SoCG Land west of Thieves Lane, Hertford (HERT3 South)
Croudace Homes
August 2017

Appendix H: Ecological Impact Appraisal (CSA, December 2016)

CSA environmental

Land at Thieves Lane,
Hertford,
Hertfordshire

Ecological Impact Assessment

Prepared by
CSA Environmental

on behalf of
Croudace Strategic Ltd.

Report No: CSA/2028/05

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urban design | ecology | landscape

Report Reference	Date	Revision	Prepared by	Approved by	Comments
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EXECUTIVE SUMMARY

Residential development of c. 255 units is proposed at Land at Thieves Lane, Hertford, for which outline planning permission will be sought.

CSA Environmental was instructed by Croudace Strategic Ltd. to undertake an Ecological Impact Assessment (EcIA) of the proposed development to determine likely significant effects. To inform this assessment a suite of ecological surveys and investigation were been undertaken.

The Site is dominated by two arable fields of low intrinsic ecological importance, such that the loss of these habitats to are not predicted to result in significant adverse effects. Established habitats along the southern, western and north western include hedgerows, areas of ancient semi-natural woodland (Blakemore Wood) and other mature woodland of ecological importance. Measures to safeguard these habitats alongside development have been set out, including the provision of a minimum 15m scalloped landscaped buffer along ancient and mature woodland boundaries.

Panshanger Park Local Wildlife Site (LWS) designation covers arable habitat to the north west of the Site, as well as bounding the Site to the south and west. Measures have been set out to mitigate adverse effects on LWS, including provision of on-site open space and interpretation boards, promotion of responsible recreation and contributions to the management of the LWS and Blakemore wood.

Bat activity was found to be higher to the southern and western boundaries of the Site, with limited activity within open arable land. No bat roosts have been confirmed on- or adjacent to the Site, although opportunities are available for roosting in adjacent woodlands. Measures have been set out to mitigate adverse effects on the bats including implementation of a sensitive external lighting scheme for the proposed development. Enhancement measures have also been set out to provide new roosting opportunities for bats at the Site.

Safeguards set out to avoid offences being caused under protection legislation for nesting birds and badgers.

Based on the successful implementation of the mitigation and enhancement detailed herein, the development has the potential to deliver net gains for biodiversity, as demonstrated by the Biodiversity Impact Assessment Calculation provided. These measures can be secured via appropriately planning conditions, intrinsic design measures and/or legal agreement.

1.0 INTRODUCTION

1.1 This report has been prepared by CSA Environmental on behalf of Croudace Strategic Ltd. It sets out the findings of an Ecological Impact Assessment (EcIA) of Land at Thieves Lane, Hertford, Hertfordshire (hereafter referred to as 'the Site').

1.2 The scope of this assessment has been determined with due consideration for best-practice guidance provided by the Chartered Institute of Ecology and Environmental Management (CIEEM) (2015; 2016). The *Biodiversity: Code of practice for planning and development* (BS 42020:2013) published by the British Standards Institution (2013) cites CIEEM Guidelines as the acknowledged reference on ecological impact assessment. In addition, informal pre-application consultation was undertaken in May 2016 with Hertfordshire and Middlesex Wildlife Trust's Senior Planning and Biodiversity officer (Matt Dodds) in respect of the scope of the assessment as well as proposed mitigation and enhancement measures.

1.3 The Site occupies an area of c. 9ha and is located around central grid reference TL 30754 12802, to the west of Hertford, on the edge of the Panshanger Park Estate. It comprises two arable fields bisected by a public footpath, with restricted field margins and sections of boundary hedgerow, adjacent to off-site broadleaved semi-natural ancient woodland (see Habitats Plan in Appendix A).

1.4 Residential development of c. 255 units is proposed at the Site, for which outline planning permission will be sought.

1.5 A desk study and extended Phase 1 Habitat survey were undertaken for the Site in March/April 2016, the findings of which are presented herein. In addition, the following further survey work was subsequently undertaken between June and November, 2016:

- Arable plant survey (July 2016)
- Bat surveys (June – August 2016)
- Badger survey (July 2016)
- Dormouse surveys (July – November 2016)

1.6 It should be noted that previous survey work was carried out at the Site, including an Ecological Appraisal in 2012 and bat surveys, a badger survey, wintering and breeding bird surveys and an arable plant survey in 2013. The results of which are referred to as appropriate herein.

1.7 This Ecological Assessment aims to:

- Establish baseline ecological conditions at the Site.

- Identify any likely significant effects of the proposed development, without mitigation, including cumulative impacts.
- Set out any ecological mitigation measures required and identify residual impacts.
- Identify any compensation measures required to offset residual effects.
- Set out details of ecological enhancement measures.
- Confirm how proposed mitigation, compensation and enhancement measures will be secured.
- Provide sufficient information to determine whether the project accords with relevant nature conservation policies and legislation, and where appropriate, to allow conditions or obligations to be proposed by the relevant authority.

1.8 EcIA can be used for the appraisal of projects of any scale. This is a best practice evaluation process, recommended by CIEEM (2016). It is intended that the evaluation findings presented here-in will aid the East Herts District Council in their review of the outline application.

2.0 LEGISLATION, PLANNING POLICY & STANDING ADVICE

Legislation

2.1 Legislation relating to wildlife and biodiversity of particular relevance to this EA includes:

- The Conservation of Habitats and Species Regulations 2010 (as amended)
- The Wildlife and Countryside Act 1981 (as amended)
- The Natural Environment and Rural Communities (NERC) Act 2006
- The Protection of Badgers Act 1992

2.2 This above legislation has been addressed, as appropriate, in the production of this report. Further information on the above legislation is provided in Appendix B.

National Planning Policy

2.3 The National Planning Policy Framework (NPPF) (Department for Communities and Local Government, 2012) sets out the government planning policies for England and how they should be applied. Chapter 11: Conserving and Enhancing the Natural Environment, is of particular relevance to this report as it relates to ecology and biodiversity. Further details are provided in Appendix B.

2.4 The Government Circular 06/2005, which is referred to by the NPPF, provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

Local Planning Policy

2.5 A number of local planning policies relate to ecology, biodiversity and/or nature conservation. These are summarised in Table B.1 of Appendix B. These policies have been addressed, as appropriate, in the production of this report.

Standing Advice

2.6 Natural England Standing Advice (Natural England, 2014) regarding protected species aims to support local authorities and forms a material consideration in determining applications in the same way as any individual response received from Natural England following consultation. Standing advice is therefore been given due consideration, alongside other detailed guidance documents, in the production of this report.

3.0 METHODS

Desk Study

3.1 The Multi-Agency Geographic Information for the Countryside (MAGIC) (2013) online database was interrogated in April 2016 to identify the following ecological features (based on the likely 'zone of influence' of such features):

- Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites within 10km of the Site.
- Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature reserves (LNR) within 3km of the Site.
- Other relevant data e.g. Ancient Woodland Inventory within 1km of the Site.

3.2 The Hertfordshire Environmental Records Centre (HERC) was contacted for details of any non-statutory designations and records of protected/notable habitats and species. This information was requested for an area encompassing the Site and adjacent land within c. 1km the Site boundary. This search area was selected to include the likely 'zone of influence' of effects upon non-statutory designations and protected or notable habitats and species.

3.3 In accordance with guidelines (English Nature, 2001), a desktop search was undertaken to identify ponds within 500m of the Site which may have potential to support breeding great crested newts, using Ordnance Survey mapping, the MAGIC database and aerial photography.

3.4 All relevant desk study data are presented in Appendix C.

Field Survey

<u>Extended Phase 1 Habitat Survey</u>

3.5 An extended Phase 1 habitat survey was carried out in fine and dry weather conditions on 29 March 2016 by Tom Clemence GradCIEEM, encompassing the Site and immediately adjacent habitats that could be viewed.

