Phase 1
Preliminary Ecological Appraisal
Land at Boleyn Road, Birmingham
Birmingham

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NE class license: Bats: survey (level 2)

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SUMMARY

The Phase 1 preliminary ecological appraisal is undertaken in order to identify key ecological constraints to the proposed development; inform planning to allow significant ecological effects to be avoided or minimized; identify any further ecological surveys needed to inform an ecological impact assessment and to support the development of mitigation of compensation measures.

Methodology

The survey was conducted by carrying out a systematic walkover of the site by Dr. Stefan Bodnar to record habitats, species, and any notable features of interest with regard to flora & Fauna. This is in accordance with standard Phase 1 survey techniques and is a methodology recommended by the Institute of Environmental Assessment (1995) and guidance from CIEEM (2012).

Key Issues and Conclusions

- This Phase 1 Ecology Report illustrates that the majority of the site is of 'moderate ecological value'. The species rich semi-improved grassland is a habitat of UK importance and target habitat within the national and county wide UK Post-2010 Biodiversity Framework. The woodland is also of moderate ecological value to wildlife.
- The proposed development would mean the loss of both the species rich semi-improved grassland and (possibly) scrub woodland, therefore considerable off-site mitigation, in the form of biodiversity offsetting and habitat creation and management elsewhere would be required if development of the site is permitted.
- As bats are negatively affected by light, the lighting on the proposed development should be minimal, low lux, cowled (directed downwards to prevent light splay), and used on timers or motion sensors. This is of particular importance on this site due to its high suitability for bat foraging and high bat roost potential of trees on site.
- It is recommended that native hedges and trees are protected and enhanced within any development of the site. Any vegetation clearance should take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.
- There are no Statutory or Non-Statutory Designated Nature Conservation Sites within the site, although there are Statutory Designated Nature Conservation Sites (SSSI) within 1km from the site. The Biological Data Search revealed no protected species recorded within the site, although the site survey determined the presence of badgers on site (foraging) though no setts present.

1. INTRODUCTION

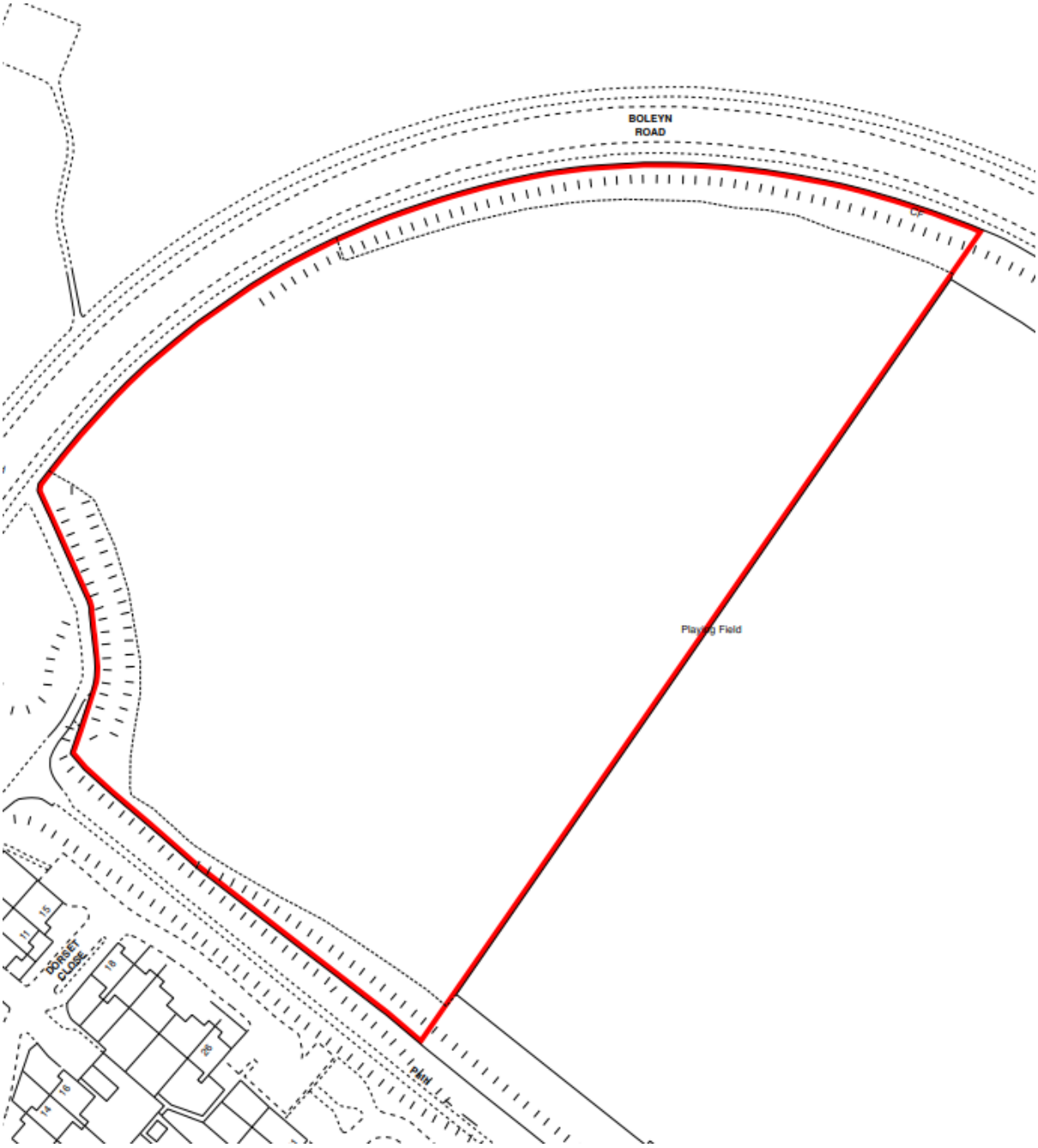
1.1. Background

At the request of BM3, a Phase 1 Preliminary Ecological Appraisal was carried out at an area of land off Boleyn Road, Frankley, Birmingham, B45 0ND to evaluate the habitats, describe any further surveys required and indicate the level of required mitigation/ compensation/ enhancement in relation to the proposed development of the site.

1.2. Site Location

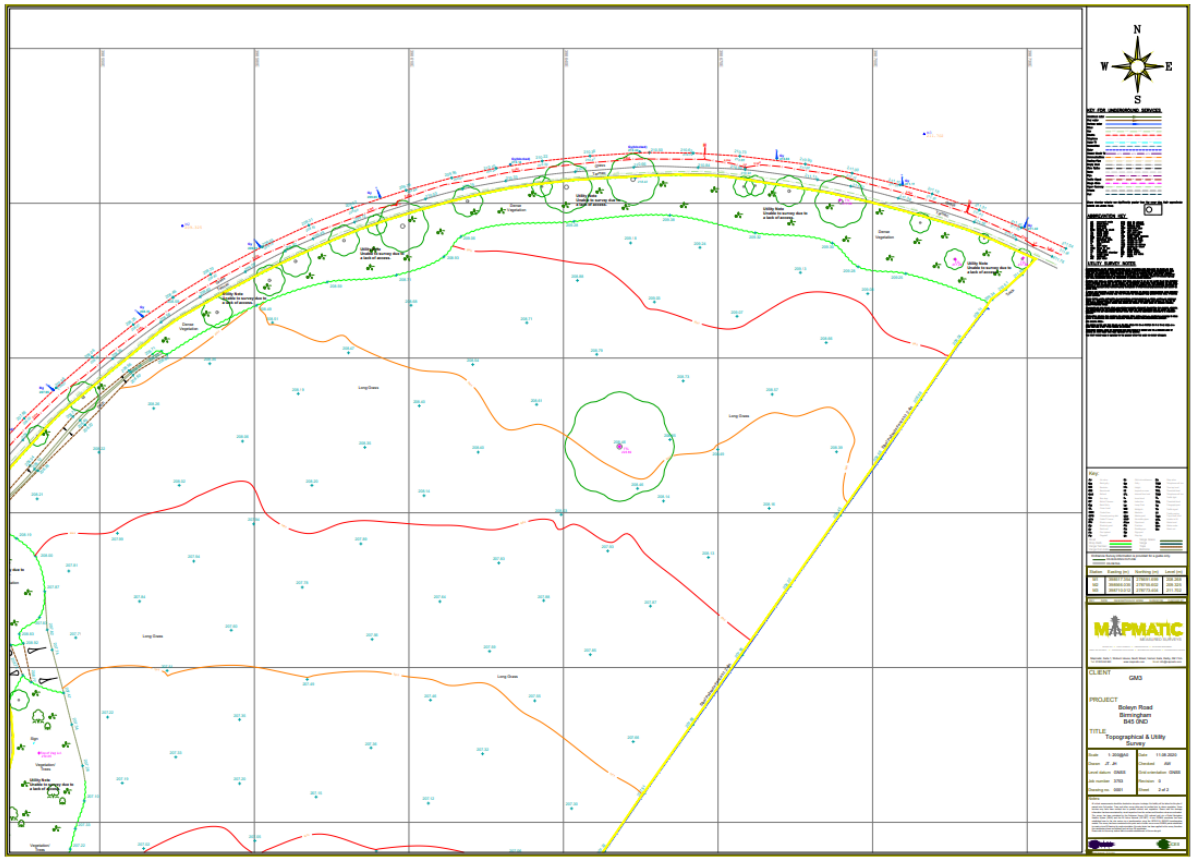
The site is an area of land off Boleyn Road, Frankley, Birmingham, B45 0ND. The site location is described below. A satellite image (Figure 1a) and Phase One diagram (see Appendices) show the area concerned.

