Ty Fry Farm,

Loughor, Swansea

Preliminary Ecological Appraisal

November 2020

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Ty Fry Farm, Loughor, Swansea Preliminary Ecological Appraisal				
Revision	Date	Prepared by	Checked by	Verified by
1.0	19 November 2020	Rory Jones MCIEEM Senior Ecologist	Alastair Krzyzosiak Ecologist	Paul Hudson MCIEEM Principal Ecologist

Summary

Brief and Site Location	Acer Ecology Ltd was commissioned by Barratt & David Wilson Homes South Wales to conduct a preliminary ecological appraisal of land at Ty Fry Farm, Loughor, Swansea, SA4 6SR within the boundary of Swansea City and County Council (Ordnance Survey Grid Reference centred at: SS 5761 9798).
Development Proposals	The proposed development site forms the eastern corner of a wider residential development of 92 units (LPA ref: 2013/0617 (outline); 2018/1537/RES (RM), which secured consent in 2018 and is under construction at the time of writing. The scheme forms part of a wider residential allocation of 130 units under the adopted Swansea Council LDP (LDP Ref: H1/32). The development itself comprises the construction of 23 residential units, with associated gardens, driveways and general infrastructure. Several small amenity spaces are incorporated into the design. The proposals will require the permanent loss of the entirety of the centre of the survey area. The majority of the peripheral hedgerows, trees and dense scrub will be retained, though sections at the north-west and south-west of the site have already been cleared as part of the wider ongoing construction works. A section of hedgerow measuring approximately 40m in the north-eastern corner will require clearance. Appropriate Root protection Areas (RPAs) for the retained trees within the peripheral hedgerows have been incorporated into the design proposals. In addition, a SuDS attenuation lagoon with associated pumping station compound will be created in the south-west of the survey area. The lagoon and infrastructure will be located outside of the RPAs of the retained trees adjacent to the south and west. Excavation will require the permanent clearance of additional areas of grassland.
Statutory and Non-Statutory Nature Designations	The Bury Inlet and Loughor Estuary RAMSAR, SPA, SAC and SSSI supports internationally important intertidal habitats and bird populations. Lying approximately 0.5km from the proposed development site, the potential for direct impacts to this designated site are extremely unlikely. The habitats within the survey area are not considered to be suitable for use by overwintering wildfowl associated with the estuary. The relatively small size of the semi-improved grassland and it's distance from the estuary mean that no adverse impacts are anticipated. The proposed development is therefore unlikely to result in 'significant effects' (IPC, 2011) to the Bury Inlet and Loughor Estuary RAMSAR, SPA, SAC and SSSI. An Appropriate Assessment[1] is not considered to be necessary.
Impacts on Habitats of Value	No parts of the site are currently considered to be of international, national, regional or district value for wildlife. The defunct species-rich hedgerows with trees at the periphery of the site qualify as 'Hedgerows', as defined in the Section 7 list, and 'Species-Rich Hedgerows' under the Swansea LBAP. The majority of the hedgerows are proposed for retention, with the exception of a small section in the north-eastern corner of the site. Provided that adequate protective measures are implemented to ensure that no accidental damage to trees or their roots take place during construction, there is considered to be good scope to ensure the long-term viability of the hedgerows and trees, and indeed even a degree of enhancement, as detailed in Section 5.

[1] For more information, consult 'Assessing Projects Under the Habitats Directive' David Tyldesley (2011) for CCW

	The dense scrub, semi-improved grassland and bracken habitats have been assessed as being of site ecological value. The hard standing, bare ground and buildings are of negligible value. Under current development proposals, the majority of the rank semi-improved grassland will be permanently lost to the development. Though this loss is unlikely to have consequences outside of the footprint of the site, it would nonetheless be desirable to retain portions of this habitat if possible, as detailed in Section 5. The dense scrub and bracken habitats will be largely cleared to accommodate the residential units, though peripheral areas of bracken will be retained as part of the wider hedgerow retention.
Impacts on Protected and Notable Species	The proposed development could potentially have adverse impacts of varying degrees on a range of legally protected species, including nesting birds, foraging/commuting bats, reptiles, hedgehogs and (albeit unlikely) great crested newts. Further surveys are therefore required to establish presence/ likely absence of reptiles and great crested newts. If present, mitigation will be required.
Invasive Non-native Species	Montbretia was recorded on site.
Requirements for Additional Survey	The following additional surveys are required: • Reptile and terrestrial-phase great crested newt survey; and • Bat transect surveys: Considering the small size of the area to be affected, and the fact that a portion of the wider site already comprises an active construction site (as well as the on-site enhancement measures being proposed in the retained areas of the site), a reduced survey effort to reflect proportionality is recommended. The survey area will be subject to one activity transect survey each season (Summer and Autumn) in appropriate weather conditions. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24 hour period. Depending on the results of the two activity surveys, a survey in the Spring season of the following calendar year may be required. Each activity transect will be supplemented by the deployment of two static detectors, recording for a period of five consecutive nights per transect visit (i.e. once per season); and potentially • If T2 will be affected by the proposed development works, it will be subject to one dusk emergence, one dawn re-entry and another dusk or dawn survey (May to August). These surveys will not be required if assurances can be made that T2 will be unaffected.
Licensing Requirements	A licence may be required upon completion of further surveys.
Recommendations	The following provisional recommendations have been made: • Habitat Retention; • Further surveys for reptiles and bats; • Precautionary measures; • Mitigation measures; and • Compensatory and enhancement measures.

1. Introduction

1.1. Brief

Acer Ecology Ltd was commissioned by Barratt & David Wilson Homes South Wales to conduct a preliminary ecological appraisal of land at Ty Fry Farm, Loughor, Swansea, SA4 6SR within the boundary of Swansea City and County Council (Ordnance Survey Grid Reference centred at: SS 5761 9798). The purpose of the assessment was to document the baseline ecological condition of the survey area, which comprises the red line boundary shown in Plan 1. This included identification of any designated sites or habitats that could be affected by the proposed works, and identification of or potential for, protected and/or otherwise notable species of conservation interest that could be affected. Potential ecological constraints were identified, and subsequent recommendations developed.

This assessment will provide initial recommendations based on the development proposals available at the time of writing. They should be revised upon finalisation of the design.

1.2. Site Description

The survey area comprises a single agricultural field that is enclosed by mature hedgerows, trees and dense scrub. It measures approximately 0.87ha and lies at the southern edge of the village of Loughor. The northern half of the site has already been cleared and currently contains the construction site compound for the wider residential development (consisting of hard standing, bare ground and container units). Adjacent to the north and east lies the village of Loughor, while a mosaic of pastoral fields and mature hedgerows form the immediate landscape to the south and west. It lies approximately 0.5km north-east of the Loughor Estuary, which constitutes part of the Bury Inlet RAMSAR, SPA, SAC and SSSI. The wider landscape is largely urban to the north and intertidal to the south.

Photo 1: Construction compound in northern half of site

Photo 2: Grassland and hedgerow in southern half of site

1.3. Proposed Works

The proposed development site forms the eastern corner of a wider residential development of 92 units (LPA ref: 2013/0617 (outline); 2018/1537/RES (RM), which secured consent in 2018 and is under construction at the time of writing. The scheme forms part of a wider residential allocation of 130 units under the adopted Swansea Council LDP (LDP Ref: H1/32).

The development itself comprises the construction of 23 residential units, with associated gardens, driveways and general infrastructure. Several small amenity spaces are incorporated into the design.

The proposals will require the permanent loss of the entirety of the centre of the survey area. The majority of the peripheral hedgerows, trees and dense scrub will be retained, though sections at the north-west and south-west of the site have already been cleared as part of the wider ongoing construction works. A section of hedgerow measuring approximately 40m in the north-eastern corner will require clearance. Appropriate Root Protection Areas (RPAs) for the retained trees within the peripheral hedgerows have been incorporated into the design proposals.

In addition, a SuDS attenuation lagoon with associated pumping station compound will be created in the south-west of the survey area. The lagoon and infrastructure will be located outside of the RPAs of the retained trees adjacent to the south and west. Excavation will require the permanent clearance of additional areas of grassland.

The proposed development plan is provided in Appendix 1.

1.4. Scope of the Study

The study comprised the following:

- A desk study to identify existing information on statutory and non-statutory sites of nature conservation interest, and records of notable or protected habitats or species within the site and its environs;
- A Phase 1 Habitat Survey of the site, extended to search for evidence of, and potential for, protected fauna; and
- Identification of potential ecological constraints to the proposed works at the site and assessments of impacts including appropriate mitigation measures where necessary.

1.5. Review of Historic Site Data

The survey area was previously assessed as part of an Extended Phase 1 Habitat Survey of the wider residential development in 2011 (Middlemarch Environmental Ltd., 2011).

The proposed development site was mapped as semi-improved grassland, bordered by dense scrub in the previous study.

1.6. Reporting

This report aims to:

- Outline the methodology used during the survey;
- Present the results of the survey;
- Provide an ecological evaluation of on-site habitats, including an assessment of the potential for protected species;
- Provide an assessment of the potential impacts of the development proposals on ecological receptors identified through the desk and field study;
- Provide an assessment of the potential ecological constraints to the proposals; and
- Provide recommendations for further survey, avoidance, mitigation and enhancement where appropriate.

2. Methods

The survey was undertaken following standard methods as described in the Chartered Institute of Ecology and Environmental Management (CIEEM) Preliminary Ecological Appraisal 2016 guidelines, and the Phase 1 Habitat Survey methodology (Joint Nature Conservation Committee, 2010). The methodology utilised for the survey work comprised a desk study, habitat survey and a survey of protected and notable species.

2.1. Desk Study

2.1.1. Protected Sites, Habitats and Species

Information on designated sites (Table 1) and protected species was obtained from the following sources. The legislation and policy relating to statutory and non-statutory designated sites can be found in Appendix 2. Plans 2 and 3 show the protected sites in relation to the proposed development site.

Table 1: Summary of Designated Sites and Other Abbreviations

Abbreviations	
Special Areas of Conservation	SAC
Special Protected Area	SPA
Site of Special Scientific Interest	SSSI
National Nature Reserve	NNR
Local Nature Reserve	LNR
Site of Importance for Nature Conservation	SINC
Ancient Semi-Natural Woodland	ASNW
Restored Ancient Woodland Site	RAWS
Plantation on Ancient Woodland Site	PAWS
South East Wales Biological Records Centre	SEWBReC
Natural Resources Wales	NRW

Table 2: Sources of Data

Source	**Data**	**Radius of Search**
NRW Geographical Information Systems (GIS) Layers	Statutory and non-statutory nature conservation designated sites Historic Phase 1 Habitat Survey Data JNCC (1992 - 96) ASNW, RAWS and PAWS	Ramsar/SACs/SPAs/SSSIs/NNRs)/LNRs – 2km[2]. SACs (designated for bats) - 10km. Site boundary. 2km.
SEWBReC	Protected species records SINCs	1km. 1km.

All available records of bat roosts were considered. For other species, only records collected within the last 10 years were considered relevant.

[2] The citations of all the SSSIs and SACs within 2km of the site were consulted to determine if any of them had features or species which could be affected by the development proposals.

2.1.2. Landscape Context

The site and wider landscape were assessed and characterised using aerial images, Ordnance Survey maps and NRW phase 1 habitat maps dating from the 1990s. The presence of off-site features and habitats, which add to the ecological value within the wider area (for example, ponds within 0.5km of the site) were identified. Where appropriate, such features were scoped into the detailed assessment of impacts presented in Section 4 below.

2.1.3. Ancient Woodland

Although ancient woodland is not a designated site as such, it is often listed as a designated site due to its ecological significance and associated protection. Ancient woodland has therefore been included within the non-statutory designated site section of this report.

2.1.4. Planning Authority

The Swansea City and Council Planning Portal[3] was consulted to determine if any previous survey information was available for the site, or immediate surroundings.

An internet-based search of the Swansea Local Biodiversity Action Plan (LBAP)[4] was undertaken.

2.2. Field Study

2.2.1. Personnel

The field survey was undertaken in good weather on the 28th July 2020 by Rory Jones[5] MCIEEM.

2.2.2. Vegetation and Habitats

The vegetation and habitat types present within the survey area were categorised and mapped in accordance with the standard[6] Phase 1 Habitat assessment methodology (Joint Nature Conservation Committee, 2010), dominant and conspicuous plant species were recorded for each habitat. Target notes were used to record information on features of ecological interest, such as evidence of, or habitats with potential to support protected species. Following the completion of the survey, a colour-coded habitat plan was digitised using Corel Draw to show the extent and distribution of the different habitat types present within the site (see Plan 4).

Hedgerows within the site were not formally assessed against the definitions within the Hedgerow Regulations 1997 as this was beyond the scope of the assessment.

[3] http:/ http://www.swansea.gov.uk/planningsearch
[4] http://www.swansea.gov.uk/article/10113/Swansea-Local-Biodiversity-Action-Plan
[5] Rory is employed by Acer Ecology and is experienced in undertaking preliminary ecological appraisals. He graduated with a degree in Environmental Geoscience from Cardiff University and has eight years postgraduate experience in the environment sector. He has undertaken extensive training in protected species assessment, phase 1 habitat surveys and botanical surveying. He holds Welsh survey licences for bats, great crested newts and dormice, together with a Natural England nest inspection licence for barn owl. Further details of his experience and qualifications can be found at http://http://bit.ly/1KSDv5l.
[6] Some additional categories were also used if applicable e.g. hard standing and Japanese knotweed.

The presence of invasive plant species listed on Schedule 9[7] of the Wildlife and Countryside Act 1981 (as amended), such as Himalayan balsam (*Impatiens glandulifera*), giant hogweed (*Heracleum mantegazzianum*) and Japanese knotweed (*Fallopia japonica*) were also noted during the survey, if present.

2.2.3. Protected and Notable Species

During the survey, emphasis was placed on searching for evidence of, and habitats with, potential to support protected or notable species, especially species meeting any of the following criteria:

- Listed under the and the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species and Planning (various amendments) (England and Wales) Regulations 2018, until and unless superseded by The Conservation of Habitats and Species (Amendment) (EU Exit) [‘CHSAEU’] Regulations 2019;
- Listed under Section 7 of the Environment (Wales) Act 2016 as being of principal importance for maintaining and enhancing biodiversity in Wales;
- Listed as a local priority for conservation, for example in the relevant Local Biodiversity Action Plan (LBAP);
- Red Listed using International Union for the Conservation of Nature (IUCN) criteria (e.g. in one of the UK Species Status Project[8] reviews, in the Species of Conservation Concern Red, Amber or Near Threatened List[9], Birds of Conservation Concern in Wales[10], or, where a more recent assessment of the taxonomic group has not yet been undertaken, listed in a Red Data Book);
- Listed as a Nationally Rare or Nationally Scarce species (e.g. in one of the Species Status Project reviews) or listed as a Nationally Notable species where a more recent assessment of the taxonomic group has not yet been undertaken; and/or
- Endemic to a country or geographic location (it is appropriate to recognise endemic sub-species, phenotypes, or cultural behaviours of a population that are unique to a particular place).

It should be noted that only those species with potential to be present on-site are mentioned within this report. The methodologies used were as follows:

Birds

Any birds observed during the field survey were recorded, in addition to features capable of supporting nesting birds (e.g. trees, hedgerows, buildings, bramble, ruderal vegetation and rough grassland etc.). The site was also assessed for its actual and potential suitability to support Wildlife and Countryside Act 1981 (as amended) Schedule 1 species.

[7] Schedule 9 species of plants and animals are ones that do not naturally occur in Great Britain but have become established in the wild and represent a threat to the natural fauna and flora.
[8] The Species Status project is the successor to the JNCC’s Species Status Assessment project, providing up-to-date assessments of the threat status of various taxa using the internationally accepted Red List guidelines (http://jncc.defra.gov.uk/page-1773).
[9] Eaton *et al.* (2015) Birds of conservation concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. British Birds 108: 708-746.
[10] Johnstone, I. and Bladwell, S. (2016) Birds of Conservation Concern in Wales 3: the population status of birds in Wales. Birds in Wales 13 (1).