3.6 Phase 1 Habitat survey (JNCC, 1990) is a method of classification and mapping wildlife habitats in Great Britain. It was originally intended to provide "…relatively rapidly, a record of semi-natural vegetation and wildlife habitat over large areas of the countryside". Phase 1 Habitat Survey methodology has been widely 'extended' beyond its original purpose to allow the capture of information at an intermediate level between Phase 1 and Phase 2 Habitat surveys. For clarity, the standard

Phase 1 Habitat survey methodology has been 'extended' in this report to include the following:

- More detailed floral species lists for each identified habitat
- Descriptions of habitat structure, the evidence of management and a broad assessment of habitat condition
- Mapping of additional habitat types (e.g. hardstanding)
- Identification of Priority Habitats under Section 41 of the NERC Act
- Identification of Habitats Directive Annex I habitat types
- Evidence of, or potential for, European Protected Species (EPS) including bats, great crested newt, dormouse and otter;
- Evidence of, or potential for, other protected species (including birds, reptiles, water vole, badger and certain invertebrates
- Evidence of, or potential for, other notable species (including S41 Priority Species as well as notable, rare, protected or controlled plants and invertebrates)

3.7 Results of the extended Phase 1 Habitat survey are presented on the Habitats Plan in Appendix A and in Table D.1 of Appendix D, which includes a list of floral species recorded in each habitat.

Preliminary Bat Roost Assessment

3.8 All accessible established trees on-site and adjacent to the boundaries were inspected and assessed in terms of their potential to support roosting bats, with due consideration for the *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016). Full survey methodology and results are provided in Appendix F.

Further Survey Work

3.9 The following detailed field survey work was carried out between June and November 2016, with full methodologies and results provided in the relevant Appendices:

- Arable plants
- Bats (Appendix F)
- Badger (Appendix G)
- Dormouse (Appendix H)

Evaluation and Assessment

3.10 Ecological features are identified, evaluated and assessed with due consideration for the CIEEM Guidelines for Ecological Impact Assessment (2016), with detailed methodology provided in Appendix E.

4.0 BASELINE ECOLOGICAL CONDITIONS

Nature Conservation Designations

Statutory

4.1 There are no statutory wildlife designations covering any part of the Site. It should be noted however that the adjacent Panshanger Park was formerly covered under a SSSI designation but has since declined and is now de-notified.

4.2 Three internationally important designations and no nationally important designations are present within 10km and 3km of the Site, respectively.

4.3 One locally important designation is present within 3km of the Site.

4.4 These statutory designations are described in Table 1 below.

Table 1. Statutory and Non-statutory Designations within Data Search Radii

Site Name & Designation	Distance & Direction from Survey Area	Brief Description of Designated Site
Internationally Important Designations within 10km		
Wormley-Hoddesdonpark Woods SAC	c. 4.7km south-east	Broad-leaved deciduous woodland dominated by former hornbeam *Carpinus betulus* coppice with sessile oak *Quercus petraea* standards.
Lee Valley Ramsar Site	c. 6.7km east	Lee Valley comprises a series of wetland habitat which supports internationally important numbers of over-wintering gadwall and shoveler and nationally important numbers of several other bird species, in addition to a diverse range of wetland flora and fauna.
Lee Valley Special Protection Area (SPA)	c. 6.7km east	Lee Valley comprises a series of wetland habitat which supports internationally important numbers of over-wintering gadwall and shoveler and nationally important numbers of several other bird species, in addition to a diverse range of wetland flora and fauna.
Nationally Important Designations within 3km		
N/A	N/A	N/A
Locally Important Designations within 3km		
Waterford Heath LNR	c. 1.7km north-east	Former sand and gravel quarry which contains a range of habitats, including grassland, scrub, plantation woodland and a small area of ancient, semi-natural woodland. In addition, slow worm, common lizard and grass snake are known to use the site.

Non-statutory Designations within 1km		
Panshanger Park Local Wildlife Site (LWS)	On western part of site and adjacent to western boundary	Large ornamental parkland. The site supports many veteran trees (c. 500). There are also areas of ancient woodland (which abut the Site boundary). Formerly a SSSI, now de-notified.
Long Wood (Sele Farm) LWS	c. 0.34km north	Ancient semi-natural broadleaved woodland with a dense canopy of hornbeam coppice with occasional standards.
North Road Cemetery, Hertford LWS	c. 0.49km north-east	Cemetery with semi-improved neutral grassland which generally supports a reasonable mix of grasses and herbs.
Land west of Sele Farm LWS	c. 0.4km north-west	Area of derelict old grassland and scrub including a north facing slope. The grassland is mainly rough and neutral in character with a shorter more acid community on the slope.
Archer's Spring Conifer Plantation LWS	c. 0.5km north-west	A conifer plantation on a small hilltop to the west of Hertford on the site of woodland shown on Bryant 1822. Remnants of the original broadleaved woodland survive on the margins of the plantation and to a lesser extent within a sparse field layer.
Hertingfordbury Park, Lower Pastures LWS	c. 0.62km south-east	Series of low lying neutral grasslands which contains several wet flushes and springs, giving rise to marshy/fen conditions in places.
St Mary's Churchyard, Hertingfordbury LWS	c. 0.65km north	Churchyard with moderately diverse neutral grassland supporting a range of fine grasses and herbs.
Willowmead LWS	c. 0.65km south-east	Mature riparian wet alder *Alnus glutinosa* woodland with crack willow *Salix fragilis* and white willow *Salix alba* carr on a waterlogged peaty substrate.
Elevenacre Wood LWS	c. 0.6km north	Narrow strip of ancient semi-natural pedunculate oak *Quercus robur* and hornbeam *Carpinus betulus* woodland on a steep north facing gravel escarpment.
Hanging Grove LWS	c. 0.72km north-west	Ancient semi-natural woodland on a west facing slope supporting mainly hornbeam standards and coppice with ash *Fraxinus excelsior* and field maple *Acer campestre* and rare pedunculate oak.
Beane Marsh LWS	c. 0.78km east	Wetland habitats on the floodplain of the River Beane.
Goldings Meadows & Woods LWS	c. 0.7km north-east	Comprises meadows, ancient woodland and several watercourses which are of

		high wildlife value.
Grassland E. of Icehouse Wood LWS (former SSSI)	c. 0.82km north	Old grassland on a moderate north-east facing slope with a good mix of finer grass species and commoner herbs growing on dry neutral to slightly acid soil.
Broadoak End Pastures LWS	c. 0.83km north	Predominantly neutral old grassland with a reasonable mix of grass and herb species.

Non-Statutory

4.5 A total of 14 non-statutory designations are present within 1km of the Site. One of which, Panshanger Park LWS covers the north-western most part of the Site, as described in Table 1 above.

Ancient Woodland

4.6 There are no Ancient Woodland sites covering any part of the Site. However, Blakemore Wood (which forms part of Panshanger Park LWS), an area of ancient woodland is located immediate adjacent to the western Site boundary. Blakemore Wood is of semi-natural ancient origin and is dominated by mature oak *Quercus robur* trees with hornbeam, sweet chestnut *Castanea sativa*, hazel *Corylus avellana*, elder *Sambucus nigra* and holly *Ilex aquifolium* present. Ground flora includes bracken *Pteridium aquilinum*, bluebell *Hyacinthoides non-scripta* and dog's mercury *Mercurialis perennis*. Several veteran and/or mature oak trees were noted to the edge of the wood adjacent to the Site boundary. Additionally, mature hornbeam trees adjacent to the western Site boundary shows evidence of historic hedge-laying.

Habitats and Flora

Notable Flora Records

4.7 HERC have provided 24 records of 14 notable plant species from within the search area. Those of potential relevance to the Site include henbane *Hyoscyamus niger* and corn spurrey *Spergula arvensis*, both of which were recorded in 1997 along the southern Site boundary. However, neither were identified during dedicated arable plant surveys, carried out by CSA in June 2013 and 15 July 2016. It should be noted that seeds of these notable arable plants can remain within the seed bank for a number of years, with plants re-emerging when suitable conditions arise.

4.8 One record of a veteran/mature tree on the north-western side of the Site was provided from 1996. However, this was confirmed to be absent during the Phase 1 habitat survey. The locations of a number of additional veteran trees were supplied for the adjacent Blakemore Woods.

Habitats

4.9 The following habitats were recorded on-site and classified in line with current Phase 1 habitat species guidance (JNCC, 1990), as illustrated in Appendix A. Detailed species lists for each habitat are provided in Appendix D.

Arable Field

4.10 The two fields on-site are dominated by arable land, with a winter wheat crop present at the time of survey. In addition, field poppy *Papaver rhoeas*, field pansy *Viola arvensis* and scentless mayweed *Tripleurospermum inodorum* were identified during the arable plants survey.

4.11 Short vegetation has established along the narrow field margins. Species present include common bent *Agrostis* capillaris, Yorkshire-fog *Holcus lanatus*, cow parsley *Anthriscus sylvestris*, common nettle *Urtica dioica* and red dead-nettle *Lamium purpureum*. Restricted areas of bracken were also present along the eastern boundary.