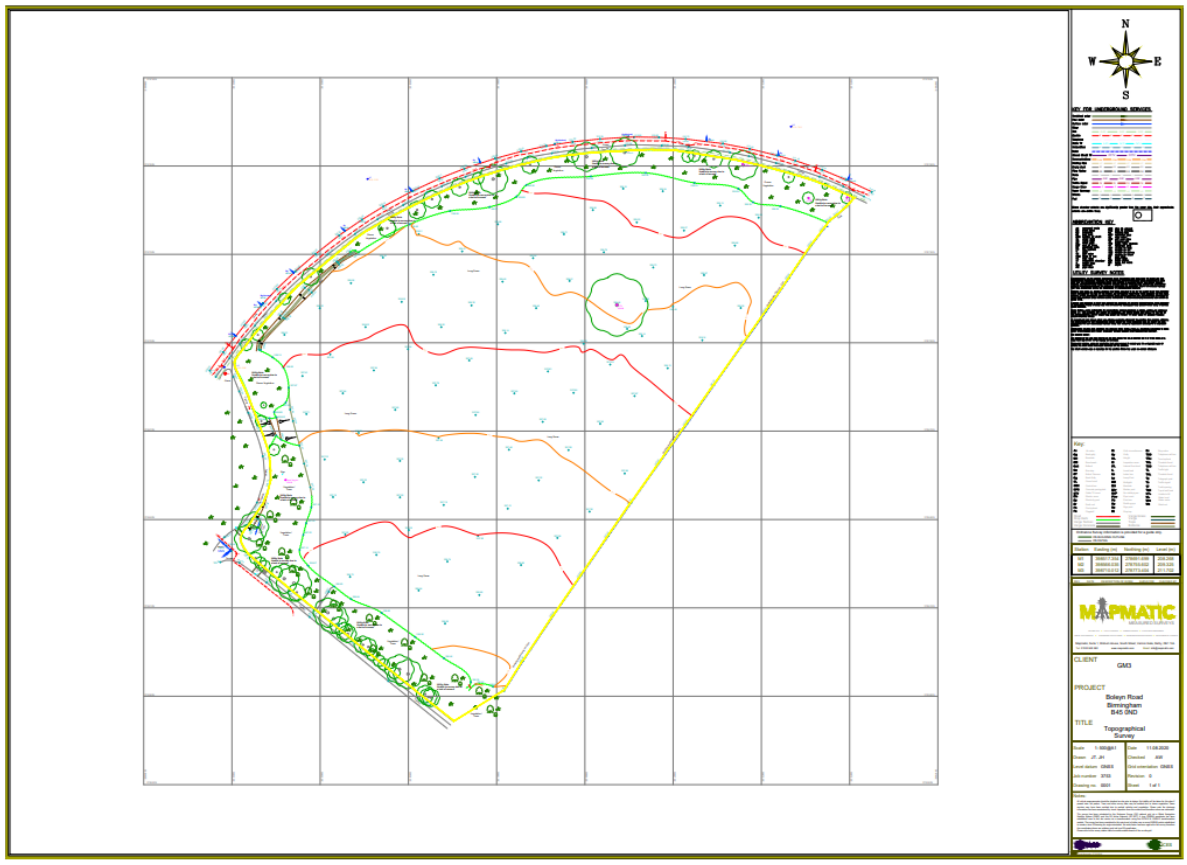
Figure 1a. Showing site location



Map data 2020 © Google.

1b. Topographical survey of site





1.3. Site Description

The development site is an area of grassland, in the midst of a housing estate in a semi-rural, partly residential area in Frankley Birmingham. There is native scrub and young landscape trees along the northern and western boundary of the site and a substantial mature oak within the site centre (See Phase 1 Habitat Map, appendix 1d and satellite images above and below.)

Map data 2020© Google.

Figure 2. Satellite image of local area around proposed development site.

The surrounding landscape is residential to the S and W and agricultural to the North and East. The open greenspaces around the housing, and the agricultural land and hedgerows are likely to provide good foraging and roosting habitats for local bat populations.

1.4. Brief Description of Project

There were no development proposals available at the time of survey, although it is understood to be intended as new build residential development. Please refer to planning application for full details.

1.5. Purpose of the Preliminary Ecological Appraisal

The phase 1 preliminary ecological appraisal report identifies key ecological constraints to the proposed development; informs planning to allow significant ecological effects to be avoided or minimized; identifies any further ecological surveys needed to inform an ecological impact assessment and supports the development of mitigation of compensation measures.

It is composed of two parts. A site visit, during which a preliminary ecological appraisal of the site is carried out to identify the major habitat types, plant, bird, reptile, mammal and other species using the site. Also a desk study, which gathers ecological data on the site and its surrounding area, to identify protected species and statutory protected sites in the vicinity of the proposed development site, in order to produce recommendations on the key ecological constraints to the proposed development.

2. METHODOLOGY

2.1 Desk Study Methodology

Information was gathered from a number of web-based data sources, published ecological reports and where appropriate, the authors own records. The ecological data search covers the following areas:

- Species of particular note
- Local Nature Reserves
- Protected species (badger, grass snake, great crested newts, otter, water vole and bats)

2.2. Survey Methodology

The survey was conducted by carrying out a systematic walkover of the site by Dr. Stefan Bodnar to record habitats, species, and any notable features of interest with regard to flora & Fauna. This is in accordance with standard Phase 1 survey techniques and is a methodology recommended by the Institute of Environmental Assessment (1995) and guidance from CIEEM (2013).

During the survey, emphasis was placed on searching for evidence of and potential of habitats and features supporting protected or notable species, especially those listed under the Conservation of Habitats and Species Regulations 2017, the Wildlife & Countryside Act 1981 (as amended), the List of Species & Habitats of Principle Importance for Conservation of Biological Diversity in Wales (Wales Biodiversity Partnership,2007) and in local Biodiversity Action Plans.

The range of methods used were as follows:

Bats

The survey consisted of three elements:

- A day-time visual external assessment of the buildings and their potential in relation to use by bats as roosts.
- A day-time visual internal assessment of the buildings and their potential in relation to use by bats as roosts
- The trees within the site were appraised for their potential suitability to support breeding, resting and hibernating bats in accordance with survey methods documented in the Bat Surveys: Good Practice Guidelines (Bat Conservation Trust 2016).

The survey was conducted by Dr. Stefan Bodnar, assisted by Dr. Louise Sutherland. Dr. Stefan Bodnar is a full time member of the Chartered Institute of Ecology and Environmental Management, an experienced ecologist with over 35 years experience of bat surveys, working under Natural England class license: Level 2, survey: bats.

Visual External Assessment of Buildings

The external building inspection (from the ground using binoculars) focused particularly on roof areas, soffits, areas of wall with cracks and apertures, vents, openings into the building and the overall structure of the buildings including any features such as crevices or cavities that may be suitable for bats to roost in. Evidence of roosting such as droppings or staining around entrances was also recorded. Where appropriate gaps and cavities were checked using an endoscope. The dates of site visits were 1st July 2020. Methods of survey used have been based on those outlined in Joint Nature Conservation Committee's Bat Workers Manual (Mitchell-Jones & McLeish, 2004), Bat Surveys for Professional Ecologists (3rd Edition) , BCT (2016), and English Nature's Bat Mitigation Guidelines (Mitchell-Jones, 2004).

Tree Surveys

The trees within the site were appraised for their potential suitability to support breeding, resting and hibernating bats in accordance with survey methods documented in the Bat Surveys: Good Practice Guidelines (Bat Conservation Trust 2016). Features of medium and high potential for bats were searched for signs of use by bats, such as droppings, urine staining and scratches around entrance holes etc. A visual inspection of the trees from ground level with the aid of binoculars was undertaken to search for evidence of actual bats as well as signs of bats (droppings, feeding remains, urine staining, scratch marks, noise and the remains of dead bats etc.). In addition, the trees were assessed for the presence of features likely to be attractive to roosting bats, such as cavities or rot holes in the trunk or branches, splits in the timber, delaminating bark, deep bark crevices, dead branches and dense ivy cover etc.

In accordance with the methodology outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines (2016) trees were assigned to the following categories:

- **Known or Confirmed Roost** - signs of bats (droppings, etc) or actual bats recorded; or previous records of bats in tree
- **High (Category 1*)** – trees with multiple, highly suitable features capable of supporting large roosts
- **Medium (Category 1)** – a tree with definite bat potential; fewer features than category 1* or potential for single bats
- **Low (Category 2)** – No obvious potential, although tree of size and age that elevated surveys may result in cracks/crevices being found; or tree has some features which have limited potential to support bats
- **Nil (Category 3)** – no potential to support bats

- The site was also assessed for potential bat foraging areas and commuting routes.

- Features of medium and high potential for bats were searched for signs of use by bats, such as droppings, urine staining and scratches around entrance holes etc. The site was also assessed for actual and potential bat foraging areas and commuting routes. Buildings within the site were assessed in accordance with the methodology outlined in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines (2016)

Reptiles

The site was assessed for its suitability to support reptiles based upon the abundance of suitable habitats such as structurally diverse habitats, hedgerows, scrub, rough grassland, wood piles, rubble, banks and compost heaps etc. The site was assessed with respect to its potential for use for hibernation and spring/summer use based on guidance provided in the Herpetofauna Workers' Manual (Joint Nature Conservation Committee 2003) and the Reptile Management Handbook (Edgar, Foster & Baker 2011).

Badgers

The whole site was searched systematically, with particular attention being paid to features likely to support badger setts (e.g. earth embankments, wooded copses etc.). The location of all badger signs such as runs, dung pits, prints, hair, foraging snuffle holes found during the survey were mapped and all setts characterised as either main, annex, subsidiary or outliers in accordance with guidance given in Surveying Badgers (Harris, Cresswell & Jefferies, 1988).

Birds

All birds observed during the field survey were recorded, in addition to features capable of supporting nesting birds (e.g. trees, hedgerows, buildings, bramble beds, ruderal vegetation and rough grassland etc). The sites was also assessed for its actual and potential suitability to support Schedule 1 and Biodiversity Action Plan priority species.

Other Species

The site was also assessed for its actual and potential suitability to support other protected or notable fauna in accordance with the Guidelines for Preliminary Ecological Appraisal (Chartered Institute of Ecology and Environmental Management, 2013).

2.3. Site Location and Access

Land off Keynell Covert, Birmingham, BY14 5YH. All areas of the site were available for access.

2.4. Date and Time of Survey

The site assessments were conducted on 18th August 2020.

2.5. Weather Conditions

The weather conditions during the survey were sunny with recent precipitation.

2.6. Survey Constraints

Owing to the time of year the initial survey took place it can be considered to provide a reasonable, though not exhaustive plant list. This survey noted the habitat types on the site, and the dominant vegetation at the time of the survey, which is likely to be constant and a fair reflection of the habitat quality present.

