site, in order to protect these designated sites, it is recommended that they, along with the habitat immediately adjacent to them, is retained and protected during the construction of the proposed development. In order to protect the sites and adjacent environmental setting, a minimum 10 m buffer is retained around them.
- 5.1.3 The updated desk study undertaken in January 2023 highlighted all known records for protected species and species of principal importance within the site and in the surrounding area. The protected species audit has been updated for the development to accurately reflect the current situation including additional species recorded since 2019.
- 5.1.4 Following the preparation of the PEA report in 2018 the following targeting surveys were undertaken;
- preliminary ground assessment of trees and buildings for bat roost potential
 - subsequent roost surveys,
 - bat activity surveys,
 - badger,
 - dormouse,
 - otter,
 - breeding bird, and
 - great crested newt.
- 5.1.5 These were subsequently undertaken and reported on in Ecology Surveys report (RPS, 2019a) with the exception of reptiles with the assumed presence of populations in all areas of suitable habitat. The potential presence of great crested newt has been scoped out following an eDNA survey and confirmation of the very low value of the concrete pond for this species.
- 5.1.6 The woodland, hedgerows and brooks should be protected within the site design. Habitat creation and habitat enhancements should be delivered according to the Biodiversity Strategy (RPS, 2019b), Hedgerow Scrub and Woodland Plan (JCD0064-007-210607) and Green Infrastructure Parameter Plan (JCD0064-006-J-210607). The measures include:
- Native planting to establish new areas of woodland to connect blocks of semi-natural woodland
 - Native planting to create blocks of mixed species and hazel dominated scrub
 - New hedgerow creation
 - New meadow grassland associated with the margins of woodlands and the sustainable drainage system.
 - Sacrificial arable crops/ nectar and pollen species
 - Eradication of invasive non-native species
- 5.1.7 The habitat provisions should be designed to maintain and enhance habitats of high value for bats, dormice, otter, brown hare, badger, breeding birds, and invertebrates. Proposals are summarised in Table 5.1 below and are consistent with the proposals included in the biodiversity mitigation strategy and the Green Infrastructure Parameter Plan.

- 5.1.8 The overarching aims of the habitat management (as defined in the Biodiversity Mitigation Strategy) are the long term provision and maintenance of biodiversity value of local importance; and the provision of habitats of value for local populations of legally protected species and Species of Principal Importance. The habitat management objectives and actions are defined in Section 3 of the strategy.
- 5.1.9 Implementing the specified habitat creation and meeting all the objectives for habitats and species will provide opportunities to safeguard highest value habitats, maintain populations of protected species and those of principal importance and enhance wildlife corridors. Following the confirmation of the recent use of the site by brown hare, measures that will help maintain the population are being incorporated. The creation of 5m wide long grassland field margins along 20% of hedgerows will provide areas optimal cover for brown hare. The sacrificial arable crops and grassland management for skylark should also benefit brown hare.
- 5.1.10 Each phase of development will be treated as a new development within the planning system and will be subject to assessment with avoidance and/or mitigation with the provision of biodiversity enhancements integrated into each. The individual developments will be consistent with the green infrastructure provision and habitat management objectives set out for the entire development area.
- 5.1.11 One phase of development will require the demolition of the farmhouse and barns and other phases will result in the loss of trees with bat roosts. All the buildings and trees will be subject to resurvey for the relevant phase/s of development and Protected Species Licences will be obtained from Natural Resources Wales where the loss of roosts is unavoidable.

Table 5.1: Habitat Management Objectives for Species

Species	Status	Objectives	Key Actions and Management
Bats	Foraging habitats and flight lines within the application site, ownership boundary and wider area Soprano and common pipistrelle were the most abundantly recorded with noctule, brown long-eared bat, serotine and Leisler's, lesser horseshoe, Nathusius pipistrelle and <i>Myotis</i> bats also recorded.	Maintain linked woodland, scrub and hedgerows ensuring they are retained as dark corridors Maintain bat flight line on the eastern boundary and north – south flight line from north of most westerly woodland block Maintain strong connections to woodland blocks and stream corridors	New woodland planting to link existing blocks Native tree and shrub planting to create new mixed species scrub and hazel dominated scrub New hedgerow creation and infill planting in gappy hedgerows Low intensity and time restricted management of the hedgerows Retain and protect maturing trees and their root protection areas and retain their potential to develop cavity features Maintain new areas of habitat to the south of the development which will support both commuting and foraging areas for bat species Installation of a range of long lasting bat boxes on mature trees across the wider site
Dormice	Local population in wider area. Woodland habitat management to increase likelihood of future colonisation of dormice with increased connections to wider woodland blocks.	Enhance and maintain the value of the SINC woodlands, hedgerows and new woodland and scrub planting for dormice Maintain strong connectivity between potential dormouse habitat Increase the availability of food resources within the natural green space through native planting	New woodland planting to link existing blocks Native tree and shrub planting to create new mixed species scrub and hazel dominated scrub New hedgerow creation and infill planting in gappy hedgerows and management <i>[cut back hard in first winter (between November to February) to encourage bushy growth down to ground level. Raise the cutting height a little each time the hedge is cut to gradually reach a dense structured new section of hedgerow.]</i> Low intensity and time restricted management of the retained hedgerows – <i>[trim back one side of the hedgerow between November to February on rotation to develop taller hedgerows with bushy growth down to ground level on both sides.]</i>