4.12 Given the absence of notable arable plants, this habitat is not considered to be of significant ecological importance.

Road Verges

4.13 Beyond the boundary hedgerows to the north and fence/hedge to the east a small strip of road verge divides the Site from adjacent highways. The northern road verge comprises short cropped grassland with less managed grassland to the eastern road verge. Species present include perennial rye grass *Lolium perenne*, false oat-grass

Arrhenatherum elatius, hogweed *Heracleum sphondylium* and yarrow *Achillea millefolium*.

4.14 Due to its restricted size and species composition this habitat is not considered to be of significant ecological importance.

Hedgerows

4.15 A series of short hedgerows were present along the Site's northern, eastern and western boundaries (H1 to H5).

4.16 H1, spanning c. 250m and c. 4-5m tall is located along the northern boundary, connecting with an area of plantation broadleaved woodland at its most western end. The hedge is untrimmed with limited foliage at the base. Over five woody species are present and as such it is considered to be species rich (Defra, 2007). Dominant species include hawthorn *Crateagus monogyna* and blackthorn *Prunus spinosa* with field maple, oak, hazel, spindle *Euonymus europaeus* and hornbeam also present. Species within the ground flora include cow parsley *Anthriscus sylvestris*, dog's mercury and lesser celandine *Ficaria verna*. Several mature oak and semi-mature ash trees are also present.

4.17 H2 comprises several short (less than 10m) untrimmed sections of cotoneaster *Cotoneaster* sp., present along the northern boundary to the east of the public footpath.

4.18 H3 comprises a c. 60m section of tall and leggy hedgerow, c. 4-6m in height. Species present include oak, blackthorn, field maple and common ivy *Hedera helix*.

4.19 H4 comprises short sections (less than 10m) of untrimmed elm *Ulmus* sp. hedgerow along the eastern boundary, adjacent to Thieves Lane.

4.20 H5 comprises a c. 50m long and c. 4-5m high untrimmed hedge, connecting Blakemore Wood with Chesher's plantation at the south western corner of the Site, with common nettle beds and rough vegetation beyond this feature to the west. Woody species present include holly, hawthorn *Crataegusmonogyna*, elder, elm and spindle.

4.21 Hedgerows H1, H3 and H5 qualify as S41 Priority Habitat (JNCC, 2011) and species-rich. Whilst they each fall short of the LWS selection criteria, they are considered to be of ecological importance at the **Local** level.

4.22 H2 and H4 are considered to fall below the threshold of ecological significance due to their restricted size and lack of connectivity.

Woodland (off-site)

4.23 The Site is enclosed along the southern and western boundaries by woodland blocks which form parts of Panshanger Park LWS. This includes ancient woodland, Blakemore Wood to the west, Chesher's

Plantation to the south and a small section of more recently established plantation woodland beyond the north-west corner of the Site (Habitats Plan, Appendix A).

4.24 Blakemore Wood is of semi-natural ancient origin and is dominated by mature oak trees with hornbeam, sweet chestnut, hazel, elder and holly present. Ground flora includes bracken, bluebell and dog's mercury. Several veteran and/or mature oak trees were noted at the edge of the wood, adjacent to the Site. Additionally, mature hornbeam trees adjacent to the western Site boundary show evidence of historic hedge-laying.

4.25 Chester's Plantation is present beyond the southernmost boundary of the Site. Tree species adjacent to the Site boundary are dominated by sweet chestnut, sycamore *Acer pseudoplatanus* and oak, with holly, elder and hawthorn also present. Ground flora is limited with some extensive areas of dog's mercury recorded. This woodland is understood to be covered under a tree preservation order (TPO #4: Panshanger Estate).

4.26 The small section of plantation woodland, north-west of the Site, comprises semi-mature sycamore, cherry *Prunus* sp., hazel and sweet chestnut with a restricted ground flora.

4.27 Blakemore Wood and Chester's Plantation form part of Panshanger Park LWS and comprise ancient and mature broadleaved woodlands, respectively, and as such are considered to be of ecological importance on a **County** level. The small section of plantation woodland off-site to the northwest is restricted in its ecological importance by the maturity of the trees and the size of the habitat, though this too forms part of the Panshanger Park LWS.

Fauna

Bats

4.28 HERC have supplied 31 bat records from within the search area dating from 1989 to 2015, these include the following species: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auratus* and Natterer's bat *Myotis nattereri*. The closest records are of common pipistrelle (c. 0.15km to the north-east of the Site). Outside of the search area are records of further species, including barbastelle *Barbastella barbastellus*, serotine *Eptesicus serotinus* and daubenton's *Myotis daubentonii* located c. 1.34km, 1.4km and 1.43km from the Site boundary, respectively.

4.29 The Site being dominated by arable land with narrow field margins offers limited foraging opportunities for bat species; however, the

sections of hedgerow and boundaries shared with the adjacent woodlands provide greater ecological opportunities.

Tree Inspection

4.30 An inspection of the on-site, site adjacent and trees within Blakemore Wood was carried out to identify suitable roosting opportunities for bats. An on-site oak tree was assessed to provide low roosting opportunities for bats, as shown in Appendix F.

4.31 A number of trees within the Blakemore Woodland and adjacent to the Site boundary are considered to provide moderate to high roosting opportunities with a large number of potential roosting opportunities (PRFs) present.

Activity Surveys

4.32 Bat activity surveys were conducted between June and August 2016 in suitable weather conditions. The full results of the bat activity surveys are provided in Appendix F.

4.33 Data from the activity surveys confirm the use of the Site by at least six bat species. Species identified were common pipistrelle, soprano pipistrelle, noctule, brown long-eared, serotine and a myotid species *Myotis sp.* bat.

4.34 The majority of calls detected during the three surveys were from common and soprano pipistrelle bats with comparatively low instances of noctule, brown long-eared, myotis and serotine also recorded.

4.35 Activity was mostly concentrated within the adjacent areas of woodland and the on-site woodland edges and hedgerows. Activity within the arable habitat was restricted to individual passes.

4.36 Peak activity was recorded during the 11 August 2016 survey with 204 contacts recorded, over 83% of which were from common pipistrelle bats.

4.37 The patterns of bat activity (all species) observed during the activity surveys are illustrated on the Bat Habitat Utilisation Plan (Appendix F), which highlights the importance of the woodland and the woodland edge commuting/foraging bats. Surveys indicate that bats do not frequently utilise the majority of the open arable habitats at the Site, instead remaining within c. 20m of the woodland edge and hedgerow habitats. This is potentially related to lower abundance of prey items, fewer navigational features (e.g. hedges) and greater light levels within the open arable habitat.

Remote Monitoring

4.38 Three remote monitoring periods of bat activity were conducted between June and August 2016. Data was collected on-site from the

woodland edge and boundary hedgerows and off-site within Blakemore Wood and Chester's Plantation. The full results of this remote monitoring are provided in Appendix F.

4.39 The same bat species were recorded on-site during the remote monitoring periods, with the addition of a single nathusius' pipistrelle *Pipistrellus nathusii* pass on 20 July 2016 at 12:22AM (n.b. this pass occurred outside of the five consecutive nights worth of data which have been analysed for the July monitoring period). Activity was greatest along the woodland edge, with lower levels along the boundary hedgerow. Common pipistrelle occurred most frequently at both points, comprising 95.8% and 81.1% of contacts recorded respectively.

4.40 No barbastelle bats were recorded during the remoted monitoring periods.

Importance

4.41 The bat surveys indicate that a small number of common bat species frequently utilise the Site, with some additional species present on occasion. The species identified utilising the Site fall into "common" (common pipistrelle, soprano pipistrelle and brown long-eared) and "rarer" (noctule, serotine, nathusius' pipistrelle and *Myotis* species) categories based on criteria for assessing rarity within range by Wray *et al.* (2010).

4.42 No bat roosts have been identified on-site, however, a number of trees assessed to have high and moderate bat roosting suitability have been identified adjacent to the Site within Blakemore Wood and Chester's Plantation.

4.43 Whilst bat activity levels on-site are relatively low, the diversity of species present is considered to represent a 'good' assemblage (minimum of six species). Based on Wray *et al.* (2010) valuing commuting routes and foraging areas for the species identified, the bat assemblage is considered to be of ecological importance at the **Local** level.

<u>Badger</u>

4.44 HERC have provided 33 records of badger *Meles meles* from within the search area dating from 1986 to 2014. The closest record is c. 0.15km from the Site.