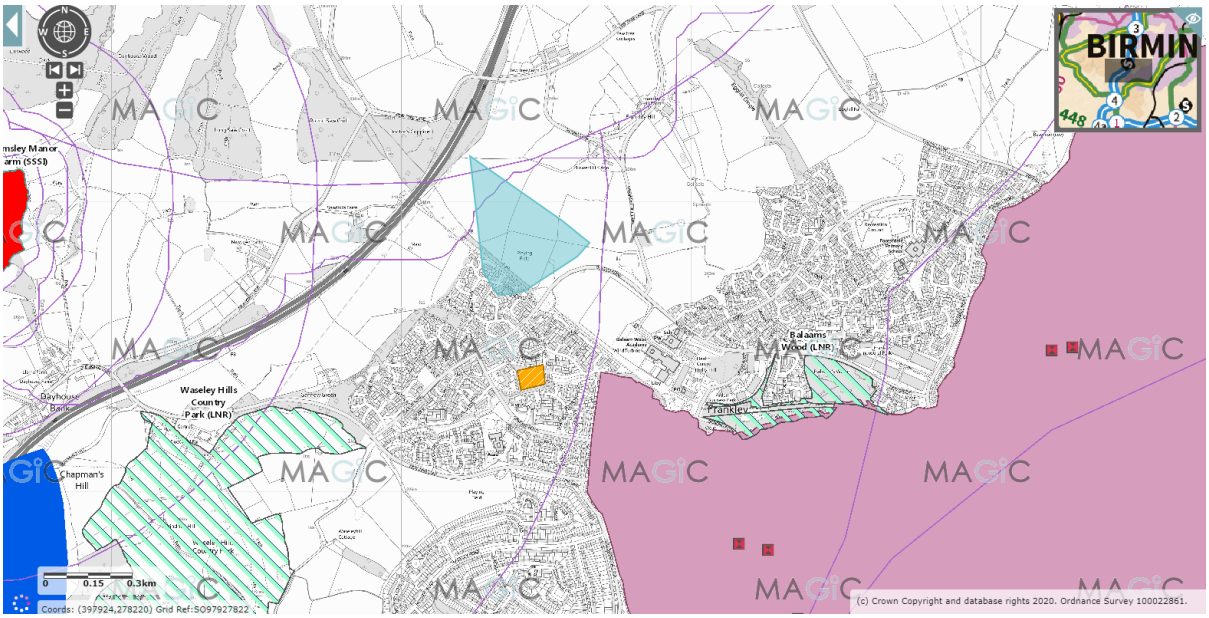
3. RESULTS

3.1 Desk Study Results

3.1a Statutory & Non Statutory Nature Conservation Sites

The map below highlights all Statutory Designated Nature Conservation sites in vicinity of the proposed development. The closest statutory protected site is Balaams Wood LNR, which lies 0.5km SE of the site.

Statutory Designated Nature Conservation sites in Vicinity of Proposed Development



A Natural England 'Magic' data search (shown above) reveals that the site lies within a Nitrate Vulnerable Zone, and SSSI Impact zone.

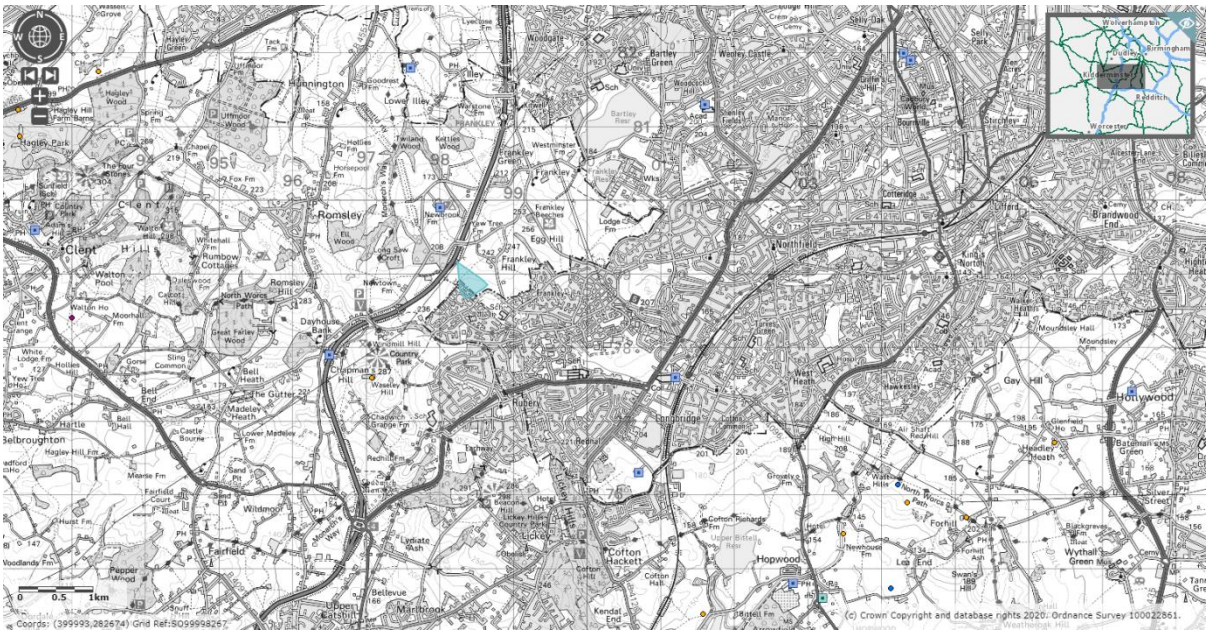
3.1b. Protected & Notable Species Records

In relation to protected and notable species, the following were recorded from freely available, online web based resources, and in places, the authors own records. All records are presented here with the approximate distances of the nearest record. In addition, a number of ecological survey reports within the area have been interrogated for protected species records. All records are post-2010 unless otherwise stated.

Protected Bat Species Occurrence Table

Species (Latin Name)	Common Name	Approximate distance of nearest record from the survey site (km)
Pipistrellus pipistrellus	Common pipistrelle	Within 1 km
Plecotus auritus	Brown long-eared bat	Within 1 km
Myotis daubentonii	Daubenton's Bat	Within 5 km
Myotis mystacinus	Whiskered Bat	Within 1 km
Myotis Brandtii	Brandt's bat	Within 1 km
Myotis nattereri	Natterer's Bat	Within 1 km

A Natural England 'Magic' data search (shown below) reveals that licenses for 5 protected bat species have been issued within 1km from the site. Great Crested Newts are present within 3 km.



Protected & Notable Species Occurrence Tables

Species (Latin Name)	Common Name	Approximate distance of nearest record from the survey site (km)
Triturus cristatus	Great Crested Newt	Within 3 km
Meles meles	Badger	Within 2 km
Erinaceus europaeus	Hedgehog	Within 1 km
Anguis fragilis	Slow worm	Within 5 km
Zootoca vivipara	Common Lizard	Within 5 km
Natrix natrix	Grass snake	Within 5 km
Lissotriton vulgaris	Smooth newt	Within 3 km

3.1c Interpretation of Available Biological Data

There are no statutory protected sites on or adjacent to the site. The closest statutory protected site is the Balaams Wood LNR, it is not likely to be affected by the proposed development.

Five species of bat are recorded within 1km of the site. Great Crested Newts are not found within 2 km. Badger are also found within 2 km of the site. Hedgehog could be present on the site, and care should be taken to ensure mammals can climb out of footings and foundations through use of exit planks.

3.2 Survey Results

3.2.1. Habitat Types Present & Baseline Ecological Conditions

The proposed development site is an improved, species rich, amenity grassland, with planted landscape trees along the northern and southern boundaries and two sections of native hedgerow along the southern boundary. The conjoined gardens of residential housing surround the site on all sides. A full list of vascular plant species is provided in Appendix 3.

- **Semi-improved species rich grassland**: The area is species rich and semi- improved. The dominant grass species are Yorkshire fog *Holcus lanatus,* Sweet vernal grass *Anthoxanthum odoratum,* Red fescue *Festuca rubra* , Timothy *Phleum pretense,* common bent *Agrostis capilaris,* False oatgrass *Arrhenatharum eliatus,* and Cocksfoot *Dactylis glomerata* also common within the sward. Other species such as Meadow buttercup *Ranunculus acris,* Creeping buttercup *Ranunculus repens,* black knapweed *Centaurea nigra,* Birdsfoot trefoil *Lotus corniculatus,* common stitchwort *Stellaria graminea* and Dandelion *Taraxacum officinale* are also present.

- **Native scrub:** Within the site a single mature English oak *Quercus robur* and along the northern and western borders, young scrub mainly English oak and Hawthorn, with some cherry, field maple, holly and elder in places.

3.2.2. Protected and Notable Species on Site

Bats:

External Visual Assessment

The assessment was carried out using the guidance provided within the publication: Bat Surveys for Professional Ecologists (3rd Edition), BCT (2016), which states:

Table 4.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement.

Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[a] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation[b]). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.[c]	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	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[a] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	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	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[a] and surrounding 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. 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.

[a] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.
[b] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.
[c] This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

There are 18 species of bat found in the UK, 17 of which are known to breed in the UK. All are small, nocturnal, flying, insectivorous mammals that are under considerable conservation threat and many having undergone severe population declines over the last century. Some species, such as pipistrelle bats (*Pipistrellus* sp) still remain relatively common and widespread in the UK, while others, such as greater

horseshoe bats (*Rhinolophus ferrumequinum*), have an extremely restricted distribution. All species of bats and their roosting sites are afforded full protection under both UK and European legislation and are designated as 'European protected species'.

Site Assessment: Foraging;

The site has high suitability for bat foraging and commuting, with suitable diverse vegetation for insect prey, partially sheltered by its trees, hedges, it is mainly dark with a small amount of light splay from the adjacent houses. Therefore, development of this site should minimize lighting on this site to avoid making this site unsuitable for bat foraging and commuting.

Bat Assessment of Trees

At least one large mature oak on site has high bat roost potential. See target note on phase 1 diagram.

Bat Assessment of Buildings

There are no on site buildings.

Conclusions

The species rich semi-improved grassland has high suitability for bat foraging so lighting on site should be minimized. At least one mature tree within the site has high bat roost potential. If this tree and its root protection zones are to be protected within the scheme, no further survey is required. However, if it is to be affected in any way by the development, at least 3 emergence surveys will be required, by a suitably qualified and experienced ecologist, in accordance with BCT 2016 Guidelines.

Badgers

Badgers (*Meles meles*) are protected in England and Wales 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. Badgers remain comparatively widespread and common throughout the UK..

The site is of moderate suitablity for badgers, and there is no evidence of badger foraging on the site. There are records of badger within 2 km of the site. There is no evidence of badger setts on the site, and no setts within 30m of the site boundary. No further survey is recommended in respect of this species.

It is possible that during development work, badgers and other mammals such as hedgehogs and foxes, will enter the working areas at night. Therefore all ground-works that are to be left open overnight must be provided with a means of escape should an animal enter. This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water.

Other mammals

The presence of other specially protected mammals, such as otter and water vole, is assessed as extremely unlikely, as there is no suitable habitat on site, despite the presence of otter within 1km.

