# Preliminary Ecological Appraisal

**Land at Alington Estate, Little Barford, Bedfordshire**

**On Behalf of:**

**Alington Estate**

**September 2021**


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**Executive Summary**

1. This report presents the results of a preliminary ecological appraisal (PEA) undertaken at Land at Alington Estate, Little Barford, Bedfordshire. The proposals are currently undetermined but likely to include both residential and commercial development. on part of the surveyed area and on a wider adjacent site area being promoted through the Bedford Borough Local Plan 2040 (BBLP) covering additional land east of the East Coast Mainline railway and west of the A428 improvement)

2. The surveyed area (167.4ha) comprised a range of arable, pasture and woodland habitats. The western boundary of the site is the River Great Ouse. The eastern boundary of the site is the mainline railway line between London and York. Due to time constraints the focus has been to survey land west of the East Coast Mainline. Any issues in this area from an ecology perspective might, together with other potential constraints such as heritage, high pressure gas main and high voltage overhead lines, have had the potential for a greater impact on the delivery of housing numbers

3. The surveyed area is not located within the zone of influence of any sites designated under the Habitats Regulations 2019 or within an Impact Risk Zone of any SSSI. The nearest statutory designated site is St Neots Common SSSI located more than 3km from the site.

4. Little Barford LWS is located within the surveyed area and comprises of a range of pasture fields and a tussocky grassland as well as a number of broadleaved plantation woodlands all of which appeared heavily grazed with negligible understory. The River Great Ouse LWS is located adjacent to the western boundary of the site.

5. The habitats on the eastern side of the minor road that runs through the surveyed area were predominantly arable with boundary hedges and small woodlands and generally of lower ecology value and hence more suitable for development.

6. The surveyed area has the potential to support a number of protected and notable species including roosting, foraging and commuting bats, breeding and wintering birds, great crested newt, water vole and otter, rare and notable invertebrates, common reptiles, European hedgehog and brown hare.

7. Recommended further surveys and assessments, to be undertaken at the appropriate time in the planning process include:

    - Biodiversity Net Gain assessment and report;
    - Botany survey of CWS and priority habitats including other grasslands and woodlands;
    - Badger scoping survey followed by bait marking survey;
    - Bat activity surveys for a site of moderate value;
    - Bat ground level roost assessment /climbing survey of trees and inspection surveys of buildings, and where required subsequent emergence surveys;
    - Breeding and wintering bird surveys;
    - Presence/absence or eDNA surveys for great crested new with waterbodies;
    - Invertebrate scoping assessment;
    - Otter and water vole surveys; and

- Presence/absence survey for common reptiles.

8. Proposals should avoid development within the LWS and there are a range of opportunities for enhancing this and other higher value habitats on the west of the surveyed area through appropriate management, which will deliver landscape-scale biodiversity benefits and create valuable multifunctional greenspace. At the same time, significant areas of residential development may be delivered within areas of lower ecological value principally on the eastern side of the site.

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## 1.0 Introduction

**1.1** Southern Ecological Solutions Ltd. (SES) was commissioned to undertake a preliminary ecological appraisal (PEA) of Land at Alington estate, Little Barford (the site). The land ownership plan is provided in **Appendix 1**. This report covered Survey Areas 1 (58.8ha) and 2 (108.6) combined and was 167.4 ha in total. The remainder of the site being promoted through the Bedford Borough Local Plan 2040 (BBLP) (land east of the East Coast Mainline railway and west of the A428 improvement) will be surveyed ahead of the Reg 19 consultation. Due to time constraints the focus has been to survey land west of the East Coast Mainline. Any issues in this area from an ecology perspective might, together with other potential constraints such as heritage, high pressure gas main and high voltage overhead power lines have had the potential for a greater impact on the delivery of housing numbers.

**1.2** The surveyed area comprises of a range of arable, pasture and woodland habitats. The western boundary of the surveyed area is the River Great Ouse. The eastern boundary of the surveyed area is the mainline railway line between London and York.

**1.3** The objective of the report is to set out the ecology baseline for the surveyed area, assess constraints and opportunities for development across the surveyed area and provide options for enhancements of both habitats and species and hence deliver a program of biodiversity net gain.

**1.4** The objectives of this appraisal were to:

- map the main ecological features within the surveyed area and compile a plant species list for each habitat type;
- make an initial assessment of the presence or likely absence of species of conservation concern;
- identify any legal and planning policy constraints relevant to nature conservation which may affect the development proposals;
- determine any potential further ecological issues;
- determine the possible need for further surveys and mitigation; and
- make recommendations for minimising impacts on biodiversity and providing net gains in biodiversity where possible in accordance with Chapter 15: *Conserving and Enhancing the Natural Environment*, of the National Planning Policy Framework (NPPF) (MHCLG, 2019), and relevant nature conservation policies within the Bedford Borough Local Plan 2030.

**1.5** Details of relevant wildlife legislation and national and local planning policies related to nature conservation and biodiversity are provided in **Appendix 2**.

### A428 Black Cat to Caxton Gibbet Road Improvement scheme

**1.6** The A428 Black Cat to Caxton Gibbet Road Improvement scheme is currently planned to run close to the southern and eastern extents of the Alington Estate landholding as shown in the plan of the route provided in **Appendix 3**. The A428 improvement Development Consent Order (DCO) application documents were published by the Highways Agency (HA) on the National Infrastructure Planning (NIP) website on 15 March 2021. This included a full Environmental Statement which itself included a Biodiversity Chapter and 19 technical appendices. The details and documents are provided on the NIP

website[1]. Currently, the confidential technical appendices on various species groups, such as badger and breeding birds are being sought from the HA. The A428 Road Improvements Biodiversity chapter will require to be reviewed as part of the proposed Phase 2 ecology surveys.

## 2.0 Methods

**2.1** The following PEA follows guidance and methods as prescribed by the Chartered Institute for Ecology and Environmental Management (CIEEM) *Guidelines for Ecological Appraisal 2nd edition* (2017) and the *Guidelines for Ecological Impact Assessment* (2018). Following these methods, a baseline of rare and/or noted ecological receptors (species and habitats) was established and valued. Predicted significant impacts upon these receptors have been identified and constraints and opportunities identified. This step-wise assessment process has informed likely mitigation and enhancement measures. These surveys will fully inform the predicted impacts of the scheme in accordance with the NPPF (MHCLG, 2021), local planning policy and relevant wildlife legislation.

### Desk Study

**2.2** SES commissioned a data search from the Bedfordshire and Luton Biodiversity Recording and Monitoring Centre (BRMC) for records of protected and notable species and for data on non-statutory designated sites. The data search encompassed the study area, and up to 2km from the boundary. Data was received on 19 March 2021. A similar data search was commissioned from Cambridgeshire and Peterborough Environmental Records Centre with data received on 18 March 2021.

**2.3** Hazel dormouse *Muscardinus avellanarius* records were checked on 19 March 2021 from the National Biodiversity Network (NBN) Atlas www.nbnatlas.org, which holds data from the People's Trust for Endangered Species (PTES). As hazel dormouse is particularly under-recorded, the data search for this species encompassed an area of up to 10km from the boundary.

**2.4** A web-based search for statutory designated sites via the Multi Agency Geographic Information for the Countryside (MAGIC) spatial data resource magic.defra.gov.uk was undertaken on 19 March 2021 for the following statutory designated sites: sites protected under the Habitats Regulations 2019 (up to 13km from the surveyed area boundary) and sites protected under the Wildlife and Countryside Act 1980 and Section 21 of the National Parks and Access to the Countryside Act 1949 (5km from the surveyed area boundary).

**2.5** An online search was also undertaken on MAGIC on 19 March 2021 for priority habitats listed under the Natural Environment and Rural Communities Act 2006 and ancient woodland listed on the ancient woodland inventory, waterbodies within 500m and records of Natural England mitigation licenses granted for great crested newt within 5km.

### Extended Phase 1 Habitat Survey

[1] A428 Black Cat to Caxton Gibbet Road Improvement scheme | National Infrastructure Planning (planninginspectorate.gov.uk).

**2.6** An extended Phase 1 Habitat Survey was carried out on 17 and 18 March 2021 by suitably qualified ecologists Steve Parr MCIEEM and Josey Travell ACIEEM during appropriate weather conditions.

**2.7** This is a standard technique for obtaining baseline ecological information for areas of land, including proposed development sites. Phase 1 Habitat Survey methods are set out in the *Handbook for Phase 1 Habitat Survey* (JNCC, 2010). Habitat mapping was undertaken using the standard classification to indicate habitat types. Features of ecological interest and value were highlighted using target notes.

**2.8** The dominant and readily identifiable higher plant species identified in each of the various habitat parcels were recorded and their abundances assessed on the DAFOR scale:

- D - Dominant
- A - Abundant
- F - Frequent
- O - Occasional
- R - Rare

**2.9** These scores represent the abundance within the defined area only and do not reflect national or regional abundances. Plant species nomenclature follows Stace (2010).

**Protected and Notable Species**

**2.10** The surveyed area was assessed during the extended Phase 1 Habitat survey for its suitability for protected and notable species that are likely to occur in the area. Considering the results of the desk study, the location and habitats in the surveyed area, an assessment was carried out for:

- Flora;
- Badger *Meles meles*;
- Bats (roosting, foraging and commuting);
- Nesting and over-wintering birds;
- Great crested newt *Triturus cristatus;*
- Hazel dormouse;
- Rare or notable invertebrates;
- Reptiles; and
- Other notable mammal species.

*Badger*

**2.11** An initial assessment was made to record badger setts across the surveyed area using standard guidelines for classifying badger setts (Harris *et al.,* 1989) and categorising entrance holes (Natural England, 2009). Together with records of signs including paths, hairs, latrines and setts. This assessment also sought to identify areas with the potential to be utilised by badgers for foraging, commuting and sett creation, such as earth banks, woodland, hedgerows and rough grassland.

*Bats*

**2.12** The surveyed area was assessed for its suitability to support roosting, foraging and commuting bats.

**2.13** Buildings and trees were assessed for their potential to support roosting bats using guidelines issued by Collins (2016). Both were assessed externally from ground level.

**2.14** Good bat foraging habitat generally includes sheltered areas and habitats with good numbers of insects, such as woodland, scrub, ponds lakes and species-rich or rough grassland. Good commuting habitat generally comprises linear features such as well-connected hedgerows, woodland edge, watercourses. The surveyed area was assigned a level of suitability according to the classification provided by Collins (2016)**.**

*Birds*

**2.15** The surveyed area was assessed for its potential to support breeding birds and significant wintering and/or migratory bird populations. Suitable habitat generally includes scrub, trees and can also include buildings, open grassland and piles of debris.

*Great Crested Newt*

**2.16** The terrestrial habitat within the surveyed area was assessed for its suitability for great crested newt. Suitable terrestrial habitat generally includes rough grassland and woodland where they can forage and hibernate, with good links to ponds where they breed. All accessible waterbodies within 500m of the surveyed area were assessed for their suitability to support great crested newt, in accordance with best practice guidelines (Oldham *et al*., 2000).

*Hazel Dormouse*

**2.17** Habitats were assessed for their general suitability for hazel dormouse. This species generally uses areas of dense woody vegetation and are more likely to be found where there is a wide diversity of woody species contributing to a three-dimensional habitat structure, a number of food sources, plants suitable for nest-building materials and good habitat connectivity.

*Invertebrates*

**2.18** The surveyed area was assessed for its potential to support rare or notable invertebrate species. This assessment was made on the basis of the structural complexity and diversity of the habitat mosaic present.

*Otter and Water Vole*

**2.19** The river, ditch and waterbody habitats were assessed for otter *Lutra lutra* and water vole *Arvicola amphibius.*

*Reptiles*

**2.20** The surveyed area was assessed for its suitability for the four commoner reptile species; common lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus*. Specific habitat requirements vary between species. Common lizard and slow worm prefer rough grassland although they can be found in a variety of habitats ranging from woodland glades to walls and pastures. Grass snake has similar habitat requirements but have a greater reliance on ponds and wetlands. Adder is more associated with dry grasslands, heathland and woodland edge habitats.

*Notable Mammals*

**2.21** The surveyed area was assessed for its potential to support Natural Environment and Rural Communities (NERC) Act 2006 mammals of principal importance which are likely to occur in the local area especially European hedgehog *Erinaceus europaeus* and brown hare *Lepus europaeus.*

**Assessment of Nature Conservation Value**

**2.22** CIEEM guidelines for Ecological Assessment in the United Kingdom (2018) have been utilised to assess the impacts upon habitats within the zone of influence of the site. CIEEM suggests that it is best to use the geographical scale (i.e. international, national, regional etc.) at which a feature (i.e. a habitat, species or other ecological resource) may or may not be important as the appropriate measure of value. As such, data from the data search and extended Phase 1 Habitat survey have been reviewed and the likely occurrence of protected and notable species/species groups assessed. This has allowed predictions of impacts to be made along with recommendations for mitigation, compensation and enhancement. Further targeted survey will refine the evaluation and associated recommendations.

**2.23** The following geographical scale categories are considered appropriate:

- International;
- National (England);
- Regional (East Midlands);
- County (Bedfordshire);
- District (St Neots);
- Local (Little Barford); and
- Site.

**Constraints**

**2.24** Desktop data searches are a valuable tool in evaluating a site's potential to hold rare and protected species, it is not however an absolute in confirming presence or absence of notable species due to the nature of how the records are collected.

**2.25** The lower ground within the surveyed area was waterlogged and access to the wet woodland areas between the church and River Great Ouse was not feasible, but this was not considered a significant constraint to the overall assessment.

## 3.0 Baseline Ecological Conditions

### The Surveyed area

**3.1** The surveyed area is located to east of the River Great Ouse.

**3.2** The surveyed area incorporates part of the floodplain of the River Great Ouse, which meanders on the western boundary of the surveyed area from south to north.

### Statutory Designated Sites

**3.3** There were no sites designated under the Habitats Regulations (2019) within 25km of the surveyed area. There were two Sites of Special Scientific Interest (SSSI) designated under the Wildlife and Countryside Act (1981) and one Local Nature Reserves (LNR) designated under Section 21 of the National Parks and Access to the Countryside Act 1949 within 5km of the surveyed area (**Table 1**). The nearest SSSI was St Neots Common SSSI located 3.1km north of the surveyed area and nearest LNR was Little Paxton Pits LNR 4.8km north of the surveyed area.

Table 1: Statutory Designated Sites with 5km of the surveyed area

| Site Name | Distance & Direction | Size (ha) | Description & Reason for Designation |
|---|---|---|---|
| St. Neots Common SSSI | 3.1km North | 33.6 | Site supports woodland, grassland, wetland, and pond habitats, which provide an area of diverse wildlife habitat, supporting a variety of species. Notable flora species include common water dropwort *Oenanthe fistulosa*, marsh orchid *Dactylorhiza praetermissa*, marsh arrow grass *Triglochin palustris*, water plantain *Alisma plantagoaquatica* and brookweed *Samolus valerand*. There are also thriving colonies of toads and frogs, the latter being rare in the county. |
| Little Paxton Pits LNR | 4.8km North | 60 | Site supports flooded gravel pit habitats, marsh, woodland, grassland, and scrub habitats, and is immediately adjacent to Little Paxton Pits SSSI. The pits are of national importance for wintering waterfowl, and an important stopping point for migrant birds. The site also supports wading birds, invertebrates, and otters. Notable fauna species include gadwall *Anas strepera*, ringed plover *Charadrius hiaticula*, snipe *Gallinago* gallinago, tufted duck *Aythya fuligula*, kingfisher *Alcedo atthis,* and nightingale *Luscinia megarhynchos*. |
| Weaveley and Sand Woods SSSI | 4.1km East | 47 | Site supports nationally rare ancient woodland habitat, with unique geology. Flora is typical of ancient woodland, and notable species present include herb-Paris *Paris quadrifolia*, butterfly orchid *Platanthera chlorantha* and pignut *Conopodium major*. |

**SSSI - Site of Special Scientific Interest**
**LNR - Local Nature Reserve**

**Non-statutory Designated Sites**

**3.4** There were six non-statutory designated sites within Bedfordshire and one with Cambridgeshire within 2km of the surveyed area (**Table 2**).