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Otter	No evidence of otter identified during 2019 survey but records from the brook close to the site boundary. Suitable habitat exists within the site in woodlands and stream corridors	Protect Bullhouse and Whitelands brook and SINC woodlands from any impacts during construction and operation Maintain dark buffer zones around woodland and stream corridors	Development specific creation and management of buffer zones along watercourses
Brown hare	Recent records of brown hare foraging within the site	Maintain and enhance foraging value of the site Increase the extent of dense field margin cover	The creation of 5m wide long grassland field margins along 20% of hedgerows to provide optimal cover Annually sown sacrificial arable crop sown with nectar and pollen wildflowers across one of the fields in southern part of the site Creation of annually sown mixed sacrificial arable species along one field boundary Establish and maintain two fields of low tussocky grassland Native tree and shrub planting which over time will create new areas of cover; mixed species scrub and hazel dominated scrub New hedgerow creation and infill planting in gappy hedgerows
Badger	The site overlaps an active badger territory with field signs found within the site. No setts were identified but could be present in dense cover within areas of woodland.	Review the potential for the creation of an additional sett through a feasibility study including survey visits, mapping of activity and the costings for the creation of an additional badger sett	Sett creation; where feasible Native tree and shrub planting to create new mixed species scrub and hazel dominated scrub New hedgerow creation and infill planting in gappy hedgerows
Hedgehog	Present in local area; assumed presence in suitable habitats within the site		Establish two fields of low tussocky grassland Native tree and shrub planting to create new mixed species scrub and hazel dominated scrub
Breeding birds	Assemblage of breeding birds identified within the application site and	Create new areas of scrub, fallow and wildflower grasslands (with	The creation of 5m wide long grassland field margins along 20% of hedgerows to provide dense ground cover

	ownership boundary during 2019 survey including both red/amber list farmland specialist	locally sourced plants and seed mix) and range of hedgerow types to supply greater food resource throughout year	Low intensity hedgerow management (rotational trimming back) to develop wider field boundaries but maintaining dense structure providing food for birds over winter
		Establish fields of with high suitability for ground nesting birds	Annually sown sacrificial arable crop sown with nectar and pollen wildflowers in southern field
		Create larger field margins on retained agricultural fields within ownership boundary	Creation of annually sown mixed sacrificial arable species field boundary
			Establish and maintain fields of low tussocky grassland for skylark through management
			Mixed species native tree and shrub planting to create new mixed species scrub and hazel dominated scrub
			New hedgerow creation and infill planting in gappy hedgerows
			Provision of a range of nest boxes
Amphibians	No evidence of GCN recorded during 2019 eDNA survey. GCN recorded 1.6km from the site boundary in 2013. Records of common frog and toad, palmate and smooth newt from local area.	Maintain SuDS attenuation basins in ecologically favourable condition	The creation of 5m wide long grassland field margins along 20% of hedgerows to provide optimal cover
			Wetland management to provide cover and foraging areas for amphibians
Reptiles	Confirmation of slow-worm population; potential for grass snake along brook corridor and in woodland	Maintain and enhance foraging value of the site	The creation of 5m wide long grassland field margins along 20% of hedgerows to provide optimal cover
		Increase the extent of tussocky field margin cover	Native tree and shrub planting to create new mixed species scrub and hazel dominated scrub
		Increase extent of scrub/grassland edge habitat	New hedgerow creation and infill planting in gappy hedgerows
			SuDS and brook corridor management to provide cover and foraging areas for grass snake

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Invertebrates	In combination the existing habitats (excluding the pasture and arable) would be expected to support a relatively varied assemblage of species	Provide varied sources of nectar over the majority of the year (native, trees, shrubs and populations of wildflower species)	Wildflower grassland creation within green infrastructure including buffer zones to woodland and watercourses and on the banks of the SuDS basins
		Maximise the niches available for use by invertebrates (maturing trees, woodland, scrub, hedgerows, SUDs attenuation ponds)	Establishment wet grassland in the base the SuDS using species suited to the wet grounds conditions that can tolerate both periodic inundation and the drying out of ground.
		Retain deadwood habitat	Establish fields of low tussocky grassland
			Mixed species native tree and shrub planting to create new mixed species scrub and hazel dominated scrub
			Woodland management avoiding surgery to mature trees (excluding)
			Low intensity and time restricted management of the hedgerows

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Multi-Agency Geographic Information for the Countryside: www.magic.gov.uk