Birds

The Wildlife and Countryside Act 1981 (as amended) makes it an offence (with certain limited exceptions) to intentionally kill, injure or take any wild bird, or to damage, take or destroy the nest of any wild bird whilst that nest is being built or in use, or to take or destroy its eggs. Furthermore, the Act affords additional protection to specific species of birds listed in Schedule 1 of the Act. In respect of these species, it is unlawful to intentionally or recklessly disturb such a bird whilst it is nest-building or is in, on or near a nest containing eggs or young; or to disturb their dependent young. Following recent revisions, fifty-nine species are listed on the UKBAP.

The following species were recorded on-site during the visit:

Bird Species:	**Latin name:**
Blackbird	*Turdus merula*
Blue Tit	*Cyanistes caeruleus*
Carrion Crow	*Corvus corone*
House Sparrow	*Passer domesticus*
Jackdaw	*Corvus monedula*
Magpie	*Pica pica*
Woodpigeon	*Columba palumbus*
Wren	*Troglodytes troglodytes*

The birds listed above were actually recorded on the site itself. The scrub and trees within the survey site could also provide suitable for nesting habitat for a number of other common woodland bird species. It is recommended that any site clearance is undertaken outside of the bird breeding season (mid March to mid August). If site clearance is undertaken during these months, a suitably qualified and experienced ecologist should be employed to ascertain the presence of any breeding birds within the site.

Great Crested Newt

The Great Crested Newt (*Triturus cristatus*) is one of the two rarest amphibian species in Britain. It is primarily a terrestrial animal, spending much of its life on land, but returning to the water to breed. Great crested newts will often return to breed in the same waterbody where they were spawned. In addition, they are highly opportunistic and will also colonise suitable new waterbodies rapidly. 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 it. The habitats within 500m of a

breeding pond are generally considered to be protected by the legislation. The Great Crested Newt is a priority species and subject to its own Biodiversity Action Plan.

There are no water bodies on the site. The terrestrial habitat is of moderate suitability for newts, being semi-improved grassland. There are records of GCNs within 2 km of the site, but not closer, therefore no further survey is recommended, although a series of precautions are advised, these are described in section 4.

Reptiles

There are four widespread species of British reptile comprising grass snake (*Natrix natrix*), slow-worm (*Anguis fragilis*), adder (*Vipera berus*) and common lizard (*Zootoca vivipara*). These animals are protected under the Wildlife and Countryside Act 1981 (as amended) and the Countryside and Rights of Way Act 2000. 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.

The on-site habitat is of low to moderate suitability for reptiles, with no records of reptiles within 2km of the site, therefore no further survey is recommended. However, a series of precautions are advised. The development should take a precautionary approach and to reduce risk of harm to reptiles as a result of the proposed development it is recommended appropriate reasonable avoidance measures should be taken during development. Including where possible:

- If reptiles are discovered at any time during processes involved with the development, work should cease immediately and the advice of a licensed ecologist sought.
- Ensuring storage of piles of materials and excavated earth on the site should be kept to a minimum.
- Storing piles of materials and excavated earth away from the field boundaries to deter reptiles from using them for temporary cover.

4.0 Discussion

It is important that this proposed development should demonstrate no net loss of biodiversity from the site. This is a duty placed on Local Authorities in the Natural Environment and Rural Communities Act 2006, Section 40. There are requirements noted for this under The National Planning Policy Framework (2019) which refers to compensation/ mitigation. It is confirmed that the enhancement, mitigation and compensation within this section will comply with all the relevant UK and EU legislation relating to protection and enhancement of ecology. (Note: Most parts of the town and country planning system in Wales are devolved. However the primary legislative framework is broadly the same as in England, although there are some differences in both primary and related subordinate legislation as it applies to Wales).

4.0. Ecological Constraints

The value of the majority of the site, in terms of ecological value to wildlife, is moderate. The species rich semi-improved grassland is a habitat of UK importance and target habitat within the national and county wide UK Post-2010 Biodiversity Framework. The scrub woodland is also of moderate ecological value to wildlife. The proposed development plans would mean the loss of the species rich semi-improved grassland and possibly the scrub woodland, therefore considerable off site mitigation, in the form of biodiversity offsetting and habitat creation and management elsewhere would be required if development of the site is permitted.

The habitats present within the area consists of the following elements (see Phase 1 Habitat Map in Appendix 1d), some of which are of European and UK importance, and are listed as UK Biodiversity Action Plan Priority Habitats:

- Species rich semi-improved grassland
- Native scrub
- Mature native tree

4.1. Additional Ecological Surveys Recommended

- A full badger survey to ascertain the presence of badgers on site would be required before any development or clearance works could be undertaken.
- At least two bat activity surveys to determine level of bat foraging and bat activity within grassland.
- Invertebrate surveys of grassland to determine risk to nationally scare invertebrate species.
- Bat emergence surveys to determine level of use of the trees on site which have high and moderate bat roost potential if these are to be lost to the development. In accordance with BCT 2016 Guidelines, trees with moderate bat roost potential require a minimum of two bat emergence surveys, trees with high bat roost potential require a minimum of three bat emergence surveys.

4.2. Minimising Ecological Impact

This section states how the negative impacts of development can be addressed:

1. *4.2a Protecting the Ecological Value of the Site.*

Within the current development plans it is not possible to preserve the features of ecological value on the site. The proposed development plans would mean the loss of both the species rich semi-improved grassland and woodland, therefore considerable off site mitigation, in the form of biodiversity offsetting and habitat creation and management elsewhere would be required if development of the site is permitted.

4.3 Precautionary Measures during Development

Birds

Any trees on site are suitable for breeding birds and potentially will have a number of nests during the breeding season. It is recommended that all clearance should take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.

Great Crested Newts and Reptiles

The following precautions shall be employed in respect of great crested newts, other amphibians and reptiles:

1. If great crested newts are discovered at any time during processes involved with the development, work should cease immediately and the advice of a licensed ecologist sought.
2. All site staff involved with site clearance and construction works are to be made aware of the potential for encountering great crested newts through a tool kit talk and the appropriate measures to be taken if great crested newts are encountered.
3. Keep duration of groundworks as short as possible.
4. Undertake during the day works that might only affect newts above ground.
5. Backfill trenches and other excavations before nightfall, or leave a ramp to allow newts to easily exit.
6. Raise stored materials (that might act as temporary resting places) off the ground, e.g. on pallets.

Including where possible:

7. Undertaking ground-works along field boundaries when reptiles are active (March to October).
8. Ensuring storage of piles of materials and excavated earth on the site should be kept to a minimum.
9. Storing piles of materials and excavated earth away from the field boundaries to deter reptiles from using them for temporary cover.

- **Badgers**

Further survey is required to determine the potential presence of active badger setts on the site. If found, a 30m safeguarding zone would be required, within which no development was undertaken, or application for Natural England licensing would be required. However, the minimum precautionary measure on sites where badgers are known to be present include:

- If possible, programme work during 'safer' periods between July and November when badgers are not rearing young.
- Ensure that all those in work are aware of the potential for setts or badgers to be encountered, and the actions to be taken if these are discovered at anytime.
- Immediately prior to the commencement of the works the developer undertakes to have all setts re-checked by an ecologist with experience of dealing with badgers.
- All excavations to be covered over or ramped so that any badgers could get out of an excavated structure. Further measures are detailed in section 5
- Disturbance in the vicinity of a sett where breeding is confirmed or expected is to be avoided during 1st December – 30th June. Badgers are particularly vulnerable at this time of year and sett interference can result in dependent cubs being abandoned. A protection zone is to be established at 30m radius

around used setts. This must be fenced with Heras fencing and be a zone excluded from construction activities. The zone is shown on the plan below:

- Disturbances, such as loud noises or vibrations, that might agitate badgers occupying a sett should be avoided or limited to areas well away from the sett.
- Noise in the vicinity of protection zone is to cease 2 hours before sunset.
- Badger tunnels can extend to 30m from the entrance holes and are located between 0.2 and several meters deep, depending on the soil topography. Excavation work and heavy machinery should be kept well away from where it could result in damage to the sett or disturbance to any badger occupying the sett.
- Any security lighting is to be directed away from setts.
- Fires and chemicals should not be used within 30 metres of sett.
- Trenches and excavations are to be covered at the end of each working day, or include ramps as a means of escape for any animal falling in.
- Any temporary exposed open pipe system should be capped to prevent badgers gaining access. In particular, open pipe work greater than 200mm outside diameter being blanked (capped) off at the end of each working day.
- Any ground-works that are to be left open overnight will be provided with a means of escape should a badger enter or creation of sloping escape ramps (manual ladders) for badgers (and other mammals potentially using the site), which may be achieved by edge profiling of trenches/ excavations or by using planks placed into them at the end of each working day.
- This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water.
- Any trenches/pits will be inspected each morning to ensure that no badgers have become trapped overnight. Should a badger become trapped in a trench it will likely attempt to dig itself into the side of the trench, by forming a temporary sett. Should a trapped badger be encountered the Named Ecologist should be contacted immediately for further advice who, if necessary, will contact Natural England in respect of legislative and licensing issues.
- The storage of topsoil or other 'soft' building materials on site will be given careful consideration. Badgers will readily adopt such mounds as setts; so as to avoid the adoption of any mounds, these will be kept to a minimum and any essential mounds subject to daily inspections (or nightly patrols if 24 hour security is present on site), with consideration given to temporarily fencing any such mounds to exclude badgers.
- The storage of any chemicals on site will be well away from the setts and contained in such a way that they cannot be accessed or knocked over by any roaming Badgers.

- The specific seasonal sensitivity of this species is summarised in Table 1. If works are required within the season of high sensitivity, these should be the subject of special scrutiny by the ecologist, with exclusion zones, and an increased level of on-site supervision employed.

Month:	J	F	M	A	M	J	J	A	S	O	N	D
Badger sensitivity level:	H	H	H	H	M	M	L	L	L	L	L	H

Table 1. Summary table of seasonal sensitivity of habitats and species found within the site. (L = Low Sensitivity, M = Moderate Sensitivity, H = High Sensitivity).

Responsible Persons

Prior to the commencement of works, in order to ensure compliance with the method statement and to sufficiently mitigate against potential effects on Badgers, the project manager will take responsibility or appoint a person to be responsible for ensuring the following:

- Compliance with legal requirements relating to nature conservation;
- Installation of physical protection measures during construction;
- Implementation of sensitive working practices during construction;
- Regular inspection and maintenance of physical protection measures and monitoring of working practices during construction; and
- Provision of training and information about the importance of "Badger Protection Zones" to all construction personnel on site.

Until such time as a responsible person has been appointed, the project manager shall be responsible for ensuring that the above points are addressed.