A comprehensive bird survey, such as a breeding bird survey, was not undertaken as this was beyond the scope of the assessment.

Bats

Preliminary Ground-level Roost Assessment

A preliminary ground-level roost assessment of the trees within the survey area was undertaken looking for features that bats could use for roosting (Potential Roost Features[11] (PRF) and evidence of bats (i.e. droppings in, around or below a PRF; odour emanating from a PRF; audible squeaking at dusk or during warm weather; or staining below the PRF). A systematic inspection was carried out around all accessible aspects of the tree, from both close to the trunk and further away. The location of those trees considered to have anything greater than negligible bat roost potential are shown in Plan 4.

The trees were assessed for their suitability to support roosting and hibernating bats in accordance with Table 4.1 of the Bat Conservation Trusts Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) (see Appendix 6). A high-powered torch (Clulite), an endoscope (Snake vision) binoculars and a ladder were used as appropriate during the survey.

Terrestrial Habitat Assessment

A preliminary assessment of the value of the site for bats (and any potential roost sites therein) was made in accordance with Table 4.1 of the Bat Surveys for Professional Ecologists (Collins, 2016) (see Appendix 5). The assessment was based on the relative abundance and quality of habitat features within the site, and surrounding landscape, suitable for roosting, foraging and commuting bats.

Dormice

The hedgerows and dense scrub were assessed for their suitability to support dormice (*Muscardinus avellanarius*) with reference to guidance such as The Dormouse Conservation Handbook (Bright, Morris & Mitchell-Jones, 2006). The structure and composition of these habitats were assessed with respect to the presence of flower, fruit or nut-bearing food-plants such as hazel (*Corylus avellana*) (a favoured food-plant of dormice), oak (*Quercus* sp.), honeysuckle (*Lonicera periclymenum*), bramble (*Rubus fruticosus* agg.), sycamore (*Acer pseudoplatanus*), as well as other trees and shrubs listed in Bright, Morris & Mitchell-Jones (2006) as being of value to dormice. In addition, connectivity to other areas of suitable habitat in the wider landscape, such as hedgerows and woodland, was assessed.

A search for hazelnuts opened by dormice was undertaken to aid determination of their presence[12]. However, the survey was undertaken outside of the optimal season for undertaking such searches, meaning

[11] Potential Roost Features that bats may use identified by Andrews include: woodpecker-holes; squirrel-holes; knot-holes; pruning-cuts; tear-outs; wounds; cankers; compression-forks; butt-rots; lightning strikes; hazard-beams; subsidence-cracks; shearing cracks; transverse cracks; welds; lifting bark; frost-cracks; fluting and ivy.

[12] As far as was practical given the vegetation structure within the survey area, the guidance set out in The Dormouse Conservation Handbook (Bright, Morris & Mitchell-Jones, 2006) was adhered to, whereby three 10m x 10m areas of heavily fruiting hazel were searched for 20 minutes each, therefore enabling an 80% confidence rating of dormouse absence in these areas.

that many of the inspected nuts had deteriorated quite significantly, making positive identification of markings characteristic of dormouse use more difficult.

A full nest tube/ box survey was not undertaken as this was beyond the scope of the assessment.

Great Crested Newts

The survey area was appraised for its suitability to support great crested newts (*Triturus cristatus*). The assessment was based on guidance outlined in the Herpetofauna Workers' Manual (Joint Nature Conservation Committee, 2003) and the Great Crested Newt Conservation Handbook (Langton, Beckett & Foster, 2001).

Ordnance Survey maps and aerial images of the land surrounding the site were consulted to determine if any ecologically connected water bodies were present within the site or within 0.5km of it. One potentially suitable water body was identified within the study area, approximately 450m to the south (see Plan 5). However, this water body lay on private land, and access had not been agreed at the time of survey. The Habitat Suitability Index (HSI) (Oldham *et al.*, 2000) was therefore not applied to it.

Badgers

Earth embankments, wooded copses, hedgerows and dense bramble beds are habitat features that often contain evidence of badger (*Meles meles*). Where present on-site and within a 30m buffer adjacent to the site, these and other suitable habitat features were searched for such evidence. Where present, the location of badger signs such as setts, runs, dung pits or latrines, prints, hair and foraging snuffle holes were recorded.

A full badger survey was not undertaken as it was beyond the scope of this assessment.

Reptiles

An assessment of the suitability of on-site habitats to support reptiles was made. Reptiles require a diverse range of habitats to meet their needs such as hedgerows, scrub, rough grassland, woodpiles, rubble, banks and compost heaps. The potential of the site to provide hibernation opportunities and spring/ summer/autumn habitat was also assessed, with reference to guidance provided in the Herpetofauna Workers' Manual (Joint Nature Conservation Committee, 2003), the Reptile Management Handbook (Edgar, Foster & Baker, 2011) and the Reptile Mitigation Guidelines Technical Note TIN 102 (Natural England, 2013). The following factors were considered: vegetation type and structure; insolation (sun exposure); slope aspect; topography; surface geology; habitat connectivity; habitat size; prey abundance; refuge opportunity; hibernation opportunity; egg-laying potential for grass snake (*Natrix natrix*); public pressure; percentage of shade; levels of disturbance and management regime.

A targeted presence/ likely absence reptile survey was not undertaken as it was beyond the scope of this assessment.

Marsh Fritillary

The survey was undertaken during the optimal season for identifying both flying adults and the eggs upon the key larval foodplants of marsh fritillary (*Euphydryas aurinia*) butterfly. All butterfly species recorded on the wing were within the site therefore recorded, and an inspection was made for the key larval food plant of this species, devil's bit scabious (*Succisa pratensis*).

The terrestrial habitats were also appraised for their potential to support this species in general, broadly according to the definitions set out in Fowles (2005). These definitions relate to the quality of habitat with respect to its suitability for supporting breeding marsh fritillary, chiefly the length of the sward and the quantity of devil's-bit scabious present.

Other Species

General habitat suitability and incidental sightings of other animal species were also noted.

2.2.4. Assessment of Ecological Value

The value of the habitats and features of the site have been provisionally evaluated and graded in accordance with a geographical frame of reference as detailed in Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland (CIEEM, 2018). The level of value of specific ecological receptors is assigned using a geographic frame of reference, i.e. international value being most important, then national, regional, county, district, local and, lastly, within the immediate zone of influence of the site only. Brief descriptions of how Acer Ecology interprets these categories are set out in Appendix 4.

2.2.5. Constraints and Limitations

General Temporal Constraints

Any ecological survey can only identify what was present on-site at the time the survey was conducted and habitat usage by species can change over time.

Incomplete Survey Information

Full surveys for the protected species listed previously have not yet been carried out. For some species of fauna for which evidence has been found or which are considered likely to occur on site, further targeted survey is recommended (see Section 5.1).

Partial Clearance of Site

Construction activities have already commenced in the northern half of the site. The field and portions of the hedgerow, trees and scrub have already been cleared to accommodate the site compound.

Restricted Access to Water Bodies Within 0.5km of Site

The potentially suitable water body could not be assessed, as access had not been agreed at the time of survey. Lying approximately by 450m from the proposed development site, this lack of access is not considered to be a significant constraint to the study.

3. Results

3.1. Desk Study

3.1.1. Statutory Nature Conservation Designated Sites

Statutory Sites (SACs or SSSIs) Designated for Bats within 10km of Site

The proposed development site lies within 10km of two SSSIs that have been specifically designated for bats:

- Rose Cottage, Llethrid SSSI lies approximately 7.7km to the south-west of the study area. This SSSI is an important breeding site for the lesser horseshoe bat (*Rhinolophus hipposideros*); and
- Coedydd Parkmill a Cwm Llethrid SSSI lies 7.7km to the south-west of the study area. This SSSI features several caves which act as hibernation sites for greater (*Rhinolophus ferrumequinum*) and lesser horseshoe bats.

Other Designated Sites within 2km

Bury Inlet and Loughor Estuary RAMSAR, SPA, SAC and SSSI lies approximately 0.5km to the south-west of the study area. Its citation states: "Comprising extensive areas of grazed saltmarsh, sand and mud flats, the area is internationally significant for its wader and wildfowl populations, with overwintering totals averaging in excess of 46,000 birds."

NNRs and LNRs

No NNRs or LNRs are present within 2km of the site.

3.1.2. Non-statutory Nature Conservation Designated Sites

SINCs

Three SINCs were recorded within 1km of the study area. These were:

- Main Swansea-Fishguard Railway Line (SINC 386), which is located approximately 0.4km south of the study area, and comprises a mosaic of species-rich purple moor-grass and rush pasture, structurally diverse and species-rich scrub, semi-natural wild, mixed deciduous component, relatively species-rich neutral grassland, lowland meadow, continuous semi-natural linear vegetation, unmodified lowland dry heath and other habitats;
- Gowerton Saltmarsh (SINC 400), which lies approximately 0.56km to the south of the study area. This site consists of coastal saltmarsh, riparian habitats and intertidal mudflats, and supports an array of bird, mammal and invertebrate species; and

- Lower Lliw Corridor and Llan Confluence (SINC 326), which lies approximately 0.8km south-east of the study area, and comprises a mosaic of species-rich purple moor-grass and rush pasture, structurally diverse and species-rich scrub, relatively species-rich neutral grassland, coastal saltmarsh and watercourses with exposure/ erosion features. It supports an array of bird, mammal and invertebrate species.

Ancient Woodland

There are five areas of ASNW located within 2km of the proposed development site, the nearest of which lies approximately 1.3km to the south. In addition, seven RAWS are present within the same search radius.

3.1.3. Designated Sites Summary

Considering the distances between Rose Cottage, Llethrid SSSI, Coedydd Parkmill a Cwm Llethrid SSSI, the SINCs and the proposed development site, no adverse impacts to roosting bats are anticipated as a result of the development. They are therefore not mentioned further in this report. Likewise, no impacts are anticipated for the various ASNWs and RAWSs.

The Bury Inlet and Loughor Estuary RAMSAR, SPA, SAC and SSSI supports internationally important intertidal habitats and bird populations. Lying approximately 0.5km from the proposed development site, the potential for adverse impacts to overwintering birds associated to this designated site is considered to be sufficiently high to warrant further discussion in Section 4.

3.2. Field Survey

3.2.1. Habitats and Vegetation

The results of the general survey of habitats and vegetation are shown on Plan 4. A botanical species list is provided in Appendix 3.

3.2.2. Summary of Habitats Present within the Site

The site consists of eight elements which are described in detail below. These comprise:

- Dense Scrub (A2.1);
- Scattered Broadleaved Tree (A3.1);
- Semi-Improved Neutral Grassland (B2.2);
- Bracken (C3);
- Defunct Species-Rich Hedgerow with Trees (J2.3.1);
- Building (J3.6);
- Bare Ground (J.4); and
- Hard Standing[13] (no alphanumeric code provided).

[13] Habitat not included within the Phase 1 Handbook (JNCC 2010)

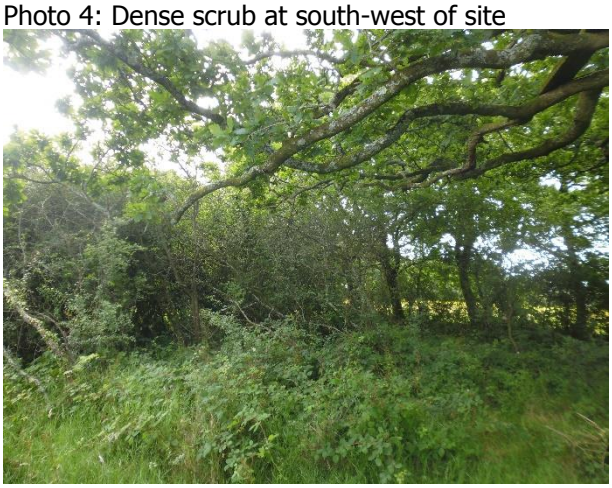
3.3. Habitat Descriptions

3.3.1. Dense Scrub (A2.1)

A large area of blackthorn (*Prunus spinosa*) and hawthorn (*Crataegus monogyna*) dominated dense scrub is present at the eastern end of the site. Other species recorded in the shrub layer include holly (*Ilex aquifolium*), grey willow (*Salix cinerea*), cherry sp. (*Prunus sp*) and bramble (*Rubus fruticosus agg.*). The understorey contained abundant nettle (*Urtica dioica*), meadowsweet (*Filipendula ulmaria*), great willowherb (*Epilobium hirsutum*) and hedge bindweed (*Calystegia sepium ssp roseata*). Herb Robert (*Geranium robertianum*) and broad buckler fern (*Dryopteris dilatata*) were also recorded frequently. A high number of introduced garden escapes have also colonised this habitat. Montbretia (*Crocosmia sp*) was among these.

Photo 3: Dense scrub at east of site

Photo 4: Dense scrub at south-west of site



3.3.2. Scattered Broadleaved Tree (A3.1)

The trees within the peripheral hedgerows of the site are described within Section 3.3.5. Those trees considered to have greater than negligible potential for supporting roosting bats are numbered on Plan 4 and are described in detail in Section 3.4.2.

3.3.3. Semi-Improved Neutral Grassland (B2.2)

The southern portion of the site comprises rank semi-improved neutral grassland. Yorkshire fog (*Holcus lanatus*) dominates the sward throughout, though herbaceous species such as meadowsweet, creeping buttercup (*Ranunculus repens*), bird's foot trefoil (*Lotus corniculatus*) and common knapweed (*Centaurea nigra*) are locally abundant. Ragwort (*Senecio jacobaea*) is abundant throughout the sward. Other graminoid species recorded include creeping bent (*Agrostis stolonifera*), rough meadow grass (*Poa trivialis*), crested dog's tail (*Cynosurus cristatus*), red fescue (*Festuca rubra*), false oat grass (*Arrhenatherum elatius*), cock's foot (*Dactylis glomerata*) and annual meadow grass (*Poa annua*). Hard rush (*Juncus inflexus*) is occasional. Herbaceous species comprised meadow buttercup (*Ranunculus acris*), hemp agrimony (*Eupatorium cannabinum*), silverweed (*Potentilla anserina*), curled dock (*Rumex crispus*), creeping thistle

(*Cirsium arvense*), creeping cinquefoil (*Potentilla reptans*), field bindweed (*Convolvulus arvensis*), ribwort plantain (*Plantago lanceolata*), red campion (*Silene dioica*), common sorrel (*Rumex acetosa*), foxglove (*Digitalis purpurea*), red clover (*Trifolium pratense*), common mouse-ear (*Cerastium fontanum*), selfheal (*Prunella vulgaris*), redshank (*Persicaria maculosa*), perforate St John's wort (*Hypericum perforatum*), daisy (*Bellis perennis*) and ox eye daisy (*Leucanthemum vulgare*).

Photo 5: Grassland in southern half of site

Photo 6: Typical structure of sward

Photo 7: Grassland in north-eastern corner of site

3.3.4. Bracken (C3)

The inward edges of the peripheral hedgerows are colonised with a bracken community. Both bracken (*Pteridium aquilinum*) and bramble form the dominant components, while great willowherb, nettle and ragwort are abundant. Other species recorded include cleavers, hedge woundwort (*Stachys sylvatica*), hemp agrimony, creeping buttercup, common bent, curled dock, blackthorn, red campion, common vetch (*Vicia sativa*), spear thistle (*Cirsium vulgare*), bird's foot trefoil, foxglove, common knapweed, meadow vetchling (*Lathyrus pratensis*), red clover, false oat grass, fleabane (*Pulicaria dysenterica*), ribwort plantain, germander speedwell (*Veronica chamaedrys*), herb Robert, Yorkshire fog, cock's foot, broad-leaved willowherb (*Epilobium montanum*), creeping thistle, creeping cinquefoil, field bindweed and hogweed (*Heracleum sphondylium*).