RPS (2019a) Ecology Surveys Report

RPS (2019b) Biodiversity Mitigation Strategy

RPS (2019c) Dormouse Mitigation Strategy

RPS (2021) Additional Mitigation and Wildlife Enhancement

FIGURES

Figure 1 – Phase 1 Habitat Map

APPENDICES

APPENDIX A

Table 5 Legislation and conservation status pertaining to protected and notable species

Abbreviation	Full details
BA	Protection of Badgers Act
UKBAP	UK Biodiversity Action Plan Priority Species
UKBAP (R)	UK Biodiversity Action Plan Priority Species (Research only species)
BDIr1	EC Birds Directive Annex 1 Species
BDIr21	EC Birds Directive Annex 2.1 Species
BDIr22	EC Birds Directive Annex 2.2 Species
Bern	The Bern Convention on the Conservation of European Wildlife and Natural Habitats
Bonn	The Bonn Convention on the Conservation of Migratory Species of Wild Animals Species
CITES	Convention on International Trade in Endangered Species
EPS	European Protected Species
HDir	EU Habitats Directive Species
NRW	Natural Resources Wales Priority Species
RD1 (Wales)	Welsh Red Data Book listing based on IUCN guidelines
RD1 (UK)	UK Red Data Book listing based on IUCN guidelines
RD2 (UK)	UK Red Data Book listing not based on IUCN guidelines (Nationally Rare and Scarce)
WBR (RSPB)	RSPB Welsh Red listed birds (not based on IUCN criteria)
WBA _m (RSPB)	RSPB Welsh Amber listed birds (not based on IUCN criteria)
UKBR (RSPB)	RSPB UK Red listed birds (not based on IUCN criteria)
UKBA _m (RSPB)	RSPB UK Amber listed birds (not based on IUCN criteria)
S42	Natural Environment and Rural Communities Act 2006 (Section 42)
S7	Environment Act (Wales) Section 7 Species
WCA1.1	Wildlife and Countryside Act Schedule 1 Part 1 Species

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WCA5	Wildlife and Countryside Act Schedule 5 Species
WCA8	Wildlife and Countryside Act Schedule 8 Species
WCA9	Wildlife and Countryside Act Schedule 9 Species
INNS	Invasive Non-Native Species
WSG.P	Guidelines for the Selection of Wildlife Sites in South Wales - Primary species
WSG.C	Guidelines for the Selection of Wildlife Sites in South Wales - Contributory species
WVP	IUCN Threat Listing of Welsh Vascular Plants
LBAP	Local Biodiversity Action Plan Species (those listed under the Vale of Glamorgan LBAP are listed as VoG)
LI (SEWBRcC)	Locally Important Species (as identified by local specialists) in SEWBRcC area.

APPENDIX B

SINCs within 2km of site boundary

Site Name	Approximate distance from site (m)	SINC description	UK BAP Priority Habitat	SINC Site Selection Criteria
North East of Knock Man Down Wood	25	Large area of predominantly ancient semi natural broadleaved woodland	Lowland mixed deciduous woodland	H1:3 Native woodlands
North Cwm Barri	500	Ancient semi-natural broadleaved woodland and semi-natural broadleaved woodland, part on an ancient woodland site	Lowland mixed deciduous woodland	H1:3 Native woodlands
South of Cwm Ciddy Farm	525	Species-moderate neutral grassland	Lowland meadows	H5:1 Lowland meadows
Rhose Point	720	Extensive site supporting a mosaic of habitats associated with old quarry and lime works including bare rock, maritime cliffs and slopes, ponds, calcareous to neutral grassland, reedbed, scrub and secondary woodland	Lowland meadows, Lowland calcareous grassland, Reedbeds, Ponds, Open mosaic habitats on previously developed land, Maritime cliffs and slopes	H1:4 Scrub communities H5:1 Lowland meadows H6:1 Lowland calcareous grassland H13:2 Ponds H14:3 Open mosaic habitats on previously developed land H15:1 Maritime cliffs and slopes
Land North of Blackton Farm	750	A series of small floodplain rush pastures with tall swamp vegetation	Purple moor grass and rush pastures, Reedbeds	H9:3 Purple moor grass and rush pastures H9:4 Reedbed
Church Hill Wood	1000	Predominantly ancient semi-natural broadleaved woodland and wood pasture with veteran oaks	Wood pasture and parkland, Lowland mixed deciduous woodland	H1:2 Wood pasture and parkland H1:3 Native woodlands
Walters Farm	1300	Series of species-rich neutral grasslands, locally damp, with large anthills	Lowland meadows	H5:1 Lowland meadows
Sutton Wood	1450	Semi-natural broadleaved woodland on an ancient woodland site	Lowland mixed deciduous woodland	H1:3 Native woodlands
West of Barry College	1450	Species-rich neutral grassland	Lowland meadows	H5:1 Lowland meadows
Curnix Farm	1550	Species rich neutral grassland	Lowland meadows	H5:1 Lowland meadows
Readers Way Pond	1580	Pond supporting important population of breeding Great crested newts	Ponds	S3 Amphibians: Great crested newts
Land South of Curnix Farm	1600	A series of small floodplain rush pastures with tall herb fen	Purple moor grass and rush pastures, Reedbeds	H9:3 Purple moor grass and rush pastures H9:4 Reedbed
Land South West of Curnix Farm	1700	Species-rich neutral grassland	Lowland meadows	H5:1 Lowland meadows