4.4 Opportunities for Biodiversity Gain

The moderate to high ecological value of this site means standard measures to enhance the site following the development, such as native planting etc., would be insufficient to prevent a net loss of biodiversity and therefore significant biodiversity offsetting and habitat creation off site would be required. Guidance on on site mitigation can be found in Appendices 4-8.

5. CONCLUSION

- This Phase 1 Ecology Report illustrates that the majority of the site is of 'moderate ecological value'. The species rich semi-improved grassland is a habitat of UK importance and target habitat within the national and county wide UK Post-2010 Biodiversity Framework. The woodland is also of moderate ecological value to wildlife.
- The proposed development would mean the loss of both the species rich semi-improved grassland and (possibly) scrub woodland, therefore considerable off-site mitigation, in the form of biodiversity offsetting and habitat creation and management elsewhere would be required if development of the site is permitted.
- As bats are negatively affected by light, the lighting on the proposed development should be minimal, low lux, cowled (directed downwards to prevent light splay), and used on timers or motion sensors. This is of particular importance on this site due to its high suitability for bat foraging and high bat roost potential of trees on site.
- It is recommended that native hedges and trees are protected and enhanced within any development of the site. Any vegetation clearance should take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.
- There are no Statutory or Non-Statutory Designated Nature Conservation Sites within the site, although there are Statutory Designated Nature Conservation Sites (SSSI) within 1km from the site. The Biological Data Search revealed no protected species recorded within the site, although the site survey determined the presence of badgers on site (foraging) though no setts present.

Date	**Prepared by**	**Checked and Verified by**
27th August 2020	Dr Louise Sutherland MIALE Ecologist	Dr Stefan Bodnar MCIEEM Principal Ecologist

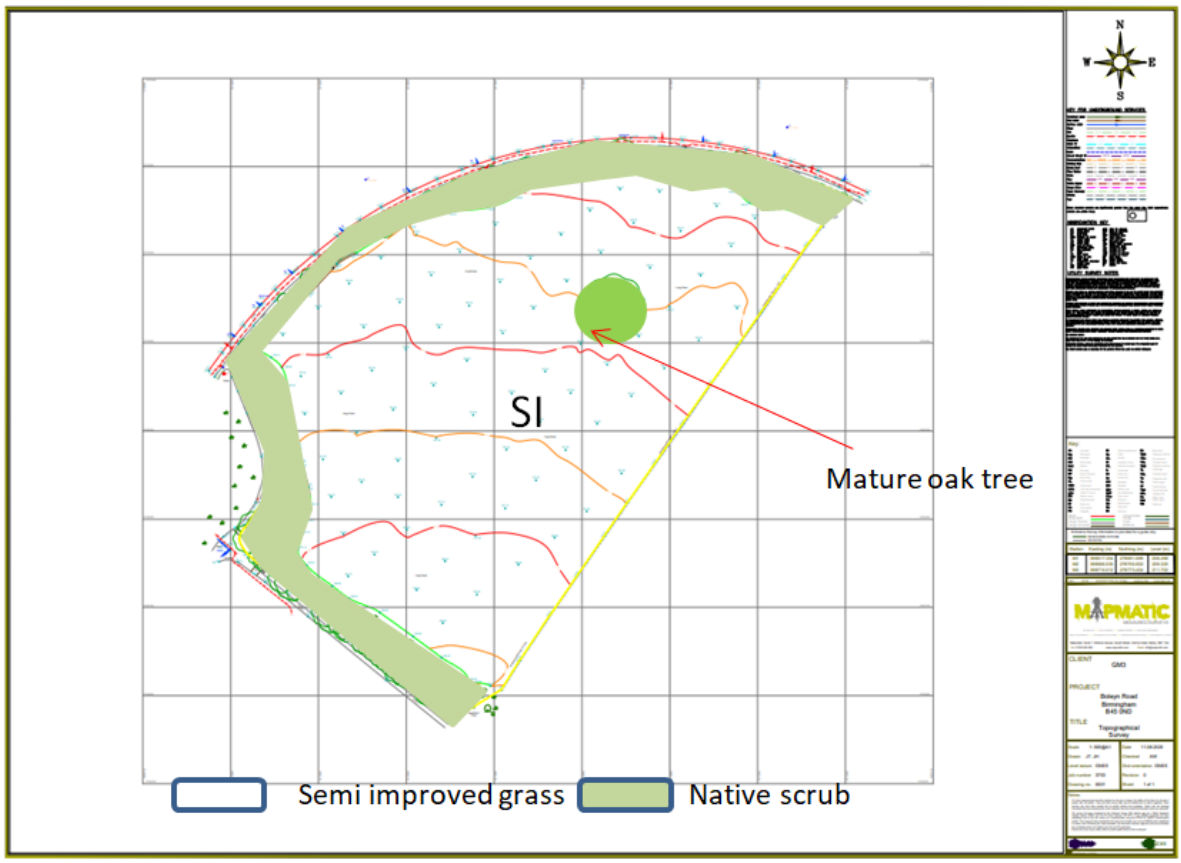
Appendix 1a Satellite Image

Map data 2020 © Google.

Appendix 1b Area context

Map data 2020 © Google.

Appendix 1d Phase 1 Habitat Map



Appendix 2 Photographs

Appendix 3 Species Lists

Trees & Shrubs

Common Name	Scientific Name
Ivy	*Hedera helix*
Ash	*Fraxinus excelsior*
Blackthorn	*Prunus spinosa*
English Oak	*Quercus robur*
Hawthorn	*Crataegus monogyna*
Hazel	*Corylus avellana*
Horse Chestnut	*Aesculus hippocastanum*
Norway maple	*Acer platanoides*
Sycamore	*Acer pseudoplatanus*
Whitebeam	*Sorbus aria*

Grasses, Sedges & Rushes

Common Name	Scientific Name
Annual meadow grass	*Poa annua*
Cocksfoot	*Dactylis glomerata*
Perennial ryegrass	*Lolium perenne*
Red fescue	*Festuca rubra*
Rough meadow grass	*Poa trivialis*
Sweet vernal grass	*Anthoxanthum odoratum*
Yorkshire fog	*Holcus lanatus*

Other Flowering Plants and Ferns

Common Name	Scientific Name
Dandelion	*Taraxacum officinale*
Creeping Buttercup	*Ranunculus repens*
Bramble	*Rubus fruticosus agg.*
Daisy	*Bellis perennis*
Herb Robert	*Geranium robertianum*
Meadow buttercup	*Ranunculus acris*
Stinging nettle	*Urtica dioica*
White clover	*Trifolium repens*
Wood Avens	*Geum urbanum*

Appendix 4: Specifications for Biodiversity Gain

Appendix 4a: British Native Trees to Attract Wildlife

Species	Average mature / ultimate height			Growth rate			Soil/ground conditions					Tolerant of sites that are				Valuable for	
	0.5-5m	6m-15m	16m+	Fast	Medium	Slow	Wet ground	Light sandy soils	Heavy soils	acid	alkaline	Shaded	Polluted	Coastal	Exposed	Birds	Insects
Alder		•		•			■		•		•	•	•		•		•
Ash			•		•		▲	•	•		•	•	•	•	•		
Aspen		•		•					•	•	•		•	•	•		•
Beech			•			•		•			•	•					•
Birch, Downy		•		•			▲			•			•		•		•
Birch, Silver		•		•				•		•			•		•		•
Blackthorn	•			•				•	•	•	•			•	•	•	•
Broom	•				•			•		•	•	•	•	•			•
Buckthorn, Alder	•					•	▲			•							
Cherry, Wild		•			•			•	•		•		•				
Cherry, Bird		•			•			•	•	•		•				•	•
Crabapple		•				•		•	•	•	•	•				•	•
Elder		•		•				•	•	•	•	•	•	•	•		•
Elm, Wych		•			•				•		•	•	•	•	•		•
Gorse	•				•			•		•	•					•	•
Hawthorn	•				•			•	•	•	•		•	•	•	•	•
Hazel		•		•					•		•	•					•
Holly		•				•		•	•	•	•	•	•	•	•	•	
Lime, small-leaved			•		•				•		•	•					•
Maple, Field		•			•				•		•	•	•				
Oak, Pedunculate			•			•			•		•				•	•	•
Oak, Sessile			•			•	▲	•	•	•		•			•	•	•
Pine, Scots			•		•			•		•					•		•
Poplar, Black			•	•			▲	•	•		•						•
Rose, Dog	•				•			•	•		•	•	•		•		•
Rose, Guelder	•				•		▲		•		•	•					•
Rowan		•		•				•		•			•	•	•	•	
Spindle	•				•				•		•	•					
Whitebeam, Common		•			•			•	•		•						•
Wild Service	•					•			•		•	•		•		•	
Willow, Crack		•		•			■				•		•	•	•	•	•
Willow, Goat		•		•	•		■		•		•	•	•	•	•	•	•
Willow, White			•	•			■				•		•	•	•	•	•
Yew		•				•		•			•	•			•	•	

■ Only species to survive waterlogged sites with anaerobic conditions.

▲ Will tolerate wet ground if there is some seasonality of "flushing (water movement) within the soil.

Appendix 4b: Non-native plants to attract wildlife

Buddleja X weyeriana cultivars

You can plant the orange-flowered B. X weyeriana hybrids with a clear conscience as they don't appear to produce viable seed, they also attract a broad spectrum of insects including both butterflies and bees, and they flower late into the season when nectar is scarce. The beautiful B. x fallowiana 'Lochinch' with silver leaves is attractive to butterflies and is also said not to produce seeds. The orange ball Buddleja (B. globosa) from South America seems to attract bees rather than butterflies.

Bupleurum fruticosum ('Shrubby Hare's Ear')

A shrubby evergreen umbellifer from Southern Europe, where it is often cultivated. It has leathery aromatic foliage and umbels of yellowish flowers, a bit like those of Fennel, that are very attractive to hoverflies and other small insects. Well worth growing for this reason.

Ceanothus X 'Gloire de Versailles'

Ceanothus come from the Western United States. Most Ceanothus have bunches of very small flowers that don't seem very attractive to insects. 'Gloire de Versailles' however is a hybrid with loose bunches of pale blue tubular flowers that are very attractive to butterflies and bees.

Caryopteris X clandonensis 'Kew Blue'

A deciduous shrub from China for a sunny position, has small tubular blue flowers attractive to insects.

Clethra alnifolia ('Sweet Pepper Bush')

A deciduous shrub from the Eastern united States that likes damp, acid or woodland soil. Has spikes of small scented white flowers attractive to moths and butterflies.