4.45 No badger setts were recorded on or adjacent to the Site. However, badgers are known to use the Site for foraging and commuting. This was confirmed by an incidental sighting of an adult badger on-site during the June bat activity survey.

4.46 A number of mammal holes were recorded within Blakemore Wood and Chester's Plantation, however, upon close inspection these were assessed to be from rabbit *Oryctolagus cuniculus*, several of which had been further excavated by fox *Vulpes vulpes*.

4.47 Badgers are considered to use the Site for low-levels of foraging. The Site being dominated by arable land provides limited foraging habitat, with opportunities mainly restricted to boundary hedgerows and the woodland edges.

4.48 Badgers are common and not considered to be of conservation concern. However badgers and their setts are protected under the Protection of Badgers Act 1992 and are therefore included in the assessment of effects below in the context of this legislation.

Dormouse

4.49 HERC have not provided records of dormouse *Muscardinus avellanarius* from within the search area, although it is understood that no dormouse survey or monitoring studies have ever been undertaken in the wider Panshanger Park area. It is however, understood that a dormouse population has been recently discovered (2013) locally at Hertford Heath, c.4km southeast of the site with records available online.

4.50 Five dormouse surveys of the Site and adjacent areas of Blakemore Wood and Chester's Plantation were undertaken between July and November 2016, during which, no evidence of dormouse was recorded.

4.51 Dormouse are therefore considered absent from the Site.

Water vole

4.52 HERC have provided five records of water vole *Arvicola amphibius* from within the search area dating from 1999 to 2014. The closest record is c. 0.74km from the Site.

4.53 No evidence of water vole was recorded during the survey. No watercourses are present on or adjacent to the Site and consequently the Site is not considered to provide suitable habitat opportunities for this species. As such, water vole are considered absent from the Site.

Otter

4.54 HERC have provided two records of otter *Lutra lutra* from within the search area, both dated from1995. The closest record is c. 0.68km from the Site.

4.55 No evidence of otter was recorded during the survey. No watercourses are present on or adjacent to the Site and consequently the Site is not

considered to provide suitable habitat opportunities for this species. As such otter are considered absent from the Site.

Other Mammals

Brown hare

4.56 HERC have not provided records of brown hare *Lepus europeus* from within the search area.

4.57 No evidence of brown hare was recorded during the survey. The Site provides some suitable habitat for brown hare to forage and lay-up with adjacent woodland providing refuge. However, given the proximity of residential development, it is likely that brown hare are discouraged to some extent. Consequently, the Site is not considered to be of significant importance to brown hare and any potential brown hare population utilising the Site is deemed to fall short of the criteria for features of significant ecological importance. Therefore, this species is not considered further in this assessment.

Hedgehog

4.58 HERC have provided 12 records of hedgehog *Erinaceus europaeus* from within the search area dating from 1986 to 2002. The closest record is c. 0.01km from the Site.

4.59 No hedgehogs or any evidence to suggest the on-site presence of hedgehogs was recorded during any of the survey work undertaken. Whilst hedgehogs have been recorded to forage on arable land (Dowie, 1993), they more typically make use of hedgerow/scrub habitats at the margins of such fields. As such, given the prevalence of arable land at the Site, it is unlikely that hedgehogs make regular use of the Site.

4.60 However, opportunities are available to ensure hedgehogs, and other small mammals, make use of new residential gardens across the Site, as detailed in the Enhancement Section.

Harvest Mouse

4.61 HERC have not provided records of harvest mouse *Micromys minutus* from within the search area.

4.62 Though a dedicated harvest mouse survey of the Site has not been completed, no evidence of harvest mouse was observed during the numerous Site visits. However, the arable crop, field margins and hedgerows present at the time of survey provides suitable habitat for this species. These suitable habitats continue within the wider Panshanger Park area which surrounds the Site. Given the size and context of the Site, it is not considered to be of significant importance to harvest mouse and any potential harvest mouse population utilising the Site is deemed to fall short of the criteria for features of significant

ecological importance. Therefore, this species is not considered further in this assessment.

Polecat

4.63 HERC have provided 6 records of polecat *Mustela putorius* from within the search area dating from 1989 to 2003. The closest record is c. 0.24km from the site.

4.64 Whilst polecats are primarily associated with riparian and wetland habitats the woodland edges of the Site may provide some limited opportunities. However, due to the unfavourable habitats present on-site for polecats, adverse impacts are considered unlikely as a result of the proposed development. Therefore, this species is not considered further within this assessment.

Birds

4.65 HERC have provided 912 records of 66 bird species from within the search area dating from 2007 to 2015, all of which are located off-site.

4.66 Wintering and breeding bird survey work carried out in 2013 revealed limited activity within the Site itself, with field edge/woodland boundaries and hedgerows considered to be the most valuable habitat for birds at the Site. Table 2 below summarises those species of conservation concern recorded on or adjacent to the Site

Table 2: Species of Conservation Concern Recorded on-site/adjacent in 2013

Common Name	Latin Name	Status (BoCC, S41, legal protection)	Notes
Black-headed gull	*Chroicocephalus ridibundus*	Amber Listed	Flyover only. No suitable breeding habitat.
Common gull	*Larus canus*	Amber Listed	Flyover only. No suitable breeding habitat.
Common tern	*Sterna hirundo*	Red Listed	Flyover only. No suitable breeding habitat.
Dunnock	*Prunella modularis*	Amber Listed	Singing males recorded in woodland areas, nearby gardens and northern hedgerow. Also foraging in field edges. Possible breeding habitat exists on-site.
House Sparrow	*Passer domesticus*	Red Listed	Colonies recorded consistently within garden areas north of the Site with birds sometimes present within the northern hedgerow where there is breeding
Lesser black-backed gull	*Larus fuscus*	Amber Listed	Flyover only. No suitable breeding habitat.

Mallard	*Anas platyrhynchos*	Amber Listed	Flyover only. No suitable breeding habitat.
Mistle thrush	*Turdus viscivorus*	Red Listed	Recorded within Blakemore wood and utilising field edges for foraging. May nest within trees on-site but more likely within adjacent woodland.
Redwing	*Turdus iliacus*	Red Listed Sch 1	Multiple birds recorded within adjacent woodlands before migration. Non-breeding species in southern Britain.
Skylark	*Alauda arvensis*	Red list	Two birds recorded in song flight over crop on one occasion. Potential nesting habitat was present early in the season.
Song thrush	*Turdus philomelos*	Red Listed S41	One bird recorded in Blakemore Wood on one occasion. Potential to forage and nest within on-Site habitats.
Starling	*Sturnus vulgaris*	Red Listed S41	Probable breeders within houses adjacent to the Site. Birds seen collecting nesting material from on-site.
Stock dove	*Columba oenas*	Amber Listed	Occasional flyover species and recorded singing within Chesher's Plantation. Unlikely to nest on-site.
Swift	*Apus apus*	Amber Listed	Recorded foraging over and near the Site in small numbers. No suitable nesting habitat is present.

4.67 The Site conditions are not considered to have changed in the time since the above wintering and breeding bird surveys were undertaken, as such they are considered valid to date.

4.68 Of the bird species recoded, three (dunnock, mistle thrush and song thrush) were assessed to be potentially using the Site and one (house sparrow) was confirmed as breeding, all of which were in low numbers. Due to the conservation status of the birds recorded, the Site is considered to be of **Local** importance.

Reptile

4.69 HERC have provided 38 records of two reptile species from within the search area including slow-worm *Anguis fragilis* and grass snake *Natrix natrix*. The closest record is for slow-worm, located c. 0.15km north-east of the Site.

4.70 No evidence of reptiles was recorded during the Site survey. The Site, being dominated by arable land with narrow field margin provides very limited opportunities for reptiles. As such reptiles are not considered likely to be present on-site.

Amphibians

4.71 HERC have provided three records of common toad *Bufo bufo* from within the search area dating from between 2002 and 2015. The closest record is c. 0.08km south-west of the Site.

4.72 The Site, being dominated by arable land, provides poor terrestrial habitat for amphibian species with no suitable waterbodies located on or adjacent to the Site. Consequently, the Site is not considered likely to support amphibian species.

4.73 Several common toad were incidentally recorded within the on-site arable habitat whilst carrying out bat activity surveys. It is considered that the arable land was being used to disperse over, rather than for resting/foraging.

4.74 Common toads are designated as S41 Priority Species and as such are of conservation concern. The low numbers of toads recorded are not considered sufficient in size to be of significant ecological importance. However, measures to enhance opportunities for amphibians at the Site are provided herein.