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Land South of Penmark	1700	A former quarry site supporting a mosaic of bare soils and rock, dense scrub and neutral grassland	Open mosaic habitats on previously developed land	H1:4 Scrub communities H14:3 Open mosaic habitats on previously developed land H16 Mosaic habitats
North West of Welsh Hawking Centre	1760	Ancient semi-natural broadleaved woodland	Lowland mixed deciduous woodland	H1:3 Native woodlands
Font-y-Gary	1800	Old quarry with range of habitats including species rich calcareous grassland, neutral grassland, bare rock, maritime cliffs and slopes, shallow pools and scrub	Lowland meadows, Lowland calcareous grassland, Reedbeds, Ponds, Open mosaic habitats on previously developed land, Maritime cliffs and slopes	H1:4 Scrub communities H5:1 Lowland meadows H6:1 Lowland calcareous grassland H13:2 Ponds H14:3 Open mosaic habitats on previously developed land H15:1 Maritime cliffs and slopes
Land North of Penmark	1950	Two small fields with tall swamp vegetation, rush pasture with areas of reed	Purple moor grass and rush pastures, Reedbed	H9:3 Purple moor grass and rush pastures H9:4 Reedbed

APPENDIX C

Notable desk study species

Other species of Conservation Concern identified during the desk study

Scientific Name	Common Name	Status
Aegithalos caudatus	Long-tailed Tit	WBAm(RSPB)
Anas platyrhynchos	Mallard	BDir21, WBAm(RSPB), UKBAm(RSPB)
Andrena pilipes	Black Mining Bee	RDB2 (UK) - NB
Anthus pratensis	Meadow Pipit	Bern, WBAm(RSPB), UKBAm(RSPB)
Apus apus	Swift	LBAP (VOG), WBAm(RSPB), UKBAm(RSPB)
Ardea cinerea	Grey Heron	LBAP (BRG, RCT), WBAm(RSPB)
Arenaria interpres	Turnstone	Bern, WBAm(RSPB), UKBAm(RSPB)
Asio flammeus	Short-eared Owl	BDir1, Bern, CITES, WBR(RSPB), LI(VC43), UKBAm(RSPB)
Aythya fuligula	Tufted Duck	BDir21, LBAP (VOG), WBAm(RSPB)
Bombus rupestris	Hill Cuckoo Bee	RDB2 (UK) - NB,
Brachypodium pinnatum	Heath False-brome	RDB1 (Wales) - WL, LI(VC50, LR)
Chloris chloris	Greenfinch	Bern, WBAm(RSPB)
Curruca communis	Whitethroat	WBR(RSPB),
Fulica atra	Coot	BDir21, WBAm(RSPB)
Fulmarus glacialis	Fulmar	Bern, LBAP (VOG), WBAm(RSPB), UKBAm(RSPB)
Gallinago gallinago	Snipe	BDir21, L, WBAm(RSPB), LI(VC43), UKBAm(RSPB)
Haematopus ostralegus	Oystercatcher	BDir22, WBAm(RSPB), LI(VC43), UKBAm(RSPB)
Hippodamia variegata	Adonis' Ladybird	RDB2 (UK) - NB, LI(BIS)
Hirundo rustica	Swallow	Bern, LBAP (VOG), WBAm(RSPB)
Larus fuscus	Lesser Black-backed Gull	BDir22, WBAm(RSPB), UKBAm(RSPB)
Larus marinus	Great Black-backed Gull	BDir22, WBR(RSPB), UKBAm(RSPB)

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Lithospermum purpureocaeruleum	Purple Gromwell	RDB1 (Wales) - EN, RDB2 (UK) - R, LBAP (VOG), LI(VC50, LR)
Motacilla cinerea	Grey Wagtail	Bern, WBAm(RSPB), UKBR(RSPB)
Nomada fucata	Painted Nomad Bee	RDB2 (UK) - NA
Oenanthe oenanthe	Wheatear	Bern, WBAm(RSPB)
Phalacrocorax carbo	Cormorant	WBAm(RSPB)
Phylloscopus trochilus	Willow Warbler	WBR(RSPB), UKBAm(RSPB)
Picus viridis	Green Woodpecker	Bern, WBAm(RSPB)
Platyrhinus resinosus	Cramp-Ball Fungus Weevil	RDB2 (UK) - NB
Plectrocnemia brevis	Plectrocnemia brevis	RDB2 (UK) - N,
Regulus regulus	Goldcrest	Bern, WBAm(RSPB)
Riparia riparia	Sand Martin	Bern, LBAP (VOG), WBAm(RSPB)
Saxicola rubetra	Whinchat	Bern, WBR(RSPB), UKBR(RSPB)
Scolopax rusticola	Woodcock	BDir21, WBR(RSPB), LI(VC43), UKBR(RSPB)
Sorbus domestica	Service-tree	RDB1 (Wales) - EN, RDB1 (UK) - CR, RDB2 (UK) - R, LBAP (VOG)
Tadorna tadorna	Shelduck	Bern, LBAP (VOG), WBAm(RSPB), UKBAm(RSPB)
Tinodes unicolor	Tinodes unicolor	RDB2 (UK)
Turdus viscivorus	Mistle Thrush	BDir22, Bern, WBAm(RSPB), UKBR(RSPB)