Hebe X 'Great Orme' and H. X 'Midsummer Beauty'

Hebes are close relatives of the herbaceous genus Veronica, and come from New Zealand. Some are much more attractive to insects than others. 'Great Orme' is a medium-sized hybrid with pale pink flowers that are attractive to butterflies. It is a distinctive cultivar and available true to name in the nursery trade.

'Midsummer Beauty' seems to be more of a generic name for a series of large shrubs with blue or grey-blue flowers in long spikes, attractive to both bees and butterflies. There are a number of other blue and white flowered Hebes that seem very popular with bumblebees.

Myrtus communis ('European Myrtle')

An attractive evergreen shrub from the South of France and Spain with small evergreen aromatic leaves. It has been grown in our gardens for centuries, but is susceptible to hard frost and prefers a site against a warm sunny wall. Fluffy white flowers in early summer are bumblebees' heaven. Purplish berries follow later which are stripped by blackbirds in January.

Amelanchier species ('Shad Bush')

Shrubs with white cherry-like blossoms early in the year, followed by blackish berries in late summer. Valuable for the berries as a source of food for berry-eating birds when most other berries are not yet ripe.

Erica terminalis ('Corsican Heath')

A shrubby heather-like plant popular with bumblebees. The Cornish Heath, Erica vagans, from the Atlantic fringes of Europe is also a good bee plant. Erica manipuliflora, from Southern Europe, and its hybrid Erica X griffithii have fragrant flowers that attract butterflies.

Eupatorium ligustrinum

A late-flowering evergreen bush that looks very like a privet, but has bunches of white fluffy flowers in September and October. These flowers seem very attractive to range of insects, especially hoverflies.

Ribes sanguineum (Flowering Currant)

It is a very good early flower for bumblebees, as indeed are the flowers of the closely related blackcurrants and gooseberries.

Appendix 4c: Plants good for moths, with species of moth they encourage beside

Plant	Moths
Bird's Foot Trefoil *(lotus corniculatus)*	*Burnet, Belted Beauty, Chalk Carpet, Latticed Heather*
Bladder Campion *(silene vulgaris)*	*Campion, Marbled Coronet, Nettle Pug, Marbled Clover, Dark Brocade, Sandy Carpet*
Borage *(borago officinalis)*	*Crimson Speckled*
Wild Clary *(salvia horminoides)*	*Twin-spot Carpet*
Biting Stonecrop *(sedum acre)*	*Yellow Ringed Carpet, Northern Rustic*
Cowslip *(primula veris)*	*Plain Clary, Northern Rustic*
Dropwort (*filipendula hexapetala)*	*Satyr Pug*
Evening Primrose *(oenothera biennis)*	*Elephant Hawk*
Field Scabious *(kanutia arvensis)*	*Marsh Fritillary, Narrow Bordered Bee Hawk, Lime Speck Pug, Shaded Pug*
Foxglove (*digitalis purpurea)*	*Lesser Yellow Underwing, Foxglove Pug*
Golden Rod *(solidago)*	*Lime Speck Pug, Bleached Pug, Golden Rod, Wormwood Pug, V Pug*
Greater Stitchwort (*stellaria holostea)*	*Dart, Yellow Underwing, Marsh Pug, Plain Clary*
Hedge Bedstraw (*gallium mollugo*)	*Ruddy Carpet, Royal Mantle, Common Carpet, Wood Carpet, Water Carpet, Beech Green Carpet, Mottled Grey, Green Carpet*
Hedge Woundwort (*stachys sylvatica)*	*Rosy Rustic, Plain Golden Y, Sub-angled Wave*
Hemp Agrimony (*eupatorium cannabinum)*	*Wormwood Pug, V Pug, Lime Speck Pug, Marsh Pug, Gem, Scarce Burnished*
Herb Bennet (*geum urbanum)*	*Riband Wave*
Herb Robert (*geranium robertianum)*	*Barred Carpet*
Hollyhock (*althaea rosea)*	*Mallow*
Kidney Vetch (*anthyllis vulneraria*)	*6-belted Clearwing*
Lady's Bedstraw (*gallium verum*)	*Hummingbird Hawk, Small Elephant Hawk, Gallium Carpet, Plain Wave, Riband Wave, Bedstraw Hawk, Archer's Dart, Red Chestnut, Ruddy Carpet, Royal Mantle, Common Carpet, Water Carpet, Beech Green Carpet, Red Twin Spot Carpet, Wood Carpet, Mottled Grey, Green Carpet*
Lady's Mantle (*alchemilla mollis)*	*Red Carpet*
Lesser Knapweed (*centaurea nigra*)	*Silver Y, Lime Speck Pug, Satyr Pug*
Lesser Meadow Rue	*Marsh Carpet*
Maiden Pink (*dianthus deltoides*)	*Marbled Coronet*
Marjoram (*majorana orignaum*)	*Sub-angled Wave, Lace Border*

Marshmallow (*althea officinalis*)	*Marshmallow*
Meadow Clary (*salvia pratensis*)	*Brown Spot Pinion, Hebrew Character, Powder4ed Quaker, Emperor*
Mullein	*Mullein, Striped Lychnis*
Navelwort (*umbilicus rupestris*)	*Weaver's Wave*
Pink	*Hawk*
Primrose *(primula vulgaris)*	*Pearl Bordered Yellow Underwing, Double Square Spot, Green Arches, Triple Spotted Clary, Ingrained Clary, Silver Ground Carpet*
Purple Loosestrife (*lythrum salicaria)*	*Emperor, Small Elephant Hawk, Powdered Quake*
Ragged Robin (*lychnis flos cuculi*)	*Campion, Lychnis, Twin-spot Carpet, Marbled Clover*
Red Campion (*melandrium rubrum*)	*Rivulet, Campion, Lychnis, Twin-spot Carpet, Sandy Carpet, Marbled Clover*
Red Clover (*trifolium pratense*)	*Latticed Heath, Chalk Carpet, Belted Beauty, Mother Skipton, Shaded Broad Bar, Narrow-bordered 5-spot Burnet*
Red Valerian (*centranthus ruber)*	*Elephant Hawk*
Rock Rose (*helianthemum mummularium)*	*Amulet, Cistus Forester, Silky Wave, Ashworth's Rustic, Argus, Wood Tiger, Northern Brown*
Rosebay Willowherb	*Twin-spot Carpet, Small Phoenix, White Banded Carpet*
Small Scabious (*scabiosa columbaria*)	*Lime Speck Pug, Shaded Pug*
Soapwort (*saponaria officinalis*)	*Marbled Clover*
St John's Wort	*Treble Bar*
Sweet Violet (*viola odorata*)	*Broad Bordered Yellow Underwing, Lesser Broad Bordered Yellow Underwing*
Tansy (*tanacetum vulgare*)	*Essex Emerald*
Thrift (*armeria maritima*)	*Amulet, Feathered Ranunculus, Thrift Clearwing, Black Banded*
Thyme	*Thyme Pug, Satyr Pug, Lace Border*
Toadflax (*linaria vulgaris)*	*Toadflax Pug, Marbled Clover*
Valerian (*valeriana officinalis*)	*Valerian Pug, Lesser Cream Wave*
White Campion (*silene latifolia alba*)	*Marbled Coronet, Marbled Clover, Sandy Carpet*
Wild Clematis (*clematis vitalnba*)	*Lime Speck Pug, Haworth's Pug, Small Emerald, The Fern, Pretty Chalk Carpet, Least Carpet, Pug, Chalk Carpet, Small Waved Umber*
White Clover (*trifolium repens*)	*Cloudy Wing Skipper, Orange, Clouded Sulphur*
Wild Pansy (*viola tricolor)*	*Pluvia*
Wild Strawberry (*fragaria vesca*)	*Amulet, Yellow Shell, Beautiful Carpet, Dark Marbled Carpet*

Wild Wallflower	*Flame Carpet*
Wormwood (*artemesia absinthium*)	*Wormwood Pug*
Yarrow (*achillea millefolium*)	*Essex Emerald, Lime Speck Pug, Straw Belle, Wormwood Pug, Ruby Tiger, Yarrow Pug, V Pug, Sussex Emerald, Grey Pug, Tawny Speckled Pug, Common Pug, Mullein Wave*
Yellow Flag Iris (*iris pseudacorus)*	*Belted Beauty, Water Ermine*
Barberry	*Scarce Tissue, Wheat*
Blackthorn/Sloe	*March, Common Emerald, Little Emerald, Mottled Pug, Feathered Thorn, Orange, Scalloped Hazel, Scalloped Oak, August Thorn, Brimstone, Early Thorn, Pale Brindled Beauty, Blue Bordered Carpet, Broken Barred Carpet, November, Pale November, Winter, Sloe Pug, Green Pug, Sharp Angled Peacock, The Magpie*
Broom	*Grass Emerald, The Streak, Broom-tip, Lead Belle, Spanish Carpet, Frosted Yellow*
Dog Rose	*V Pug, Little Thorn, Shoulder Stripe, Barred Yellow, Streamer*
Hawthorn	*March, Common Emerald, Little Emerald, November, Pale November, Winter, Mottled Pug, Pinion Spotted Pug, Common Pug, Grey Pug, Peppered, Brindled Beauty, Pale Brindled Beauty, Feathered Thorn, Scalloped Hazel, The Magpie, Scalloped Oak, Large Thorn, Early Thorn, Oak Tree Pug, Broken Barred Carpet*
Hazel	*Oak Beauty, Small White Wave, The Magpie, Clouded Border, Barred Umber, Winter, Pale November*
Oak	*Brindled Pug, Oak Tree Pug, Spring Usher, Peppered, Oak Beauty, Brindled Beauty, Pale Brindled Beauty, Small Brindled Beauty, Feathered Thorn, Orange, Lunar Thorn, Purple Thorn, Scalloped Hazel, Scalloped Oak, Scorched Wing, Large Thorn, August Thorn, November, September Thorn, Pale November, Winter, March, Blotched Emerald, Common Emerald, Little Emerald, False Mocha, Maiden's Blush, Marbled ug, Red-green Carpet, Broken Barred Carpet*
Rowan	*Orange Underwing, Welsh Wave, Mottled Pug, Red-green Carpet*
Wild Privet	*Lilac Beauty, Barred Toothed Striped, Yellow Barred Brindle,*

Appendix 4d: Plants and Habitats to attract Bats

1. Flower Borders and Lawns

Larvae and adults of many insects will be catered for by introducing a wide range of food, in the form of nectar, seeds and fruit as well as vegetation.