Photo 8: Bracken habitat along western hedgerow

Photo 9: Bracken habitat in north-east of site

3.3.5. Defunct Species-Rich Hedgerow with Trees (J2.3.1)

The peripheries of the site are largely composed of defunct species-rich hedgerows with abundant semi-mature and mature trees. The trees are typically semi-mature with DBH's ranging from approximately 15 – 40cm. Heights range from approximately 12 – 18m. The main structural component of the hedgerows varies from approximately 3 – 4m. It is gappy throughout, though the south-western corner of the site has developed into a dense canopy. Sessile oak (*Quercus petraea*) is the dominant species throughout all sections of hedgerow. Holly, hawthorn, blackthorn, sycamore (*Acer pseudoplatanus*), hazel and English elm are all frequent, while grey willow is occasional.

The understorey is typically relatively sparse in nature, consisting of enchanter's nightshade (*Circaea lutetiana*), creeping buttercup, bramble, bracken, germander speedwell, herb Robert, creeping bent, honeysuckle (*Lonicera periclymenum*), Yorkshire fog, creeping soft grass (*Holcus mollis*) and annual meadow grass.

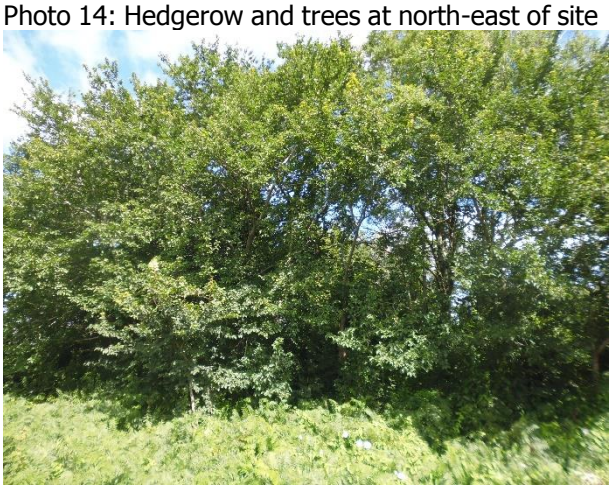
Photo 10: Defunct species-rich hedgerow with trees along western boundary of site

Photo 11: Typical form of trees within hedgerow

Photo 12: Hedgerow end at south-west of site

Photo 13: Gappy hedgerow at southern boundary

Photo 14: Hedgerow and trees at north-east of site



3.3.6. Building (J3.6)

Several container units are present within the site compound area in the northern half of the site. A silo is also present.

Photo 15: Container units in north-east of compound

Photo 16: Container units

3.3.7. Bare Ground (J4)

Several areas of bare ground are present within the survey area, including a vehicular track in the south-western corner and a large spoil pile in the north-east. Vegetation cover is limited in these areas, though creeping thistle, creeping cinquefoil, curled dock, field bindweed, ribwort plantain, hogweed and Yorkshire fog were recorded.

Photo 17 Bare ground vehicular track in south-west of site:

Photo 18: Bare ground spoil pile in north-east

3.3.8. Hard Standing

The majority of the site compound in the northern half of the site comprises hard standing. It is devoid of vegetation.

Photo 19: Hard standing within site compound

Photo 20: Hard standing

3.4. Protected and Notable Species

3.4.1. Notable Plant Species

Data Trawl Results

SEWBReC provided no records of protected plant species or species of principal importance listed under the Environment (Wales) Act 2016 from within 1km of the site proposed for development.

Field Survey Results

No plant species, which individually are considered to be of either of national, regional or local significance were recorded on the site.

3.4.2. Birds

Desk Study Results

SEWBReC provided numerous records for birds within 1km of the site. The following table shows nesting birds associated with the habitats present on-site and their conservation status:

Table 3: Records of Birds

Species		Schedule 1	Section 7 list	Red list[14]	Amber list[15]
Barn owl	*Tyto albo*	Yes			
Bar-tailed godwit	*Limosa lapponica*		Yes		Yes
Black-headed gull	*Chroicocephalus ridibundus*				Yes
Bullfinch	*Pyrrhula pyrrhula*		Yes		
House sparrow	*Passer domesticus*		Yes	Yes	
Kestrel	*Falco tinnunculus*		Yes		Yes
Lapwing	*Vanellus vanellus*		Yes	Yes	
Linnet	*Linaria cannabina*		Yes	Yes	
Red kite	*Milvus milvus*	Yes			
Reed Bunting	*Emberiza schoeniclus*		Yes		Yes
Skylark	*Alauda arvensis*		Yes	Yes	
Song thrush	*Turdus philomelos*		Yes	Yes	
Starling	*Sturnus vulgaris*		Yes	Yes	

Field Survey Results

A moderate number of birds were recorded on site, including: jackdaw (*Corvus monedula*), dunnock (*Prunella modularis*), wren (*Troglodytes troglodytes*), great tit (*Parus major*), magpie (*Pica pica*), blackbird

[14] Bird species of high conservation concern, such as those whose population or range is rapidly declining, recently or historically, and those of global conservation concern.

[15] Bird species of medium conservation concern, such as those whose population is in moderate decline, rare breeders, internationally important and localised species and those of unfavourable conservation status in Europe.

(*Turdus merula*), tree creeper (*Certhia familiaris*), nuthatch (*Sitta europaea*), carrion crow (*Corvus corone*), long tailed tit (*Aegithalos caudatus*), wood pigeon (*Columba palumbus*), goldfinch (*Carduelis carduelis*) and greenfinch (*Carduelis chloris*).

3.4.3. Bats

Desk Study Results

No bat roost records were received from within 1km of the site. SEWBReC did return a low number of records of bats foraging or commuting within 1km of the site. These included common pipistrelles (*Pipistrellus pipistrellus*), soprano pipistrelles (*Pipistrellus pygmaeus*) and noctules (*Nyctalus noctula*).

There were no records of bat surveys having been previously undertaken on within the same postcode on the Local Authority planning portal.

Field Survey Results

Trees

All of the trees within the survey area were assessed for their suitability to support roosting bats. The majority of scattered trees within the peripheral hedgerows were semi-mature in age, with a lack of PRFs. They were therefore assessed as having negligible bat roost potential and were scoped out of the assessment. They are therefore not mentioned further in this context in the report.

However, T1-3 on Plan 4 were assessed as having a greater level of potential. They have been described in detail in the table below:

Table 4: Trees Assessed for Bat Potential

No.	Description	Evidence of roosting bats	Potential Roost Features (PRF)	Potential for Roosting Bats
1	Semi-mature sessile oak. Single trunk. Approximate DBH 50cm, height 14m.	None.	Single knot facing north-east at 8m.	Low.
2	Mature sessile oak. Single trunk. Approximate DBH 80cm, height 18m.	None.	Broken branches facing north-west at 4m and 5m (both facing upwards – sub-optimal for bats). Knot facing east at 9m. Broken branch facing east at 5m. Tear-out facing east at 5m. Light ivy coverage with stems less than 50mm diameter[16], partially obscuring a thorough inspection.	High.

[16] For ivy to provide an environment suitable for occupation by roosting bats it has to have attained significant age. Typically, the stems should be a minimum of 50mm diameter (ideally some even larger) and have sections that have formed pockets into which bats slide or crawl up and under to rest against the bark of the mature tree (G Billington 2011, *pers comm.*, quoted in Andrews 2013).

No.	Description	Evidence of roosting bats	Potential Roost Features (PRF)	Potential for Roosting Bats
3	Semi-mature sessile oak. Single trunk. Approximate DBH 30cm, height 12m.	None.	Light ivy coverage with stems less than 50mm diameter, partially obscuring a thorough inspection.	Low.
DBH – Diameter at Breast Height DBH. This refers to the tree diameter measured at 4.5 feet above the ground.				

Photo 21: T1

Photo 22: T1, knot

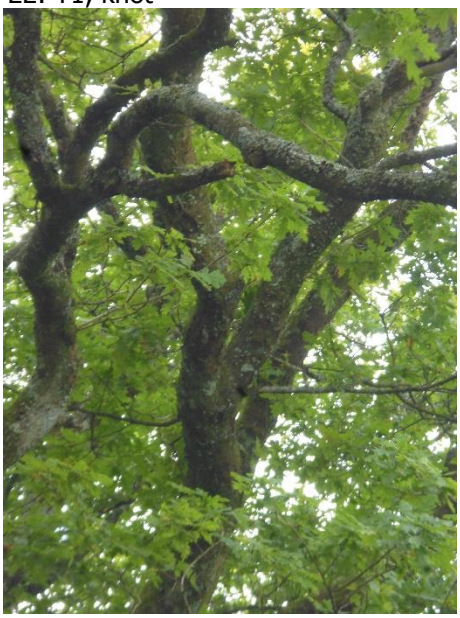


Photo 23: T2

Photo 24: T2, broken branch

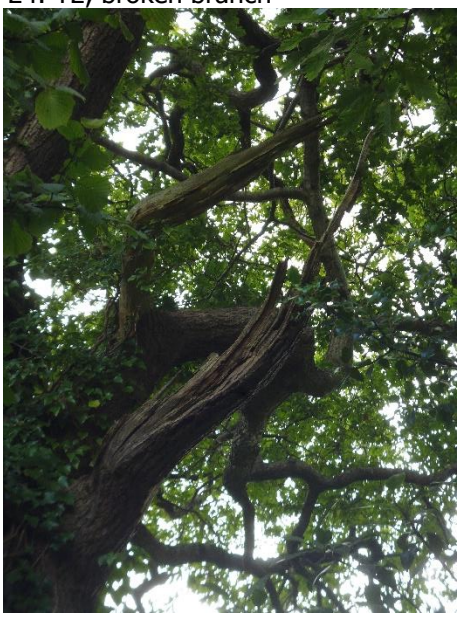


Photo 25: T2, tear-out

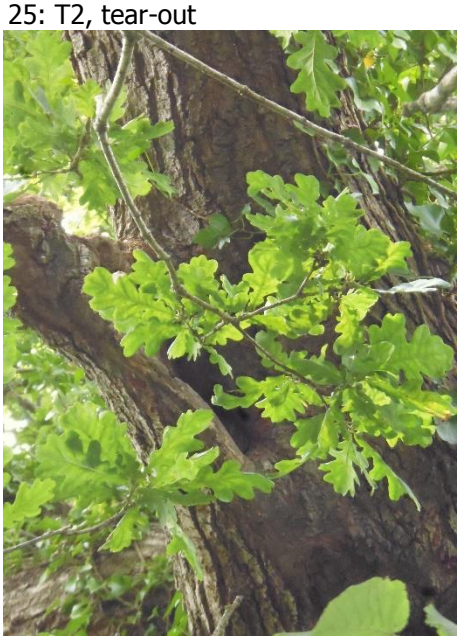


Photo 26: T3

Bat Habitat Suitability

The site is collectively considered to provide moderate quality foraging and commuting habitat for bats. The rank semi-improved grassland and mature hedgerows with trees around the perimeter provide high quality foraging and commuting features in their own regard. Furthermore, these features are ecologically connected to the wider landscape to the south. However, the value of the site is limited by the fact that the northern half comprises a construction site, with a reasonably high degree of artificial lighting at night, and hard standing habitats that offer very little value for bats.

3.4.4. Dormice

Desk Study Results

SEWBReC did not return any published records of dormice from within 1km of the site (SEWBReC data, 2020).

Field Survey Results

No signs or evidence of dormice was recorded on site (though the survey was undertaken outside of the optimal season for nut searches). The peripheral hedgerows contains seven food-plants known to form part of the dormouse diet (hazel, sessile oak, sycamore, grey willow, hawthorn, blackthorn and holly). Furthermore, hazel (arguably the most important foodplant) is frequent within the hedges. However, they are structurally generally unsuitable for use by dormice – being very gappy in places

The field and built areas are considered to be wholly unsuitable for use by dormice.

3.4.5. Great Crested Newt

Desk Study Results

SEWBReC did not return any records of great crested newt from within 1km of the site.

Field Survey Results

The terrestrial habitats across the southern half of the survey area are considered to be relatively suitable for use by great crested newts, comprising rank grassland, hedgerows and dense scrub. A log pile is present within the hedgerow understorey at the north-west of the site (Target Note 1, Plan 4). This could feasibly used as a hibernaculum or refugium.

3.4.6. Badgers

Desk Study Results

The data search returned two badger records within 1km of the site (SEWBReC data, 2020). The nearest record was made approximately 0.67km to the south-east in 2011.

Field Survey Results

No evidence of badgers was recorded on site.

The majority of the habitats within the survey area are considered suitable for use by badgers.

A mammal track is present at the south-west of the site (Target Note 2, Plan 4).

3.4.7. Reptiles

Desk Study Results

The data search returned eight records of reptiles within 1km of the site (SEWBReC data 2020). These included one record of common lizard (*Zootoca vivipara*), two records of grass snake, and five records of slow-worm (*Anguis fragilis*). The nearest record is of a slow-worm approximately 0.5km to the south-west, recorded in 2012.

Field Survey Results

No direct evidence of reptiles was recorded on site. However, the site is considered to provide moderate quality reptile habitat. Unlike some species, the precise floristic composition of habitats is often irrelevant to reptiles. Instead, the site's physical structure and thermal properties are more important (Edgar *et al.* 2011). The peripheries of the rank grassland and hedgerow understorey, together with the potential refugia and hibernacula (Target Note 1, Plan 4) offer good quality features. The value of the site is limited by the fact that the grassland sward is uniformly dense throughout, lacking a mosaic of shorter areas which are equally valuable for reptiles.

3.4.8. Marsh Fritillary and Small Pearl-Bordered Fritillary

Desk Study Results

SEWBReC did not return any records of fritillary from within 1km of the site.

Field Survey Results

No marsh fritillary butterflies were recorded during the survey and none of the key larval foodplants were recorded.

The rank semi-improved grassland is considered to be sub-optimal for supporting this species, as it is uniformly rank throughout and lacks the diversity of vegetation structure that is beneficial to marsh fritillaries. This species is not mentioned further in this report.

3.4.9. Other Mammals

Desk Study Results

SEWBReC returned 14 records of common hedgehog (*Erinaceus europaeus*), within 1km of the site. The nearest of which was recorded approximately 0.4km to the north-east in 2011.

Field Survey Results

No incidental sightings of other mammals were recorded on site. However, is likely that a range of common small mammals are present on the site, including hedgehogs, shrews (*Sorex sp.*), voles and mice (*Apodemus sp.*) etc., occurring either as resident species or whilst foraging and/or commuting. The tall ruderal and hedgerows habitats, and the woodland understorey is considered to provide highly optimal refugia for day-resting hedgehogs, and hibernacula during the winter months.

3.4.10. Invertebrates

Desk Study Results

The data search returned no records of notable invertebrate records from within the study area.

Field Survey Results

A range of butterflies were recorded on site: speckled wood (*Pararge aegeria*); meadow brown (*Maniola jurtina*); large white (*Pieris brassicae*); gatekeeper (*Pyronia tithonus*); small skipper (*Thymelicus sylvestris*); ringlet (*Aphantopus hyperantus);* and marbled white (*Melanargia galathea*).

4. Ecological Evaluation, Legislation and Impact Assessment

The ecological value of the *in-situ* habitats and the potential/actual presence of protected species are discussed in this section, along with a summary of relevant legislation and planning policies relating to habitats and species. Potential impacts on protected sites, *in-situ* habitats and protected or notable species arising from the proposed development, are identified including both direct and indirect impacts, and those associated with construction and operational stages.

4.1. Statutory Nature Conservation Designated Sites

Legislation and policy relating to protected sites is summarised in Appendix 2.

4.1.1. Bury Inlet and Loughor Estuary RAMSAR, SPA, SAC and SSSI

Assessment of Ecological Value

This site supports internationally important intertidal habitats and bird populations.

Assessment of Potential Development Impacts

Lying approximately 0.5km from the proposed development site, the potential for direct impacts to this designated site are extremely unlikely. The habitats within the survey area are not considered to be suitable for use by overwintering wildfowl associated with the estuary. The relatively small size of the semi-improved grassland and it's distance from the estuary mean that no adverse impacts are anticipated. The proposed development is therefore unlikely to result in 'significant effects' (IPC, 2011) to the Bury Inlet and Loughor Estuary RAMSAR, SPA, SAC and SSSI. An Appropriate Assessment[17] is not considered to be necessary.