Locally Important Species identified during the desk study

Scientific Name	Common Name	Status
Anacamptis pyramidalis	Pyramidal Orchid	LI(SEWBrEC), LI(VC47), LI(VC48, LS)
Blackstonia perfoliata	Yellow-wort	LI(SEWBrEC), LI(VC47), LI(VC48, LR), LI(VC49, LS), LI(VC52, LS)
Brachytron pratense	Hairy Dragonfly	LI(BIS), LI(SEWBrEC)
Calopteryx	Demoiselle damselflies	LI(SEWBrEC)

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Calopteryx splendens	Banded Demoiselle	LI(BIS), LI(SEWBrEC)
Calopteryx virgo	Beautiful Demoiselle	LI(BIS), LI(SEWBrEC)
Centaurea scabiosa	Greater Knapweed	LI(SEWBrEC), LI(VC47), LI(VC48, LR), LI(VC49, LR), LI(VC50, LS)
Cirsium dissectum	Meadow Thistle	LBAP (VOG), LI(VC43), LI(VC47), LI(VC48, LR), LI(VC49, LR)
Conocephalus dorsalis	Short-winged Cone-head	LI(SEWBrEC)
Conocephalus fuscus	Long-winged Cone-head	LI(SEWBrEC)
Cordulegaster boltonii	Golden-ringed Dragonfly	LI(BIS), LI(SEWBrEC)
Corvus corax corax	Corvus corax corax	LI(BIS)
Dactylorhiza incarnata	Early Marsh-orchid	LI(SEWBrEC), LI(VC43), LI(VC47), LI(VC49, LR), LI(VC51, LS)
Delichon urbicum	House Martin	Bern, LBAP (VOG), UKBAm(RSPB)
Echium vulgare	Viper's-bugloss	LI(SEWBrEC), LI(VC47), LI(VC48, LS), LI(VC49, LS), LI(VC50, LS), LI(VC51, LS), LI(VC52, LS)
Epipactis palustris	Marsh Helleborine	CITES, LBAP (VOG), LI(SEWBrEC), LI(VC47), LI(VC48, LS), LI(VC49, LR), LI(VC51, LS)
Erodium moschatum	Musk Stork's-bill	LI(SEWBrEC), LI(VC47), LI(VC49, LS), LI(VC50, LR), LI(VC52, LR)
Hordeum secalinum	Meadow Barley	LI(SEWBrEC), LI(VC43), LI(VC49, LS)
Hypericum hirsutum	Hairy St John's-wort	LI(SEWBrEC), LI(VC48, LR), LI(VC49, LR)
Iris foetidissima	Stinking Iris	LI(SEWBrEC), LI(VC51, LS)
Lathyrus nissolia	Grass Vetchling	LI(SEWBrEC), LI(VC43), LI(VC49, LR), LI(VC50, LS)
Lathyrus sylvestris	Narrow-leaved Everlasting-pea	LI(SEWBrEC), LI(VC43), LI(VC49, LS)
Leptophyes punctatissima	Speckled Bush-cricket	LI(SEWBrEC)
Limonium vulgare	Common Sea-lavender	LI(SEWBrEC), LI(VC48, LS), LI(VC49, LR), LI(VC50, LR), LI(VC52, LS)
Linum bienne	Pale Flax	LI(SEWBrEC), LI(VC49, LR), LI(VC50, LR), LI(VC51, LS), LI(VC52, LS)
Medicago arabica	Spotted Medick	LI(SEWBrEC), LI(VC49, LS), LI(VC50, LR), LI(VC51, LR), LI(VC52, LR)
Neottia nidus-avis	Bird's-nest Orchid	CITES, RDB1 (UK) - NT, LBAP (VOG), LI(SEWBrEC), LI(VC43), LI(VC47),