**3.5** Details of Little Barford CWS are provided in Appendix 4.

Table 2: Non-statutory designated sites within 2km of the surveyed area

| Site Name | Area (ha) | Distance and Direction | Reasons for Designation |
|---|---|---|---|
| **Bedfordshire** | | | |
| Little Barford CWS | 29.48 | Within surveyed area | Complex of two semi-improved pastures to the east, an area of swamp vegetation in a poplar plantation to the west (not surveyed), a churchyard and the neighbouring section of the River Great Ouse. |
| River Great Ouse CWS | 213.1 | Adjacent W boundary | River and adjacent habitats and features which are considered part of the river system |
| Begwary Brook Pits CWS | 15.8 | 0.1km W | Mosaic of freshwater and wetland habitats |
| Wyboston Pits CWS | 104.18 | 0.1km W | Series of flooded, disused gravel pits surrounded largely by amenity grassland with scattered trees and shrubs but with smaller areas of neutral and marshy grasslands and broadleaved plantation. |
| St John's Wood CWS | 5.7 | 1.0km E | Ancient semi-natural woodland |
| Lath Pool and Ditch CWS | 0.8 | 1.3km S | Pond and ditch habitats |
| **Cambridgeshire** | | | |
| River Great Ouse CWS | N/A | 0.5km N | Major river not grossly modified by canalisation or poor water quality; supports >0.5ha NVC S6 swamp; >0.5ha S4 swamp; >0.05ha MG13 grassland; a NS vascular plant (*Nymphoides peltata*); breeding populations of a NR dragonfly (*Libellula fulva*) |

**Habitats**

**3.6** The mapped habitats recorded from the Bedfordshire data search are provided in **Appendix 5**. The plan indicates that the fields adjacent to the River Great Ouse are classified as floodplain grasslands.

**3.7** A Phase 1 Habitat map of the surveyed area and species recorded within the principal habitats are provided in **Appendix 6**. The Phase 1 Habitat types (JNCC, 2010) within the surveyed area are listed below followed by a description of each habitat type:

*Woodland, Hedgerows and Scrub*

- Semi-natural broadleaved woodland
- Plantation broadleaved woodland
- Semi-natural mixed woodland
- Scattered scrub
- Scattered deciduous trees
- Tall ruderal
- Ephemeral/short perennial
- Defunct species-poor hedgerow
- Intact species-poor hedgerow

*Grassland and Marsh*

- Semi-improved neutral grassland
- Poor semi-improved grassland
- Improved grassland
- Marsh/Marshy grassland

*Swamp, Marginal and Inundation*

- Swamp

*Open Water*

- Running water
- Standing water

*Cultivated/Disturbed Land*

- Arable
- Hedgerow
- Dry ditch
- Buildings
- Bare ground

*Woodland and Scrub*

*Semi-natural broadleaved woodland*

**3.8** Pockets of semi-natural broadleaved were present within the surveyed area and were predominantly pedunculate oak *Quercus robur (*dominant) with ash *Fraxinus excelsior* (abundant), field maple *Acer campestre* (occasional), bird cherry *Prunus avium* (rare) and holly *Ilex aquifolium* (rare). The woodlands appeared to be heavily grazed and supported a limited understory of hazel *Corylus avellana*, elder *Sambucus nigra* and hawthorn *Crataegus monogyna* with a depauperate ground flora of nettle *Urtica dioica* (frequent) with occasional lesser celandine *Ficaria verna,* green alkanet *Pentaglottis sempervirens*, cleavers *Galium aparine* and daffodil *Narcissus sp*. (rare) noted.

*Plantation broadleaved woodland*

**3.9** A large plantation of poplar species *Populus sp*. with a dense understory dominated by dense stands of saw sedge *Cladium mariscus* and other sedge species *Carex spp*., with bramble *Rubus fruticosus agg.* and nettle was located adjacent to the floodplain grasslands and was waterlogged and inaccessible at the time of survey.

**3.10** Older plantations of ash and oak were located to the south of the Church with fenced boundaries and planted in straight lines. There was a negligible understory of elder (occasional) and depauperate ground flora. Woodland management appeared to be limited with no thinning and hence there were elements of standing dead wood where some saplings had been crowded out.

*Semi-natural mixed-woodland*

**3.11** Woodlands located to the east of the surveyed area were of more ancient origin and included mature oak (dominant), ash (abundant), Scot's pine *Pinus sylvestris* (occasional) horse chestnut *Aesculus hippocastanum* (rare), holly (rare), bird cherry (rare). The understory was limited to bramble (dominant), nettle (dominant), green alkanet (occasional), cleavers (occasional), lesser celandine (occasional) and dog violet *Viola riviniana* (rare).

*Scattered scrub*

**3.12** The section of ground between the arable field and the power station in the north east of the surveyed area was dominated by planted scrub with defunct rabbit fences. This habitat was dominated principally by hawthorn, blackthorn *Prunus spinosa,* elder and with occasional field maple and dog rose *Rosa canina*. The ground flora was heavily rabbit-grazed grassland with a diverse herb assemblage including cut-leaved cranesbill *Geranium dissectum* and yarrow *Achillea millefolium*.

*Scattered deciduous trees*

**3.13** Species noted scattered within fields and pastures included mature sycamore *Acer pseudoplatanus*, weeping willow *Salix babylonica*, white poplar *Populus alba*, cherry plum *Prunus cerasifera,* hawthorn, crab apple *Malus sylvestris* (rare) and pedunculate oak. The River Great Ouse at the base of the floodplain grasslands was lined with occasional mature willow and poplar trees.

*Tall ruderal*

**3.14** Species within woodland edges and field boundaries included giant willowherb *Epilobium hirsutum (*occasional), nettle (dominate) and burdock Arctium lappa. One field within the eastern section of the surveyed area was an abandoned fallow with abundant ruderals dominated by broad-leaved dock *Rumex obtusifolius*, and creeping thistle *Cirsium arvense*.

*Ephemeral/short perennial*

**3.15** Species within woodland edges and field boundaries included rosebay willowherb *Chamerion* angustifolium (occasional), nettle (dominate) and dock *Rumex sp.* (occassional).

*Defunct species-poor hedgerow*

**3.16** This habitat was located primarily along field boundaries throughout the surveyed area. Species present included stands of hawthorn (dominant), blackthorn (abundant), hazel (occassional), field maple (occassional), and apple (rare). The hedgerows were under no obvious management, with large gaps present at regular intervals.

*Intact species poor hedgerow*

**3.17** Species within this habitat included field maple (frequent), willow (frequent), hazel (frequent), hawthorn (abundant), blackthorn (abundant) with the occassional dog rose and bramble. This habitat was recently planted along the northern boundary of the surveyed area but was not yet mature enough to be subject to regular management.

*Grassland and Marsh*

*Semi-improved neutral grassland*

**3.18** The field between the church and old farm was a rank, tussocky grassland with cocks' foot *Dactlyis glomerata*, perennial rye grass *Lolium perenne*, with fescue species *Festuca sp* and broadleaf plantain *Plantago major*, and lesser celandine.

*Poor semi-improved grassland*

**3.19** Species identified during the preliminary inspection of this habitat included cocks' foot, perennial rye grass, thistle, fescue species *Festuca sp*. Occasional creeping thistle and frequent dock were also noted in free—draining areas along the east of the surveyed area.

*Improved grassland*

**3.20** This habitat was restricted to the graveyard of the onsite church. Species noted within included dandelion, snow drop, daffodil. The sward height was exceptionally short and under regular management.

*Marsh/Marshy grassland*

**3.21** A wide, spring-fed channel was located within the unimproved pasture field between the church and the farm buildings. The channel was dominated by hard rush *Juncus effusus* with brooklime *Veronica beccabunga* and fool's water cress *Helosciadium nodiflorum*.

*Swamp, Marginal and Inundation*

*Swamp*

**3.22** An area of swamp was identified within the west of the surveyed area. Vegetation was tall and included common reed *Phragmites australis (*dominant).

*Open Water*

*Running water*

**3.23** A stream that appeared to have been modified flowed west to east within the Centre of the surveyed area. The banks were grassed over or overgrown with scrub with negligible emergent and marginal species. The stream was shallow with a gravel bed in sections. Flora species noted within included occasional brooklime and common reed *Phragmites australis* was dominant where the ditch widened at the junction with the adjacent River Great Ouse. A second stream was within the flooded woodland and not surveyed.

*Standing water*

**3.24** A number of waterbodies were identified within the surveyed area. Limited vegetation was identified within these, with common reed (dominant) and yellow flag *Iris pseudocorus* noted (rare) and water lily *Nymphaea alba* (rare) noted in three of the waterbodies.

**3.25** There were eight ponds within the surveyed area. Descriptions are found below with their HSI scores provided in Table 5 and a location plan provided in **Appendix 7**.

- P1: This was a small (c. <100m$^2$) ephemeral pond within a swamp in woodland located along the western boundary.
- P2: This was a small (c.300m$^2$) ephemeral pond within woodland, located within the south of the surveyed area.
- P3: This was a moderate (c. <1100m$^2$) sized pond dominated by common reed located to the south of the surveyed area boundary, adjacent to woodland.
- P4: This was a small (c. <100m$^2$) partially tree-shaded pond with approximate 81-85% emergent vegetation.
- P5: This was a small (C. (c. 175m$^2$) managed pond in an ornamental, garden setting with limited marginal and emergent vegetation.
- P6: This was a moderate (c.350m$^2$) field boundary pond with c.66-80% emergent vegetation.
- P7: This was a moderate ((c. 900m$^2$) tree shaded ephemeral pond within woodland in the east of the surveyed area.
- P8: This was a very small (c. <50m$^2$) waterbody located within a hollow behind a farm building in the north of the surveyed area, with negligible emergent or marginal vegetation.

*Cultivated/Disturbed Land*

*Arable*

**3.26** The dominant species within this habitat was the crop rape seed *Brassica napus*.

**3.27** Abandoned gardens around the manor house included trees such as holm oak *Quercus ilex,* horse chestnut, with an understory of wood sqill *Scilla siberica,* creeping cinquefoil *Potentilla reptans,* cleavers, with occasional lesser celandine, daffodil, and sorrel *Rumex acetosa*.

*Defunct species-poor hedgerow*

**3.28** This habitat was dominated by hawthorn with little recent management.

*Intact species poor hedgerow*

**3.29** Species within this habitat included field maple (frequent), willow (frequent), hazel (frequent), hawthorn (abundant), blackthorn (abundant) with the occasional dog rose and bramble. This habitat was recently planted along the northern boundary of the surveyed area but was not yet mature enough to be subject to regular management.

*Dry ditch*

**3.30** A number of ditches which were considered to only be seasonally wet were present within the east of the surveyed area. These were predominantly adjacent to arable fields and contained limited flora diversity.

*Buildings*

**3.31** A number of buildings were present within the surveyed area. Most within the surveyed area appeared to be unoccupied for some years and hence in a poor state of repair. Buildings dated between 14$^{th}$ century to 20$^{th}$ century and included a church, manor house, farmhouse, small gatehouses and a range of barns and outbuildings. A gatehouse and the detached house adjacent to the church were occupied.

*Bare ground*

**3.32** Bare ground was present within the surveyed area and provided an area of hardstanding around the main house, farm buildings and also provided an access road to St Deny's Church.

*Summary*

**3.33** Priority Habitats listed under NERC (2006) include:

*Woodland, Hedgerows and Scrub*

- Semi-natural broadleaved woodland
- Plantation broadleaved woodland
- Semi-natural mixed woodland
- Scattered deciduous trees

- Defunct species-poor hedgerow
- Intact species-poor hedgerow

*Grassland and Marsh*

- Semi-improved neutral grassland
- Marsh/Marshy grassland

*Swamp, Marginal and Inundation*

- Swamp

*Open Water*

- Running water
- Standing water

**3.34** The grassland and wetland habitats on western side of the surveyed area were of predominantly moderate to high ecological value. The arable habitats were of low ecological value. The habitats within the surveyed area are considered likely to range from **County to Site** importance. Confidence in this assessment is high.

**Protected and Notable Species**

*Data Search*

**3.35** In Bedfordshire there was a total of 517 records of 157 species including 127 bird species (>80% of all records) were recorded within 2km of the surveyed area over the last 10 years. In Cambridgeshire, there was a total of 255 records of 53 species including 30 bird species were recorded within 2km of the surveyed area over the last 10 years. The data for both counties are summarised in **Appendix 8.**

*Rare and Notable Flora*

**3.36** There were no records of Schedule 8-protected plants within 2km of the surveyed area except for records of bluebell *Hyacinthoides non-scripta*. No rare or protected species were recorded within the surveyed area, but given the habitats present within the surveyed area, including the floodplain grasslands and semi-improved neutral grasslands, some may possibly occur within the surveyed area. The grasslands and woodlands within the surveyed area are considered to be of **Site** importance for rare and notable plants and the arable habitats likely **Negligible**. But confidence in this assessment is moderate.

*Invasive Species*

**3.37** There were records of Nuttall's waterweed *Elodea nutallii* and Indian balsam *Impatiens glandulifera* within 2km from the surveyed area.

**3.38** No invasive species were observed within surveyed area during the Phase 1 Habitat Survey, but the check of the riverside habitats was not comprehensive because of the lack of access due to the waterlogged conditions. Confidence in this assessment is therefore moderate.

*Badger*

**3.39** There were four records within Bedfordshire within 2km from the surveyed area.

**3.40** The surveyed area supported a number of setts and details are provided in **Table 3** and mapped within **Appendix 9**. The surveyed area is therefore currently considered of **Local** importance for badger and but given the extent of impenetrable dense scrub within the surveyed area, confidence in this assessment is only moderate.

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*Bats*

**3.41** The records are summarised in Table 4. There were 135 records of nine species of bat within 2km from the surveyed area, including serotine *Eptesicus serotinus* and Leisler's bat *Eptesicus leisleri.*

Table 4: Bats recorded within 2km of the surveyed area

| Taxa | Records |
|---|---|
| Brown Long-Eared Bat *Plecotus auritus* | 5 |
| Common Pipistrelle *Pipistrellus pipistrellus* | 28 |
| Daubenton's Bat *Myotis daubentonii* | 13 |
| Leisler's Bat *Nyctalus leisleri* | 2 |
| Nathusius' Pipistrelle *Pipistrellus nathusii* | 3 |
| Natterer's Bat *Myotis nattereri* | 6 |
| Noctule *Nyctalus noctula* | 18 |
| Noctule or Leisler's Bat *Nyctalus sp.* | 4 |
| Serotine *Eptesicus serotinus* | 4 |
| Serotine or Leisler's Bat *E. serotinus/ N. leisleri* | 2 |
| Soprano Pipistrelle *Pipistrellus pygmaeus* | 18 |
| Unidentified "big bat" *Nyctalus/ Eptesicus* | 2 |
| Unidentified bat *Vespertilionidae* | 6 |
| Unidentified Myotis bat *Myotis sp.* | 5 |
| Unidentified pipistrelle species *Pipistrellus sp.* | 19 |

*Bats – Roosting*

**3.42** A small number of trees had deep fissures, rot holes, woodpecker holes, broken branches and other crevices, so offered numerous opportunities for roosting bats. The majority of the plantation woodland trees were largely smooth-limbed but the check within the tree belts was not exhaustive. The surveyed area is therefore currently considered of **Local** importance for roosting bats and confidence in this assessment is moderate.