- Grow night scented flowers. These attract moths and other night flying insects of particular importance to bats.
- Plant herbs and old fashioned cottage-garden annuals attractive to insects.
- Leave part of your lawn un-mown from about mid-May to encourage insect larvae which feed on grass. Allow to seed before cutting, and rake up the hay afterwards.
- Sow wild flower seed collections in your borders.

2. Trees and Shrubs

At woodland edges space and sunshine combine with the trees to give shelter and warmth, and insects will concentrate there. So even in the smallest garden try to have at least one tree or shrub. Native trees are more attractive to insects than foreign species.

If space is limited, silver birch and goat willow are quick growing and are host to many insect visitors. With a little more space, try to make a bank of vegetation to give your garden a woodland edge structure.

3. Shelter Belts

Rows of bushes or trees can be created or improved, encouraging concentrations of insects and providing a feeding area for bats,

- Plant up gaps in natural hedges,
- A row of fast-growing cypress can be valuable.
- Train climbers using battens against a wall or fence, to provide possible roosting sites.
- Create a sheltered corner by using any combination of walls, fences, hedges or woodland edge at two angles.

Scented herbs

Chives, Borage, Lemon balm, Marjoram, Mint - many varieties

Night scented flowers for the border (in approximate order of flowering)

Bedding Plants

Nottingham catchfly	Silene nutans	
Night-scented catchfly	S. noctiflora	
Bladder campion	S, vulgaris	
Night-scented stock	Matthiola bicornis	
Sweet rocket	Hesperis natronalis	
Evening primrose	Oenothera biennis	
Tobacco plant	Nicotiana affinis	
Cherry pie	Heliotropun x hybndurr	
Soapwort	Saponaria officinalis	

Climbers

European honeysuckle	Lonicera caprifolium	July-November
Italian honeysuckle	L. etrusca superba	July-August
Japanese honeysuckle	L. japonica halliana	August-October
Honeysuckle (native)	L. periclymenum...	July-August
White jasmine	Jasminium otiicinale	
Dogrose	Rosa canina	
Sweetbriar	R. rubiginosa	
Fieldrose	R. arvensis	
Ivy	Hedera helix	
Bramble - many species		

Large trees, small trees and shrubs

Oak	Quercus robur & Q. petrea
Ash	Fraxinus excelsior
Silver birch	Betula pendula
Field maple	Acer campestre
Hawthorn	Crataegus monogyna
Alder	Ainus glutinosa
Goat willow	Salix caprea
Guelder rose	Viburnum opulus
Hazel	Coryllus avellana
Blackthorn	Prunus spinosa
Elder	Sambucus nigra
Buddleia davidii	

Rock plants for walls

Ivy-leaved toadflax	Cymbana muralis

Wall pennywort Umbilicus rupestris

Appendix 4e: Plants and Habitats to Attract Birds

Plants to Feed Birds.

Many shrubs, climbers, trees, garden and 'wild' plants provide food, directly or indirectly, through berries, seeds or the insects they attract.

Berry or fruit bearing trees and shrubs will attract members of the Thrush family, Blackbird, Fieldfare, Mistle and song Thrush, Redwing and Robin. Also Starlings and, in some winters, Waxwing and even some Warblers, e.g., Blackcaps who eat berries in the early autumn before they migrate. Unless mentioned, the berries attract all the above birds plus others as specified.

Shrubs with Berries.

- Aronia arbutifolia (Red Chokeberry) : bright red fruits
- Berberis: most forms have black/purple berries, especially loved by Blackbirds.
- Callicarpa 'Profusion': bright violet coloured berries.
- Cornus (Dogwood): blue tinted white berries (not C.Mas).
- Cotoneaster : prolific red, orange or yellow berries - birds often choose red first, through orange to yellow last. (Note berries are poisonous to humans).
- Euonymous europaeus (spindleberry: large bright red fruits which open to emit orange red seeds.(Note berries are poisonous to humans).
- Ilex (Holy): red, orange or yellow berries - red berries preferred (need partner to fruit).(Note berries are poisonous to humans).
- Mahonia: decorative black berries.
- Rosa rugosa : large red hips, particularly attractive to Greenfinches which pick out the seeds.
- Sambucus (Elder): red or black berries - over 32 species reported eating them, especially Blackcap and, occasionally, Collar Doves.
- Viburnum opulus (Guelder Rose) : translucent berries
- Viscum album (Mistletoe): familiar white globular berries of this parasite that grows in trees, especially apple, are a good food source for Blackbirds.

Climbers with Berries.

- Chaenomeles (Flowering Quince/Cydonia): Autumn Quinces.
- Hedera (Ivy) : shiny black berries
- Lonicera (Honeysuckle: red or black berries attract Thrushes plus Bullfinches and Marsh and Willow Tits. (Note berries are poisonous to humans).

- Pyracantha (Firethorn) :red, orange or yellow berries - choose red for the birds to eat before Christmas usually with orange or yellow to follow in a hard winter.
- Clematis vitalba (Old Man's Beard): seed heads are enjoyed by many birds.

Trees with Berries or Fruits.

- Crataegus monogyna (Hawthorn : red berries.
- Malus (Crab Apple: red fruited varieties are best for birds.
- Prunus (Cherries): fruits quickly picked off.
- Sorbus aucuparia (Mountain Ash/Rowan) :red, orange or pink flushed white berries. The darker the fruits the more attractive they are to birds. Occasionally bring Spotted Flycatchers to the garden.
- Taxus (Yew): sparse red berries attract a wide range of birds. Attractive also to Badgers.(Note berries are poisonous to humans).

Trees with Seed Cones.

- Alnus glutinosa (Alder), and Betula (Birch): seeds from cones enjoyed by Goldfinches, Greenfinches, Redpolls, Siskins and Tits.
- Pinus sylvestris (Scots pine) : pine cones from which Crossbills and Great Spotted Woodpeckers prise seed.

Trees with Blossom.

- Although not always welcome, Bullfinches strip the buds of fruit trees in late winter and early spring.

Garden Plants.

- Crocus: yellow and orange flowers are attractive to Sparrows because they contain yellow pigment carotene to brighten up their plumage for the breeding season.
- Echinops ritro (Globe Thistle: seed heads are eaten by Goldfinches and flower heads attract insects.
- Helianthus (Sunflower: seed heads are eaten by Greenfinches. The nectar attracts a wide range of insects.
- Lavandula (Lavender): flowers going to seed are attractive to Goldfinches.
- Primula (Polyanthus/Primrose): yellow and orange flowers are attractive to Sparrows.

Wild Plants.

You can provide a haven for wild plants to exist in their own right recreating a wild meadow to attract insects which, in turn, attract birds and other wildlife.

- Betony.
- Bird's Foot Trefoil.
- Common Poppy - seeds are favourite food of Finches.
- Field Scabious.
- Greater Knapweed.
- Meadow Cranesbill.
- Musk Mallow.
- Ox Eye Daisy.
- Oxlip.
- Primrose.
- Rough Hawkbit.
- Self Heal.
- Teasel - seed heads are a favourite food of Goldfinches.
- Wild Strawberry

The Lawn.

This is one of the principal sources of food for birds who enjoy feeding on insects including-:Ants eaten by Green Woodpeckers; Leatherjackets by Starlings; Snails by Song thrushes; Slugs by Toads and Worms by Blackbirds, Robins and Thrushes.

Cover and Protection.

By surrounding your garden by thick and often prickly hedging and dotting suitable shrubs around, you can provide safe nesting havens that are protected from marauding cats and even the unwelcome attention of unfriendly humans.

The most successful shrubs and trees for this purpose include:-

- Conifers especially chamaecyparis, Taxus (Yew) and Thuja Placata.
- Crataegus.
- Eleagnus.
- Hedera (Ivy) up a tree.
- Ligustrum (Privet) especially for Blackbirds.
- Lonicera (Honeysuckle).
- Pittosporum.
- Salix caprea (Weeping Kilmarnock Willow).

Appendix 4f: Plants and Habitats to attract Bees

Native Plants for Bees

Native plants should be your first choice to help our native bees. Listed below are some plants that are good sources of nectar or pollen for bees. Both the common and Latin names of the plant genus are given. This list is not exhaustive; there are many other plants good for bees. Individual species have not been included because we hope the list will be useful across the U.S. Not all of these genera will have species in your local area, but they do represent plants that will grow in a variety of environments. Use a wildflower guide or contact local nurseries to find your local species.

- Aster *Aster*
- Black-eyed Susan *Rudbeckia*
- Caltrop *Kallstroemia*
- Creosote bush *Larrea*
- Currant *Ribes*
- Elder *Sambucus*
- Goldenrod *Solidago*
- Huckleberry *Vaccinium*
- Joe-pye weed *Eupatorium*
- Lupine *Lupinus*
- Oregon grape *Berberis*
- Penstemon *Penstemon*
- Purple coneflower *Echinacea*
- Rabbit-brush *Chrysothamnus*
- Rhododendron *Rhododendron*
- Sage *Salvia*
- Scorpion-weed *Phacelia*
- Snowberry *Symphoricarpos*
- Stonecrop *Sedum*
- Sunflower *Helianthus*
- Wild buckwheat *Eriogonum*
- Wild-lilac *Ceanothus*
- Willow *Salix*

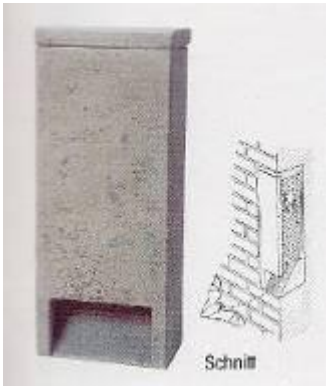
Garden plants for bees

Flower beds in gardens, business campuses, and parks are great places to have bee-friendly plants. Native plants will create a beautiful garden but some people prefer "garden" plants. Many garden plants are varieties of native plants, so this list only includes plants from other countries--"exotic" plants--and should be used as a supplement to the native plant list.

As with the native plants, this list is not exhaustive.

- Basil *Ocimum*
- Cotoneaster *Cotoneaster*
- English lavender *Lavandula*
- Giant hyssop *Agastache*
- Globe thistle *Echinops*
- Hyssop *Hyssopus*
- Marjoram *Origanum*
- Rosemary *Rosmarinus*
- Wallflower *Erysimum*
- Zinnia *Zinnia*

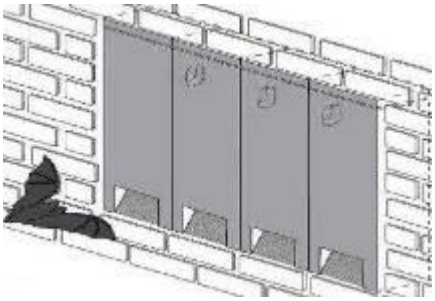
Appendix 5: Bat Boxes and Bat Brick Specifications to Provide Bat Habitat on Buildings



Schwegler 1FR can be installed within brick masonry just leaving the entrance and can be rendered over.