4.2. Assessment of Ecological Value of On-site Section 7, LBAP and SINC Habitats

4.2.1. Hedgerows

Assessment of Ecological Value

The defunct species-rich hedgerows with trees at the periphery of the site qualify as 'Hedgerows', as defined in the Section 7 list, and 'Species-Rich Hedgerows' under the Swansea LBAP.

Assessment of Potential Development Impacts

The majority of the hedgerows will be retained, with the exception of a small section in the north-eastern corner of the site. Provided that adequate protective measures are implemented to ensure that no accidental damage to trees or their roots take place during construction, there is considered to be good scope to ensure the long-term viability of the hedgerows and trees, and indeed even a degree of enhancement, as detailed in Section 5.

[17] For more information, consult 'Assessing Projects Under the Habitats Directive' David Tyldesley (2011) for CCW

4.3. Assessment of Ecological Value of On-site Habitats Which Do Not Qualify as Section 7, LBAP and SINC Habitat

Assessment of Ecological Value

The dense scrub, semi-improved grassland and bracken habitats have been assessed as being of site ecological value. The hard standing, bare ground and container units are of negligible value.

Assessment of Potential Development Impacts

Under current development proposals, the majority of the rank semi-improved grassland will be permanently lost to the development. Though this loss is unlikely to have consequences outside of the footprint of the site, it would nonetheless be desirable to retain portions of this habitat if possible. The southern boundary of the site and the area surrounding the attenuation pond and pumping station would provide a suitable location (see Section 5). There is also a risk of adversely affected reptiles, hedgehogs and invertebrates if this habitat is cleared unsympathetically (see Section 4.5).

The dense scrub and bracken habitats will be largely cleared to accommodate the residential units, though peripheral areas of bracken will be retained as part of the wider hedgerow retention.

4.4. Assessment of Impacts of Invasive Species

Presence of Montbretia

Montbretia is present within the dense scrub at the eats of the site.

Legislation

Montbretia is listed under Schedule 9 to the Wildlife and Countryside Act 1981 in Wales. As such, it is an offence to plant or otherwise allow this species to grow in the wild.

Assessment of Potential Development Impacts

Clearance of the dense scrub runs the risk of inadvertently spreading montbretia within the site.

4.5. Protected and Notable Species

4.5.1. Birds

Assessment of Ecological Value of Site for Birds

The trees, hedgerows and dense scrub provide nesting and foraging opportunities for a range of tree and scrub nesting bird species. The rank grassland may be utilised by ground nesting species.

As a whole, the site is considered to be of local value to birds. It contains individual features that provide moderate foraging and nesting habitats for a range of species, but all these features are widespread and common in the surrounding landscape.

Legislation

All wild British birds (while nesting, building nests and sitting on eggs), their nests and eggs (with certain limited exceptions) are protected by law under Section 1 of the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000. Included in this protection are all nests (at whatever stage of construction or use) and all dependent young until the nest is abandoned and the young have fledged and become independent. Particularly rare species such as barn owl (*Tyto alba*) are listed on Schedule 1 which gives them additional protection from disturbance whilst nest building, whilst near a nest with eggs or young, or from disturbing the dependent young.

Impact Assessment of Proposed Development on Birds

Clearance of small portions of hedgerow, the dense scrub and to a lesser extent the rank grassland will result in the loss of potential nesting sites that could be utilised during the breeding season (Marsh to August inclusive), and the death, injury or disturbance to birds present at the time of work. Any other vegetation clearance may also result in adverse impacts to nesting birds. Though the vast majority of the peripheral hedgerows and trees will be retained, construction works could disturb nesting birds in these areas, which may cause them to abandon their nests.

These impacts can be avoided either by timing the works so that they fall outside of the nesting season, or by inspecting the vegetation immediately prior to clearance works (see Section 5). Compensatory measures should be implemented to ensure that no net losses to nesting sites occur as a result of the works, as set out in Section 5.

4.5.2. Bats

Assessment of Ecological Value of Site for Bats

Potential Tree Roosts

T2 has been assessed as having high bat roost potential, while T1 and T3 have low potential for such use.

Potential Foraging and Commuting Habitat

The site is collectively considered to provide moderate quality foraging and commuting habitat for bats. The rank semi-improved grassland and mature hedgerows with trees around the perimeter provide high quality foraging and commuting features in their own regard. Furthermore, these features are ecologically connected to the wider landscape to the south. However, the value of the site is limited by the fact that the northern half comprises a construction site, with a reasonably high degree of artificial lighting at night, and hard standing habitats that offer very little value for bats.

Legislation

All species of bats and their roosting sites are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species and Planning (various amendments) (England and

Wales) Regulations 2018. All species of UK bats are designated as 'European protected species'. Seven species of bat (soprano pipistrelle (*Pipistrellus pygmaeus*), barbastelle (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*), noctule (*Nyctalus noctula*), brown long-eared (*Plecotus auritus*), lesser horseshoe (*Rhinolophus hipposideros*) and greater horseshoe bats (*Rhinolophus ferrumequinum*)) are listed under Section 7 of the Environment (Wales) Act 2016 as being of principal importance for maintaining and enhancing biodiversity in Wales.

Impact Assessment of Proposed Development on Bats

T1, T2 and T3 are all proposed for retention. However, there is a risk that they may be indirectly affected by via root damage, or accidentally damaged during construction. Protective barriers will therefore be installed to ensure that no such inadvertent impacts occur. These will be established in line with the tree root protection zones detailed in the arboriculture report that has been produced for the site. If an adequate barrier cannot be established around T2, then this tree will require further targeted survey (see Section 5). Trees may potentially require felling or partial lopping if the existing access point required widening. If any clearance of T1 or T3 is required, the precautionary measures detailed in Section 5 will be adopted.

The proposed works will result in a relatively small area of moderate-quality foraging and roosting habitat being lost, and these losses will be permanent in nature. Furthermore, increase in artificial lighting levels will be significant. If this lighting envelops the retained hedgerows and trees of the site, it could adversely affect foraging and commuting bats. The further surveys and precautionary measures detailed in Section 5 will therefore need to be employed.

4.5.3. Dormice

Assessment of Ecological Value of Site for Dormice

Although the presence of dormice on site cannot be ruled out completely, it is considered unlikely. The hedgerows generally lack the continuous structure that dormice favour. In places the scrub canopy is completely absent, with the hedgerow instead being composed of relatively widely spaced scattered trees only. The absence of any historic records for this species within the study area further suggests their absence.

Legislation

Dormice are a 'European protected species' and afforded full protection under both UK and European legislation. Dormice are listed under section 7 of the Environment (Wales) Act 2016 as being of principal importance for maintaining and enhancing biodiversity in Wales. Since 2000, the UK population has declined by over a half (51%), decreasing on average by 3.8% year (PTES, 2019). It is included in the Swansea City and County Council Local Biodiversity Action Plan.

Impact Assessment of Proposed Development on Dormice

Considering that the majority of hedgerows will be retained with precautionary measures, anticipated risk to dormice is considered to be very low. No further survey is therefore recommended. Although their presence on site is considered to be unlikely, it cannot be ruled out completely. Therefore, the proposed clearance of a small section of hedgerow in the north-eastern corner will need to be undertaken under a strict precautionary method statement, as detailed in Section 5.

The section of hedgerow to be cleared lies at the terminal end of a network of hedgerows to the south. No impacts associated to fragmentation of habitat are therefore anticipated.

4.5.4. Great Crested Newt

Assessment of Ecological Value of Site for Great Crested Newt

The potentially suitable but inaccessible water body approximately 450m to the south of the proposed development site is ecologically connected by a network of hedgerows. However, as a general rule, suitable habitats within 250m of a breeding pond are likely to be used most frequently by great crested newts (English Nature 2001). When considered in addition to the lack of published records of this species within the study area, the likelihood of great crested newts migrating on to the proposed development site is considered unlikely, though it cannot be ruled out completely.

Legislation

Great Crested Newt is a 'European protected species' afforded full protection under both UK and European legislation. This protection extends to the habitats which support great crested newt and it is generally assumed that the species might be present in terrestrial habitats up to 0.5km[18] of a breeding pond, depending on habitat quality, connectivity and population size. The great crested newt is a priority species in Wales Under Section 7 of the Environment (Wales) Act 2016. It is also included in the Swansea City and County Council Biodiversity Action Plan.

Impact Assessment of Proposed Development on Great Crested Newt

The Great Crested Newt guidelines state that *'Small scale losses of terrestrial habitat, especially over 250m from the breeding pond, will probably have little effect on populations but some mitigation may be required'* (English Nature 2001). However, the clearance of moderate-sized areas of rank grassland (and a small section of hedgerow and dense scrub) is considered to be more extensive and potentially significant than 'small scale' loss. If present, site clearance works could result in the death, injury or disturbance of individuals, and the permanent loss of great crested newt terrestrial habitats. Further survey of the terrestrial habitats on site will therefore be undertaken to confirm the likely absence of this species, prior

[18] Great Crested Newts have been recorded travelling long distances: 1.3km within a 7-week period by an immature individual great crested newt (Kupfer 1998, detailed in Jehle et al 2011); 250m in a study by Beebee and Griffiths (2000) and 120-360m in a study by Arntzen and Tenuis (1993). In addition, a study by Duff (1989) found that over half of a population overwintered in an area more than 120m away from the main breeding pond. However, long-distance movement of great crested newt is rare and most studies indicate that much shorter distances are typical (Jehle et al 2011).

to any site clearance. If access can be arrange, a HSI assessment of the water body approximately 450m to the south of the proposed development site will also be undertaken.

4.5.5. Badgers

Assessment of Ecological Value of Site for Badgers

The survey area is suitable for use by badgers, and they may forage or commute across it. Indeed, records of this species exist in proximity to the proposed development site (SEWBReC, 2020). A mammal path in the south-west of the site could potentially have been created by badgers, though there is no conclusive evidence of this.

Legislation

Badgers are protected under the Protection of Badgers Act 1992. Protection applies both to the animal itself and to its nesting burrows (setts), and current interpretation of the Act also confers some protection to key foraging areas.

Impact Assessment of Proposed Development on Badgers

As no setts were recorded within the peripheral hedgerows or dense scrub of the site and only a relatively small area of scrub and hedgerow will be cleared, adverse impacts to badgers are considered unlikely. Furthermore, any works are anticipated to be undertaken during the daytime, further reducing the scope for impacting badgers. The precautionary measures detailed in Section 5 should nonetheless be adopted to further reduce the likelihood of impacts.

4.5.6. Reptiles

Assessment of Ecological Value of Site for Reptiles

The site is considered to provide moderate quality reptile habitat.

Legislation

With the exception of smooth snake (*Coronella austriaca*) and sand lizard (*Lacerta agilis*) (which are afforded greater protection), common reptiles are protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). They are given so-called 'partial protection', which prohibits the deliberate killing or injury of individuals. The habitats of common reptiles are not specifically protected. These species are listed as priority species in Wales under Section 7 of the Environment (Wales) Act 2016.

Impact Assessment of Proposed Development on Reptiles

The proposed works will result in the permanent loss of an area of moderate-quality reptile habitat within the site. Clearance of the vegetation may therefore result in the accidental killing or injury of reptiles. Recommendations for further work are outlined in Section 5.

4.5.7. Hedgehog

Assessment of Ecological Value of Site for Hedgehogs

Hedgehogs may forage and rest during the day within the hedgerow/dense scrub understoreys and log pile (target Note 1, Plan 4) could be used by hibernating individuals.

Legislation

Hedgehogs are afforded partial protection under the Wildlife and Countryside Act (1981) and are listed as priority species under Section 7 of the Environment (Wales) Act 2016. They are also listed in the Swansea City and County Council LBAP in light of dramatic population declines.

The legislation afforded to hedgehogs in the Environment Wales Act (2016) requires all public bodies including Local Authorities to have regard for biodiversity conservation[19] when carrying out their functions.

Impact Assessment of Proposed Development on Hedgehogs

Adverse impacts to hedgehogs are considered unlikely, as the rank grassland itself is unsuitable for supporting day-resting individuals. Any clearance of the woodland carries a greater level of risk. Woodland clearance may therefore result in the accidental killing or injury of hedgehogs. Precautionary measures to avoid such impacts are provided in Section 5.

4.5.8. Invertebrates

Assessment of Ecological Value of Site for Invertebrates

The rank semi-improved grassland supports a good diversity of common invertebrate species, though it is not exceptional in this regard.

Assessment of Development Impacts of Proposed Development on Invertebrates

The proposed works will result in the permanent loss of all of the rank semi-improved grassland on site. As well as permanently removing valuable invertebrate habitat, this will also risk killing or injuring any invertebrates (especially in larval form) present at the time of construction. It is therefore recommended that portions of this habitat are retained, as detailed in Section 5.

[19] Biodiversity conservation in respect to hedgehogs is interpreted as a commitment to restoring or enhancing their population.

5. Required Actions

The following recommendations have been developed based on the development proposals available at the time of writing. It should be noted that they may be subject to change upon receipt of the final design. The implementation of these recommendations will ensure compliance with the (Wales) Act 2016, Planning Policy Wales version 10 (Welsh Government, 2018[20], TAN 5 *Nature Conservation and Planning* (2009), Section 6 and 7 of the Environment Wales Act, 2016, The Conservation of Habitats and Species Regulations 2017and help to avoid or minimise adverse impacts on the environment and protected species, mitigate and compensate for losses where damage is unavoidable and promote opportunities to enhance biodiversity. The Environment (Wales) Act 2016, Planning Policy Wales version 10 (Welsh Government, 2018)[21] stipulate that developments must provide net benefit for Biodiversity.

5.1. Proposal Design Amendment

5.1.1. Retention of Semi-Improved Grassland

Under current development proposals, the majority of the rank semi-improved grassland will be permanently lost to the development. Though this loss is unlikely to have consequences outside of the footprint of the site, it would nonetheless be desirable to retain portions of this habitat if possible.

There is considered to be good scope to retain portions of this habitat along the southern boundary of the site, and the area surrounding the attenuation pond and pumping station in the south-western corner (see indicative area on Plan 6). The establishment of a wildlife protection zone will ensure that the retained area of habitat is not damaged during the construction phase of the development.

This retained area will be subject to sensitive management techniques that will ensure the long-term value of this area for botany, ground nesting birds, foraging bats and potentially reptiles.

The following points outline the work to be undertaken in the wildlife protection zones and mitigation measures designed to minimise negative impacts:

Protection During Construction

Site Induction/ Toolbox Talk

Clearance and construction personnel will be made aware of the ecological value of the retained area of grassland.

[20] Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions … and in so doing promote the resilience of ecosystems. Development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity.

[21] Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions … and in so doing promote the resilience of ecosystems. Development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a net benefit for biodiversity.

Protection of Retained Grassland

General construction operations in the vicinity of the retained areas of grassland could inadvertently damage the quality of this habitat, either directly through plant movement, or indirectly via pollution events. The following measures are therefore recommended to avoid such an occurrence:

Protective Fencing

The area of retained grassland will be protected from construction works, together with a 2m ecological buffer zone, which shall be established prior to the commencement of any site construction works in proximity to the area. The boundary will be clearly demarcated and marked out prior to the onset of works. It is recommended that high visibility plastic barrier fencing is used, as this will enable the wildlife protection zone to be readily visible, while still remaining a cost effective solution. The fencing will be supported by metal poles. All contractors will be made aware of the site boundary and of the importance of controlling works to ensure that the areas within it are not encroached upon. This will ensure that no physical disturbance to the retained grassland associated to construction works occurs. In doing so, it will ensure the preservation of the retained grassland topsoil and flora in this habitat.

The area of grassland in the location of the attenuation pond will inevitably be subject to temporary disturbance during construction.