*Bat - Foraging*

**3.43** The river and grassland habitats provide a range of moderate to high value foraging habitats for bats as a commuting link to the grasslands and wetland habitats to the north and south of the surveyed area. The surveyed area is therefore currently considered overall of **Local** importance for foraging/commuting bats and confidence in this assessment is moderate.

*Birds*

**3.44** There were records of a range of terrestrial species associated with farmland and woodland as well as waterbird species likely to be associated with the open water habitats. There were 12 species listed under Schedule 1 of the WCA 1981 (as amended) within 2km including barn owl *Tyto alba* and kingfisher *Alcedo atthis* and various raptor species. Records were also obtained for eight red-listed birds of Conservation Concern (BoCC) (Eaton *et al.,* 2015), including house sparrow *Passer domesticus*, starling *Sturnus vulgaris*, and song thrush *Turdus philomelos*.

**3.45** A barn owl was recorded in one of the old barns and, given the tent of droppings and feathers, is likely to have a roost site in one of the buildings. The scattered trees may support breeding kestrel *Falco tinnunculus* and owls. The surveyed area is likely to support a wide range of widespread breeding and wintering species associated with rivers, wetlands, woodlands and grassland and is considered of **District** importance for breeding birds; confidence in this assessment is moderate.

*Great Crested Newt*

**3.46** There were two records from the last 10 years within 2km of the surveyed area. There were a large number of records within 5km from licensing returns as summarised in Table 5.

Table 5: Great Crested Newt Mitigation Licence Returns within 5km of the Surveyed area

| No. | Survey Date | OS Grid ref | Distance and Direction |
|---|---|---|---|
| 1 | 7/4/2015 | TL176542 | 1.7km South |
| 2 | 14/4/2015 | TL176542 | 1.7km South |
| 3 | 9/4/2015 | TL176542 | 1.7km South |
| 4 | 7/5/2014 | TL164539 | 2.3km south |
| 5 | 20/5/2014 | TL164539 | 2.3km south |
| 6 | 21/5/2014 | TL164539 | 2.3km south |
| 7 | 20/4/2015 | TL176540 | 1.9km South |
| 8 | 14/4/2015 | TL176540 | 1.9km South |
| 9 | 7/4/2015 | TL176540 | 1.9km South |
| 10 | 5/5/2015 | TL176540 | 1.9km South |

| No. | Survey Date | OS Grid ref | Distance and Direction |
|---|---|---|---|
| 11 | 11/5/2015 | TL176540 | 1.9km South |
| 12 | 12/5/2015 | TL168531 | 3km South |
| 13 | 14/4/2015 | TL181527 | 3km South |
| 14 | 12/5/2015 | TL181527 | 3km South |
| 15 | 15/4/2015 | TL181527 | 3km South |
| 16 | 26/5/2015 | TL181527 | 3km South |
| 17 | 7/4/2015 | TL181527 | 3km South |
| 18 | 28/4/2015 | TL181527 | 3km South |
| 19 | 18/4/2015 | TL178526 | 3.3km South |
| 20 | 15/4/2015 | TL178526 | 3.3km South |
| 21 | 7/4/2015 | TL178526 | 3.3km South |
| 22 | 26/5/2015 | TL179525 | 3.4km South |
| 23 | 7/4/2015 | TL179525 | 3.4km South |
| 24 | 16/4/2015 | TL179525 | 3.4km South |
| 25 | 12/5/2015 | TL179525 | 3.4km South |
| 26 | 28/4/2015 | TL179525 | 3.4km South |
| 27 | 19/5/2015 | TL179525 | 3.4km South |
| 28 | 20/5/2015 | TL177524 | 3.5km South |
| 29 | 17/4/2015 | TL177524 | 3.5km South |
| 30 | 9/4/2015 | TL177524 | 3.5km South |
| 31 | 7/4/2015 | TL177524 | 3.5km South |
| 32 | 5/5/2015 | TL177524 | 3.5km South |
| 33 | 15/4/2015 | TL177524 | 3.5km South |
| 1 | 12/5/2015 | TL177524 | 3.5km South |

**3.47** There were eight waterbodies within the surveyed area, and these are labeled as P1 to P8 on the Phase 1 plan. A Habitat Suitability Index (HSI) was calculated, and the data are presented in Table 6. The eight waterbodies were of either Poor, Below Average or Good suitability.

Table 6: HSI assessment for waterbodies within the Surveyed area

| Pond reference | HIS Score | HIS Suitability |
|---|---|---|
| 1 | 0.4997 | Poor |
| 2 | 0.5095 | Below Average |
| 3 | 0.7284 | Good |
| 4 | 0.5282 | Below Average |
| 5 | 0.7228 | Good |
| 6 | 0.7547 | Good |
| 7 | 0.5136 | Below Average |
| 8 | 0.3812 | Poor |

**3.48** The evidence suggests that there is a high likelihood that great crested newt is present within a waterbody either within the surveyed area or functionally linked to the surveyed area. The surveyed area is considered of **Site** importance for great crested newt and confidence in this assessment is low.

*Hazel Dormouse*

**3.49** There is limited evidence of presence with Bedfordshire and no records were received within 2km. The data from the NBN gateway also suggest no records within 5km; the nearest location was the

reintroduced population within Brampton Wood SSSI, approximately 12km north of the surveyed area and on the opposite side of the A1 highway.

**3.50** The woodlands within the surveyed area had a bare understory and were considered sub-optimal and the hedgerows were defunct in many places and hence lacked connectivity and structure and so not considered optimal habitat. Hence hazel dormouse is therefore considered likely absent from the surveyed area and not considered further in this assessment.

*Invertebrates*

**3.51** There were 21 records of 10 invertebrate species including a range of butterfly, moth and dragonfly species. Scarce libellula *Libellula fulva* has been recorded from the River Great Ouse.

**3.52** The river and waterbodies may support other notable species. The surveyed area is therefore considered to be of at least **District** importance for invertebrates within the higher value habitats and likely of **Site** or **Local** importance elsewhere; confidence in this assessment is moderate.

*Otter and Water Vole*

**3.53** There were three records of otter or water vole within 2km of the surveyed area. Otter is known to be expanding its range in central England. Hence the River Great Ouse may form a commuting corridor for otter and the swamp and tall herb fen, and scrub habitats offer relatively undisturbed lying up locations. The presence of holts is considered unlikely but requires further survey.

**3.54** There is a low likelihood of water vole presence given the lack of records although there is suitable habitat, and hence its status requires confirmation.

**3.55** The surveyed area is therefore considered to be of **Local** importance for otter and **Site** importance for water vole; confidence in this assessment is moderate.

*Reptiles*

**3.56** There were records of grass snake *Natrix helvetica* within 2km of the surveyed area. The identified habitats were considered highly suitable for common reptile species including swamp and tall herb fen, rivers and grassland habitats. The surveyed area is considered to be of at least **Local** importance for reptiles; confidence in this assessment is moderate.

*Other Notable Species*

**3.57** There were records of European hedgehog *Erinaceus europaeus* within 2km of the surveyed area. The scrub and grassland habitats were considered suitable foraging habitats and the buildings and nearby muck heaps suitable hibernating and breeding sites. The surveyed area is considered to have **Local** importance for European hedgehog; confidence in this assessment is moderate. The grassland habitats were considered suitable for brown hare *Lepus europaeus*. The surveyed area is considered to have **Local** importance for brown hare; confidence in this assessment is moderate.

*Summary*

**3.58** An evaluation of the surveyed area in relation to ecology features is provided in **Table 7**.

Table 7: Evaluation of existing ecological features

| Feature | Summary Description | Importance | Confidence |
|---|---|---|---|
| Statutory Designated Sites | None within ZoI of the surveyed area or SSSI IRZ; nearest St Neots Common SSSI located 3.1km N of the surveyed area | National | High |
| Non-statutory Designated Sites | Little Barford LWS located within the surveyed area; River Great Ouse CWS adjacent surveyed area | County | High |
| Habitats | Woodland, floodplain grassland, semi-improved grassland, swamp and hedges considered to be priority habitats together with arable and other habitats | District - Local | High |
| Badger | Main sett and a range of other setts. | Local | Moderate |
| Bats | At least nine species recorded within 3km. A number of roosting opportunities especially within buildings and trees and high-quality foraging opportunities within LWS and adjacent River Great Ouse. | Local | Moderate |
| Birds | Likely to support a large breeding assemblage of common and widespread species including hole-nesting species and those associated with rivers, wetlands and grasslands. Barn owl recorded in farm buildings. | District | Moderate |
| Great Crested Newt | Local records from south of the surveyed area. Eight waterbodies within the surveyed area, three with Good suitability. | Local | Moderate |
| Hazel Dormouse | Considered absent and not considered further in this assessment | - | - |
| Invertebrates | May support a notable assemblage associated within grasslands and riverine habitats; also mature trees. | District - Site/Local | Moderate |
| Otter and Water Vole | Otter may use the surveyed area especially for commuting and lying up.<br>Water vole likely absent. | Local<br>Site | Moderate |
| Reptiles | Potential for species within riverine and grassland habitats. | Local | Moderate |
| Notable Mammals | Woodlands and grasslands may provide foraging habitat for European hedgehog and brown hare | Local | Moderate |

## 4.0 Likely Impacts, Mitigation and Enhancement Measures and Residual Effects

### Description of Proposals

**4.1** The proposals have not been finalised but will likely include a number of opportunities for residential and commercial development (parish growth and new settlement options). In order to respect some of the ecological features identified in this report, parcels of the surveyed area are proposed to remain free of development.

### Statutory Designated Sites

**4.2** None located within 3km of the surveyed area; the nearest was St. Neots Common SSSI located 3.1km north of the surveyed area. The surveyed area was not located within an SSSI IRZ for residential development. Local Policy indicates that downstream impacts to SAC arising from increased flooding or pollution events should be fully considered as follows:

> *Policy 44*
> *v. Ensure that any new development or activities do not lead to adverse impacts on Natura 2000 sites downstream of Bedford i.e. Portholme (SAC) and The Great Ouse Washes (SAC/SPA/Ramsar) including as a result of increased flooding or because of pollution.*

**4.3** Hence, whilst standard measures included within the flood risk assessment and foul sewage strategy should lead to ensuring that there are no such effects, this should be formally screened within a Habitats Regulations Assessment (HRA) report and, if likely significant effects are anticipated, then mitigation proposed within an Appropriate Assessment.

### Non-statutory Designated Sites

**4.4** There were seven non-statutory designated sites within 2km of the surveyed area (**Table 2**). Little Barford CWS was located within the surveyed area and the western boundary of the surveyed area was formed by the River Great Ouse CWS.

**4.5** Impacts from development include direct habitat loss and indirect effects of habitat degradation from increases in recreational pressure.

**4.6** Proposals should seek to avoid development within and immediately adjacent to the CWS. Where this is not possible, the proposals should incorporate the creation of appropriate habitat buffers or alternative greenspaces together with instigation of a habitat management plan for the two CWS. This would enhance the protected sites, provide biodiversity benefits and meet local planning policy requirements.

### Habitats

**4.7** The surveyed area is comprised of a range of priority habitats of County value as well as other predominantly arable habitats of lesser value.

**4.8** Priority habitats listed under NERC (2006) were considered to include:

*Woodland, Hedgerows and Scrub*

- Semi-natural broadleaved woodland
- Plantation broadleaved woodland
- Semi-natural mixed woodland
- Defunct species-poor hedgerow
- Intact species-poor hedgerow

*Grassland and Marsh*

- Semi-improved neutral grassland
- Marsh/Marshy grassland

*Swamp, Marginal and Inundation*

- Swamp

*Open Water*

- Running water
- Standing water

**4.9** All these habitats require to be retained and protected from disturbance or if habitat loss is unavoidable then fully mitigated by replacement habitat creation or planting. The habitats provide opportunities for enhancement through appropriate management and where necessary suitable planting.

**4.10** The quality of the LWS and other priority habitats including floodplain and pasture grasslands, woodlands and hedgerows should be confirmed by a specialist botany survey in spring/early summer**.**

**4.11** A Biodiversity Net Gain (BNG) calculation should be carried out using the Defra Metric (2.0) using the baseline habitats mapped in the Phase 1 plan in relation to the proposed landscape layout. Given the potential quality of the retained habitats in the surveyed area, a net gain is likely to be achievable and hence an offset is unlikely to be required but habitat scenarios should be modelled at an early design stage to ensure a minimum 10% net gain may be delivered.

**4.12** Landscaping should include trees, shrubs and plants of known benefit to wildlife especially for nectar-feeding species such as bats and invertebrates. A reference list is provided in **Appendix 10**. It is considered that mitigation is fully achievable within the surveyed area with regards to habitat losses.

**Protected and Notable Species**

*Badger*

**4.13** Nine badger sets were identified during the walkover survey. Due to the number of setts noted within the surveyed area and the activity at each, there is a need to confirm the status of badger through further surveys. Further recommended surveys include a full badger scoping survey to identify all setts,

sett monitoring surveys to confirm sett status and bait marking surveys to confirm clan territories within surveyed area.

**4.14** The results of these surveys will determine any suitable and appropriate mitigation required. Any active badger setts impacted by the development may require full or partial closure to enable work, with works restricted within 30m of any retained, active setts. Closure of active setts will require a licence from Natural England. Badger sett closures can only be undertaken between 1st July – 30th November, with licenses generally granted upon the receipt of full planning permission. If a main sett is found within the surveyed area boundary, and due to be impacted by proposals, a replacement main sett would be required to be provided within the existing clan territory.

**4.15** In general, the following precautionary construction techniques which are applicable to most construction sites and are sympathetic to badgers are recommended:

- Covering trenches at night or leaving a plank of wood leant against the side to ensure badgers can escape if they were to accidentally fall in;
- Covering open pipework with a diameter of greater than 120mm at the end of the workday to prevent animals from entering and becoming trapped;
- Covering chemicals and storing them appropriately overnight; and
- Regular removal of litter.

**4.16** The loss of foraging or sett building habitat is likely to require a level of mitigation in the form of maintaining areas of meadow, woodland and boundary habitats and within low light corridor during the construction and operation stages. There is considerable opportunity to enhance the habitats along the River Great Ouse for foraging badgers through appropriate woodland and wet meadow creation. Planting using a range of native species within the landscape scheme is advised and a list of potential species is provided in Appendix 10. It is considered that mitigation is fully achievable within the surveyed area with regards to badgers.

*Bats - Foraging*

**4.17** The wetland and woodland habitats within the western section of the surveyed area are assessed of high value for foraging and commuting bats and with records of rare species within 2km of the surveyed area. Other habitats within the east of the surveyed area are assessed as being of moderate value.

**4.18** Surveys are required to confirm the status of foraging and commuting bats within the surveyed area through a series of activity and static surveys. The surveyed area is assessed as supporting habitats of high and moderate value for foraging bats and survey given the presence of meadow habitats within the surveyed area.

**4.19** The survey effort for areas of high value will include two transects and automated surveys each month including a dusk to dawn survey (visits April – October) which will adhere to current guidance (Collins 2016). The survey effort for the eastern section of the surveyed area will be single monthly transects and automated detector surveys each month (April to October).

**4.20** The loss of foraging habitat is likely to require a level of mitigation in the form of maintaining some areas of meadow and boundary habitats and within low light corridor during the construction and

operation stages. There is considerable opportunity to enhance the habitats along the River Great Ouse for foraging bats through appropriate woodland and wet meadow creation.