Great Crested Newt

4.75 Panshanger Park is known to support great crested newts. However, no ponds have been identified within 500m of the site. Whilst a single large lake with some marginal wetland habitats is present c.400m southwest of the Site, this habitat is considered unlikely to support great crested newts. As such, great crested newts are considered absent from the Site.

Invertebrates

4.76 SBRC have provided 66 records of 39 invertebrate species from within the search area. None of which are located on-site. The majority of these records are for Panshanger Park LWS which is known to support important assemblages of invertebrates. This includes saproxylic species (Coleoptera in particular) associated with deadwood habitats of mature woodland (for which the former Panshanger Park SSSI was previously designated).

4.77 In addition, two of the records are for statutory protected species, namely white-letter hairstreak *Satyrium w-album* and purple emperor *Apatura iris*. The closest of which is for white-letter hairstreak *Satyrium w-album*, which lies c. 0.1km to the south of the Site.

4.78 White-letter hairstreak sole food plant is elm and as such has suffered population decline since the introduction of Dutch elm disease to the UK in the 1970/80s. Although elm is present on the Site it is predominantly in restricted and isolated sections of hedge (H4). As such this species is not considered likely to be present on-site.

4.79 A range of terrestrial invertebrate species are likely to be present on-site. However, given the extent of arable cultivation, the Site is not considered to be of significant importance to invertebrates and the invertebrate assemblage is deemed to fall short of the criteria for features of significant ecological importance.

Summary of Ecological Features

4.80 Table 3 below summarises all important or legally protected ecological features identified within their respective Zone of influence, along with their geographic level of importance and/or protected status:

Table 3. Summary of Ecological Features and their Geographic Level of Importance

Ecological / Feature	Ecological Importance [Geographic Level of Importance and/or Legal Protection]
Wormley-Hoddesdonpark Woods SAC	International
Lee Valley Ramsar Site and SPA	International
Waterford Heath LNR	Local
Panshanger Park LWS	Local
Long Wood (Sele Farm) LWS	Local
Land west of Sele Farm LWS	Local
Archer's Spring Conifer Plantation LWS	Local
Hertingfordbury Park, Lower Pastures LWS	Local
St Mary's Churchyard, Hertingfordbury LWS	Local
Willowmead LWS	Local
Elevenacre Wood LWS	Local
Hanging Grove LWS	Local
Beane Marsh LWS	Local
Goldings Meadows & Woods LWS	Local
Grassland E. of Icehouse Wood LWS	Local
Broadoak End Pastures LWS	Local
Blakemore Wood (Ancient Woodland)	Local
Bats	Local & Protected (EPS)
Badger	Protected Species (Badger Act)
Hedgehog	Local & S41
Birds	Local

5.0 ASSESSMENT OF EFFECTS

5.1 Residential development of c. 255 units is proposed at Land at Thieves Lane, Hertford, for which outline planning permission will be sought.

5.2 The illustrative masterplan provides an indicative layout for the Site which includes the following:

- c. 6.97ha of potential residential land
- Vehicular access points from Thieves Lane and Welwyn Road
- On-site circular pedestrian footpath which connect with existing footpath network

Assessment of Likely Significant Effects

Summary of Effects

5.3 Before mitigation the proposed scheme is predicted to result in, at most, adverse effects significant at the Local level. After mitigation no significant (residual) effects are predicted.

5.4 Impacts to on-site habitats are quantified in the Biodiversity Impact Assessment Calculator (Appendix I). After mitigation a positive Biodiversity Impact Score is anticipated (Habitat Biodiversity Impact Score = 1.16, Linear Biodiversity Impact Score = 2.06), demonstrating the potential for the development to secure net gains for biodiversity.

5.5 Table 4 below summarises the assessment of effects, mitigation and subsequent residual effects.

Table 4. Summary of Effects

Important Ecological Feature	Likely Significant Effect (before mitigation) and/or Legal Implication	Mitigation Measures	Mechanism by which Mitigation is Secured	Residual Effects (after mitigation)
Wormley-Hoddesdonpark Woods SAC	No significant effect	-	-	-
Lee Valley Ramsar Site/SPA	No significant effect	-	-	-
Waterford Heath LNR	No significant effect	-	-	-
Panshanger Park LWS	Adverse effect significant at the **Local** level	Scalloped woodland buffer; Front properties on to woodland; Provision of on-site POS; information	Planning condition /intrinsic design measures/ Section 106	No significant effect

Important Ecological Feature	Likely Significant Effect (before mitigation) and/or Legal Implication	Mitigation Measures	Mechanism by which Mitigation is Secured	Residual Effects (after mitigation)
		boards; provision of on-site dog mess bins; and new residents information leaflet; Monetary contribution to management of LWS.	agreement	
Other LWSs	No significant effect	-	-	-
Ancient Woodland	See Panshanger Park LWS			
Hedgerows	Adverse effect significant at the **Local** level	Protective fencing and strengthening of existing hedgerows	Planning condition	No significant effect
Bats	Adverse effect significant at the **Local** level	Scalloped woodland buffer; Sensitive lighting scheme	Planning condition /intrinsic design measures	No significant effect
Badger	Protection of Badgers Act 1992	Protection measures during construction; pre-commencement badger check	Legal requirement & Planning condition	No significant effect
Birds	Wildlife and Countryside Act 1981 (as amended)	No clearance of vegetation during the bird breeding season (i.e. not during March-August inclusive)	Legal requirement	No significant effect

Wormley-Hoddesdonpark Woods SAC

Predicted Effects

5.6 Wormley-Hoddesdonpark Woods SAC comprises broad-leaved deciduous woodland dominated by former hornbeam coppice with sessile oak standards. The site is located c. 4.7km south-east of the Site and c. 8km by road. The site is currently used extensively by the public

for recreation. As such, public access/disturbance has been classified as a 'threat' in the Site Improvement Plan (2015).

5.7 However, given the distance of Wormley-Hoddesdonpark Woods SAC from the Site, visitor numbers are not anticipated to significantly increase during operational phases, such that no significant adverse effects are predicted.

5.8 It is noted that although no specific mitigation measures are considered necessary, proposed mitigation measures with regard to other designated sites, including on-site walking routes and open space, is likely to reduce any limited effects.

Lee Valley Ramsar Site/SPA

Predicted Effects

5.9 Lee Valley comprises a series of wetland habitat which supports internationally important numbers of over-wintering birds. The closest part of Lee Valley Ramsar/SPA is a straight line distance of c. 6.7km east of the Site, however, the likely access point (from Rye Meads Nature Reserve carpark) is c. 11km, or c. 20 minutes from the Site by road.

5.10 Public access/disturbance, from watersports, angling and dog walking, is listed as a threat to the bittern, gadwall and shoveler populations, for which the site is designated (Natural England, 2014). Plans are in place to investigate if a change to access management is required.

5.11 Whilst Lee Valley Ramsar/SPA is listed as under threat from recreational pressures, the proposed development is considered suitably distant from the site to not cause a significant increase or impact during either the active or post-construction phases.

5.12 It is noted that although no specific mitigation measures are considered necessary, proposed mitigation measures with regard to other designated sites, including on-site walking routes and open space, is likely to reduce any limited effects.

Waterford Heath LNR

Predicted Effects

5.13 Waterford Heath LNR is located c. 1.7km north-east of the Site, or c. 4km by road. The site has public access and encourages visitors via the Herts and Middlesex Wildlife Trust website and as such is managed in accordance.

5.14 It is noted that although no specific mitigation measures are considered necessary, proposed mitigation measures with regard to other designated sites, including on-site walking routes and open space, is likely to reduce any limited effects.

Panshanger Park LWS

Predicted Effects

5.15 Panshanger Park LWS bounds the Site to the south and west, in addition to covering part of the Site in the north-west. Areas of the LWS which bound the Site comprise Blakemore Wood, an area of broadleaved ancient semi-natural woodland, Chester's Plantation, a mature broadleaved plantation woodland and a restricted area of young broadleaved plantation woodland.

5.16 Panshanger Park LWS is promoted for recreational use and hosts a number of organised wildlife walks. The site was formerly designated as a SSSI for its wood pasture, parkland and veteran trees, although is understood to have declined since then.