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		LI(VC49, LR), LI(VC50, LR), LI(VC51, LR), LI(VC52, LR)
Nymphaea alba	White Water-lily	LI(SEWBrEC), LI(VC49, LS)
Ophrys apifera	Bee Orchid	CITES, LI(SEWBrEC), LI(VC47), LI(VC48, LR), LI(VC49, LS)
Orobancha minor	Common Broomrape	LI(SEWBrEC), LI(VC49, LR), LI(VC50, LR), LI(VC51, LS), LI(VC52, LS)
Orthetrum cancellatum	Black-tailed Skimmer	LI(BIS), LI(SEWBrEC)
Orthetrum coerulescens	Keeled Skimmer	LI(BIS), LI(SEWBrEC)
Paris quadrifolia	Herb-Paris	LI(SEWBrEC), LI(VC43), LI(VC47), LI(VC51, LS), LI(VC52, LR)
Platanthera chlorantha	Greater Butterfly-orchid	RDB1 (UK) - NT, LI(SEWBrEC), LI(VC43), LI(VC49, LS), LI(VC50, LS), LI(VC51, LS), LI(VC52, LR)
Ranunculus auricomus	Goldilocks Buttercup	LI(SEWBrEC), LI(VC48, LR), LI(VC49, LS), LI(VC52, LS)
Rubia perigrina	Wild Madder	LI(SEWBrEC), LI(VC48, LR), LI(VC50, LS), LI(VC51, LR), LI(VC52, LS)
Salvia verbenaca	Wild Clary	LI(SEWBrEC), LI(VC49, LR), LI(VC51, LR), LI(VC52, LR)
Silaum silaus	Pepper-saxifrage	LI(SEWBrEC), LI(VC47), LI(VC50, LS)
Sison amomum	Stone Parsley	LI(SEWBrEC), LI(VC47), LI(VC49, LS)
Syntrichia papillosa	Marble Screw-moss	RDB1 (Wales) - LC,

APPENDIX D

Phase 1 Habitat Survey Target Notes

Target Note	Grid Reference	Description	Photos
1	ST 07443 67287	Ash and Hawthorn trees. Moderate bat roost potential.	
2	ST 07761 67362	Woodland block. Moderate bat roost potential. Potential to support dormouse, badger and otter.	
3	ST 07544 67160	Small stand of dead and dying Ash around manure pile. Moderate bat roost potential.	
4	ST 07956 67219	Woodland block. Moderate bat roost potential. Potential to support dormouse, badger and otter.	
5	ST 08271 67041	Woodland block. Moderate bat roost potential. Potential to support dormouse, badger and otter. Stone wall also running along western edge.	

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6	ST 08489 66973	Viaduct bordering eastern boundary. Moderate bat roost potential.	
7	ST 08117 66719	Japanese Knotweed stands to the south of buildings	
8	ST 08607 67116	Hedgerow with trees backing onto woodland strip. Woodland strip has moderate bat roost potential.	
9	ST 08595 67279	Ivy covered Ash with moderate bat potential.	
10	ST 08227 67224	Strip of scattered trees linking woodland, dominated by mature oak with moderate bat roost potential.	
11	ST 08189 67235	Whitelands brook bordered by ~3 m either side with scrub and marginal vegetation. Habitat provides marginally suitable habitat to support water vole and otter.	

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13	ST 08312 67330	Woodland strip bordering Whitelands brook. Thick scrub understory in places. Moderate bat roost potential, dormouse, otter and badger potential.	
14	ST 08230 67303	Ivy covered Ash with moderate bat potential.	
15	ST 08160 67356	Ash with moderate bat roost potential	
16	ST 08126 67402	Oak with moderate bat roost potential	
17	ST 08050 67176	Mature Oaks with moderate bat roost potential	
18	ST 08007 67354	Oak and Ash tree with moderate bat roost potential	

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19	ST 08295 67528	Mature ivy covered Ash with moderate bat roost potential	
20	ST 08309 67817	Hedge with trees meets block Ash, Hazel, Hawthorn. Moderate bat roost potential.	
21	ST 08161 67975	Hedge with trees, small stand of Japanese knotweed	
22	ST 07901 67772	Farm buildings with moderate bat roost potential.	 
23	ST 07841 67785	Area of standing water/pond within farm, concrete lined with potential to support amphibians such as great crested newt.	

APPENDIX E

Biodiversity Review 2022

REVIEW OF BASELINE ECOLOGY, MODEL FARM, RHOOSE

1 INTRODUCTION

- 1.1.1 RPS were commissioned by Legal & General to carry out a site walkover of the proposed development site known as Model Farm located within the Vale of Glamorgan, north of Porthkerry. The site central grid reference is ST 080673.
- 1.1.2 A site walkover was carried out by Stephen Devereaux on the 4th November 2022. The purpose of the survey was to broadly assess any habitat change since the Preliminary Ecological Appraisal report was prepared in May 2019.
- 1.1.3 A Phase 1 Habitat survey of the site was carried out in May 2018 along with an accompanying desk study and protected species scoping survey. The habitats were subject to further assessment in spring 2019 prior to the issuing of the Preliminary Ecological Appraisal report.
- 1.1.4 The survey walkover in November 2022 covered the proposed development site, approximately 45ha in extent which forms the northern part of the application site.
- 1.1.5 The current status of the on-site pond was reviewed, and a Habitat Suitability Index (HSI) survey was undertaken to assess its current potential value for great crested newt *Triturus cristatus* and the likelihood of the waterbody being colonised since the previous environmental DNA survey completed in spring 2019.