**4.21** Planting using a range of nectar-rich and native species within the landscape scheme is advised and a list of potential species is provided in **Appendix 10.** It is considered that mitigation is fully achievable within the surveyed area with regards to foraging bats.

*Bats - Roosting*

**4.22** An assessment of roosting potential of the trees and buildings is required, through an inspection of internal and external features by a licensed bat ecologist. A ground level tree assessment may be combined with a climbing survey where this is feasible. This will determine the need for follow- up emergence surveys.

**4.23** The proposed development provides the opportunity to enhance the surveyed area for bats through the provision of additional roosting surveyed areas on trees.

**4.24** If any new external lighting is necessary, this should avoid directly lighting retained and newly planted trees. A sensitive lighting strategy should be employed to reduce indirect impacts on local bat populations. The following mitigation strategies have been taken from the Institution of Lighting Professionals and BCT Guidance Note 08/18 Bats and artificial lighting in the UK (2018):

- In general, light sources should not emit ultra-violet light so as to avoid attracting insects and thus potentially reducing numbers in adjacent areas, which bats may use for foraging. Metal halide and fluorescent sources should not be used.
- LED luminaires should be used where possible. A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component. Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Other ways to reduce light spill include the use of directional luminaires, shields, baffles and/or louvres. Flat, cut-off lanterns are best. Additionally, lights should be located away from reflective surfaces where the reflection of light will spill onto potential foraging/commuting corridors. Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill. Where windows and glass facades etc. cannot be avoided, low transmission glazing treatments may be a suitable option in achieving reduced illuminance targets.
- Lighting that is required for security or access should use a lamp of no greater than 2000 lumens and be passive infrared sensor activated on a short timer (1 minute), to ensure that the lights are only on when required and turned off when not in use. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

**4.25** It is considered that mitigation is fully achievable within the surveyed area with regards to roosting bats through a sensitive design at masterplan stage incorporating use of bat roosting features throughout the site.

*Birds*

**4.26** The breeding and wintering bird assemblage may include kingfisher and other notable species. Breeding and wintering bird surveys (a minimum of three surveys in each season (breeding March–July, wintering November- February) are required to confirm the value of the breeding and non-breeding assemblages.

**4.27** Potential impacts on nesting birds include death, damage to and disturbance of nests during vegetation clearance. Where clearance of nesting bird habitat such as scrub is required, then this should be undertaken outside the nesting bird season (March to August inclusive), or only once a habitat inspection has been carried out by a suitably qualified ecologist immediately prior to clearance.

**4.28** The inclusion of bird boxes installed on trees may be required as mitigation. These would also provide an enhancement to the surveyed area. Boxes should target species of conservation concern known to occur locally including barn owl or target species recorded within the surveys. It is considered that mitigation is fully achievable within the surveyed area with regards to nesting birds.

*Great crested newt*

**4.29** There are eight waterbodies within the surveyed area, three with 'Good' suitability. Further surveys are required and should include a minimum of four presence/likely absence surveys from March to June with at least two surveys between mid-April to mid-May following published guidance (English Nature, 2004). If great crested newt is present, an additional two surveys should be carried out to categorise the population class size, hence totaling six surveys with at least three surveys carried out between mid-April to mid-May. Alternatively, environmental DNA (eDNA) pond water samples could be taken between 15 April and 30 June to determine presence/absence following published guidance (Biggs *et al.,* 2014).

**4.30** Where great crested newt is present and there are likely construction impacts on waterbodies or adjacent terrestrial habitat, then a mitigation licence for translocation of animals to a receptor area will be required from Natural England. The license will also stipulate a level of mitigation in the form of replacement ponds and/or habitat.

**4.31** The proposals may also enhance the surveyed area though waterbody and terrestrial habitat creation as well as enhancing ecological connectivity between waterbodies. It is considered that mitigation is fully achievable within the surveyed area with regards to great created newts (if present).

*Hazel Dormouse*

**4.32** Given the likely absence of hazel dormouse from the surveyed area, no mitigation is required for any hedgerow or woodland habitat loss. However, as a general principle, works that enhanced hedgerow and woodland connectivity may support future dormouse populations as well as benefiting a wide range of other species.

*Invertebrates*

**4.33** The priority habitats within the surveyed area are considered likely to support notable assemblages of rare or notable invertebrates including stag beetle and the assemblage value should be confirmed by a scoping survey by specialist invertebrate ecologist and follow-up surveys as required.

**4.34** The inclusion of native, nectar-rich plants in the landscaping, as proposed for bats, would enhance the surveyed area post-development for invertebrates. As such, mitigation is considered fully achievable for invertebrate species within the surveyed area.

*Otter and water vole*

**4.35** The presence of water vole may not be discounted, and otter may use the surveyed area for commuting and lying up. A presence/absence survey of potential water vole habitats following standard methods (Strachan *et al.,* 2011) during the breeding season (mid-April to mid-September) when water voles are most active above ground and therefore field signs are most abundant is required to confirm the status within the surveyed area. This survey may also check for otter spraints and other field signs and follow methods provided by Chanin (2003). If water vole are found to be present, mitigation is considered fully achievable within the surveyed area given extent of suitable habitat present.

*Reptiles*

**4.36** The presence of reptiles may not be discounted especially within the tussock grasslands and field edges. A presence/absence survey across all suitable habitats and conforming to standard survey methods is considered to be required and involves a seven-visit survey (Froglife, 1999) during 'suitable' days for reptile activity; a 'suitable' survey day is determined by the weather, with temperature being the pre-eminent factor.

**4.37** Mitigation may require translocation of animals from preferred habitats such as rough grassland and scrub edge and/or sensitive habitat clearance methods. Mitigation and enhancement of retained habitats may be enabled by the provision of a mosaic of habitats providing sheltering/foraging and hibernating areas and log pile hibernacula. It is considered that mitigation is fully achievable within the surveyed area with regards to reptiles.

*Notable Mammals*

**4.38** The presence of European hedgehog cannot be discounted. No specific mitigation above that provided for reptiles is required, with mitigation considered fully achievable within the surveyed area. Hedgehog highways in garden fences and 'hedgehog homes' and/or compost heaps (sensitively managed) as well as small reptile hibernacula would be valuable enhancements within the surveyed area.

**4.39** Brown hare may be present within the surveyed area but there are large areas of suitable habitat to the north and impacts are likely to be negligible on the local population.

## 5.0 Conclusions

**5.1** The large surveyed area supports a range of protected and priority habitats predominantly within the western section of the surveyed area, much of which is within or adjacent to the River Great Ouse floodplain. There are also areas of lower value, farmland habitats within the eastern section of the surveyed area. The surveyed area provides suitable habitat for a number of protected and/or notable species. A summary of features, likely impacts and outline mitigation and enhancement measures is provided in Table 8.

**5.2** Through incorporation of relevant surveys, mitigation and precautionary methods, it is considered that the surveyed area could deliver a significant biodiversity net gain in terms of measures to support high value habitats and protected species and to carry this out in line with current wildlife legislation, *chapter 15 of the NPPF* (MHCLG, 2021); and local planning policies relevant to ecology.

**5.3** The proposed development therefore provides an important opportunity to deliver landscape scale, biodiversity benefits that enhance habitats within and adjacent to the River Great Ouse floodplain and strengthen ecological connectivity for priority habitats and protected and notable species.

Table 8: Summary of likely impacts, mitigation and enhancement measures and residual effects

| Feature | Likely Impacts | Further Surveys and Consultation | Likely Mitigation and Enhancement Measures | Residual Effect |
|---|---|---|---|---|
| Statutory Designated Sites | Downstream pollution and flooding events on Portholme and Ouse Washes SACs | HRA screening and appropriate assessment if non-standard mitigation required | • None more than standard measures are likely | Neutral |
| Non-statutory Designated Sites | Effects on Little Barford CWS within the surveyed area | Phase 2 vegetation survey of CWS in May - June | • Proposed access roads should seek to avoid CWS if possible.<br>• Habitat restoration should seek to improve CWS. | Positive |
| Priority Habitats | Loss of habitats of up to County value | Biodiversity Net Gain Assessment (when layouts drafted)<br><br>Phase 2 vegetation survey of all priority habitats in May- June | • Layout should avoid higher value habitats where possible.<br>• Biodiversity net gain assessment.<br>• Habitat restoration within retained floodplain habitats.<br>• New native species planting. | Positive |
| Badger | Potential disturbance, damage and destruction of badger setts within surveyed area.<br><br>Loss of foraging and sett building habitat. | Bait marking survey to determine clan territories | • If impacts to active setts then licensed closure (part or full) and potential artificial sett creation. | Neutral |

| Feature | Likely Impacts | Further Surveys and Consultation | Likely Mitigation and Enhancement Measures | Residual Effect |
|---|---|---|---|---|
| Bats - Activity | Disturbance effects due to lighting | Bat activity surveys for a site of high-moderate value | • Retention of priority habitats.<br>• Sensitive lighting within the development.<br>• Nectar-rich planting scheme. | Positive |
| Bats - Roosts | Disturbance and potential loss of bat roosts in tree and buildings | GLTA trees and building inspection surveys. Emergence surveys of buildings and trees with >moderate bat roost potential | • Retention of mature trees where possible.<br>• Provision of bat boxes. | Neutral |
| Birds | Destruction/damage of nests | Breeding and wintering bird surveys (minimum three per season) | • Retention of priority habitats.<br>• Works undertaken outside of breeding bird season or after nest search and adhering to method statement.<br>• Provision of bird boxes. | Positive |
| Great Crested Newt | Death/injury of adult great crested newt and loss of terrestrial habitats | eDNA surveys to confirm status Presence/absence surveys in 2022 | • If present, then district licensing or licensed programme of clearance of animals from construction zones with habitat mitigation where required. | Neutral |
| Hazel Dormouse | N/A | Likely absent | • Maximise hedgerow and woodland connectivity for any future populations. | Positive |
| Invertebrates | Potential for a wide range of notable species including stag beetle | Invertebrate assessment by specialist including LWS and all priority habitats | • Retention of priority habitats<br>• Wildlife friendly planting scheme. | Positive |
| Otter and Water Vole | Death/injury of otter and water vole. Disturbance from inappropriate lighting and human recreational pressure. | Otter and water vole surveys of all riparian habitats. | • Sensitive clearance of habitats under licence if required.<br>• Retention of priority habitats. | |
| Reptiles | Death/injury of slow-worm and common lizard | Sampling to confirm presence/absence survey in suitable habitats | • Sensitive clearance of habitats adhering to method statement.<br>• Translocation of reptiles to receptor site from donor habitats.<br>• Provision of rough grassland habitats and log piles/ hibernacula. | Positive |

| Feature | Likely Impacts | Further Surveys and Consultation | Likely Mitigation and Enhancement Measures | Residual Effect |
|---|---|---|---|---|
| European Hedgehog and Brown hare | Death/injury | N/A | • Sensitive clearance of habitats.<br>• Provision of hedgehog homes/hibernacula. | Positive |

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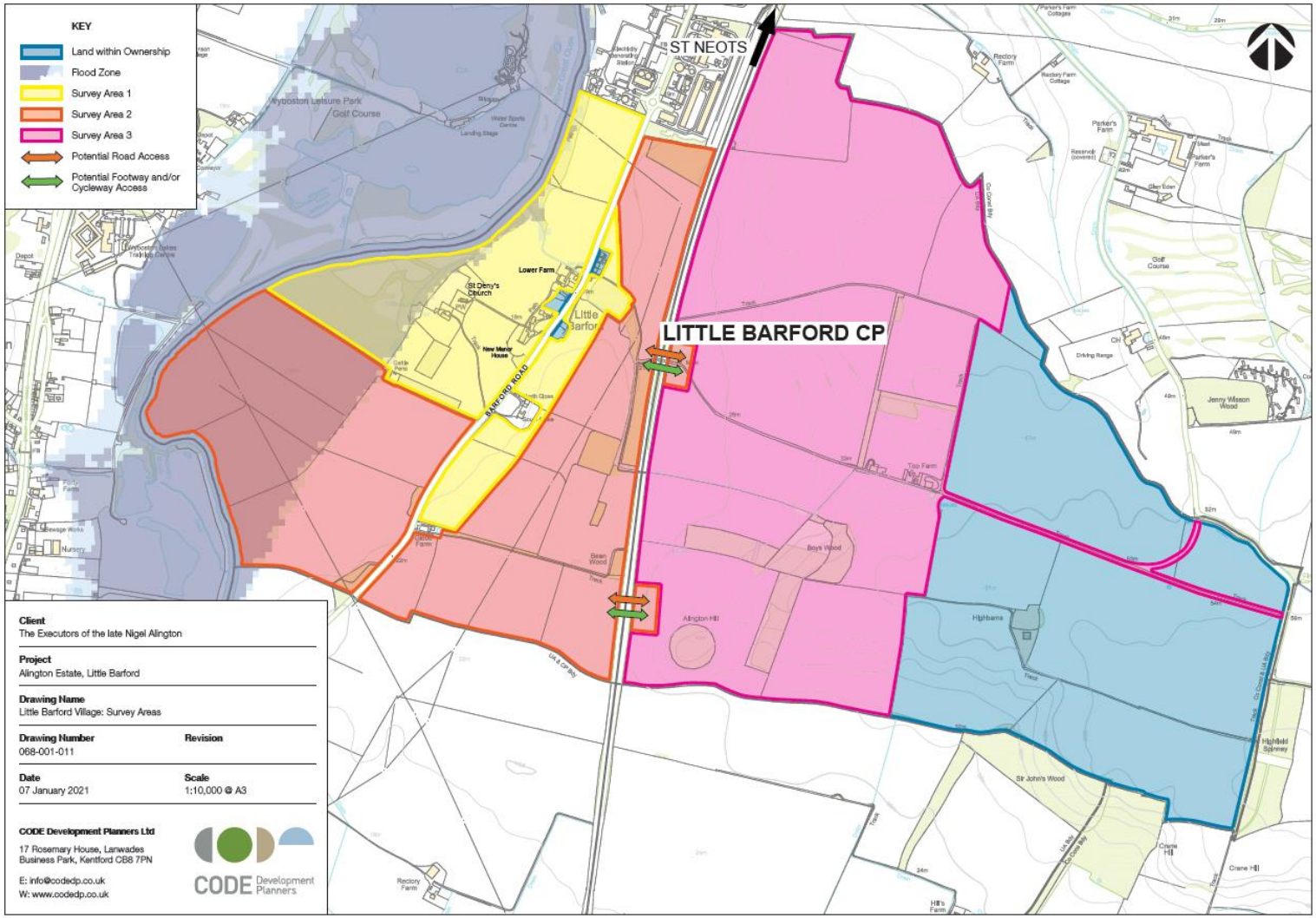
## Appendix 1: Site* location plan




*The site here is Survey Areas 1 and 2 only.

## Appendix 2: Legislative and Policy Framework

### National Planning Policy Framework (NPPF)

The *NPPF* (MHCLG, 2021) outlines what the planning system should do to contribute to and enhance the natural and local environment through the following policy statements:

*Paragraph 8*

Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

*Paragraph 20*

Strategic policies should set out an overall strategy for the pattern, scale and quality of development, and make sufficient provision for:

d) conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure, and planning measures to address climate change mitigation and adaptation.

*Paragraph 28*

Non-strategic policies should be used by local planning authorities and communities to set out more detailed policies for specific areas, neighbourhoods or types of development. This can include allocating sites, the provision of infrastructure and community facilities at a local level, establishing design principles, conserving and enhancing the natural and historic environment and setting out other development management policies.