Pollution Prevention

All working methods will conform to the requirements set out in the following PPGs:

- PPG 6 Working at construction and demolition sites; and
- PPG 21 Pollution incident response planning.

Specifically, care should be taken to avoid pollution and excess sedimentation within the site as a whole and the areas of marshy grassland in particular. Current Environment Agency best practice guidance should be observed. It is recommended that surface water/pollutant run-off will be avoided during construction phase and the measures recommended for achieving this outlined in the Environment Agencies guidance document Working at construction and demolition sites: PPG6 Pollution Prevention Guidelines are implemented, as stated above. These include the following measures:

Contingency Measures

Contingency measures for unforeseen incidents such as spillages should be set in place prior to commencement of construction works. Such procedures and measures will cover aquatic or land pollution and procedures in the event of fire. Contingencies to control and contain hydrocarbon spillages from e.g. parked vehicles once the area is developed should also be implemented.

Deliveries

Deliveries to site can be a common cause of pollution. Vehicles can cause water pollution as they enter and exit site, for example by spreading mud or contaminated material on neighbouring roads. Pollution can also be caused at the point of delivery, especially with fuels, oils and hazardous materials; for example, a fuel hose not correctly connected and leaking or when the area is unsuitable for storing that material. Measures to prevent pollution cause by deliveries include:

- Identify an area where all deliveries will be completed, and communicate the requirements to suppliers and those working on site. This is likely to be at the north-western corner of the site, at the existing site entrance;
- Ensure all deliveries are made as far away from the retained area of grassland as possible;
- Ensure any tanks, drums or containers coming to site are in a satisfactory condition – check for damage or leaks;
- Make sure that deliveries of polluting materials are delivered directly to a safe storage area, and not left anywhere else on site; a safe storage area may need secondary containment depending on the material to be stored e.g. oil and hazardous chemicals;
- Ensure that all material deliveries will be supervised, especially hazardous materials; and
- Prepare tool box talks to site workers on deliveries and preventing pollution.

Fuel Storage

- Ensure fuel storage areas are secured and protected from vandals;
- Locate fuel storage areas away from the retained grassland and any drains;
- Remove interconnecting hoses at night or protect hoses further by using a scaffold tube with kee clamp fittings; and
- Ensure that fuel storage is bunded in accordance with the British Standard.

Spill Response

If an accidental spill does occur on site. A quick response is needed to contain the spilled material (e.g. fuel, hazardous material etc.). Spill kits and a staff induction should be provided prior to the start of work so that a quick response by staff on site in ensured if a spill occurs.

Management prescriptions

Full details of management prescriptions and enhancement measures to ensure the long-term viability of this habitat are provided in Section 5.5.1.

5.2. Further Survey Work

Works should not commence until the survey below has been carried out. Results from this survey will inform and allow for targeted recommendations for the avoidance (timing of works), future mitigation and

compensation measures required as part of the development and determine if any protected species derogation licences are required.

5.2.1. Reptile and Terrestrial-Phase Great Crested Newt Survey + HSI Assessment of Water Body

Works should not commence until further surveys have been carried out to assess the potential impact to reptiles and (albeit very unlikely) terrestrial-phase great crested newts on site.

Surveys to determine the presence/ likely absence of reptiles and terrestrial-phase great crested newts should be carried out between mid-July to mid-October (inclusive). This timeframe will ensure that any breeding great crested newts will have left their breeding ponds and will be present within terrestrial habitats of the site. The survey will follow the advice provided by the Herpetofauna Workers' Manual (Gent and Gibson, 2003), and comprise a 'direct search' and the monitoring of artificial and naturally occurring refugia placed in areas of the site assessed as being most attractive to reptiles (e.g. longer grass, scrub margins etc.).

A variety of different types of refugia should be used. Refugia will comprise primarily squares of roofing felt, carpet tiles and/ or corrugated metal tins of varying sizes but mainly 60 x 60cm. Naturally occurring refugia including discarded logs, timber and large rocks etc. will also be checked. Where possible, artificial refugia should be laid in south-facing positions in areas deemed least likely to be tampered with. Refugia will be left undisturbed on site for two weeks, prior to commencement of the survey to allow the reptiles and/ or newts on the site sufficient time to find and start utilising them. The refugia will then be checked on at least seven separate occasions, non-consecutively, in suitable weather conditions (warm, overcast periods with low wind speeds) in order to record any reptile species beneath or basking upon them. As a guideline, it is recommended that the optimal time to survey reptiles is between 08:30 and 11:00 or 16:30 and 19:00, and when the air temperature is between 9ºC and 18ºC[22] (Froglife, 1999). Strong rain and wind are deemed unsuitable for surveying reptiles (Froglife, 1999). Ideally, the survey will be spread out across the survey season.

The survey results will determine whether reptiles or great crested newts are present on the site, and if so will provide the basis for designing and implementing a reptile mitigation strategy prior to the start of the development. Depending on the population present it may be possible for individuals to be encouraged to move offsite voluntarily via species deterrence measures and destructive searches.

If great crested newts are encountered, a suitable qualified ecological consultant or Natural Resources Wales must be consulted. If necessary, a derogation licence will be obtained before work can resume.

If access can be arranged, a Habitat Suitability Assessment of the potentially suitable water body approximately 450m south of the proposed development site should also be undertaken.

[22] Natural England's Reptile Mitigation Guidelines recommend that the temperature is between 10-20ºC.

The water body approximately 450m to the south of the proposed development site will be subject to a HSI assessment.

5.2.2. Bat Activity Surveys

The proposed works will result in the permanent loss of a relatively small area of moderate quality foraging and commuting habitat, as well as potential impact to foraging/ commuting bats around the periphery of the site due to increased artificial lighting. The development proposals are of a type listed within Box 1 of section 1.2.3.2 of the Bat Survey Guidance (Collins, 2016). Consequently, it is considered that bat activity surveys should be undertaken on the site.

Table 8.3 of the Bat Conservation Trust Bat Surveys for Professional Ecologists (see Appendix 8) states that moderate suitability habitat for bats should be subject to one activity transect survey each month (April - October) in appropriate weather conditions. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24 hour period.

However, considering the small size of the area to be affected, and the fact that a portion of the wider site already comprises an active construction site (as well as the on-site enhancement measures being proposed in the retained areas of the site), a reduced survey effort to reflect proportionality is set out below.

The survey area will be subject to one activity transect survey each season (Summer and Autumn) in appropriate weather conditions. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24 hour period. Depending on the results of the two activity surveys, a survey in the Spring season of the following calendar year may be required.

Each activity transect will be undertaken in addition to the deployment of two static detectors to complement each transect, recording for a period of five consecutive nights per transect visit (i.e. once per season). The two detectors will be positions in areas of varying habitat quality for bats across the site.

5.2.3. Bat Surveys of T2 (If tree Not Retained and Adequately Protected)

T2 is proposed for retention. However, there is a risk that it may be indirectly affected by via root damage, or accidentally damaged during construction. Protective barriers will therefore be installed to ensure that no such inadvertent impacts occur. If an adequate barrier cannot be established around T2, then this tree will require further targeted survey before works can commence.

Current best practice guidelines (Collins, 2016) state that trees with high bat roost potential should be subject to three dusk emergence or dawn re-entry surveys.

To ensure that all potential bat access features are covered, T2 will require two surveyors to be present during each survey (i.e. covering either side of the tree).

Surveys should be spread out to sample as much of the survey period as possible and spaced at least two weeks apart, preferably more (Collins, 2016). The surveys will be undertaken between 1st May and 31st

August. Ideally, at least one survey should be undertaken in the core maternity period mid-June to mid-July.

It should be reiterated that this survey will not be required if T2 can be retained with adequate protective measures.

5.3. Precautionary Measures

5.3.1. Vegetation Clearance Works

Timing of Clearance Works

No vegetation clearance will take place until the completion of the survey recommended in Section 5.1.

Full details of timing restrictions (specifically for nesting birds, reptiles, hedgehogs and potentially great crested newts) will be devised upon the completion of the further survey.

5.3.2. Protective Fencing

The retained hedgerows and trees could be accidentally affected by plant during the construction phase of works. They will require a degree of protection, to ensure that they are not accidentally damaged during construction. They will be securely fenced-off to prevent accidental damage, prior to the commencement of construction work and treated in accordance with British Standard BS5837 (2012) *Trees in Relation to Design, Demolition and Construction – Recommendations*. A protective fence (see Appendix 9) will be erected prior to the commencement of any site works e.g. before any materials or machinery are brought on site, development or the stripping of soil commences. The fence shall have signs attached to it stating that no works are permitted within the fence. The protected fence will only be removed following completion of all construction works.

5.3.3. Good Construction Practices for Badger

In line with good practice, any open trenches and excavations associated with the development will either be closed at night or a means of escape provided (e.g. plank at no greater angle than 45º) to help any badgers, hedgehogs or other trapped animals escape.

5.3.4. Soft Felling of Trees with Low Suitability for Bats

Any works to T1 or T3 must be undertaken in adherence to the method statement below. 'Soft felling', is a generic term used to describe more cautious felling approaches, using lowering and cushioning techniques to reduce the impact of felling limbs/ivy growth which may still have bats within cavities:

- Works to the tree will take place between October and February to coincide with the period of lowest bat activity and likelihood of bats being present. This timescale would also eliminate the risk of causing accidental harm to nesting birds;

- Tree surgeons undertaking felling works will be warned of the possible presence of roosting bats (and/or nesting birds), and of their protected status. It will be clearly understood that in the event of any bats (or occupied birds' nests) being found the contractor must halt works in the area surrounding the roost (i.e. at least 15m from the identified roost) and advice sought from Acer Ecology Ltd;
- Any hollow sections of any tree, or any limbs with cavities etc, will be severed above and below the cavity, taking care not to cut through any potential cavities or hollows, and lowered to the ground with minimal force using rope slings. This technique will be employed if the trees are subsequently found to have large cavities or split limbs;
- Any removed hollow sections which cannot be fully examined for bats will be removed to a shaded location and left undisturbed on the ground in a safe condition for 24 hours. This will allow any bats present to rouse themselves and fly off after nightfall. The sections will be positioned on the ground so that access to the cavities is unobstructed, but so that the cavities will not become filled with rain water; and
- The services of an appropriately qualified and licensed bat consultant will be available on an 'on-call' basis at all stages of the works to deal with any unexpected encounters with bats or nesting birds.

5.4. Mitigation Measures

Full details of mitigation measures for nesting birds, reptiles, hedgehogs and (potentially) great crested newts will be provided upon completion of the further survey set out in Section 5.1.

5.4.1. Sensitive Lighting Strategy for Bats

The specifics for new lighting provision within the development site is currently unknown. Nevertheless, certain areas of the site have significantly higher value for foraging and commuting bats. A sensitive lighting strategy is therefore recommended to ensure that these areas remain dark at night. Essentially, this lighting zone will encompass the periphery of the site (i.e. the retained hedgerows and trees).

It is likely that if planning consent is granted a condition will be applied requiring the submission of a lighting strategy which will include: a) lighting type, positioning and specification; b) measures to minimise light spill from glazed areas; and c) drawings setting out light spillage in key areas for bats based on technical specifications. Some general principles are set out below.

Full details of lighting specifications will be devised upon completion of the further surveys.

5.4.2. Vegetation Clearance Method Statement for Dormice

The section of hedgerow I the north-east of the site will be cleared in either May or September/ October. This will avoid torpid individual dormice or nest bound juvenile dormice (who cannot disperse naturally). Vegetation clearance works will be preceded by a hand search of the area by a licensed ecological

consultant. They will search features that could be utilised for nest sites. This approach will also be suitable for hedgehog and other animals.

If a dormouse is discovered in the works area, all works will immediately cease, and advice will be sought from the licensed ecologist or Natural Resources Wales. In such an occurrence, a development licence will likely be required from NRW.

Once this has been completed and a tool-box talk has been provided to all on-site workers, the area of vegetation to be cleared within the works area will be cut using hand tools. The works will commence at the end of the hedgerow, and will progressively work inwards the other end, thus giving any dormice that may be present the chance to escape the works area into adjacent habitat.

N.B. If clearance of works are undertaken in May then this will require a nesting bird check by a suitably qualified ecologist immediately prior to removal of such habitats. If any active nests are found these will be protected, along with an appropriate buffer zone of 5m, until the nesting is complete and the young have fledged[23].

5.5. Compensation and Enhancement Measures

The following measures will be incorporated into the design proposals to enhance the ecological value of the site.

5.5.1. Botanical Enhancement of Retained Grassland

The retained area of semi-improved grassland in the south and south-west of the site will be enhanced, either by the sowing of species-rich seed mixes to boost floristic diversity, or by the adoption of ecologically friendly management regimes, both of which are detailed below.

Seed Mix Selection

Soils across the site are classified as slowly permeable, seasonally wet acid loamy and clayey soils with impeded drainage (Soilscape 17). This soil type would therefore be suitable for supporting a loam and alluvial soils seed mix.

The LWM4 Loam and Alluvial soils species mix provided by Landlife Wildflowers is recommended. This mix contains mainly perennial species to create and enhance a permanent wildflower meadow which establishes in the first year and flowers from the second year onwards – therefore ensuring the long-term productivity of the retained habitat. LWM4 supports bees, butterflies and other pollinators, as 77% of the wildflowers included in this mixture are recommended by the Royal Horticultural Society (RHS) as 'Perfect for Pollinators'.

It contains 23 UK Native wildflower and grass species. Species include: Tufted vetch 0.8%, Black medick 1.2%, Meadow Buttercup 1.0%, White campion 0.8%, Wild Clary 1.0%, Cowslip 0.2%, Goat's-beard 1.4%,

[23] Some bird species, especially raptors and owls remain dependent upon the nesting site after fledging and so depending upon the species the nest site may need to be protected for a period of time after fledging.

Greater Knapweed 1.4%, Common Knapweed 1.0%, Lady's bedstraw 1.0%, Rough hawkbit 0.2%, Meadow Vetchling 0.6%, Oxeye daisy 0.6%, Field Scabious 0.2%, Hoary plantain 0.4%, Ribwort plantain 0.8%, Ragged robin 0.4%, Salad burnet 2.0%, Selfheal 1.2%, Common Sorrel 1.2%, Wild Carrot 0.8%, Yarrow 0.6%, Yellow-rattle 1.2%, Slender creeping red fescue 16.0%, Chewing's fescue 17.6%, Common bent 4.0%, Smooth-stalked meadow grass 5.6%, Rough-stalked meadow grass 4.0%, Smaller cat's tail 8.0%, Creeping bent 3.2%, Crested dog's tail 17.6%, Meadow Foxtail 4.0%.

Pre-Planting

Ground preparation and sowing will need to take place in April or October. The most successful way to establish wild flowers and grasses from seed is to sow into a clean seedbed that has been first cleared of all weeds and other vegetation and then cultivated to produce optimum conditions for germination. The precise measurements of areas allocated to grass and flower planting is yet to be finalised. However, the sowing rate is 5g/m^2. This should be used as a guide when purchasing the seed mixture.

Planting

To ensure the success of the seedlings, planting will be carried out manually and carefully. Planting is recommended to be undertaken during the autumn to allow seedling roots to establish over the winter and have a greater chance of competing with the existing sward in the spring and summer.

Future Management

Subsequent aftercare and site management will be required. The retained semi-improved grassland should ideally be mown in autumn, as this timing allows plants to flower and set seed which will not only increase the floristic diversity of the site, but will also benefit invertebrates that require nectar sources and roosting locations during the spring and summer. Ideally, the sward should be cut to a height of about 8 to 10cm. Different areas of grassland should be mown on rotation in every second year in late summer (September), by hand or with small-scale mowing machine (i.e only half of grassland area will be cut each year). The uncut areas will be cut the following year so that the grassland areas are cut at least once every two years. Arisings should then be collected and removed from site.

The use of herbicides, pesticides and artificial fertilisers on site should generally be avoided, although pernicious weeds may need to be spot-treated with herbicide.