2 BASELINE ECOLOGY

2.1 Habitats

- 2.1.1 The site walkover assessment found that the habitats within the application boundary remain largely unchanged between 2019 and 2022.
- 2.1.2 The site continues to comprise predominantly of arable fields and improved pasture with connected pockets of broadleaved woodland.

Hedgerows

- 2.1.3 The field layout and hedgerow boundaries remain unchanged being intact comprising predominantly of hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa* with a range of other woody species occurring at low frequency.
- 2.1.4 No change in hedgerow management was noted and no areas of hedgerow had been lost or damaged. As would be expected the species composition and hedgerow condition has not changed over the last 3 years.

Arable

- 2.1.5 In 2019, all the arable fields were subject to intensive agricultural management and crop production. The 2022 survey, although the majority of fields remain in use for cereal crop production and oil seed rape, four of the arable fields had been speculatively sown with a single species wildflower crop to be used as a commercial supply of wildflower seed with the option of being cropped and sold as hay.
- 2.1.6 The sown wildflower crop species were sainfoin *Onobrychis* sp., ox-eye daisy *Leucanthemum vulgare*, cornflower *Centaurea cyanus*, and common knapweed *Centaurea nigra*. Other herbaceous species were also recorded at lower frequency amongst the single species crops, most were native but also included some non-natives including cosmos *Cosmos* sp.

- 2.1.7 The wildflowers are crop species and to be commercially viable would need to be sown each year mirroring the arable management for traditional crop species. Therefore, the habitat remains as arable land, but the type of crop will have provided an increase in sources of nectar and pollen in summer 2002. Harvesting / cropping has not removed all the deadheads, which if left, would supplement the sources of winter food for farmland birds.

Pond

- 2.1.8 The only pond within the site, lies on the northern boundary adjoining the Port Road. It is a small concrete structure to provide a source of water for cattle. The surface of the pond is a continuous layer of duckweed. A patch tall emergent (reed sweet-grass) has colonised the western bank below the water line.
- 2.1.9 The margins of the pond are overhung by bramble and heavily shaded with bare concrete on the southern side where cattle access the water.
- 2.1.10 A narrow hedgerow separated the pond from the road with a thin strip of bramble between the concrete pond and adjoining shed on the boundary of the farmyard. The dense surface cover of duckweed creates 100% shade across the open water reducing the value of the pond since 2019 when duckweed was not abundant.

Other Habitats

- 2.1.11 The walkover survey confirmed that the current extent and status of all the other habitats within the development site is consistent with the findings present in the PEA in 2019.

Improved Grassland

- 2.1.12 A large part of the application site comprises improved grassland in the form of cattle pasture. The site field layout has not been altered and the composition of the low diversity sward continues to be dominated by perennial rye grass *Lolium perenne* with scattered ruderals (common nettle *Urtica dioica*, creeping thistle *Cirsium arvense*, white clover *Trifolium repens*, and broadleaved dock *Rumex obtusifolius*). Grazing intensity appears unchanged with the status and value of the habitat remaining as described in 2019.

Semi-natural Broadleaved Woodland

- 2.1.13 Interconnected series of broadleaved woodland blocks run along the southern side of the proposed development. The woodland boundaries match those mapped in 2019. The predominant canopy species in the woodlands remains as mature ash *Fraxinus excelsior* and oak *Quercus sp.* The ash dieback disease will significantly change the canopy extent and composition as mature ash trees are lost.
- 2.1.14 The shrub layer comprises predominantly hawthorn, hazel *Corylus avellana*, and field maple *Acer campestre*. The field layer is typically dominated by bramble *Rubus fruticosus* agg.

Bramble Scrub

- 2.1.15 The one large patch of dense bramble scrub recorded in 2019 remains unchanged in extent, located in the corner of an improved pasture in the east of the site where the field slopes down toward a woodland block.
- 2.1.16 In 2022 all areas of bramble were noted on a few field boundaries which were not previously mapped, because of their small extent. Localised bramble encroachment from the field boundary is considered to be a long-term trend.

2.2 Faunal Species

Great Crested Newts

- 2.2.1 An HSI survey was carried out on the concrete lined 'cattle drinking' pond on the northern boundary of the site, following the guidelines set out by ARGUK. Based on the features and context the pond has poor suitability of the waterbody for breeding populations of GCN as calculated using the HSI criteria (Table 1). This result is influenced by the limited pond features, its location alongside a working agricultural environment, proximity of a busy road, and the presence of only two other ponds within a 1km radius, both of which are separated from the development site by major roads. The summary of the HSI results of which are shown below in Table 1.