*Paragraph 73:*

*The supply of large numbers of new homes can often be best achieved through planning for larger scale development, such as new settlements or significant extensions to existing villages and towns, provided they are well located and designed, and supported by the necessary infrastructure and facilities (including a genuine choice of transport modes). Working with the support of their communities, and with other authorities if appropriate, strategic policy-making authorities should identify suitable locations for such development where this can help to meet identified needs in a sustainable way. In doing so, they should:*

*a) consider the opportunities presented by existing or planned investment in infrastructure, the area's economic potential and the scope for net environmental gains;*

*Paragraph 120*

Planning policies and decisions should:

a) encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains – such as developments that would enable new habitat creation or improve public access to the countryside;
b) recognise that some undeveloped land can perform many functions, such as for wildlife, recreation, flood risk mitigation, cooling/shading, carbon storage or food production;

*Paragraph 174*

Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

*Paragraph 175*

*Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework58; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.*

*Paragraph 179*

To protect and enhance biodiversity and geodiversity, plans should:

a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity56; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

*Paragraph 180*

When determining planning applications, local planning authorities should apply the following principles:

a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and
d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

**Bedford Borough Local Plan 2030**

Policies relevant to ecology and biodiversity include:

***Policy 39 – Retention of trees***

*In considering proposals for development all of the following criteria will apply:*

*i. Applicants shall consider opportunities to retain trees of high amenity and environmental value taking into consideration both their individual merit and their contribution as part of a group or broader landscape feature. Existing trees on and immediately adjacent the development site shall be recorded following guidance in the relevant British Standard.*

*ii. Development applications shall provide details as to how the retained trees, hedges and hedge banks will be protected prior to, during and after construction.*

*iii. No building, hard surfacing drainage or underground works will be permitted that does not accord with the principles of the relevant British Standard unless, exceptionally, the Council is satisfied that such works can be accommodated without harm to the trees concerned or there are overriding reasons for development to proceed.*

*iv. Planning permission will be refused for development resulting in the loss or deterioration of ancient woodland and the loss of aged or veteran trees found outside ancient woodland (including from indirect impacts such as increased visitor pressure), unless the need for, and benefits of, the development in that location clearly outweigh the loss.*

*v. The Council will protect existing trees through the making of Tree Preservation Orders where appropriate.*

***Policy 40 – Hedgerows***

*Any hedgerows should be retained on development sites, unless there are overriding benefits that justify their removal. Where removal is deemed necessary, details addressing the criteria under the Hedgerow Regulations 1997 (as amended) shall be submitted to demonstrate the validity for removal and details of the replacement hedgerows. Replacement hedgerows shall be of an equal scale, native and species- rich and should be provided where possible, elsewhere on the development site. Where there are gaps in the existing hedgerows on the site, the development should provide for additional hedgerow planting.*

***Policy 42S** – Protecting biodiversity and geodiversity Planning applications for development are required to assess the impact of the proposal on the biodiversity and geodiversity value of the site and*

*its surroundings. This should be carried out by a suitably qualified professional in accordance with industry standards.*

*A proposal which is likely to have an adverse effect on a Site of Special Scientific Interest (SSSI) or Natura 2000 site will not be permitted unless there are exceptional reasons that outweigh the harm to the site.*

*Development should be designed to prevent any adverse impact on locally important sites, species and habitats of principal importance contained within the Natural Environment and Rural Communities (NERC) Act 2006. However, in these circumstances where an adverse impact is unavoidable, the application shall demonstrate how the harm will be reduced through appropriate mitigation.*

*Where protected species or priority habitats of principal importance are adversely affected, the application will need to demonstrate how the proposed mitigation will reduce the adverse effects. If adequate mitigation is not possible, the application will need to demonstrate that the overriding reasons outweigh the impacts on the biodiversity and geodiversity of the borough otherwise the development will be refused.*

*Developments with potential to have an adverse impact, either alone or in combination, on the integrity of a European Designated Site will be assessed in accordance with the requirements of the Habitats Regulations.*

***Policy 43** – Enhancing biodiversity Development proposals should provide a net increase in biodiversity through the following: i. Enhancement of the existing features on the site; or ii. The creation of additional habitats on the site; or iii. The linking of existing habitats to create links between ecological networks and where possible, with adjoining features.*

***Policy 44** – River Great Ouse Development proposals along and adjoining the River Great Ouse will be required to:*

*i. Improve access to the River Great Ouse including canoe portage areas and related facilities will be supported as outlined in the 2011 Bedford Waterspace Study (or as amended) where it can be demonstrated that there will be no harmful impact on the character or environment, and*

*ii. Deliver improvements as relevant to the site and area of the river which have regard to the 2011 Bedford Waterspace Study, and*

*iii. Ensure that new river moorings have pedestrian access and vehicle access to an adopted road, unless it can be demonstrated that there is an alternative means of access, and*

*iv. Ensure that new marinas have access to an adopted road and car parking is provided in accordance with the Parking Standards for Sustainable Communities: Design and Good Practice supplementary planning document to accommodate visitors' and residents' vehicles, and*

*v. Ensure that any new development or activities do not lead to adverse impacts on Natura 2000 sites downstream of Bedford i.e. Portholme (SAC) and The Ouse Washes (SAC/SPA/Ramsar) including as a result of increased flooding or because of pollution.*

**Wildlife Legislation**

The two principal wildlife statutes are the Conservation of Habitats and Species Regulations (The Habitats Regulations 2017) that deals with internationally important sites and species, and the Wildlife and Countryside Act (WCA) 1981 that deals with nationally important sites and species.

Certain habitats and species within discrete sites are protected as SSSI under the WCA 1981. A proportion of these are more strictly protected as proposed or designated SPA, SAC and Ramsar sites under the Conservation of Habitats and Species Regulations (2017). These designations protect features and resources listed as being of international importance from both direct and indirect effects arising from a range of issues including proposed development. In addition, non-statutory designated sites (e.g. Local Wildlife Sites) are protected under the National Parks and Access to the Countryside Act, (1949) Section 21.

Certain species listed on Schedule 5 of the WCA 1981, including all bat species, great crested newt (great crested newt) *Triturus cristatus,* hazel dormouse *Muscardinus avellanarius* and otter *Lutra lutra* are also protected under Schedule 2 of the Habitats Regulations 2010 making them European Protected Species (EPS). Taken together it is illegal to:

- Deliberately kill, injure or capture any wild animal of EPS;
- Deliberately disturb wild animals of any EPS in such a way to be likely to significantly affect:
- The ability of that species to survive, breed, rear or nurture their young; or
- The local distribution of that species.
- Recklessly disturb an EPS or obstruct access to their place of rest;
- Damage or destroy breeding sites or resting places of such animals;
- Deliberately take or destroy the eggs of such an animal;
- Possess or transport any part of an EPS, unless acquired legally; and/or
- Sell, barter or exchange any part of an EPS.

A range of species other than birds, including water vole *Arvicola amphibius*, is protected from disturbance and destruction under the WCA 1981 through inclusion on Schedule 5.

All breeding birds are protected from deliberate destruction under the WCA 1981. Certain species are further protected from disturbance at their nest sites being listed on Schedule 1 of the WCA 1981.

Common reptiles including common lizard *Zootoca vivipara,* slow-worm *Anguis fragilis*, grass snake *Natrix helvetica* and adder *Vipera berus* are protected under the WCA 1981, they are listed as schedule 5 species, therefore part of Section 9(1) and section 9(5) apply; the Countryside and Rights of Way Act 2000 (CRoW) also strengthens their protection.

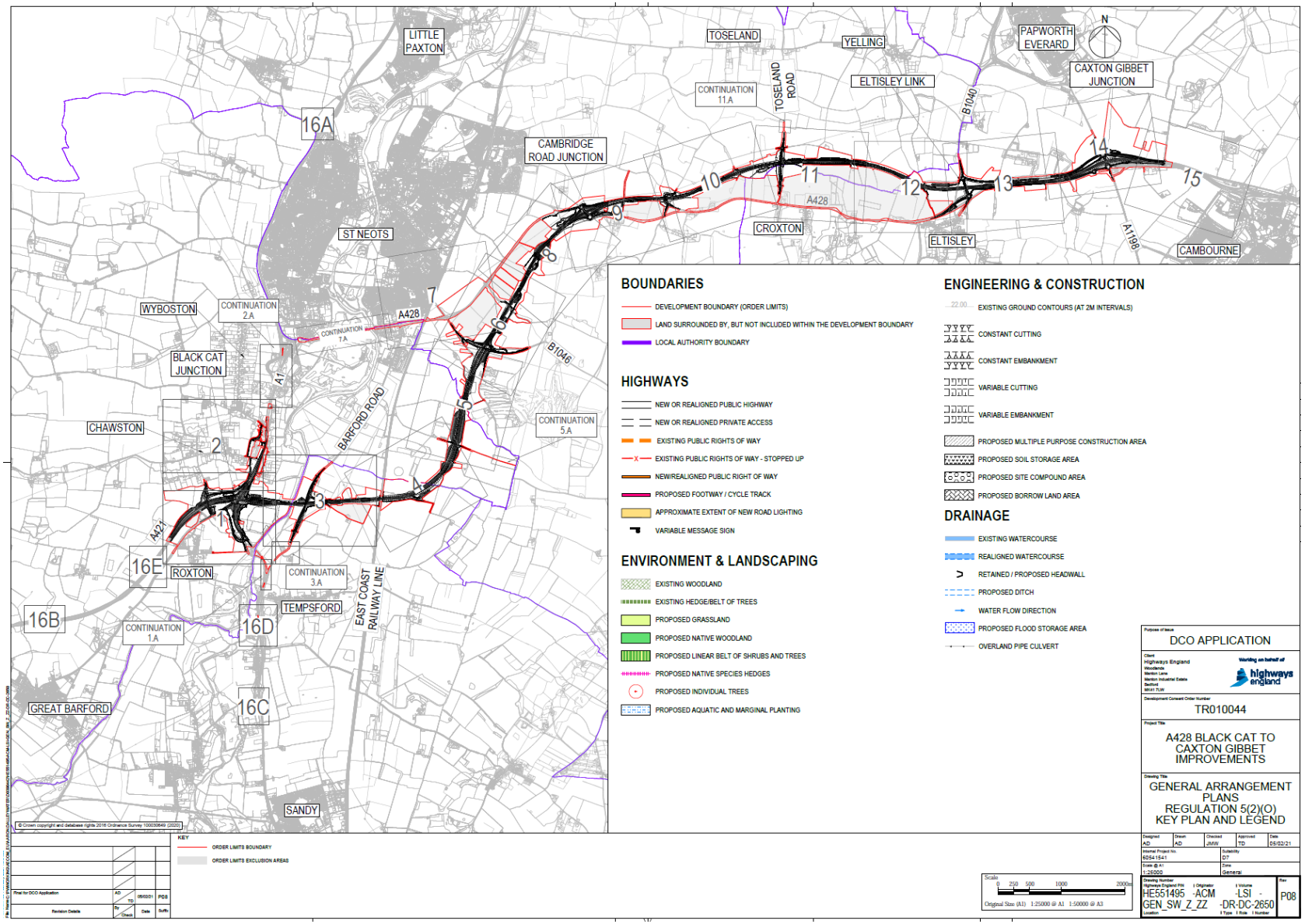
Badger *Meles meles* is protected from sett disturbance and destruction under the Protection of Badgers Act 1992.

Section 40 of The Natural Environment and Rural Communities Act (NERC) 2006 places a legal duty on Local Authorities to conserve biodiversity. Section 41 (S41) sets out a list of 943 species and habitats of principal importance. These species are known as England Biodiversity Priority (EBP) species and are those identified as requiring action under the former UK Biodiversity Action Plan (BAP) and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework.

Native, species-rich hedgerows that fit certain criteria are protected as being 'important' under the Hedgerow Regulations (1997).

Japanese Knotweed *Fallopia japonica*, along with other introduced and invasive species are listed under Schedule 9 of the WCA 1981. Japanese knotweed is highly invasive, and its rhizomes cause damage to buildings and other infrastructure. Hence it is also classed as controlled waste under the Environment Protection Act 1990 and has therefore either to be removed or disposed of in a licensed landfill or the rhizomes buried to a depth of at least 5m.

## Appendix 3: A428 Black Cat to Caxton Gibbet Road Improvement scheme



## Appendix 4: Little Barford LWS Citation and Location

| | | | |
|---|---|---|---|
| Site name: | **Little Barford CWS** | Main habitats present: | |
| Status(es): | County Wildlife Site | UK BAP Priority habitat) | Fen, Marsh and Swamp (Broad |
| Gridref: | TL178570 | | |
| Area: | 29.48 hectares | | |
| Council(s): | Bedford Borough | Other habitat(s) | Neutral grassland |
| History: | | | Semi-natural broadleaved woodland |
| 1990 | CWS recognized | | Broadleaved plantation |
| Unknown | Name changed from "Little Barford Complex CWS" | | Ruderal vegetation |
| CWS recognized for: | Swamp | | River |
| | Neutral grassland | | Permanently wet ditch |
| | | | Hedge |

Site Description:
Phase 1 Survey 1990

A CWS containing a diversity of habitats including swamp and neutral grassland. The CWS comprises: an area of swamp vegetation at TL175569 surrounded by broadleaved plantation to north, west and south; a narrow block of semi-natural broadleaved woodland extending from TL175568 northeast to TL177570; a field of neutral grassland at TL177567; Little Barford churchyard at TL177569; a group of four small fields extending from TL177569 north to TL178571; a riverside belt of broadleaved plantation at TL178571; a field of neutral grassland at TL179570; the River Great Ouse forms the northwestern boundary of the site.

Little Barford Churchyard has a redundant church and the churchyard is very overgrown with some small areas well-tended. Botanically it is not of much interest.

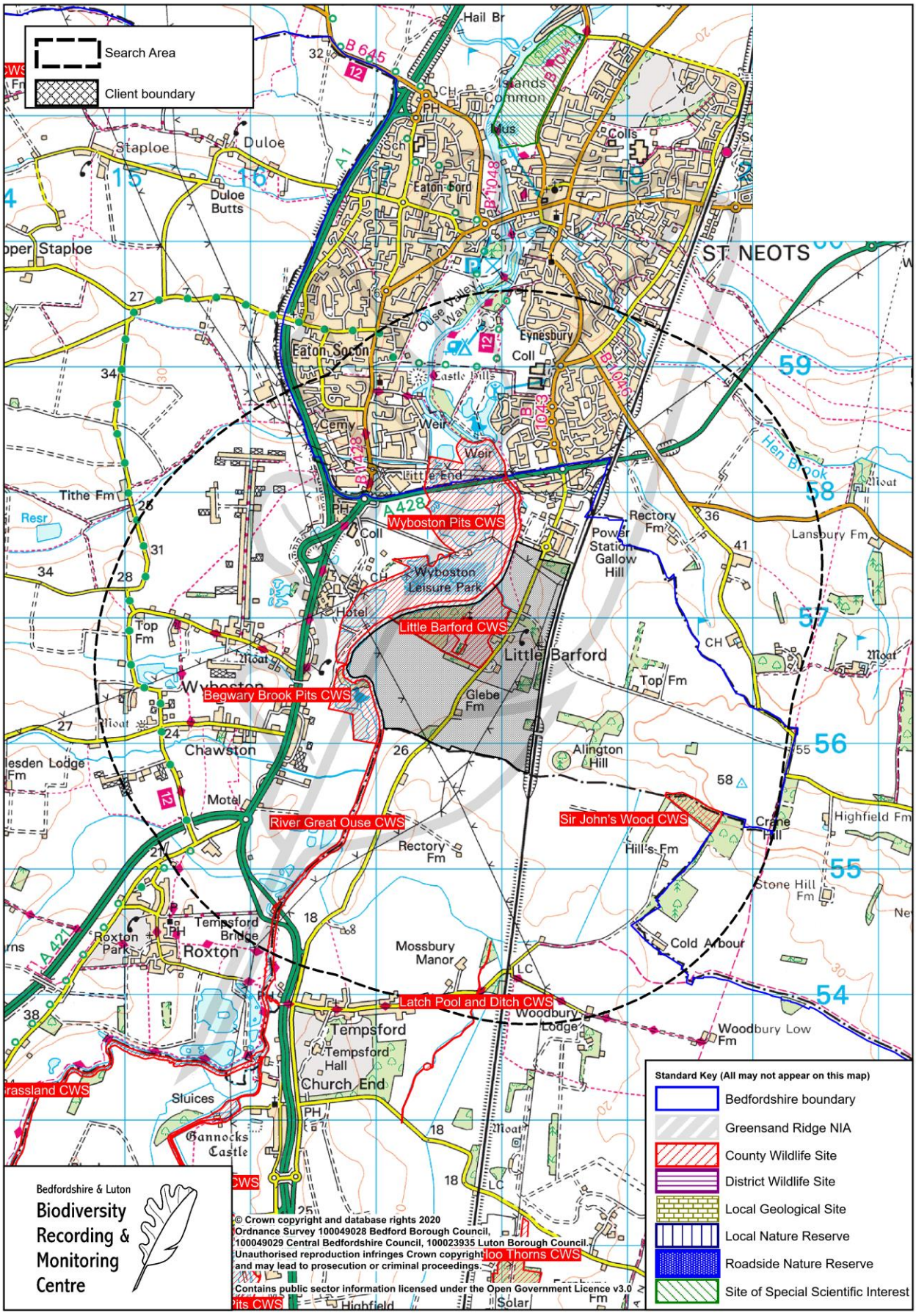
Survey July 1995
Complex of two semi-improved pastures to the east, an area of swamp vegetation in a poplar plantation to the west (not surveyed), a churchyard and the neighbouring section of the River Great Ouse.