5.17 The proposed development is anticipated to increase the local population by c. 612 residents (according to the 2014 UK average of 2.4 people per household (Office for National Statistics, 2015)). Due to the distance of Panshanger Park LWS from the Site a potentially significant increase in recreational pressures from walkers and dog-walkers is anticipated. In the absence of mitigation, due to the sensitivity of the flora and fauna present on the site such pressures are predicted to result in an adverse effect, significant at the **Local** level.

5.18 The part of the Site which is included within Panshanger Park LWS comprises c. 1.1ha of arable habitat and a boundary hedgerow (H1). As noted above, the arable habitat is not considered to be of significant ecological importance, though H1 is. As such, in the absence of mitigation an adverse effect, significant at the **Local** level is predicted. Furthermore, ENV14 of East Herts Council Local Plan (2007) states: *"Development and land use change likely to have an adverse effect on a Local Nature Reserve or Wildlife Site, or a Regionally Important Geological/Geomorphological Site, will not be permitted unless it can be clearly demonstrated that there are reasons for the proposal, which outweigh the need to safeguard the substantive nature conservation value of the site or feature."*

Mitigation Measures

5.19 A defensive scalloped landscaped buffer of minimum 15m to Blakemore Wood and Chester's Plantation will be provided, in accordance with Standing Advice for Ancient Woodland and Veteran Trees[1] (Natural England and the Forestry Commission, 2014). Ideally the

[1] P11: *"Development must be kept as far as possible from ancient woodland, with a buffer area maintained between the ancient woodland and any development boundary. An appropriate buffer area will depend on the local circumstances and the type of development. In a planning case in West Sussex the Secretary of State supported the arguments for a 15m buffer around the affected ancient woodland, but larger buffers may be required. The permanent retention of buffer zones must be secured as part of the planning permission. These should be allowed to develop into*

buffer will also extend around the edge of the young plantation woodland in the north-west of the Site, in total creating a minimum of c. 1.3ha of woodland buffer planting.

5.20 The buffer will be scalloped in shape and comprise a woodland edge 'ecotone' grading from high canopy through to dense shrub layer, down to herbaceous planting (covering a total area of c. ≥1.3ha). Species will comprise native stock, of local providence where practicable. Defensive species will be used in the shrub layer to discourage recreational use or the establishment of unofficial footpaths. The scalloped shape will allow species present within the seed bank of the woodland edge to naturally regenerate over time.

5.21 The detail of the proposed planting will be set out at the detailed design stage. However, the following species will be included within the dense shrub layer: hawthorn, blackthorn, holly, hornbeam, field maple, spindle, hazel, dog rose and honeysuckle *Lonicera periclymenum*. The base of the shrub layer and the scalloped areas will be sown with Emorsgate EW1 – Woodland Mixture to provide a rich ground flora, in keeping with this habitat type.

5.22 It is recommended properties along the woodland edge be fronted onto the woodland to reduce dumping of garden waste into the woodland.

5.23 Areas of Public Open Space (POS) will be provided on-site, including a circular footpath. Information boards will be strategically positioned along the route to encourage responsible recreation. On-site dog mess bins will also be provided to encourage responsible behaviour from dog-walkers.

5.24 New residents will be provided with a short leaflet setting out the importance of their local site and relevant information on reducing impacts whilst visiting the LWS, including details on public involvement in management of the LWS.

5.25 To further reduce the impact of increased recreational pressures within Panshanger Park LWS a monetary contribution towards its management, specifically Blakemore Wood will be made. This could be put towards the provision of deer-proof fencing, to encourage regeneration of the ancient woodland ground flora or other management priorities.

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semi-natural habitat. Developments such as gardens must not be included within buffer zones as there is limited control over how they may be used, or developed in the future; for example, they might be paved or decked without the need for planning permission or they may include inappropriate species which could escape into the woodland."

5.26 Loss of the arable habitat within the on-site area of Panshanger Park (c. 1.1ha) would be suitably mitigated by the proposed woodland buffer planting (c. 0.4ha within this area). In addition, H1 is scheduled to be retained and protected, as detailed below.

5.27 The aforementioned mitigation will be secured via appropriately worded planning conditions, intrinsic design measures and/or Section 106 agreement.

Residual Effects

5.28 With the implementation of the above mitigation measures no residual effects are anticipated within the offsite areas of Panshanger Park LWS.

Additional Local Wildlife Sites

5.29 A number of additional LWS are present within 1km of the Site (as detailed in Table 1). These sites are sensitive to increases in recreational pressures, potentially leading to disturbance, trampling and nutrient enrichment. However, the relative distance and restricted size of these sites limits their attractiveness to recreational users. As such they are anticipated to receive an insignificant increase in recreational pressures as a result of the proposed development.

5.30 Although no specific mitigation measures are considered necessary for the additional LWSs, those listed in reference to Wormley-Hoddesdonpark Woods SAC and Panshanger Park LWS will reduce any otherwise limited effects.

Ancient Woodland

5.31 The assessment of effects in relation to Panshanger Park LWS accounts for Blakemore Wood, the area of ancient woodland adjacent to the western Site boundary.

Hedgerows

Predicted Effects

5.32 All of the on-site hedgerows are scheduled to be retained. However, the removal of a restricted section of H1 is planned to make way for a potential access point.

5.33 In the absence of mitigation, the retained hedgerows will be vulnerable to damage during the construction phase from passing construction traffic and ground compaction. In addition, the removal of part of H1 to make way for an access point will result in habitat fragmentation and loss of connectivity.

5.34 Overall, in the absence of mitigation, a significant adverse effect is predicted at the **Local** level.

Mitigation Measures

5.35 Suitable protective fencing will be erected around all on-site hedgerows in accordance with BS 5837:2005. This will be secured by an appropriately worded planning condition.

5.36 Hedgerow removal will be kept to a minimum to mitigate for the fragmentation of H1. In addition, where possible new growth from the two sections of H1 will be encouraged to link at the top of the canopy through careful management.

Residual Effects

5.37 Subject to the implementation of the above mitigation measures no residual effects are predicted.

Bats

Predicted Effects

5.38 The Site, being dominated by arable habitat is of limited ecological importance for bats, with the majority of bats noted as staying within c. 20m of the woodland edge and hedgerow habitats (Bat Habitat Utilisation Plan, Appendix F).

5.39 Blakemore Wood, Chester's Plantation and the associated woodland edge habitats are shown to be the areas of principal importance for bats within the survey area. Moderate levels of bat activity were also recorded along the northern boundary hedgerows (H1-3).

5.40 The majority of the on-site hedgerows are scheduled to be retained, however a section of H1 is anticipated to be removed to make way for an access point. This has the potential to disrupt bats which use this hedgerow to commute/forage.

5.41 The Site is currently unlit, although, there is some light spill from the adjacent roads (Welywn Road to the north and Thieves Lane to the east). The introduction of new artificial lighting of retained/adjacent habitat during the construction and operational phases may lead to adverse disturbance impacts to bats and other nocturnal wildlife.

5.42 In the absence of mitigation, an adverse effected to bats is anticipated, significant at the **Local** level.

Mitigation Measures

5.43 The mitigation measures set out above in relation to hedgerows would enable the protection of retained hedgerow habitats during and after construction for foraging and commuting bats.

5.44 The 15m (minimum) scalloped buffer planting along the on-site woodland edges will minimise passive light spill and disturbance from

the proposed development in addition to providing new foraging and commuting habitat.

5.45 Furthermore, a sensitive external lighting scheme will be developed in consultation with a bat ecologist to avoid/minimise light spill onto retained, created and adjacent woodland habitats. This will be developed and instigated for both the construction and post-construction phases so to maintain dark corridors for bats and other nocturnal wildlife.

5.46 The above will be secured by an appropriately worded planning condition and/or intrinsic design measures.

5.47 Measures for ecological enhancement in respect to bats are also set out herein.

Residual Effects

5.48 Subject to the inclusion of proposed planting and the implementation of a bat-sensitive lighting scheme, no significant effects are anticipated with to bats.

<u>Badger</u>

Predicted Effects

5.49 Badgers are protected under the Protection of Badgers Act (1992).

5.50 Whilst no badger setts have been identified on-site or within 30m of the boundary, badgers are known to use the Site for foraging and dispersal. Therefore, during the construction phase, badgers are at risk of falling into open excavations or entering open ended pipework (above 150mm diameter), risking an offence under the above legislation.

Mitigation Measures

5.51 To safeguard badgers, steep sided excavations over 1m deep must have ramps or a means of escape installed and pipework (over 150mm diameter) must be capped of blocked if they are to be left overnight.