Table 1 ARGUK GCN HSI Results

Pond Name: Model Farm Pond		
Grid Ref: ST078677		
SI No	SI Description	SI Value
1	Geographic location	0.5
2	Pond area	0.3
3	Pond permanence	0.9
4	Water quality	0.33
5	Shade	1
6	Waterfowl effect	1
7	Fish presence	1
8	Pond Density	0.1
9	Terrestrial habitat	0.25
10	Macrophyte cover	0.5
HSI Score		0.47
Pond suitability		Poor

- 2.2.2 The low value and relative isolation from other ponds within the local environment makes colonisation by great crested newts since the pond was surveyed in spring 2018, very unlikely.

Bat Roosts

- 2.2.3 Four sections of the complex of farm buildings were confirmed to be being used by roosting bats in summer 2019. Three trees with confirmed bat roosts fall within the construction footprint and will be removed during future phases of development. All the roosts were low status non-breeding roosts used by small numbers of commonly occurring bat species.
- 2.2.4 Each development will obtain full information on the number, position and status of bats roosts in advance of development informing the mitigation proposals, species protection measures. The use of roosts varies over time, and it will be essential that each licence application is supported by relevant data.

Other Species of Principal Importance / Legally Protected Species

- 2.2.5 With no change in the habitat types within the development area the potential value of the site for species listed under Section 7 of the Environment Act Wales and legally protected species will remain as previously assessed.
- 2.2.6 The value of the developed site for these species has been addressed in the Biodiversity Management Strategy. The approach includes a precautionary assumed potential presence of dormouse in the woodlands and hedgerows; otter activity in the watercourse and the use of the by assemblages of foraging bats and breeding birds.

Table 2: Habitat Management Objectives for Species (Taken from the Biodiversity Management Strategy)

Species	Status	Objectives
Bats	Foraging habitats and flight lines within the application site, ownership boundary and wider area	Maintain linked woodland, scrub and hedgerows ensuring they are retained as dark corridors
	Soprano and common pipistrelle were the most abundantly recorded with noctule, brown long-eared bat, serotine and Leisler's, lesser horseshoe, Nathusius pipistrelle and <i>Myotis</i> bats also recorded.	Maintain bat flight line on the eastern boundary and north – south flight line from north of most westerly woodland block
		Maintain strong connections to woodland blocks and stream corridors
		Retain and protect maturing trees and their root protection areas and retain their potential to develop cavity features
Dormice	Local population in wider area. Woodland habitat management to increase likelihood of future colonisation of dormice with increased connections to wider woodland blocks.	Maintain new areas of habitat to the south of the development which will support both commuting and foraging areas for bat species
		Enhance and maintain the value of the SINC woodlands, hedgerows and new woodland and scrub planting for dormice
		Maintain strong connectivity between potential dormouse habitat
Otter	No evidence of otter identified during 2019 survey but records from the brook close to the site boundary. Suitable habitat exists within the site in woodlands and stream corridors	Increase the availability of food resources within the natural green space through native planting
		Protect Bullhouse and Whitelands brook and SINC woodlands from any impacts during construction and operation
		Maintain dark buffer zones around woodland and stream corridors
Breeding birds	Assemblage of breeding birds identified within the application site and ownership boundary during 2019 survey including both red/amber list farmland specialist	Create new areas of scrub, fallow and wildflower grasslands (with locally sourced plants and seed mix) and range of hedgerow types to supply greater food resource throughout year Create larger field margins on retained agricultural fields within south of ownership boundary Provision of nest boxes

Amphibians	No evidence of GCN recorded during 2019 eDNA survey. GCN recorded 1.6km from the site boundary in 2013. Records of common frog and toad, palmate and smooth newt from local area.	Maintain SuDS attenuation basins in ecologically favourable manner
Invertebrates	In combination the existing habitats (excluding the pasture and arable) would be expected to support a relatively varied assemblage of species	Provide varied sources of nectar over the majority of the year (native, trees, shrubs and populations of wildflower species) Maximise the niches available for use by invertebrates (maturing trees, woodland, scrub, hedgerows, SUDs attenuation ponds) Retain deadwood habitat

Badger

- 2.2.7 Badger are a very widespread species and the activity within the landscape will vary over time. No new setts were found during the walkover survey, and outside the woodlands the potential for the establishment of new setts is low.

- 2.2.10 For highly mobile species like badger, surveys in advance of each phase of development will be important to define effects and locate any new setts within or adjacent to the areas of development activity.

3 CONCLUSION

- 3.1.1 The current status and extent of the habitats within the development footprint which remain unchanged since the previous surveys were undertaken and the protected species audit completed for the development accurately reflects the current situation.
- 3.1.2 The activity of individual faunal species will vary from year to year. Species surveys are a requirement for each phase of development and the data collected at this stage will directly inform the detailed mitigation and species protection measures and programme of works. Species licence applications for development phases will be underpinned by these surveys.
- 3.1.3 With habitats present in 2022 very largely unchanged, the species survey data collected in 2019 is very likely to reflect the current use of the site by legally protected species and those listed under S7 of the Environment (Wales) Act 2016.