*Southeast Field*
Semi-improved neutral grassland with gravel track running through leading to the house. The topsoil is thin with gravel underneath and there are some small hillocks in the northwest corner. Dominated by Glyceria maxima. Other species include Dactylis glomerata, Senecio jacobaea, Cynosurus cristatus, Plantago lanceolata, Rumex crispus, Carduus nutans, Crepis sp., Cerastium fontanum, Galium verum, Rumex acetosa, and Hordeum murinum was frequent on the hillock near the house.

*Northeast Field*
Semi-improved neutral grassland that is grazed by cattle. There is a wide ditch running northwest to southeast that is wet at the bottom. Grassland species include Cirsium arvense, Carduus nutans, Urtica dioica, Senecio jacobaea, Galium verum, Rumex crispus, Cerastium fontanum, Plantago lanceolata, Cynosurus cristatus and Ranunculus repens. Ditch species include Myosotis scorpioides, Juncus inflexus, Apium nodiflorum, Veronica beccabunga and Polygonum minus.
The field next to the churchyard is fenced with no access. Species include Bromus sp., Heracleum sphondylium, Silene alba.

*Churchyard*
The churchyard is neglected grassland that is becoming overgrown on the north and east sides, with frequent Urtica dioica arnd Cirsium vulgare. Arrhenatherum elatius is dominant and other species include Holcus lanatus, Dactylis glomerata, Heracleum sphondylium, Silene alba, Achillea millefolium, Centaurea nigra, Galium verum, Veronica chamaedrys and Rumex acetosa.

The CWS is bounded to the north by northern bank of River Great Ouse, the southwest and northeast side is fenced and the east side is bounded by garden fences. Neutral grassland indicator species identified on the grasslands; Pimpinella saxifrage, Galium verum and Lotus corniculatus.


Search Area
Client boundary
Wyboston Pits CWS
Little Barford CWS
Begwary Brook Pits CWS
River Great Ouse CWS
Sir John's Wood CWS
Latch Pool and Ditch CWS
Loo Thorns CWS
ST NEOTS
Eaton Ford
Eaton Socon
Eynesbury
Little End
Wyboston Leisure Park
Little Barford
Chawston
Roxton
Tempsford
Tempsford Hall
Church End
Mossbury Manor
Woodbury Lodge
Woodbury Low Fm
Cold Arbour
Stone Hill Fm
Highfield Fm
Lansbury Fm
Rectory Fm
Power Station
Gallow Hill
Alington Hill
Glebe Fm
Top Fm
Hill's Fm
Crane Hill
Sluices
Gannocks Castle
Duloe
Duloe Butts
Staploe
Tithe Fm
Motel
Hotel
Bedfordshire & Luton
Biodiversity Recording & Monitoring Centre
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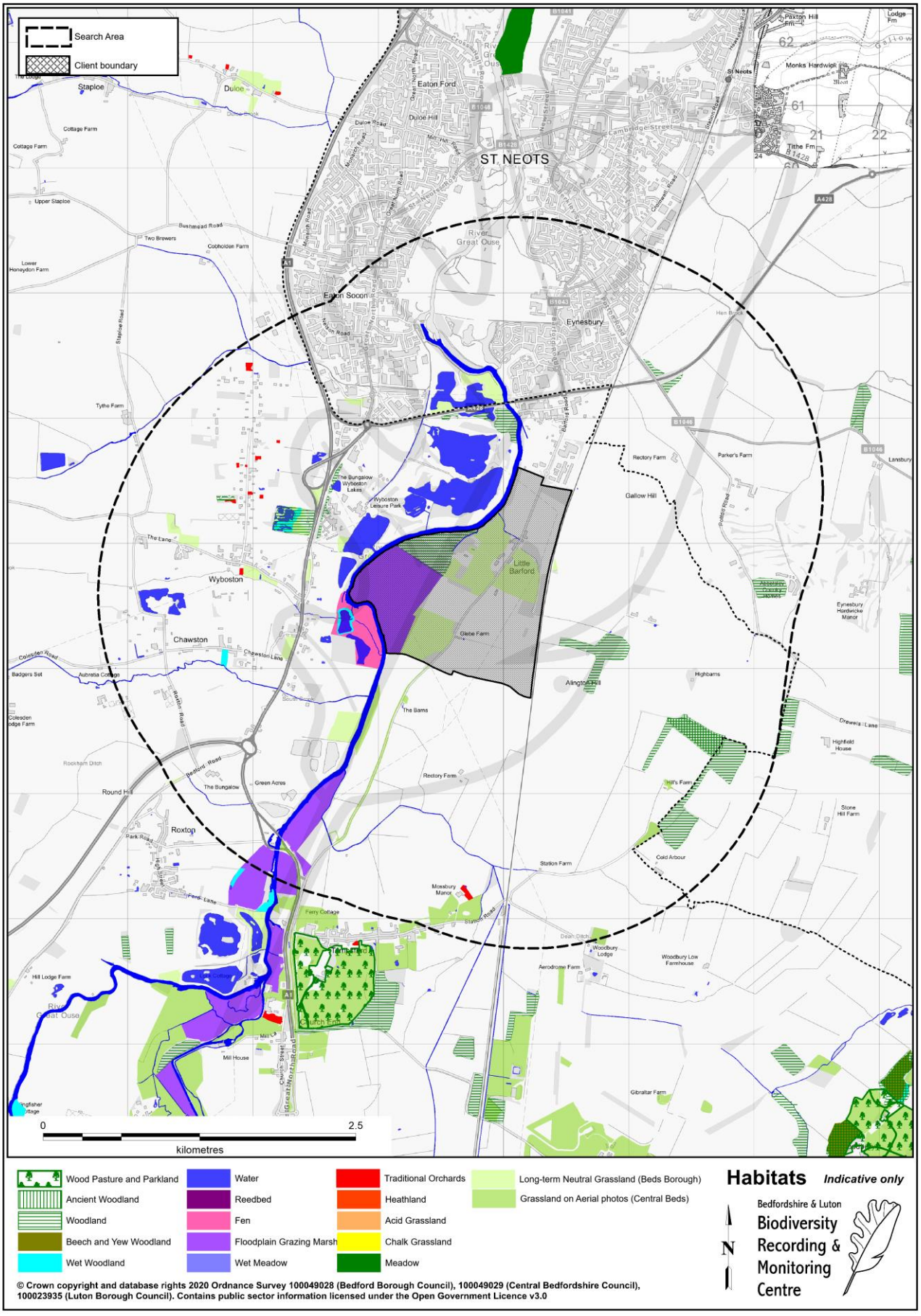
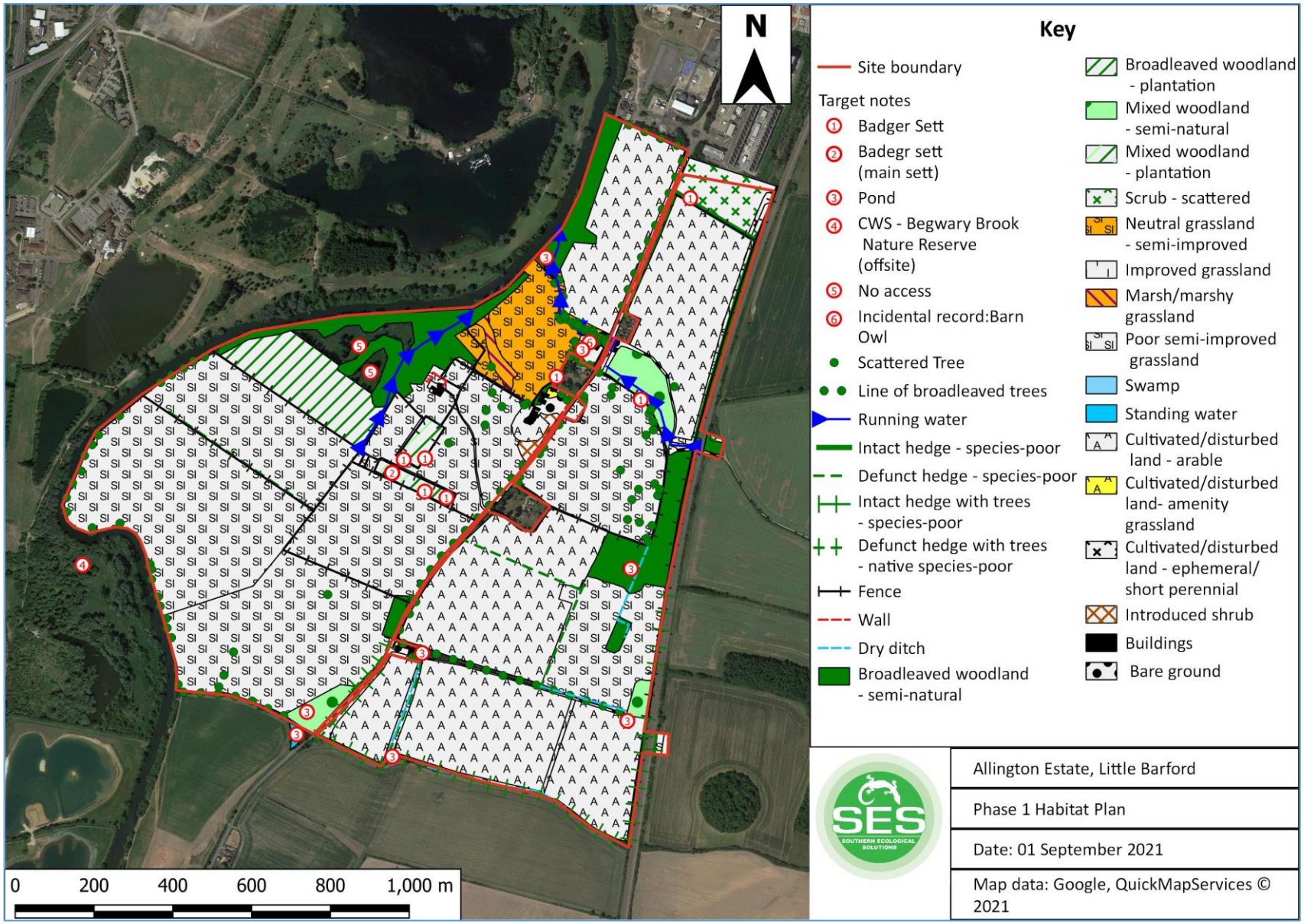
Standard Key (All may not appear on this map)
Bedfordshire boundary
Greensand Ridge NIA
County Wildlife Site
District Wildlife Site
Local Geological Site
Local Nature Reserve
Roadside Nature Reserve
Site of Special Scientific Interest

## Appendix 5: Priority Habitats within 2km of the Site



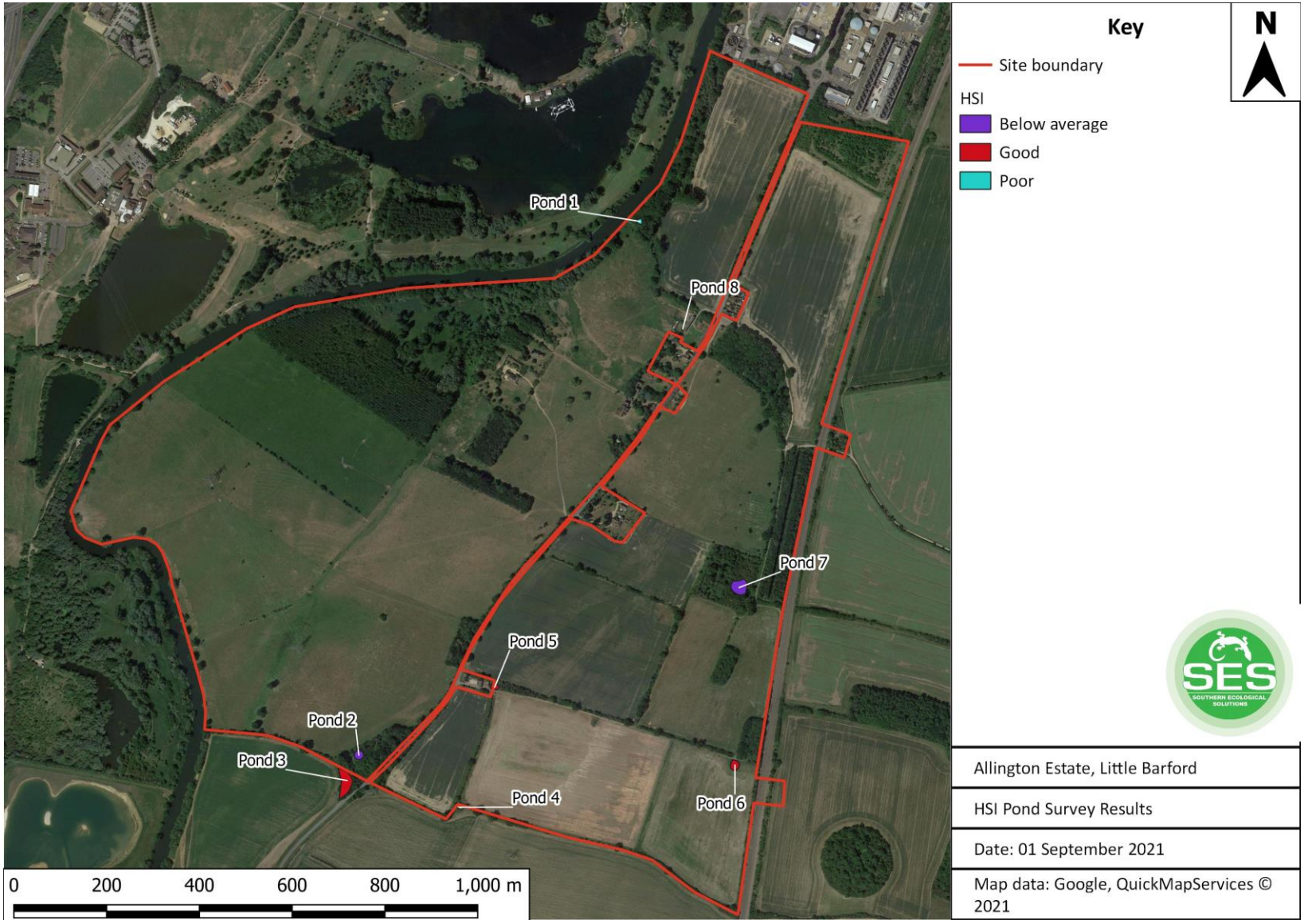
**Appendix 6: Phase 1 Habitat Survey Plan**