5.5.2. Retained Hedgerow Enhancement

To enhance the retained hedgerows and help meet the requirements of national planning policy, the retained hedgerows will be planted with additional spiny or thorny species along the periphery of the site. The thorny planting will fill out existing gaps in the hedgerow and where possible will run parallel to the existing hedgerows to widen them.

The species composition of the newly planted areas will be as follows:

• Common hawthorn (*Crataegus monogyna*)	35%
• Blackthorn (*Prunus spinosa*)	30%
• Hazel (*Corylus avellana*)	20%
• Holly (*Ilex aquifolium*)	5%
• Field maple (*Acer campestre*)	5%
• Pedunculate oak (*Quercus robur*)	5%

It is expected that bramble, dog rose and honeysuckle will colonise the hedgerows over time from adjacent areas.

The compensatory planting will be undertaken as soon as possible in order to maximise the establishment time.

Whips will be fitted with spiral guards to prevent damage from rabbits. They will be planted with an approximate density of 1 plant per meter squared. They will be mulched using wood chips to at least 3cm deep to prevent competition from weed species. The mulch will be maintained (topped up if necessary) for at least the first three years to aid establishment.

The new planted sections will be managed as follows:

Year 1	All failed whips replaced	Whips cut back to 1/3 of height	Mulch inspected and topped up if necessary
Year 2	All failed whips replaced	Whips cut back to 1/2 of height	Mulch inspected and topped up if necessary
Year 3	All failed whips replaced	Whips cut along road sides only	Mulch inspected and topped up if necessary
Years 4 - 10	Hedgerow cut on side only - not on top.		
Year 11 Onwards	Hedgerow management strategy of wider site adopted – ideally cut on 2-3 year cycle.		

Newly planted hedgerows will not be cut until they are fully established and removed from the tree protection guards.

Any failed planting will be identified and replaced. Replacement planting will take place annually for the first 5 years from initial planting. Up to 5% failure rate will be tolerated, but if more than 5% failure occurs, replacement planting of the same species will be provided with an aim of attaining an 85% success rate after 5 years.

All newly planted trees should be maintained in accordance with the requirements of British Standard 4428 (1989) Code of Practice for General Landscape Operations (excluding Hard Surfaces) and British Standard 8545 (2014). Trees from nursery to independence in the landscape.

Newly planted trees should not be cut during the first five years of growth to ensure mature establishment.

Trunk distortion, damage and constriction can be caused by tree guards and stakes, leading to structural weakness developing in the trunks. Removal of tree protection will therefore be undertaken promptly once specimens have successfully established.

Timing of the removal of protection will vary according to tree growth rate and the original size of the specimens(s) concerned. This will range from three to seven years following planting or selection and once specimens are of a reasonable height (1 - 2 metres). This will be undertaken by the operator in accordance with BS 7370 Part 1 (1991): Grounds maintenance.

5.5.1. General Adoption of Wildlife-Friendly Planting Scheme

The soft landscaping scheme for the wider site will include habitat enhancements for birds, foraging bats, and hedgehogs, through the provision of shrubs or trees that bear berries or nuts. Native trees and shrubs that are indigenous to the region will be utilised, and any new plantings of native species should be of UK provenance. Any ornamental hedgerows will utilise wildlife-friendly species.

Suitable species for use in any new tree or shrub planting include wild cherry (*Prunus avium*), rowan (*Sorbus aucuparia*), guelder rose (*Viburnum opulus*) and sessile oak, holly, field maple and common hawthorn. Plant species that provide a rich source of nectar could be used. Suitable species include flowering herbs such as lavender (*Lavendula* spp) and violets (*Viola* spp), and shrubs such as flowering currant (*Ribes sanguineum*), privet (*Ligustrum vulgare*), forsythia (*Forsythia* spp), dogwood (*Cornus sanguinea*), berberis (*Berberis* spp*),* pyracantha (*Pyracantha* sp) and ceanothus (*Ceanothus* sp).

5.5.2. Nesting Bird Enhancement

Bird nesting opportunities within the site will be compensated for and enhanced by the incorporation of bird boxes on suitable retained features within the site, and on the fabric of the new built properties. This internal incorporation will ensure the long-term viability of these enhancement measures.

Six bird boxes will be erected upon retained trees or suitable building facades within the site. They will be located in secluded positions, ideally within dense cover and at a minimum height of 3m from ground level. They will face outwards from the site. Specialised boxes that cater for specific bird species will be used, including:

- Two open fronted nest boxes will be fitted to retained trees at the perimeter of the site (See Plan 6 and Appendix 10). Open fronted nest boxes cater for a range of bird species, including robin, dunnock, wren, pied wagtail, redstart and flycatcher. Due to the more exposed nature of these nest boxes, it is especially important to ensure that they are located in dense cover in order to

avoid the attention of potential predators. Suitable locations could be within ivy coverage on the external building walls, or within the areas of broadleaved woodland;

- Two standard nest boxes will be located within the site (See Plan 6 and Appendix 11). An entrance hole of 32mm will attract species such as great, blue and coal tits, along with nuthatch, flycatchers and sparrows. These nest boxes can be sited in a wide range of locations throughout the site; and
- Two house sparrow terraces will be installed on the exterior elevation of one of the residential properties (see Plan 6) at the perimeter of the site, facing outwards. The boxes should be positioned at least five metres above ground level and will be located away from windows. House sparrows are sociable birds and prefer to nest in colonies. Appendix 12 shows a typical house sparrow terrace nest box, which allows up to three pairs to breed in proximity to each other. In order to shield the box from direct sunlight, a timber shelf should be fitted directly above each box.

5.5.3. Roosting Bat Enhancement

In order to enhance the site for use by roosting bats, two bat bricks (see Appendix 13) will be installed upon the external elevations of the residential properties at the perimeter of the site. A variety of bat boxes/ bricks are available from nhbs[24]. They will face outwards onto the retained linear features to allow bats undisrupted dispersal to local foraging habitat, and in positions where the entrance is not artificially illuminated at night. Bat bricks should be positioned a minimum of 3m from the ground.

In addition, some provision of roosting opportunities for bats in retained areas of the site itself will also be incorporated into the site plans (see Plan 6) as a site enhancement measure:

Four Schwegler 2F bat boxes with a double front panel (or suitable alternative) (see Appendix 14) will be erected on a suitable, retained large tree[25] at the perimeter of the site. It is recommended that between two to three boxes are fitted to some suitable trees, facing different directions to ensure a variety of micro-climates for the roosting bats. The boxes should be positioned in sunny spots, between 3 to 6m above ground level. They will be retained on site after completion of the works in-perpetuity as a biodiversity enhancement.

5.6. Licensing

It has not been possible to determine whether a NRW European Protected Species development licence with respect to great crested newts will be required. This will be determined after the reptile and terrestrial-phase great crested newt survey detailed in Section 5.1.

[24] https://www.nhbs.com/browse/subject/421/bat-boxes

[25] The bat box should ideally be positioned to face either south-east, south or south-west and located as high as possible, ideally located in a sunny position which is as close as possible to the previous roosting location. A flight path clear from any obstructions should be maintained around the bat box once in situ. The bat box should be positioned away from horizontal branches directly below or above the bat box which could easily be accessed by cats. Ash trees should be avoided due to future problems with Chalara or ash dieback (*Hymenoscyphus fraxineus*).

5.7. Longevity of Report

If development works do not begin within two years of the date of this report, an update survey is likely to be required in accordance with guidance from Natural Resources Wales (NRW)[26] and BS 42020:2013[27], to determine if conditions have changed since those described in this report.

[26] As set out in Point 5 of the NRW *Bat Surveys - Frequently Asked Questions* and Point 4 of the guidance included within the NRW European Protected Species Development Application Form.

[27] As set out in Section 6.2.1, point 7 which states that ecological information should not normally be more than two/three years old, or as stipulated in good practice guidance).

6. References and Bibliography

Amphibian & Reptile Group (2010) *Great Crested Newt Habitat Suitability Index*. ARG UK Advice Note 5. ARG.

Andrews H (2013). *Bat Tree Habitat Key*. AEcol, Bridgwater

Biodiversity Reporting & Information Group (2007) *Report on the Habitats & Species Review: A Report to the UK Biodiversity Partnership*. Joint Nature Conservation Committee, Peterborough.

Bright, P, Morris, P A & Mitchell-Jones, T (2006) *The Dormouse Conservation Handbook*. Second Edition. English Nature. Peterborough.

British Standard Institute (2015) BS 8596:2015 *Surveying for Bats in Trees and Woodland*.

Chartered Institute of Ecology & Environmental Management (2017) *Guidelines for Preliminary Ecological Appraisal.* 2nd edition. CIEEM, Winchester. https://bit.ly/2k0mhOH.

Chartered Institute of Ecology & Environmental Management (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* CIEEM https://bit.ly/2OjRny9

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

Countryside Council for Wales (2005) *Habitats of Wales. Phase I Data 1979-1997. Lowlands and Uplands*. CD ROM, Bangor.

Edgar, P, Foster, J & Baker, J (2011) *Reptile Habitat Management Handbook*. Amphibian Reptile Conservation and Natural England. Peterborough.

English Nature (2001) *Great Crested Newt Mitigation Guidelines*, Peterborough.

Gent, T. & Gibson, S. (2003) *Herpetofauna Workers Manual.* Joint Nature Conservation Committee, Peterborough.

Harris, S, Cresswell, P & Jefferies, D J (1988) *Surveying Badgers*. Mammal Society Occasional Publication 9.

Infrastructure Planning Commission (2011) *Advice Note Ten: Habitat Regulations Assessment Relevant to Nationally Significant Infrastructure Projects*.

Jehle, R, Thiesmeier B, Foster, J (2011) *The Crested Newt: A Dwindling Pond Dweller.* Kock, Bielefeld, Germany.

Joint Nature Conservation Committee (2010) *Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit*.

Langton, T E S, Beckett, C L & Foster, J P (2001) *Great Crested Newt Conservation Handbook.* Froglife, Halesworth.

Morris P (2004) *Dormice*. Whittet Books.

Natural England (2011) *Reptile Mitigation Guidelines: Natural England Technical Information Note TIN 102*. Peterborough.

Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155

People's Trust for Endangered Species (2019) *The State of Britain's Dormice 2019.*

South Wales Wildlife Sites Partnership (2004) *Guidelines for the Selection of Wildlife Sites in South Wales*. Gwent Wildlife Trust. http://bit.ly/2gx1SBo

Wales Biodiversity Partnership (WBP 2008) *Wildlife Sites Guidance Wales: A Guide to Develop Local Wildlife Systems in Wales*. Wales Biodiversity Partnership/Welsh Assembly Government. https://www.biodiversitywales.org.uk/File/36/en-GB.

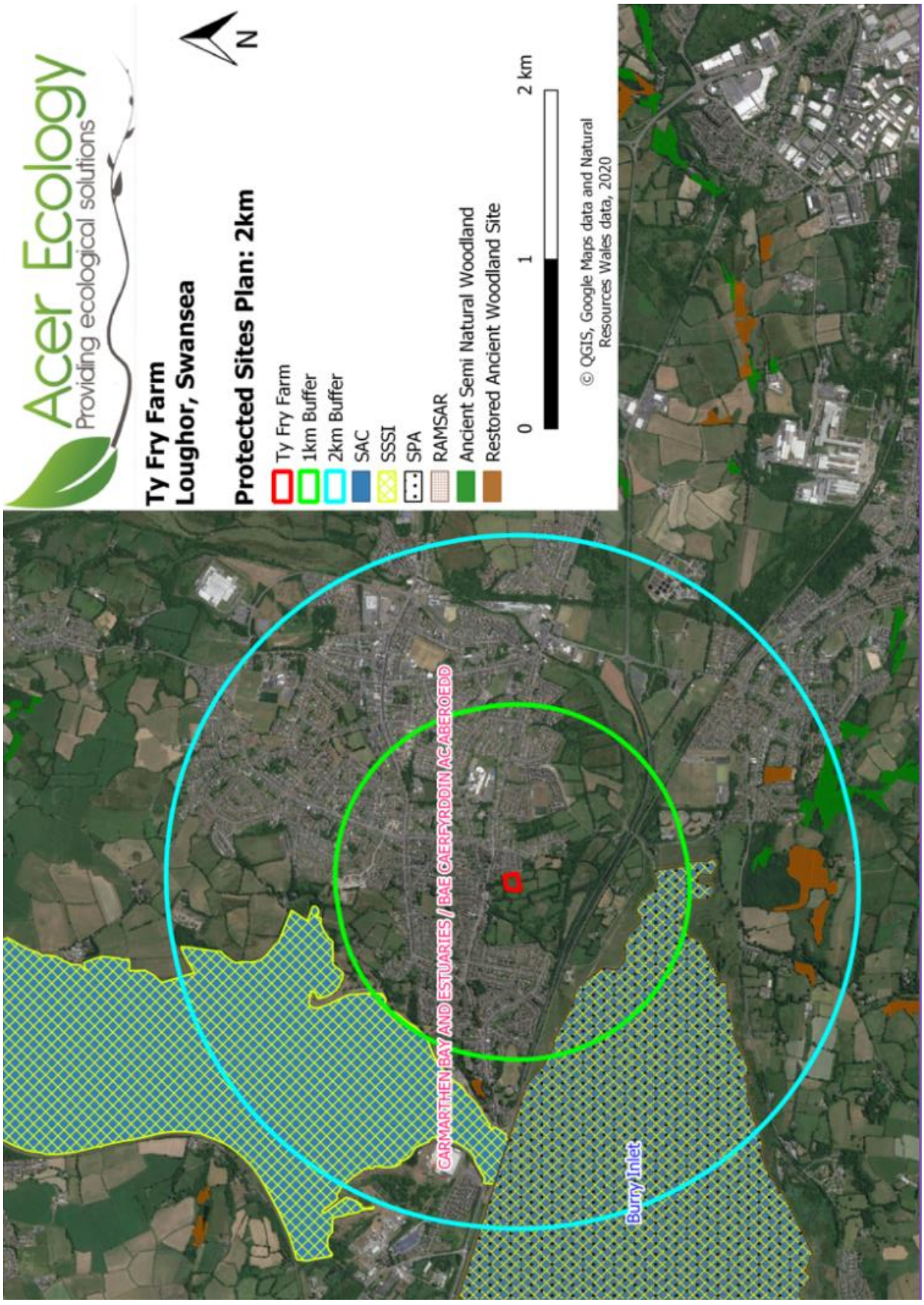
Wales Biodiversity Partnership (2016) *Environment Wales Act 2016. Section 7 Habitats List.* Wales Biodiversity Partnership/Welsh Assembly Government. http://bit.ly/2hFuEvO

Wales Biodiversity Partnership (2016) *Environment Wales Act 2016. Section 7: Interim List of Living Organisms & Habitats of Principal Importance for the Purpose of Maintaining and Enhancing Biodiversity in Wales.* Wales Biodiversity Partnership/Welsh Government. http://bit.ly/2hm4CRJ.