5.52 New landscaping at the Site is anticipated to provide additional foraging opportunities for badgers including native fruiting trees which provide seasonal windfall fruit.

5.53 It is also recommended that a pre-commencement check for badger setts be made, as these can be excavated in a relatively short period.

5.54 The above will be secured by an appropriately worded planning condition and/or intrinsic design measures.

Residual Effects

5.55 Based on the implementation of mitigation measures detailed no residual effects are anticipated.

Birds

Predicted Effects

5.56 Wild birds, their active nests, and their eggs are protected under the Wildlife and Countryside Act 1981 (as amended).

5.57 The on-site hedgerows will be retained, however, a small section H1 is scheduled to be removed for access. As such there is risk of killing/injury to nesting birds within this habitat which could result in an offence being caused; particularly during the nesting bird season (March to August, inclusive).

Mitigation Measures

5.58 To avoid committing an offence under the Wildlife and Countryside Act 1981 (as amended), any vegetation clearance will take place outside of the bird nesting period (i.e. outside of March to August inclusive), or failing that following confirmation by a suitably qualified ecologist that nesting birds are absent from the habitats to be cleared. These mitigation measures are a legal requirement, and would therefore be secured as such.

5.59 The provision of the scalloped woodland buffer planting will provide a number of new nesting and foraging opportunities for a range of bird species, in addition to minimising disturbance to birds which use the woodland habitats.

Residual Effects

5.60 Based on the implementation of mitigation measures detailed no residual effects are anticipated.

Cumulative Effects

5.61 Following a review of the Local Authority Planning Portal, no cumulative effects have been identified with respect to the Site.

Enhancement

5.62 The following ecological enhancements, secured through appropriately worded conditions and/or intrinsic detailed design, are proposed in-line with the aims of the National Planning Policy Framework to encourage opportunities to incorporate biodiversity in and around developments:

- Design of any **surface water attenuation, conveyance or drainage features** to include habitats of ecological importance including wet

grassland, reedbeds, wetland scrub/carr and standing water (e.g. wildlife ponds).

- **Hedgehogs:**
    - 150 x 150mm holes will be strategically left at the base of connecting timber garden fences and timber boundary fences to enable hedgehogs, and other small animals, including toads to disperse through the Site and forage.

- **Provision of bat roosting and bird nesting opportunities** integrated within the Site (numbers and specification to be determined at detailed design stage).

6.0 CONCLUSIONS

6.1 The Site is dominated by arable habitats of limited intrinsic ecological importance. Before mitigation the proposed scheme is predicted to result in, at most, adverse effects significant at the Local level.

6.2 Based on successful implementation of the mitigation and enhancement measures outlined above, no significant adverse effects are predicted and the scheme is considered to adhere to all relevant nature conservation legislation, as well as national and local planning policy.

6.3 The mitigation and enhancement measures set out herein can be secured through appropriately worded planning conditions as part of any planning consents granted, appropriate control of detailed design, and/or under legal obligation of wildlife protection law.

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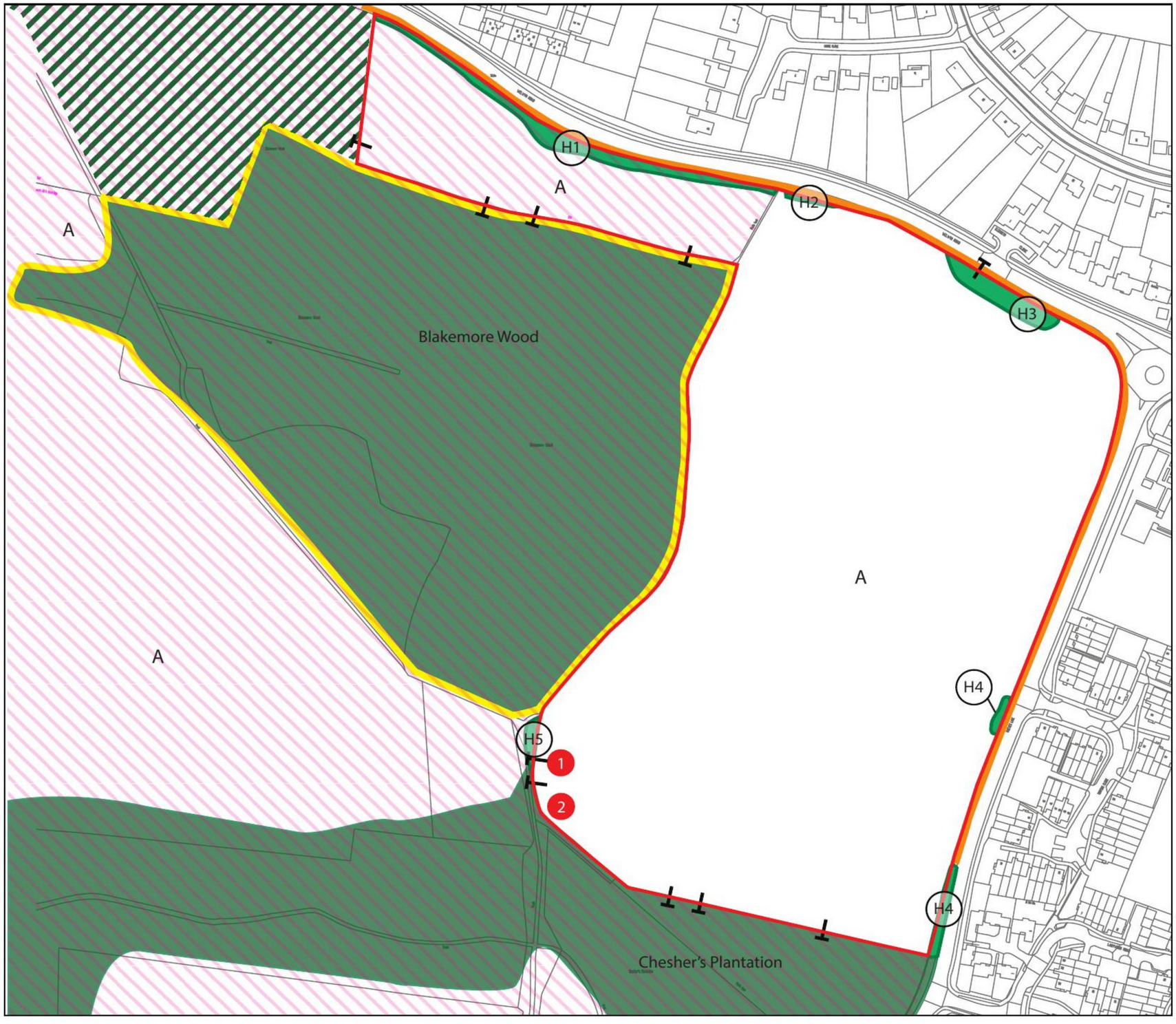
Appendix A

Habitats Plan



N

Key

- Site boundary
- A — Arable land
- Broad-leaved woodland
- Ancient semi-natural woodland
- Broad-leaved plantation woodland
- Hedgerow
- Road verge
- Panshanger Park Local Wildlife Site
- H1 — Hedgerow reference
- T — Mammal run
- 2 — Target note:
  1. Badger *Meles meles* hair recorded, caught on boundary wire fence.
  2. Badger dung pit.

0 50 100metres

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Project	Thieves Lane, Hertford	Date Dec' 2016	Drawing No. CSA/2028/102
Drawing Title	Habitats Plan	Scale @ A3 RTS	Rev A
Client	Croudace Strategic Ltd	Drawn TJC	Checked JW

Appendix B

Legislation and Planning Policy

The **Conservation of Habitats and Species Regulations 2010** (as amended) enacts the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, and Council Directive 79/409/EEC on the Conservation of Wild Birds, into UK law. The Regulations allow for the designation of Statutory Nature Conservation-sites (SACs and SPAs) and European Protected Species ('EPS' including all UK bat species, great crested newt, hazel dormouse and otter) which are assigned a greater level of protection than under national legislation.

The **Wildlife and Countryside Act 1981** (as amended) forms the primary piece of UK legislation relating to the protection of habitats and species (including nesting birds, reptiles and water vole). Additionally, badgers are protected under the **Protection of Badgers Act, 1992.**

Section 40(1) of the **Natural Environment and Rural Communities (NERC) Act 2006** states that each public authority "must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity". This legislation makes it clear that planning authorities should consider impacts to biodiversity when determining planning applications, with particular regard to the Section 41 list of 56 habitats and 943 species of principal importance, irrespective of whether they are covered by other legislation. The S41 list was taken forward for action under the UK BAP (first published in 1994). The UK BAP has now been superseded by the Biodiversity 2020 Strategy (DEFRA, 2011), which continues to prioritise the S41 list, setting national targets for the period to 2020, and the UK Post-2010 Biodiversity Framework (JNCC & DEFRA, 2012), which shows how these contribute to targets at the European level. Whilst BAPs are therefore no longer formally recognised, many of the tools and resources originally developed for the BAP remain in use, such as the background information which still forms the basis of work at national level.