## Plant Species within Principal Phase 1 Habitats

| Common name | Latin name | Amenity Grassland | Dense scrub | Introduced shrub | Mixed scattered trees | Species poor hedge with trees | Semi-improved grassland | Deciduous woodland | Species-poor intact hedge | Species-rich intact hedge | Tall Ruderal |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Apple | *Malus sp* | | | | X | | | X | | | |
| Ash | *Fraxinus excelsior* | | | | X | | | X | | | |
| Aspen | *Populus tremula* | | | | X | | | X | | | |
| Blackthorn | *Prunus spinosa* | | X | | | | | X | X | X | |
| Bramble | *Rubus fruticosus* | | X | | | | | | | | |
| Broad leaved dock | *Rumex obtusifolius* | | | | | | | | | | X |
| Burdock | *Arctium lappa* | | | | | | | | | | |
| Cleavers | *Galium aparine* | | | | | | | | | | X |
| Cocksfoot | *Dactylis glomerata* | | | | | | X | | | | |
| Common ivy | *Hedera helix* | | X | | | | | X | | | |
| Common nettle | *Urtica dioica* | | | | | | X | | | | X |
| Creeping Bent | *Agrostis stolonifera* | | | | | | X | | | | |
| Daisy | *Bellis perennis* | X | | | | | | | | | |
| Dandelion | *Taraxacum sp.* | X | | | | | X | | | | |
| Elder | *Sambucus nigra* | | X | | | | | | | | |
| Elm | *Ulmus minor var. vulgaris* | | | | X | | | | | | |
| Field maple | *Acer campestre* | | | | X | | | X | X | X | |
| Hawthorn | *Crataegus monogyna* | | X | | X | | | X | X | X | |
| Holly | *Ilex aquifolium* | | | | | | | | | | |
| Horse chestnut | *Aesculus hippocastanum* | | | | X | | | | | | |
| Oak | *Quercus sp.* | | | | X | | | X | | | |
| Plantain | *Plantago sp* | | | | | | X | | | | |
| Red dead nettle | *Lamium purpureum* | | | | | | | | | | X |
| Rosebay Willowherb | *Chamerion angustifolium* | | | | | | | | | | X |
| Spear thistle | *Cirsium vulgare* | | | | | | | | | | X |
| Sycamore | *Acer pseudoplatanus* | | | | X | | | X | | | |
| Teasel | *Dipsacus fullonum* | | | | | | | | | | X |
| White poplar | *Populus alba* | | | | | | X | | | | |
| Wild cherry | *Prunus avium* | | | | X | | | X | | | |
| Willow | *Salix sp.* | | | | | | | X | | X | |

**Appendix 7: Pond survey plan**



## Appendix 8: Summary of protected and notable species records within 2km of the site (2011-2020)

### Bedfordshire

| Taxa | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| **Amphibian** | | | **1** | **1** | **2** | | **1** | **1** | **1** | **7** |
| Common frog | | | | | | | 1 | | | 1 |
| Common toad | | | 1 | 1 | | | | | | 2 |
| Great crested newt | | | | | 1 | | | 1 | | 2 |
| Midwife toad | | | | | | | | | 1 | 1 |
| Smooth newt | | | | | 1 | | | | | 1 |
| **Bird** | **55** | **70** | **90** | **43** | **26** | **65** | **57** | **65** | | **471** |
| Arctic tern | | | | | | 1 | | | | 1 |
| Barn owl | | | | | 2 | | 3 | 2 | | 7 |
| Barnacle goose | | | | | 1 | | 1 | | | 2 |
| Black redstart | 1 | | | | | 1 | | | | 2 |
| Black swan | | | | | | | 1 | | | 1 |
| Black-headed gull | 2 | 1 | 1 | 1 | | | 2 | | | 7 |
| Blue tit | 2 | 2 | 2 | 2 | | | | | | 8 |
| Brambling | | | | | 1 | | | | | 1 |
| Bullfinch | 1 | | 2 | | | | 2 | 2 | | 7 |
| Buzzard | | 1 | | 1 | | | 1 | 1 | | 4 |
| Canada goose | 1 | 1 | | | | 2 | 1 | | | 5 |
| Cetti's warbler | | | | 1 | | 1 | | | | 2 |
| Coal tit | | | | | | 1 | 2 | | | 3 |
| Collared dove | 1 | 1 | 1 | 2 | | 1 | | | | 6 |
| Common gull | | | 1 | | | 2 | 2 | | | 5 |
| Common sandpiper | | | | | | 1 | 1 | | | 2 |
| Common tern | | 1 | | 1 | 1 | 1 | | | | 4 |
| Coot | 2 | 1 | 1 | | 1 | | 1 | | | 6 |
| Cormorant | 2 | | 1 | | | 2 | | | | 5 |
| Corn bunting | | 1 | 1 | | | | | | | 2 |
| Cuckoo | | 2 | 2 | 1 | 1 | 1 | | | | 7 |
| Dunlin | | | | | | 1 | | | | 1 |
| Dunnock | 2 | 1 | 2 | | 1 | 1 | | 1 | | 8 |
| Egyptian goose | 1 | | | 1 | | | 2 | 1 | | 5 |
| Greater white-fronted goose | | 1 | | | | | | | | 1 |
| Feral pigeon | | | 1 | 2 | 1 | | | | | 4 |
| Fieldfare | 2 | | 1 | 1 | | 1 | | | | 5 |
| Gadwall | | | | 2 | | | | 2 | | 4 |
| Gannet | | | | | | | | 1 | | 1 |
| Goldcrest | 1 | 1 | 2 | | | | 4 | | | 8 |
| Golden plover | | | 1 | 1 | | | | | | 2 |
| Goldeneye | | | 2 | | | | | | | 2 |
| Goldfinch | 2 | 2 | 2 | 1 | 1 | | | 1 | | 9 |
| Goosander | | | 2 | | 1 | | | 2 | | 5 |
| Great crested grebe | | 1 | 2 | 1 | 1 | | 2 | | | 7 |
| Great spotted woodpecker | 1 | 2 | | | | 1 | 1 | | | 5 |
| Great tit | 2 | 1 | 2 | 1 | | | | | | 6 |
| Great white egret | | | | | | | | 1 | | 1 |
| Green sandpiper | | | | | | 2 | | | | 2 |
| Green woodpecker | 1 | 1 | 1 | | | 3 | 1 | 1 | | 8 |

| Taxa | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Greenfinch | 2 | 2 | 1 | 1 | | | | 1 | | 7 |
| Greenshank | | | | | | | | 1 | | 1 |
| Grey heron | 2 | 1 | 1 | | | 2 | | | | 6 |
| Grey partridge | | | | 1 | | | | 2 | | 3 |
| Grey wagtail | | 1 | | 1 | 2 | 1 | | 1 | | 6 |
| Greylag goose | 1 | 1 | | | | 2 | | | | 4 |
| Hawfinch | | | | | | | 1 | | | 1 |
| Hen harrier | | | | 1 | | | | | | 1 |
| Herring gull | | | | 1 | | | | | | 1 |
| Hobby | | 1 | 1 | | | | | | | 2 |
| House martin | | 2 | | | | 1 | | 1 | | 4 |
| House sparrow | 1 | 2 | 2 | 2 | 1 | | | 1 | | 9 |
| Jack snipe | | | | | | | | 1 | | 1 |
| Kestrel | 4 | 1 | | | 2 | | 1 | | | 8 |
| Kingfisher | | 1 | 1 | 1 | | | | | | 3 |
| Kittiwake | | 1 | | | | | | | | 1 |
| Lapwing | | | | 2 | 1 | 2 | | 1 | | 6 |
| Lesser black-backed gull | | | 2 | 1 | | | 1 | | | 4 |
| Lesser redpoll | | 1 | 1 | | | | | | | 2 |
| Linnet | 1 | 2 | 1 | | | 1 | | 2 | | 7 |
| Little egret | | 2 | | | | 1 | 1 | | | 4 |
| Little grebe | 1 | | 1 | | | | | 2 | | 4 |
| Little owl | | | | | | 1 | 1 | | | 2 |
| Little ringed plover | | | 1 | | | 1 | | | | 2 |
| Mallard | 1 | 2 | 1 | | 1 | 1 | 1 | | | 7 |
| Mandarin duck | | | | | | | | 1 | | 1 |
| Marsh harrier | | | 1 | | | | | | | 1 |
| Marsh tit | 2 | | 1 | | | | | | | 3 |
| Meadow pipit | | | 1 | | | 1 | 1 | 1 | | 4 |
| Mediterranean gull | | | | | | | 1 | 1 | | 2 |
| Merlin | | | 1 | | | | | | | 1 |
| Mistle thrush | | | 3 | 2 | | | 1 | 1 | | 7 |
| Moorhen | 1 | 1 | | | | 2 | | | | 4 |
| Mute swan | 1 | 1 | 1 | | | 1 | | | | 4 |
| Nightingale | 1 | | 2 | | | | | | | 3 |
| Nuthatch | | | 1 | | | 1 | | 1 | | 3 |
| Osprey | | | | | | | | 1 | | 1 |
| Oystercatcher | | | | | | 1 | | | | 1 |
| Peregrine | 1 | | 1 | | | 1 | | | | 3 |
| Pochard | | | | | | | | 2 | | 2 |
| Quail | | | 1 | | | | | 1 | | 2 |
| Red kite | | | 1 | | | 3 | | 2 | | 6 |
| Red-crested pochard | | | | | | | 1 | 1 | | 2 |
| Redshank | | | | | | | 1 | | | 1 |
| Redwing | 2 | 1 | 2 | | | 1 | 1 | | | 7 |
| Reed bunting | | 2 | 1 | | | | 1 | | | 4 |
| Ringed plover | | | | | | 2 | | 1 | | 3 |
| Robin | 1 | 2 | 2 | 1 | | | 1 | 1 | | 8 |
| Rock pipit | | | | | | 1 | | | | 1 |
| Rook | 2 | | 2 | | | | 1 | 1 | | 6 |
| Sand martin | | 1 | | | | 1 | 1 | | | 3 |
| Sanderling | | | | | | 1 | | | | 1 |

| Taxa | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Shag | | | | | 1 | | | | | 1 |
| Shelduck | | | | | | 1 | 1 | | | 2 |
| Short-eared owl | | | 1 | | | | | | | 1 |
| Shoveler | | 1 | | | | | | 2 | | 3 |
| Siskin | 1 | | 2 | | | 1 | 1 | | | 5 |
| Skylark | | 1 | 1 | | | 1 | 1 | 1 | | 5 |
| Smew | | | | | | | 1 | | | 1 |
| Snipe | | | | | | | 1 | 1 | | 2 |
| Song thrush | 2 | 2 | 3 | | | 1 | | | | 8 |
| Sparrowhawk | | 1 | | 1 | | | | 1 | | 3 |
| Spotted flycatcher | | | 1 | | | | | | | 1 |
| Starling | 1 | | 2 | 1 | | | 2 | | | 6 |
| Stock dove | | | 3 | 1 | 1 | | 1 | 1 | | 7 |
| Stonechat | | | | | 1 | | | 1 | | 2 |
| Swallow | | 3 | 1 | | | | 1 | 1 | | 6 |
| Swift | | | 1 | 1 | | 1 | | 1 | | 4 |
| Tawny owl | | | 1 | | | | | | | 1 |
| Teal | | | | 1 | | 1 | | 1 | | 3 |
| Treecreeper | | 2 | | | | 1 | | 2 | | 5 |
| Tufted duck | | | 1 | | 2 | 1 | 2 | | | 6 |
| Turnstone | | | | | | 1 | 1 | | | 2 |
| Turtle dove | | 1 | 1 | 1 | | | | | | 3 |
| Water rail | | 1 | | | | | | | | 1 |
| Wheatear | | 1 | | | | | 1 | 2 | | 4 |
| Whimbrel | | | | | | | | 2 | | 2 |
| Whinchat | | | | 1 | | | | 1 | | 2 |
| White stork | | | | | | 1 | | | | 1 |
| White/pied wagtail | | | 1 | 1 | | | 1 | | | 3 |
| White-fronted goose | | 2 | | | | | | | | 2 |
| Wigeon | | | | 1 | | | | 2 | | 3 |
| Willow warbler | | 2 | 1 | | | | | | | 3 |
| Woodcock | 1 | 1 | 1 | | | | | | | 3 |
| Wren | 2 | 1 | 2 | 1 | 1 | | | 1 | | 8 |
| Yellow wagtail | | | 1 | | 1 | 2 | | 1 | | 5 |
| Yellowhammer | | 2 | 2 | | | 1 | | 1 | | 6 |
| **Flowering plant** | | | | | **4** | **3** | **1** | **3** | | **11** |
| Bluebell | | | | | 1 | | | | | 1 |
| Box | | | | | | 1 | | | | 1 |
| Chicory | | | | | | | 1 | | | 1 |
| Common cudweed | | | | | | 1 | | | | 1 |
| Dwarf spurge | | | | | | | | 1 | | 1 |
| Field pepperwort | | | | | 1 | | | | | 1 |
| Fritillary | | | | | 1 | | | | | 1 |
| Greater dodder | | | | | | | | 1 | | 1 |
| Indian balsam | | | | | 1 | | | | | 1 |
| Nuttall's waterweed | | | | | | 1 | | | | 1 |
| Vervain | | | | | | | | 1 | | 1 |
| **Insect - butterfly** | **1** | | | | **1** | | | | | **2** |
| **Insect - dragonfly** | | | | **1** | **1** | **1** | **1** | **1** | | **5** |
| **Insect - moth** | **1** | **1** | | | | | **2** | **2** | | **6** |
| **Mollusc** | | | | **1** | | | | **1** | | **2** |
| **Reptile** | **1** | | **1** | | | | | | | **2** |