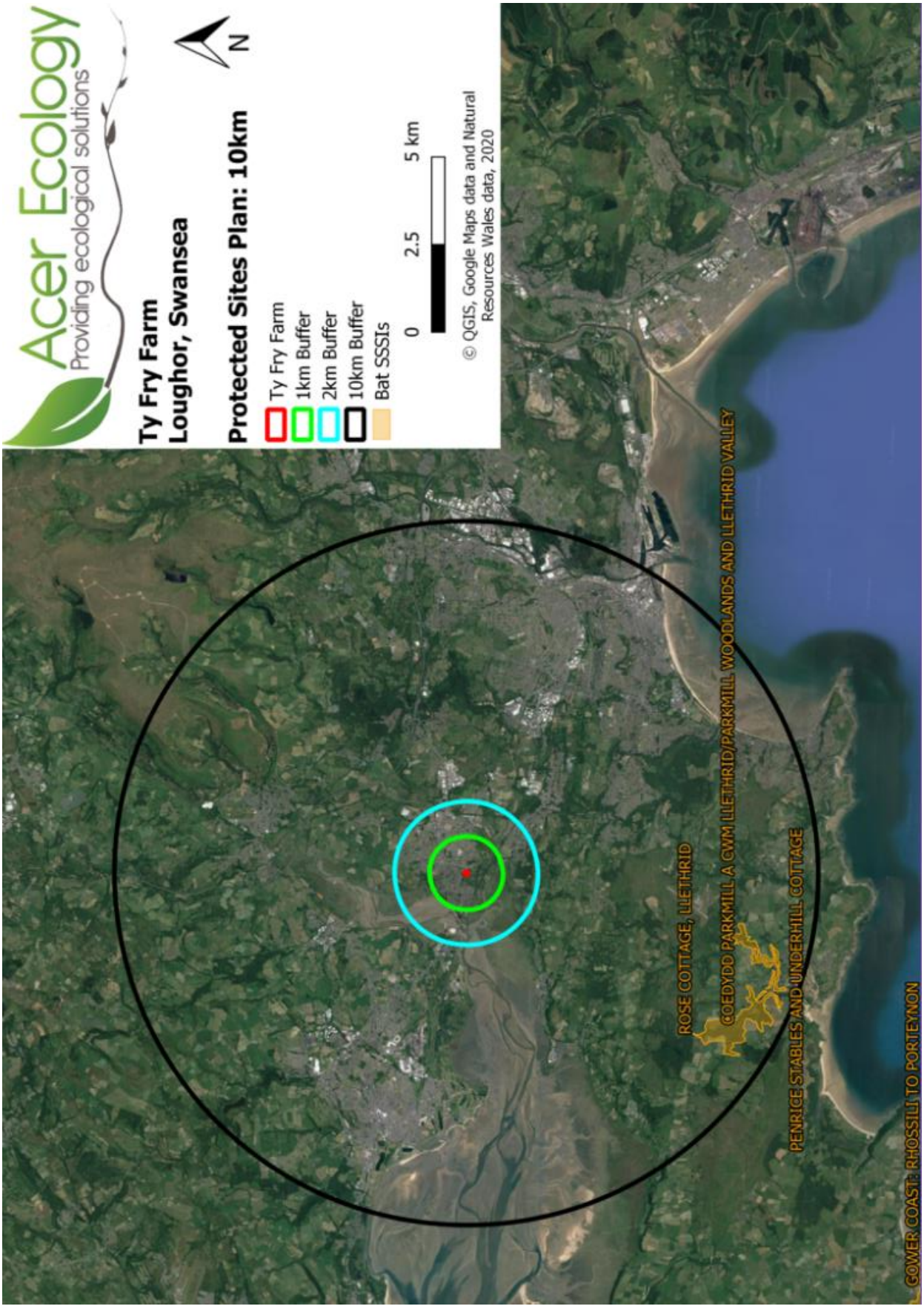
Welsh Government. (2018). *Planning Policy Wales*. 10th Edition. https://bit.ly/35h3ENh

Plan 1: Site Location

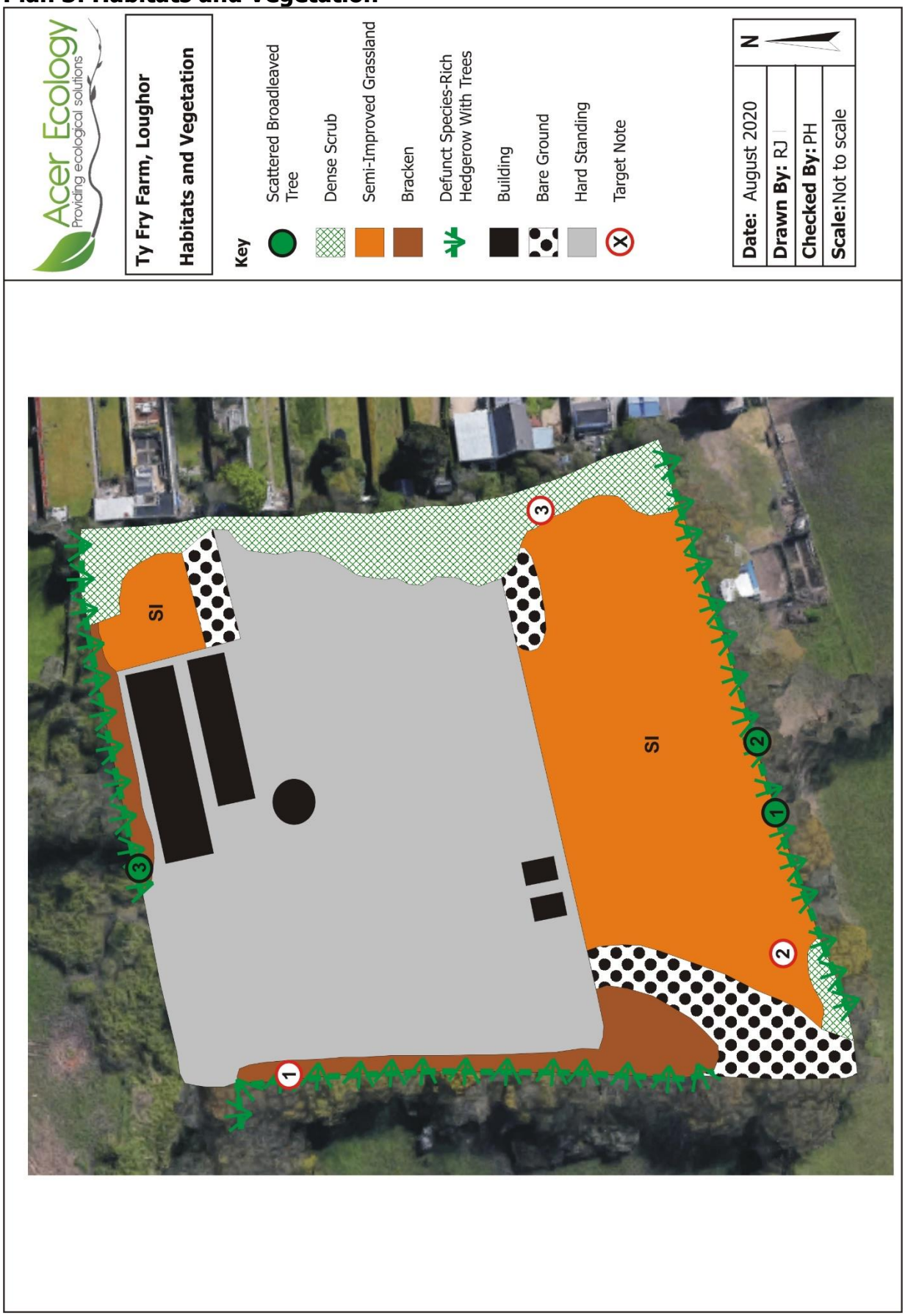
Plan 2: Site Location and Protected Sites (2km Buffer)



Plan 3: Site Location and Protected Sites (10km Buffer)



Plan 3: Habitats and Vegetation



Plan 5: Location of Water Bodies within 500m of Site

Plan 6: Mitigation Plan

Appendix 1: Proposed Development Works

PHASE 2, TY FRY FARM, LOUGHOR - **SITE LAYOUT** Pegasus

Appendix 2: Legislation and Policy Relating to Statutory and Non-Statutory Designated Sites

SACs

SACs are strictly protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds). Of the Annex I habitat types, 78 are believed to occur in the UK. Of the Annex II species, 43 are native to, and normally resident in, the UK.

Development proposals within 10km of an SAC must be subject to Habitats Regulations Assessment's (HRA). If the LPA determine that a significant effect is likely, then it will be necessary to undertake an Appropriate Assessment[28].

SSSIs

SSSIs are important as they support plants and animals that find it difficult to survive elsewhere in the countryside, and they represent the country's best wildlife and geological sites. SSSIs are legally protected under the Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006, and are of national (second tier) biodiversity significance and form the essential building blocks of the United Kingdom's protected areas for nature conservation. Many are also designated as Natura sites i.e. internationally (first tier) designated sites. It is an offence for any person to intentionally or recklessly damage the protected natural features of a SSSI.

LNRs

Under the National Parks and Access to the Countryside Act 1949, LNRs may be declared by local authorities after consultation with the relevant statutory nature conservation agency. LNRs are declared and managed for nature conservation, and provide opportunities for research and education, or simply enjoying and having contact with nature.

National Parks

National Parks are designated for their aesthetic and recreational value as opposed to wildlife value, however, they often contain habitats of high ecological value also.

ASNW and Woodland

The UK is a sparsely wooded country: 11.5% of Great Britain is covered with trees. Only 1.2% of the UK is ancient semi-natural woodland, a valuable and irreplaceable natural resource. Ancient semi-natural woodland, and plantations on ancient woodland sites, are a priority for conservation (JNCC).

[28] For more information, consult 'Assessing Projects Under the Habitats Directive' David Tyldesley (2011) for CCW

The Welsh Assembly has recognised that areas of ancient woodland are declining and becoming increasingly fragmented and emphasises the importance of conserving ancient woodland and its value as a biodiversity resource through the publication of Planning Policy Wales (2016). Furthermore, the UK Biodiversity Action Plan (UKBAP) includes objectives to conserve, and, where practicable, enhance: the quality and range of wildlife habitats and ecosystems; the overall populations and natural ranges of native species; internationally important and threatened species, habitats and ecosystems; species, habitats and natural and managed ecosystems characteristic of local areas; and biodiversity of natural and semi-natural habitats where this has been diminished over recent decades.

Paragraph 5.2.9: "Trees, woodlands and hedgerows are of great importance, both as wildlife habitats and in terms of their contribution to landscape character and beauty. They also play a role in tackling climate change by trapping carbon and can provide a sustainable energy source. Local planning authorities should seek to protect trees, groups of trees and areas of woodland where they have natural heritage value or contribute to the character or amenity of a particular locality. Ancient and semi-natural woodlands are irreplaceable habitats of high biodiversity value which should be protected from development that would result in significant damage."

Paragraph 5.2.10: "Local planning authorities should, as appropriate, make full use of their powers to protect and plant trees to maintain and improve the appearance of the countryside and built up areas."

Environment (Wales) Act 2016

The Environment (Wales) Act 2016 dictates that Local authorities have a duty to have regard to the conservation of biodiversity in exercising their functions. The duty affects all public authorities and aims to raise the profile and visibility of biodiversity, to clarify existing commitments relating to biodiversity, and to make it a natural and integral part of policy and decision making. According to the act, a public authority must take account of the resilience of ecosystems, in particular the following aspects:

a) diversity between and within ecosystems;
b) the connections between and within ecosystems;
c) the scale of ecosystems;
d) the condition of ecosystems (including their structure and functioning); and
e) the adaptability of ecosystems.

Part 1 Section 7 of the Act provides a list of the living organisms of principal importance for maintaining and enhancing biodiversity in Wales.

National Planning Policy Wales (2018)

The primary objective of PPW is to ensure the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation

Appendix 3: Species Recorded

All species recorded by Acer Ecology, 2020

Taxonomic Name	Common Name	W	LM	CG	LDA	PMG	PIL	TF	Status
Trees and Shrubs									
Acer pseudoplatanus	Sycamore								Alien
Corylus avellana	Hazel								
Crataegus monogyna	Common hawthorn								
Fraxinus excelsior	Ash								
Ilex aquifolium	Holly								
Lonicera periclymenum	Honeysuckle								
Prunus sp	Cherry sp								
Prunus spinosa	Blackthorn								
Quercus petraea	Sessile oak	W							
Rubus fruticosus agg.	Bramble								
Salix cinerea	Grey willow								
Ulmus procera	English elm								
Herbaceous Plants									
Agrostis capillaris	Common bent								
Agrostis stolonifera	Creeping bent								
Arrhenatherum elatius	False oat-grass								
Bellis perennis	Daisy								
Calystegia sepium ssp roseata	Hedge bindweed								Monmouthsh sap
Centaurea nigra	Common knapweed		LM	CG					Rct sap
Cerastium fontanum	Common mouse-ear								
Circaea lutetiana	Enchanter's-nightshade								
Cirsium arvense	Creeping thistle								
Cirsium vulgare	Spear thistle								
Convolvulus arvensis	Field bindweed								
Crocosmia sp	Montbretia								Alien
Cynosurus cristatus	Crested dog's-tail								
Dactylis glomerata	Cock's-foot								
Digitalis purpurea	Foxglove								
Dryopteris dilatata	Broad buckler-fern								
Epilobium hirsutum	Great willowherb								
Epilobium montanum	Broad-leaved willowherb								
Eupatorium cannabinum	Hemp agrimony					PMR			
Festuca rubra	Red fescue								
Filipendula ulmaria	Meadowsweet					PMR			
Galium aparine	Cleavers								
Geranium robertianum	Herb-Robert								

Heracleum sphondylium	Hogweed								
Holcus lanatus	Yorkshire fog								
Holcus mollis	Creeping soft-grass								
Hypericum perforatum	Perforate st john's-wort		LM	CG					
Juncus inflexus	Hard rush								
Lathyrus pratensis	Meadow vetchling		LM						
Leucanthemum vulgare	Ox-eye daisy		LM						
Lotus corniculatus	Common bird's-foot-trefoil		LM	CG			PIL		
Persicaria maculosa	Redshank								
Plantago lanceolata	Ribwort plantain								
Poa annua	Annual meadow-grass								
Poa trivialis	Rough meadow-grass								
Potentilla anserina	Silverweed								
Potentilla reptans	Creeping cinquefoil								
Prunella vulgaris	Self-heal								
Pteridium aquilinum	Bracken								
Pulicaria dysenterica	Common fleabane					PMR			
Ranunculus acris	Meadow buttercup								
Ranunculus repens	Creeping buttercup								
Rumex acetosa	Common sorrel						PIL		
Rumex crispus	Curled dock								
Senecio jacobaea	Common ragwort								
Silene dioica	Red campion								
Stachys sylvatica	Hedge woundwort								
Trifolium pratense	Red clover		LM						
Urtica dioica	Common nettle								
Veronica chamaedrys	Germander speedwell								
Vicia sativa	Common vetch								

'Habitat Indicator Species' Totals (Wales Biodiversity Partnership 2008[29])		1	6	3	0	3	2	0	
		W	**LM**	**CG**	**LDA**	**PMR**	**PIL**	**TF**	

'Primary' and 'Contributory' Totals (Wales Biodiversity Partnership 2008)		0	0
		Primary Species	**Contributory Species**

[29] Wales Biodiversity Partnership (2008) Wildlife Sites Guidance Wales: A Guide to Develop Local Wildlife Systems in Wales. Wales Biodiversity Partnership/Welsh Assembly Government.

Key to Indicator Species (Wales Biodiversity Partnership 2008[30])

W - Woodland, LM – Lowland meadow, CG - Calcareous Grassland, LDA – Lowland Dry Acid Grassland, PMR Purple moor-grass and rush pasture, PIL – Post Industrial Land, TF Species-rich Tillage Fields and Margins – PS – Primary Species, CS – Contributory Species

SINC Selection

Sites which support one primary species or five contributory species; or habitats which support eight lowland meadow, eight calcareous grassland, seven lowland dry acid grassland, twelve purple moor-grass and rush pasture or eight tillage field and margins indicator species, should be considered for SINC selection. Post-industrial sites supporting 20 or more indicator species from the combined post-industrial land, acid, neutral, calcareous and marshy grassland lists should be also considered for selection.

Appendix 2: Definitions of Site Value

International Value

Internationally designated or proposed sites such as Ramsar Sites, Special Protection Areas, Biosphere Reserves and Special Areas of Conservation, or non-designated sites meeting criteria for international designation. Sites supporting populations of internationally important species or habitats.

National Value

Nationally designated sites such as Sites of Special Scientific Interest (SSSIs), or non-designated sites meeting SSSI selection criteria (NCC 1989), National Nature Reserves (NNRs) or Nature Conservancy Review (NCR) Grade 1 sites, viable areas of key habitats within the UK Biodiversity Action Plan. Sites supporting viable breeding populations of Red Data Book (RDB) species (excluding scarce species), or supplying critical elements of their habitat requirements.