Ibstock Enclosed Bat Box B is designed specifically for the pipistrelle bat.

Schwegler WI integral Summer & Winter Bat Box.



Schwegler 2FR Bat Tube is the same design as the 1FR but with holes in the sides. Multiple tubes to be placed next to each other to form a much larger roost.

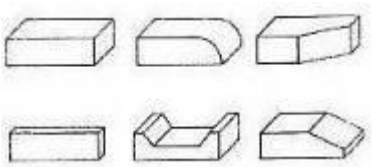
Schwegler 27 wall can be installed within brick masonry. It can be rendered over.

Schwegler 1FQ wall-mounted bat box.

Schwegler 1FE Bat Access Panel can be surface-mounted or integrated. The open back enables bats access through exterior walls.

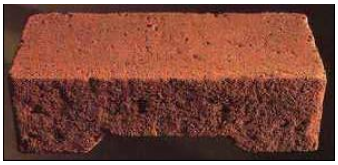
Ibstock Bat Box with Engraved Motif C is designed specifically for the pipistrelle bat and is available in all brick colours.

Ibstock Free Access Bat Box allows bats to access the cavity wall of the building.



Modified bricks for creating bat access points. A standard brick is shown top left. Purpose made bat bricks can also be used.

Norfolk Bat Brick allows bats to access the cavity wall of the building. The slits are the perfect size for Natterer's bat, Daubenton's bat, Brandt's bat and Brown long-eared.



Marshall's Bat Access Brick *(Also available in stone)* allows bats access into the cavity wall of the building.

APPENDIX 6: Insect Box Specifications

A variety of insect boxes is recommended to encourage a diversity of insect species and encourage bats.

Wooden Insect House

A general insect habitat for beneficial insects in summer and, later in the year, over wintering ladybirds and lacewings. Locate in a sheltered place near nectar or pollen plants or by a pond. Durable and strong construction in acacia, oak or larch with no maintenance necessary.
Dimensions: 22 × 13.5 × 13.5cm.

Woodcrete Insect House

An insect nest made from long-lasting, insulating, woodcrete, with holes of different sizes providing homes for a variety of beneficial insects such as bees and solitary wasps.
Dimensions: 14 × 8 × 26cm; Weight: 3.65kg

Insect House with Inspection Tubes

This nesting and hibernation box for insects has a woodcrete exterior with a wooden front panel which can be removed for observation. Through the transparent tubes you can see the usually hidden lifecycle of many solitary types of bees and hymenoptera including egg-laying, development of larvae and sealing of brood chambers. Typical inhabitants are wild bees and thread-waisted wasps. All the species attracted to this box are harmless non-aggressive pollinating insects.
Dimensions: 33 × 21 × 51 cm; Weight: 7.1kg.

Appendix 7. Bird Box Specifications

Schwegler boxes have the highest occupation rates of all box types. They are carefully designed to mimic natural nest sites and provide a stable environment for chick rearing and winter roosting. They can be expected to last 25 years or more without maintenance.

2. Schwegler No 11 House Martin Nest (Code: 002097D)

It is increasingly difficult for swallows and house martins to find suitable nest-building material. The mud they do find, if any, is often poor quality. In addition, the walls of buildings are nowadays often very smooth As a result, nests tend to fall down, sometimes with the nestlings inside. In many places, the vibration caused by heavy vehicles shakes the nests loose. This nest has been developed to enable House Martins to breed successfully on external facades without overhanging eaves and has proved highly successful.

3. Schwegler No 16 Swift Box (Code: 002087D)

The design of this box mimics bell tower louvres. It has a removable panel for easy inspection of the nest chamber.

4. 2H Robin Box (Code: 002015D)

This box is attractive to robins, pied wagtails, spotted flycatcher, wrens and black redstarts. Best sited on the walls of buildings with the entrance on one side.

5. Sparrow Terrace

House sparrows are gregarious and prefer to nest close to each other, so this woodcrete box provides room for three families under one roof. Made from long-lasting, breathable woodcrete. No maintenance required. Designed for fixing to walls (not suitable for fences or sheds due to the weight of the box). Available in choice of stone colour (pictured) or brown.

6. Schwegler 1B Bird Box

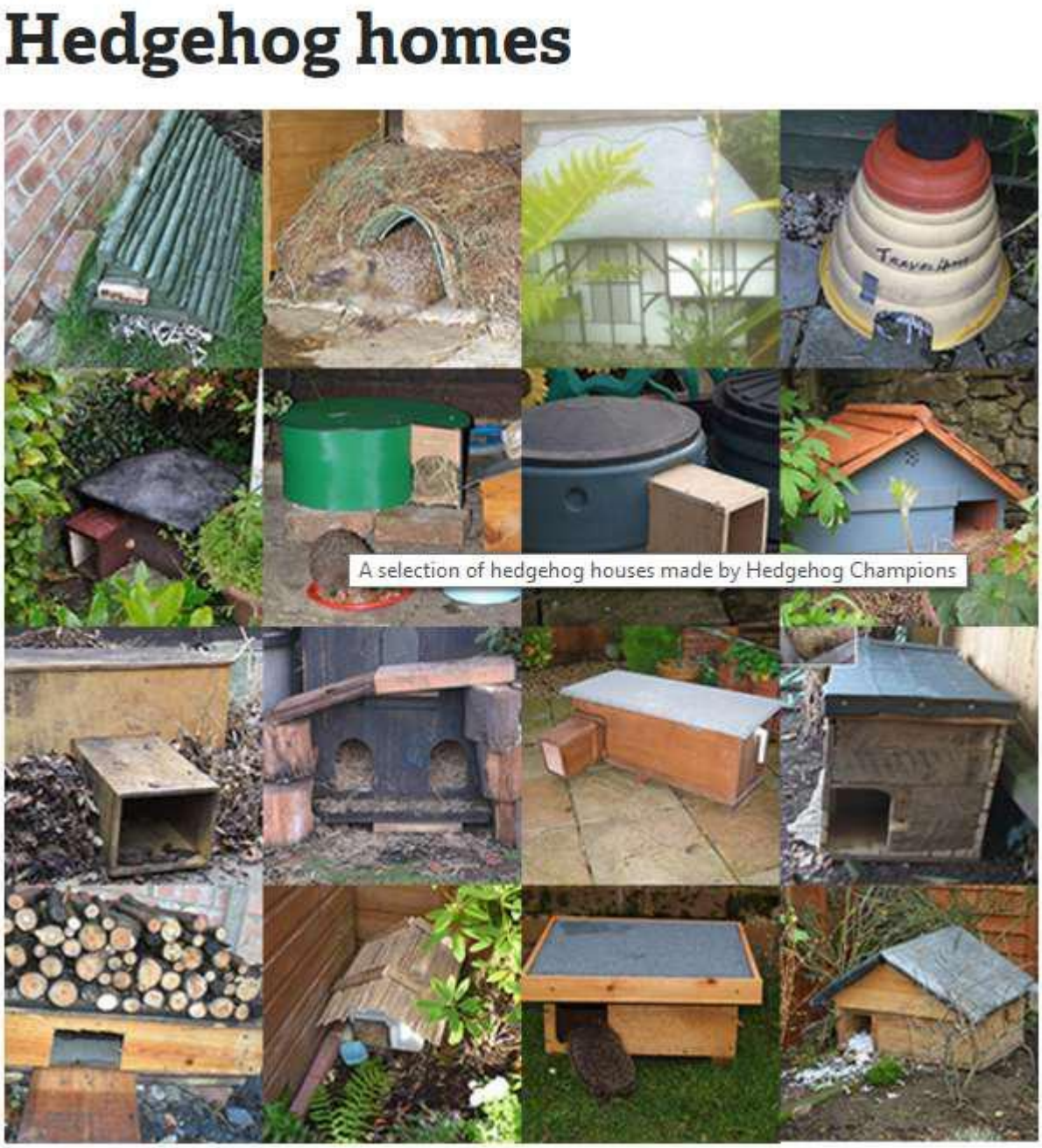
The most popular box for garden birds, the 1B appeals to a wide range of species, and is the official nest box of National Nest Box Week. The box can be nailed to the trunk of a tree, or hung from a branch. Woodcrete, 23cm high x 16cm diameter. Available in choice of four colours - brown, green, red or white. Available with 32mm entrance hole (standard) or with 26mm hole

7. Schwegler Built-in Multi-System Main Cavity Bird Box (Code: 002101D)

The multi-system has exchangeable front panels for kestrels, jackdaws or swifts. The system can be installed in all types of buildings, whether constructed of concrete, brick or timber. To meet the needs of various species of bird, different types of front panel are available for use with the main cavity. The main cavity is supplied without a front panel which should be ordered separately.
Positioning: At heights of 5m or more on a sheltered external wall.
Suitable for: Dependant on the type of front panel chosen.
Material: Woodcrete **Height:**415mm **Width:** 445mm
Depth:415mm **Weight:**2.8Kg

Appendix 8: Measures specifically for hedgehogs

Hedgehog boxes or domes; a variety of types are shown below:



Hedgehog Dome with insulated base

for use as summer home and hibernation in winter

[Pic. 1]: SCHWEGLER Hedgehog Dome with Hedgehog family

Hedgehogs are a protected species.

They usually construct nesting places in hollow tree stumps, piles of wood, dense vegetation and piles of leaves, all of which are becoming harder to find.

They will readily occupy our Hedgehog Dome, which provides year round accommodation, including hibernation quarters. Hedgehogs are welcome visitors to gardens because their diet consists of Snails, Caterpillars, Millipedes, etc.

[Pic. 2]: Hedgehog Dome (occupied)

Material: SCHWEGLER wood-concrete. Brown protective coating for a balanced temperature

Siting: Choose somewhere protected from wind and rain. Try and avoid placing the Dome where the animals have to cross a lawn because these are mainly damp at night.

Nesting material: Ideally fill with hay (supplied with the Dome) but alternatively use dry leaves and straw, as well as cut up newspaper and wood shavings.

Dimensions:
Interior: ⌀ 44 cm Height: 28 cm Entrance: 11 x 12 cm
Exterior: ca. ⌀ 50 cm

Colour: Classic Brown

[Pic. 3]: Hedgehog Dome

Weight: ca. 17 kg

Detailed instructions are supplied.

Hedgehog Dome with insulated base **order no.: 00 390 / 4**

(incl. nesting material, ready to use)