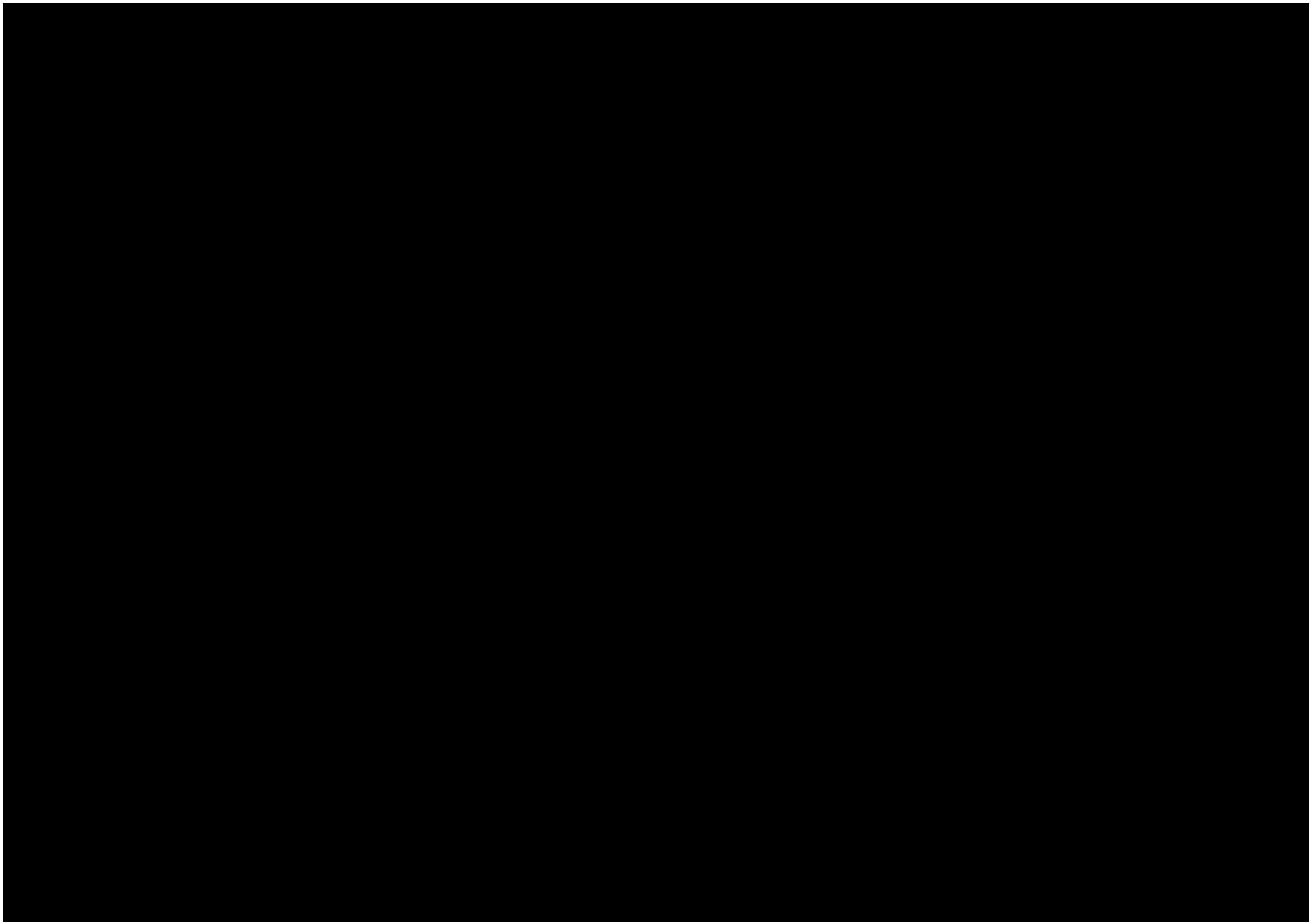
| Taxa | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Grass snake | 1 | | 1 | | | | | | | 2 |
| **Terrestrial mammal** | **1** | **3** | | **2** | **2** | | | **3** | | **11** |
| American mink | | 1 | | | | | | | | 1 |
| Eastern grey squirrel | | | | | | | | 1 | | 1 |
| Eurasian badger | | 1 | | | 2 | | | 1 | | 4 |
| European rabbit | | 1 | | 1 | | | | 1 | | 3 |
| West European hedgehog | 1 | | | 1 | | | | | | 2 |
| **Total** | **59** | **74** | **92** | **48** | **36** | **69** | **62** | **76** | **1** | **517** |

## Cambridgeshire

| Taxa | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2019 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Bird** | **14** | **104** | **72** | | | | | | **190** |
| Barn owl | | 1 | 4 | | | | | | 5 |
| Bearded tit | | 2 | | | | | | | 2 |
| Black kite | 1 | | | | | | | | 1 |
| Cetti's warbler | | 8 | 6 | | | | | | 14 |
| Cuckoo | 1 | | 4 | | | | | | 5 |
| Curlew | | 1 | | | | | | | 1 |
| Fieldfare | | 1 | 1 | | | | | | 2 |
| Firecrest | | | 1 | | | | | | 1 |
| Grasshopper warbler | | | 1 | | | | | | 1 |
| Green sandpiper | | | 1 | | | | | | 1 |
| Hobby | 2 | 4 | | | | | | | 6 |
| House sparrow | 1 | 78 | 10 | | | | | | 89 |
| Kingfisher | | | 6 | | | | | | 6 |
| Lesser redpoll | 2 | 2 | 3 | | | | | | 7 |
| Lesser spotted woodpecker | | | 1 | | | | | | 1 |
| Linnet | | 1 | 1 | | | | | | 2 |
| Little egret | | 1 | | | | | | | 1 |
| Marsh tit | | | 1 | | | | | | 1 |
| Peregrine | | | 2 | | | | | | 2 |
| Quail | | | 19 | | | | | | 19 |
| Red kite | 2 | 2 | 1 | | | | | | 5 |
| Redwing | | | 1 | | | | | | 1 |
| Reed bunting | | | 1 | | | | | | 1 |
| Short-eared owl | | | 1 | | | | | | 1 |
| Spotted flycatcher | | | 4 | | | | | | 4 |
| Starling | 1 | | 3 | | | | | | 4 |
| Swift | 3 | 1 | | | | | | | 4 |
| Tree pipit | | 1 | | | | | | | 1 |
| Turtle dove | | 1 | | | | | | | 1 |
| White-fronted goose | 1 | | | | | | | | 1 |
| **Flowering plant** | | | **1** | **1** | | | | | **2** |
| Chicory | | | 1 | | | | | | 1 |
| Common cudweed | | | | 1 | | | | | 1 |

| Taxa | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2019 | Total |
|---|---|---|---|---|---|---|---|---|---|
| **Insect - butterfly** | **2** | | **5** | | | | | | **7** |
| **Insect - moth** | **15** | **5** | **12** | | | | | | **32** |
| **Insect - true fly** | **2** | | | | | | | | **2** |
| **Reptile** | | | **1** | | | | | | **1** |
| Grass snake | | | 1 | | | | | | 1 |
| **Terrestrial mammal** | **2** | **3** | | **7** | **2** | **3** | **3** | **1** | **21** |
| Bats | | | | | 1 | | | | 1 |
| Eurasian badger | 1 | 2 | | 1 | | | | | 4 |
| European otter | | 1 | | | | | 2 | | 3 |
| Pipistrelle bat species | | | | | 1 | 1 | | | 2 |
| Soprano pipistrelle | | | | | | 2 | 1 | 1 | 4 |
| West European hedgehog | 1 | | | 6 | | | | | 7 |
| **Grand total** | **35** | **112** | **91** | **8** | **2** | **3** | **3** | **1** | **255** |

[redacted]



## Appendix 10: Species on Known Benefit to Wildlife especially Bats and Invertebrates

The following table is reproduced from Gunnell, K., Grant, G. and Williams, C. (2012). Landscape and Urban Design for Bats and Biodiversity, Bat Conservation Trust. This table contains a suggested species list of plants that can provide benefit for bats either by providing a food source for insects and/ or roost potential. The plants listed are predominately native to Britain. The small group of non-native plants included for their documented value for wildlife. The list has been checked by the author against Natural England's list of invasive non-native plants.

| Plant species | Common name | Native (N) | Type | Benefit | Soil | Light | Extensive green roofs | Living walls | Rain gardens | Hedge/ trees | Beds/ borders |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Acer campestre* | Field maple | N | T/S | C | Any | Sun/ shade | | | | Y | |
| *Acer platanoides* | Norway maple | | T | S | Well drained/ alkaline | Sun/ shade | | | | Y | |
| *Acer saooharum* | Sugar maple | | T | S | Any | Sun/ shade | | | | Y | |
| *Achillea millefolium* | Yarrow | N | HP | C,F | Well drained | Sun | | | | Y | |
| *Ajuga reptans* | Bugle | N | HP | C,F | Any | Sun/ shade | Y | | Y | | |
| *Anthyllis vulneraria* | Kidney vetch | N | HP | F | Well drained | Sun | Y | | | | |
| *Aubrieta deltoidea* | Aubrieta | | H | F | Well drained | Sun/shade | | Y | | | |
| *betula pendula* | Sliver birch | N | T | C | Sandy/ acid | Sun | | | | Y | |
| *Cardamine pratensis* | Cuckoo- flower | N | HP | F | Moist | Sun/ shade | | | Y | | Y |
| *Carpinus betulus* | Hornbeam | N | T | C | Clay | Sun | | | | Y | |
| *Centaurea nigra* | Common knapweed | N | HP | C,F | Dry, not acid | Sun | Y | | | | Y |
| *Centranthus ruber* | Red valerian | | HP | F | Well drained | Sun | Y | | | | Y |
| *Clematis vitalba* | Old man's Beard | N | C | F | well drained/ alkaline | Sun | | | | Y | |
| *Corylus avellana* | Hazel | N | S | C | Any dry | Sun/ shade | | Y | | Y | |
| *Crataegus monogyna* | Hawthorn | N | S | S,C | Any | Sun/shade | | | | Y | |
| *Daucus carota* | Wild carrot | N | Bi | S,C,F | Any | Sun | Y | | | | Y |
| *Dianthus spp.* | Pinks | N | A-Bi | F | Well drained | Sun | Y | Y | | | Y |
| *Digitalis purpurea* | Foxglove | N | Bi | C | Well drained | Shade/ partial shade | | | | Y | Y |
| *Erica cinera* | Bell heather | N | S | F | Sandy | Full sun | | | | | Y |
| *Ersimum cherira* | Wallflower | | Bi-P | F | Well drained | Sun | | Y | | | Y |
| *Eupatorium* | Hemp agrimony | N | H | F | Moist | Sun/ shade | | | Y | | Y |
| *Fagus sylvatica* | Beech | N | T | C, R | Well drained alkaline | Sun/ shade | | | | Y | |
| *Foeniculum vulgare* | Fennel | | H | F | Well drained | Sun | | | | | Y |
| *Fraxinus excelsior* | Common Ash | N | T | C, R | Any | Sun/ shade | | | | Y | |
| *Hebe spp.* | Hebe species | | S | F | Well drained | Sun /shade | | | | Y | Y |
| *Hedera Helix* | Ivy | N | C | F,C | Any | Sun/ shade | | Y | Y | Y | Y |
| *Hesperis matrionalis* | Sweet Rocket | | H | F | Well drained/ dry | Sun/ shade | | | | | Y |
| *Hyacinthoides non - scripta* | Bluebell | N | B | F | Loam | Shade/ partial shade | | Y | | Y | Y |
| *Ilex aquailfolium* | Holly | N | T | C | Any | Sun/ shade | | | | Y | |
| *Jasmine officinale* | Common jasmine | | C | F | Well drained | Sun | | Y | | | Y |
| *Lavandula spp.* | Lavender species | | S | F | Well drained / sandy | Sun | | Y | | | Y |
| *Linaria vulgaris* | Toadflax | N | HP | C | Well drained/ alkaline | Sun | Y | | | | Y |
| *Lonicera periclymenum* | Honeysuckle | N | C | F | Well drained | Sun | | Y | | Y | |
| *Lotus corniculatus* | Bird's foot trefoil | N | HP | F | Well drained/ dry | Sun | Y | | | | Y |
| *Lunaria annua* | Honesty | | Bi | F | Any | Sun/ partial shade | Y | | | | Y |
| *Malus spp.* | Apple | | T | C | Any | Sun | | | | Y | Y |
| *Matthiola longipetala* | Night - scented stock | | A | F | Well drained/ moist | | | | Y | | Y |
| *Myosotis spp.* | Forget me not sp. | N | A | F | Any | Sun | Y | Y | | | Y |
| *Nicotiania alata* | Ornamental tobacco | | A | F | Well drained moist | Sun / partial shade | | | Y | | Y |
| *Oneothera spp.* | Evening primrose | | Bi | F | Well drained | Sun | Y | | | | Y |
| *Origanum vulgare* | Marjoram | N | HP | F | Well drained / dry | Sun | | | | Y | |
| *Populus alba* | White poplar | N | T | C | Clay loam | Sun | | | | Y | |
| *Primula veris* | Cowslip | N | HP | F | Well drained/ moist | Sun/ partial shade | Y | | | | Y |

| Plant species | Common name | Native (N) | Type | Benefit | Soil | Light | Extensive green roofs | Living walls | Rain gardens | Hedge/ trees | Beds/ borders |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Primula vulgaris* | Primrose | N | HP | F | Moist | Partial shade | Y | Y | | Y | Y |
| *Prunus avium* | Wild cherry | N | T | C | Any | Sun | | | | Y | Y |
| *Prunus domestica* | Plum | | T | C | Well drained/ moist | Sun | | | | Y | Y |
| *Prunus spinosa* | Blackthorn | N | S | C | Any | Sun/ partial shade | | | | Y | |
| *Querois petraea* | Sessile oak | N | T | C,R | Sandy loam | Sun/ shade | | | | Y | |
| *Quercus robur* | Common oak | N | T | R | Clay Loam | Sun/ shade | | | | Y | |
| *Rosa canina* | Dog rose | N | S | C | Any | Sun | | | Y | Y | Y |
| *Salix spp.* | Willow species | N | S | S,C | Moist | Sun/ shade | | | Y | Y | |
| *Sambucus nigra* | Elder | N | T | C | Clay loam | Sun | | | | Y | |
| *Saponaria officinalis* | Soapwort | N | HP | F | Any | Sun | | | | | Y |
| *Saxifraga oppositifolia* | Saxifrage | N | HP | C | Well drained | Sun | Y | Y | | | Y |
| *Scabiosa columbaria* | small scabious | N | HP | F | Well drained/ alkaline | Sun | Y | | | | Y |
| *Sedum spectabile* | Ice plant | | HP | F | Well drained/ dry | Sun | Y | | | | Y |
| *Silene dioecia* | Red campion | N | HP | F | Any | Shade/ partial shade | | Y | Y | Y | Y |
| *Sorbus aucuparia* | Rowan | N | T | C | Well drained | Sun | | | | Y | |
| *Stachys lanata* | Lamb's ear | | HP | F | Well drained/ dry | Sun | | | | | Y |
| *Symphotrichum spp.* | Michaelmas daisies | | HP | F | Any | Sun | | | | | Y |
| *Tages patula* | French marigold | | A | F | Well drained | Sun | | | | | Y |
| *Thymus serpyllum* | Creeping thyme | N | HP/ S | F | Well drained/ dry | Sun | Y | Y | | | Y |
| *Tilia x europaea* | Common lime | | T | C | Any | Sun/ shade | | | | Y | |
| *Trifolium spp.* | Clover species | N | H | F | Any | Sun | Y | | | | Y |
| *Valerina spp.* | Valerian species | N | HP | F | Moist | Sun/ partial shade | | | Y | | Y |
| *Verbascum spp.* | Mulleins | N | Bi, HP | C | Well drained | Sun | | | | | Y |
| *Verbena bonariensis* | Verbena | | HP | F | Well drained/moist | Sun | | | | | Y |
| *Viburnum lantana* | Wayfaring tree | N | S | C | Any | Sun/ shade | | | | Y | Y |
| *Viburnum opulus* | Guelder rose | N | S | C | Moist | Sun/ shade | | | Y | Y | |
| *Viola tricolor* | Pansy | N | A | F | Well drained/ moist | Sun/ partial shade | Y | Y | | | Y |

## Legend

| Type | | Benefit | |
|---|---|---|---|
| HP | Herbaceous perennial | C | Moth caterpillar food plant |
| Bi | Biennial | S | Sap sucking insects (e.g., whiteflies) |
| BiP | Biennial perennial | F | Flowers attract adult moths |
| T | Tree | E | Good roost potential |
| S | Shrub | | |
| H | Herb | | |
| A | Annual | | |
| B | Bulb | | |
| C | Creeper/ climber | | |