Regional Value

Sites containing viable areas of threatened habitats listed in a regional Biodiversity Action Plan, comfortably exceeding Site of Importance for Nature Conservation (SINC) criteria, but not meeting SSSI selection criteria. Sites supporting regionally significant areas of BAP habitats or large and viable populations Nationally Scarce species, or those included in the Regional Biodiversity Action Plan on account of their rarity, or supplying critical elements of their habitat requirements.

County Value/District Value

Site identified as a Site of Importance to Nature Conservation (SINC) at the district level; meeting South Wales Wildlife Sites Partnership (SWWSP) 2004 published designation criteria, but falling short of SSSI designation criteria, whether designated as a SINC or not. Ancient woodlands and sites supporting regionally significant areas of UK BAP habitat. Large scale examples of BAP habitats or areas supporting small populations of protected, UK BAP/ LBAP or threatened species (other than badger).

High Local

Habitats which just fail to meet Regional value criteria, but which appreciably enrich the ecological resource of the locality. Sites supporting species which are notable or uncommon in the county; or species which are uncommon, local or habitat-restricted nationally, and which might not otherwise be present in the area. Moderate scale examples of BAP habitats or areas supporting small populations of protected, UK BAP/LBAP or threatened species.

Local Value

Old hedges, woodlands, ponds, significant areas of species-rich grassland, small scale examples of BAP habitats or areas supporting small populations of protected, UK BAP/LBAP or threatened species. Undesignated sites or features which appreciably enrich the habitat resource in the context of their immediate surroundings, parish or neighbourhood (e.g. a species-rich hedgerow). Rare or uncommon species may occur but are not restricted to the site or critically dependent upon it for their survival in the area.

Site Value (within the immediate zone of influence)

Low-grade and widespread habitats. Woodland plantations, structured planting, small areas of species-rich grassland and other species-rich habitats not included in the UK or Local BAP.

Negligible

No apparent nature conservation value.

Appendix 3: Guidelines for Assessing Potential Suitability of a Proposed Development Site for Bats

Suitability	Commuting and Foraging Habitat
Negligible	Negligible habitat features on-site likely to be used by commuting and foraging bats.
Low	Commuting Habitat Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Foraging Habitat Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	Commuting Habitat Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Foraging Habitat Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Commuting Habitat Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. Foraging Habitat High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Proximity to Known Bat Roosts Site is close to and connected to known roosts.

Appendix 6: Bat Survey Protocol for Trees Affected by Arboricultural Work

The trees were assigned to the following categories:

Suitability	Commuting and Foraging Habitat
Negligible	Negligible habitat features on site likely to be used by commuting and foraging bats.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

Appendix 7: Minimum Number of Flight Surveys Required [31](Collins 2016) T2

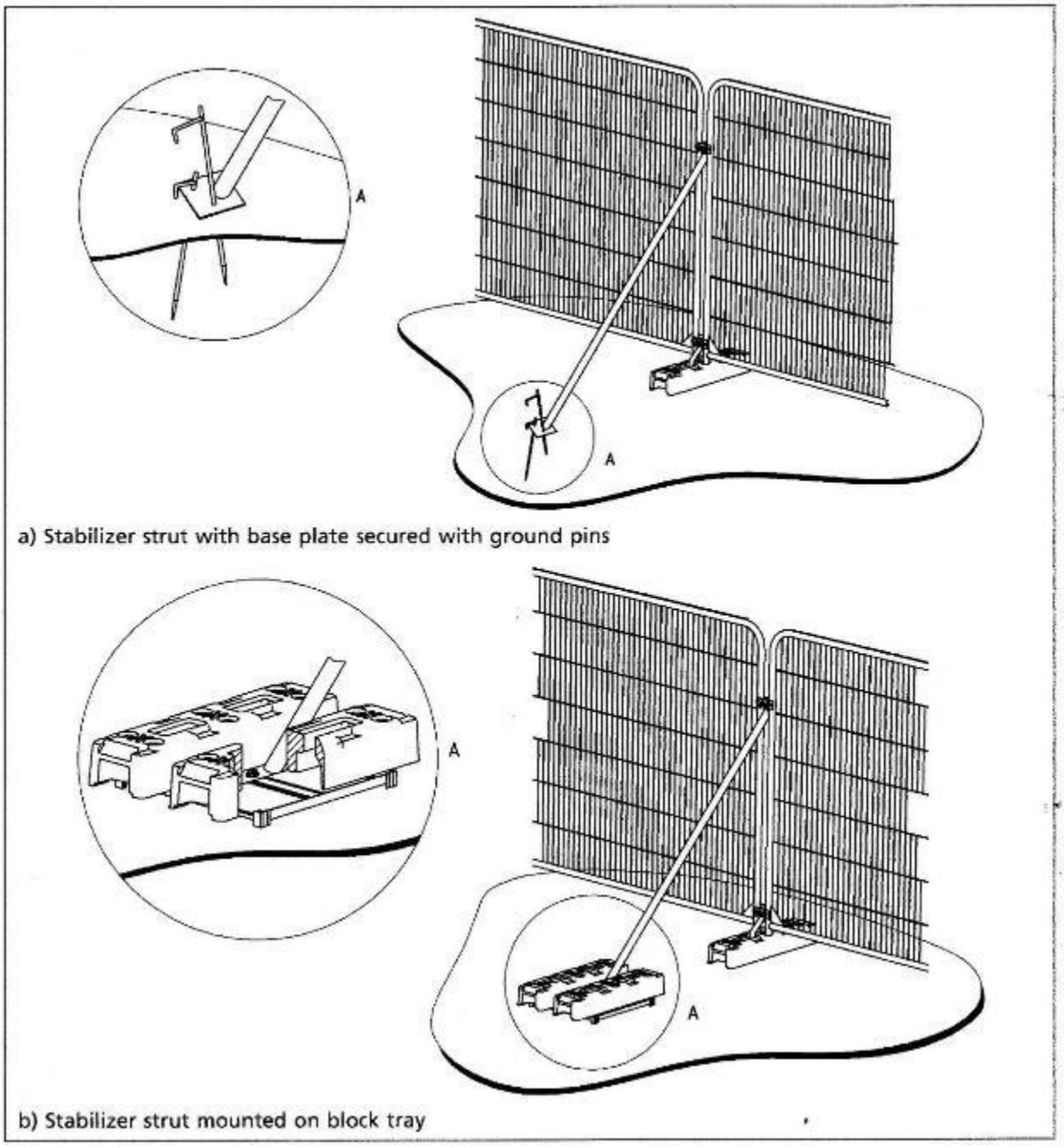
High Roost Suitability	Moderate Roost Suitability	Low Roost Suitability
Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn. Surveys should be undertaken from May to September with at least two of the surveys from May to August.	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey[32]. Surveys should be undertaken from May to September with at least one of the survey between May and August.	One survey visit. One dusk emergence or dawn re-entry survey (Survey period is from May to August).

[31] Multiple survey should be spread out to sample as much of the survey period as possible; It is recommended that surveys are spaced at least two weeks apart, preferably more. A dawn survey immediately after a dusk survey is considered only one visit.

Appendix 8: Recommended Number of Bat Activity Surveys to Achieve a Reasonable Survey Effort in Relation to Habitat Suitability (Collins 2016)

Survey Type	Negligible Suitability Habitat for Bats	Low Suitability Habitat for Bats	Moderate Suitability Habitat for Bats	High Suitability Habitat for Bats
Transect/ Spot County/ Timed Search Surveys	No survey required.	One survey visit per season (Spring – April/ May, Summer – June/ July/ August – Autumn – September/ October) inappropriate weather conditions for bats. Further surveys may be required if these survey visits reveal higher levels of bat activity than predicted by habitat alone.	One survey visit per month (April to October) in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.	Up to two survey visits per month (April to October) in appropriate weather conditions for bats. At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.
AND				
Automated/ Static Bat Detector Surveys	None required.	One location per transect, data to be collected on five consecutive nights per season (Spring – April/ May, Summer – June/ July/ August – Autumn – September/ October) in appropriate weather conditions for bats.	Two locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.	Three locations per transect, data to be collected on five consecutive nights per month (April to October) in appropriate weather conditions for bats.

Appendix 9: Protective Barriers - BS 5837:2012



Appendix 10: Open-Fronted Nest Box

Schwegler 2H Half Box

These should never be hung on trees or bushes as this could allow small predators to access the interior and predate nesting birds.

This nest box should always be installed on the external walls of houses, barns, garden sheds etc. It is designed to be hung so that the entrance is to one side (90° angle to wall).

Correctly positioned it can attract species such as Black Redstart, Pied Wagtail, Grey Spotted Flycatcher, and occasionally Robin and Wren.

The front panel is easily removed to facilitate cleaning.

Appendix 11: Standard Hole Nest Box

Nest Box 1B
Material: SCHWEGLER wood-concrete


Great Tit

The internal diameter of this nest box is 12 cm. It is usually attached to a tree using the Aluminium Nail (see Fig. 1). It can also be hung from a branch (see Fig. 2).

The front panels, which can be bought separately, are interchangeable between model 1B, 2M and 2F, and can easily be removed from the nest box. Different entrance hole sizes are available to prevent birds from competing with one another for the boxes.

Available entrance hole sizes:

Ø 32 mm, Ø 26 mm and Oval 29 x 55 mm

Suitable for the following species:

- **Entrance hole 32 mm:** Great-, Blue-, Marsh-, Coal- and Crested Tit, Redstart, Nuthatch, Collared and Pied Flycatcher, Wryneck, Tree and House Sparrows, bats.
- **Entrance hole 26 mm:** Blue-, Marsh-, Coal- and Crested Tit, possibly Wren. All other species are prevented from using the nest box due to this smaller entrance hole.
- **Oval entrance hole: (29 x 55):** Redstart; also used by species that nest in the Ø 32 mm boxes. However, because more light enters the brood chamber, it is preferred by Redstarts.


Clutch of Great Tit eggs


From a branch (Fig. 2)


On the trunk, using Aluminium Nail (Fig.1)

The Schwegler 1B general small bird box will be preferably mounted on a stable tree trunk, rather than on branches which will sway. The mounting location will not be heavily shaded. Boxes should be mounted vertically on the tree.

Boxes will be mounted a minimum of 2m, and preferably 3m, above the ground, and as far as possible placed on the SE- or SW-facing surfaces of the tree trunks.

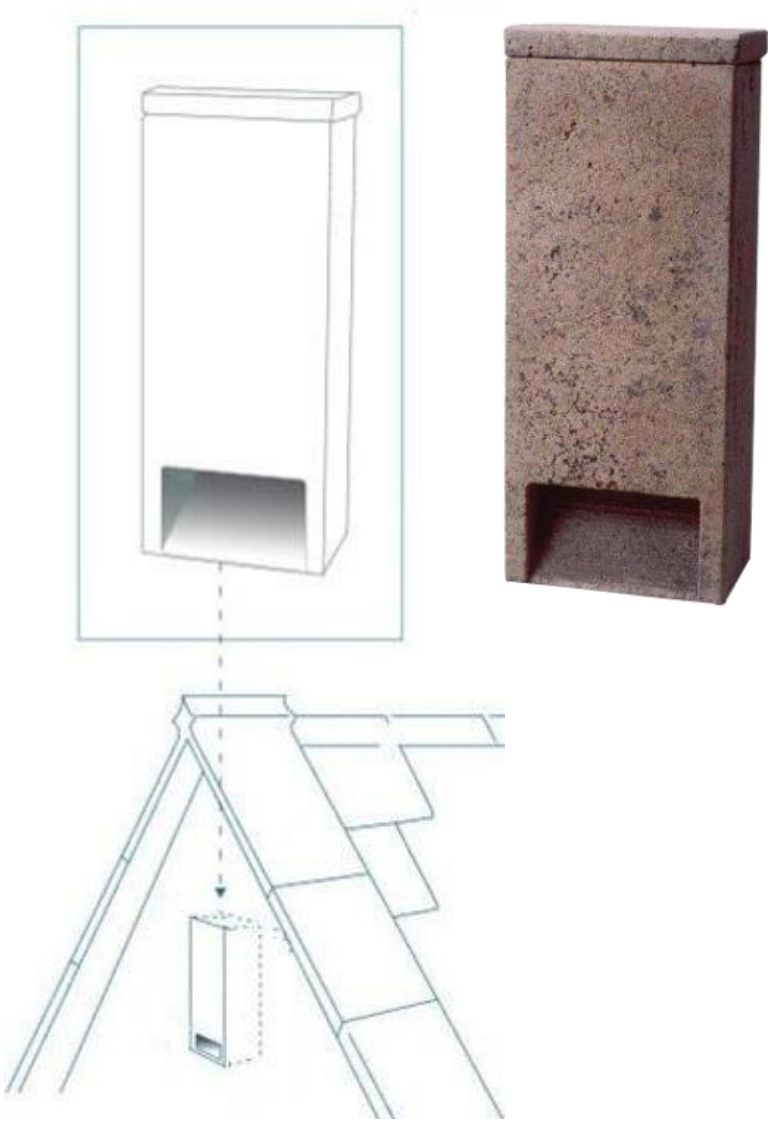
Appendix 12: House Sparrow Nest Box

Schwegler 1SP Sparrow Terrace

Sparrows are gregarious and prefer to nest close to each other, so this triple-nest box provides room for three families under one roof. It's made from long-lasting, breathable woodcrete to provide the optimum environment for sparrows to nest and rear their chicks.

Positioning: On buildings of all kinds in typical habitats including industrial buildings and barns at a height of at least 2m (eg. under eaves)
Suitable for: House and tree sparrows and individual redstarts
Material: Woodcrete PLUS
Height: 240mm
Width: 430mm
Depth: 220mm
Weight: 15kg

Appendix 13: Schwegler 1FR Bat Tube

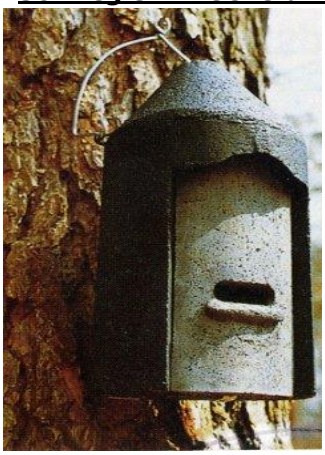


Tube not rendered

Tube rendered over

Appendix 14: Schwegler 2F Bat Box

Schwegler 2F General Bat Box



The Schwegler 2F General Bat Box is the standard and most popular bat box. Ideal for summer roosts and is constructed of woodcrete, providing a breathable, stable temperature within. If it is not occupied after a number of years, it is easily converted to a 2M Bird Box by simply changing the front panel.

Position: Ideal for trees, should be mounted on tree trunks at a height of 3 – 6 meters. Can be positioned in clusters of three, with each box facing west through a south-eastern aspect to provide a variety of micro habitats.
Height: 33cm.
Diameter: 16cm.
Weight: 4kg.

Selection of Trees

Selected trees should ideally be a minimum of 500mm diameter at the height of fixing. Trees should not be obviously unstable or badly rotted. The timber and bark at the point of fixing should be sound.

Position of Boxes on Trees

Boxes should be mounted on tree trunks, rather than on boughs or branches. The mounting location should not be heavily shaded. Boxes should be mounted vertically on the tree.

Bat boxes should be mounted a minimum of 4m from the ground, and as far as possible placed in clusters of 3 as shown below.

The entrance to the box should be clear of obstructions and obstacles in the flight-path towards it. An 'open airspace' of about 3m square should be preserved in front of and below the entrance, and elsewhere any overhanging branches should be at least 1m away.

The mounting location should be readily and safely accessible by ladder, but not accessible by someone climbing up the trunk or onto an adjacent tree or wall etc; some lower branches may need to be trimmed below the box to remove ready handholds or footholds for would-be tree-climbers (as well as any small branches crowding the entrance).

As far as possible, boxes should be placed in locations which are not conspicuous from the ground, so as not to attract unwanted attention from passers-by. This objective is assisted by selecting locations which are not visible/accessible from public footpaths, byways etc.