National Planning Policy Framework (2012) (NPPF) sets out the government planning policies for England and how they should be applied. With regards to ecology and biodiversity, Chapter 11: Conserving and Enhancing the Natural Environment, paragraph 109, states that the planning system and planning policies should:

- Minimise impacts on, and provide net gains in, biodiversity where possible, "contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures".
- Recognise the wider benefits of ecosystem services.

Under these aims, paragraph 117 states the need to plan for biodiversity at a landscape scale, linked to national and local targets.

Paragraph 118 sets out the principles that local planning authorities should apply when determining planning applications:

- Refuse planning permission if significant harm cannot be avoided, adequately mitigated, or, as a last resort, compensated for
- Encourage opportunities to incorporate biodiversity in and around developments
- Permission should not normally be permitted where an adverse effect on a nationally designated Site of Special Scientific Interest is likely, either individually or in combination with other developments
- Refuse planning permission if development will result in the loss or deterioration of irreplaceable habitats, such as ancient woodland and the aged or veteran trees, unless the need for, and benefits of, the development in that location clearly outweigh the loss

The **Government Circular 06/2005**, which is referred to within the NPPF, defines statutory nature conservation-sites and protected species as a material consideration in the planning process.

Local planning policies of relevance to ecology, biodiversity and/or nature conservation have been set out in Table B.1 below.

Table B.1. Summary of regional and local planning policy relating to ecology

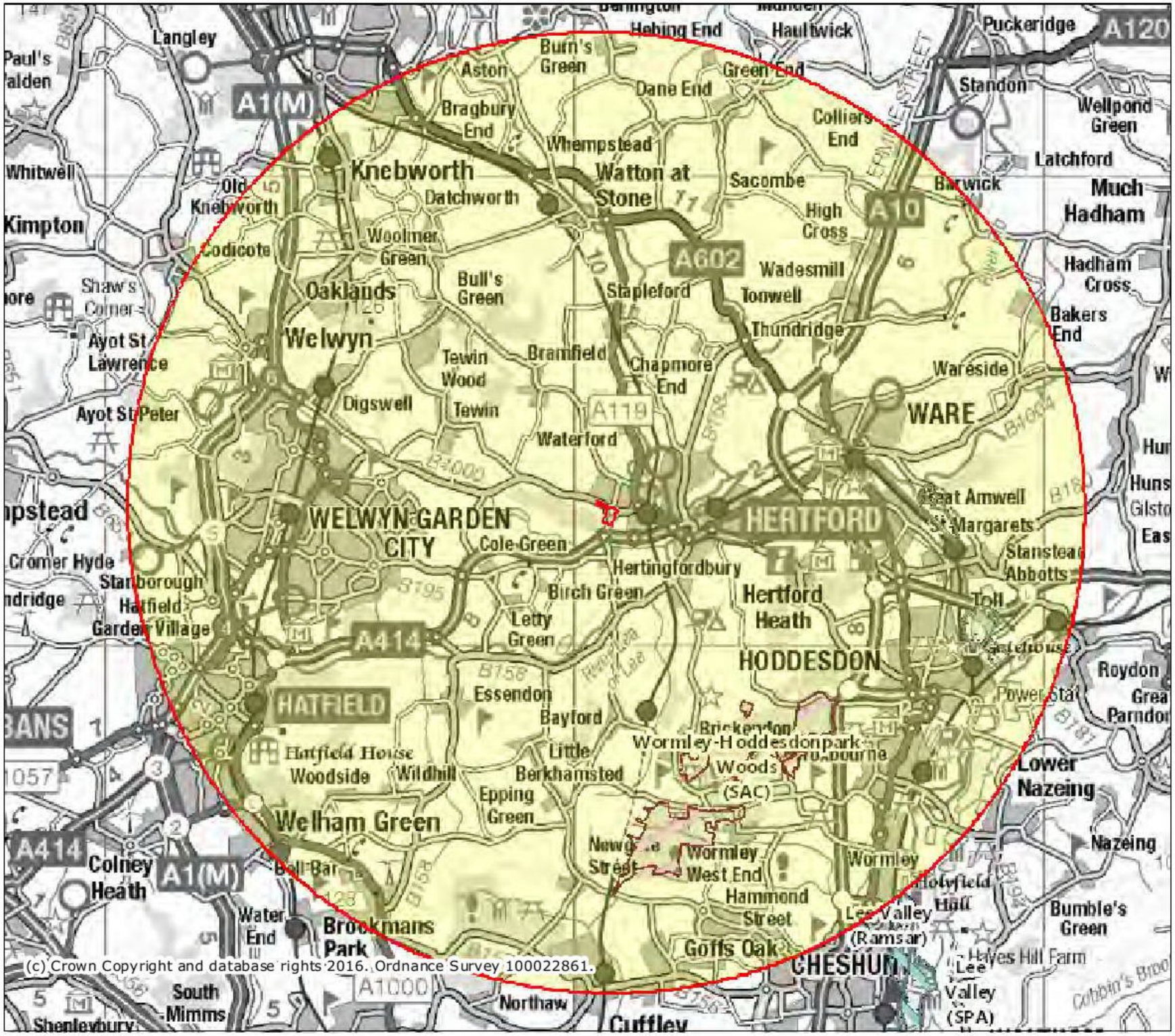
Policy	Summary
East Herts Local Plan 2007	
ENV1 Design and Environmental Quality	(I) All development proposals, including extensions to existing buildings, will be expected to be of a high standard of design and layout and to reflect local distinctiveness. To those ends, development proposals will be expected to: …(g) minimise loss or damage of any important landscape features; (h) provide landscape, recreation or amenity features, and where appropriate habitat creation, in accordance with the Hertfordshire Local Biodiversity Action Plan…
ENV11 Protection of Existing Hedgerows and Trees	(I) In its consideration of all development proposals, including new road or road improvement or maintenance works, the District Council will endeavour to ensure maximum retention of existing hedgerows and trees and their reinforcement by new planting of native broad-leaved species. (II) Where hedge and tree removal is unavoidable, replacement planting of broad-leaved species along an appropriate and natural line of the new, or realigned, highway will be expected.
ENV14 Local Sites	(I) Development and land use change likely to have an adverse effect on a Local Nature Reserve or Wildlife Site, or a Regionally Important Geological/Geomorphological Site, will not be permitted unless it can be clearly demonstrated that there are reasons for the proposal, which outweigh the need to safeguard the substantive nature conservation value of the site or feature. (II) In all cases where development or land use change is permitted, which would damage the nature conservation

Policy	Summary
	value of the site or feature, such damage will be kept to a minimum. Where appropriate the District Council will consider the use of conditions and/or planning obligations (or as subsequently revised) to provide appropriate mitigatory and/or compensatory measures.
ENV16 Protected Species	(I) Development and other land use changes which may have an adverse effect on badgers and other species protected by Schedules 1, 5, and 8 of the Wildlife and Countryside Act 1981, as amended, and the Nature Conservation (Natural Habitats, &c.) Regulations 1994 will only be permitted where harm to the species can be avoided. (II) Where in exceptional cases permission is granted contrary to the above, the District Council will impose conditions and planning obligations (or as subsequently revised) which seek to: (a) facilitate the survival of existing populations of species as well as encouraging the provision of new habitats; (b) reduce disturbance to a minimum; (c) provide adequate alternative habitats to sustain at least the current levels of populations.

Appendix C

Desk Study Information

2028_10km Buffer



Legend

- Ramsar Sites (England)
- Special Areas of Conservation (England)
- Special Protection Areas (England)

Projection = OSGB36
xmin = 498800
ymin = 196900
xmax = 561800
ymax = 228500
Map produced by MAGIC on 4 April, 2016.

Site Check Report Report generated on Mon Apr 04 2016
You selected the location: Centroid Grid Ref: TL306128
The following features have been found in your search area:

Ramsar Sites (England)

Name	LEE VALLEY
Reference	UK11034
Hectares	451.3

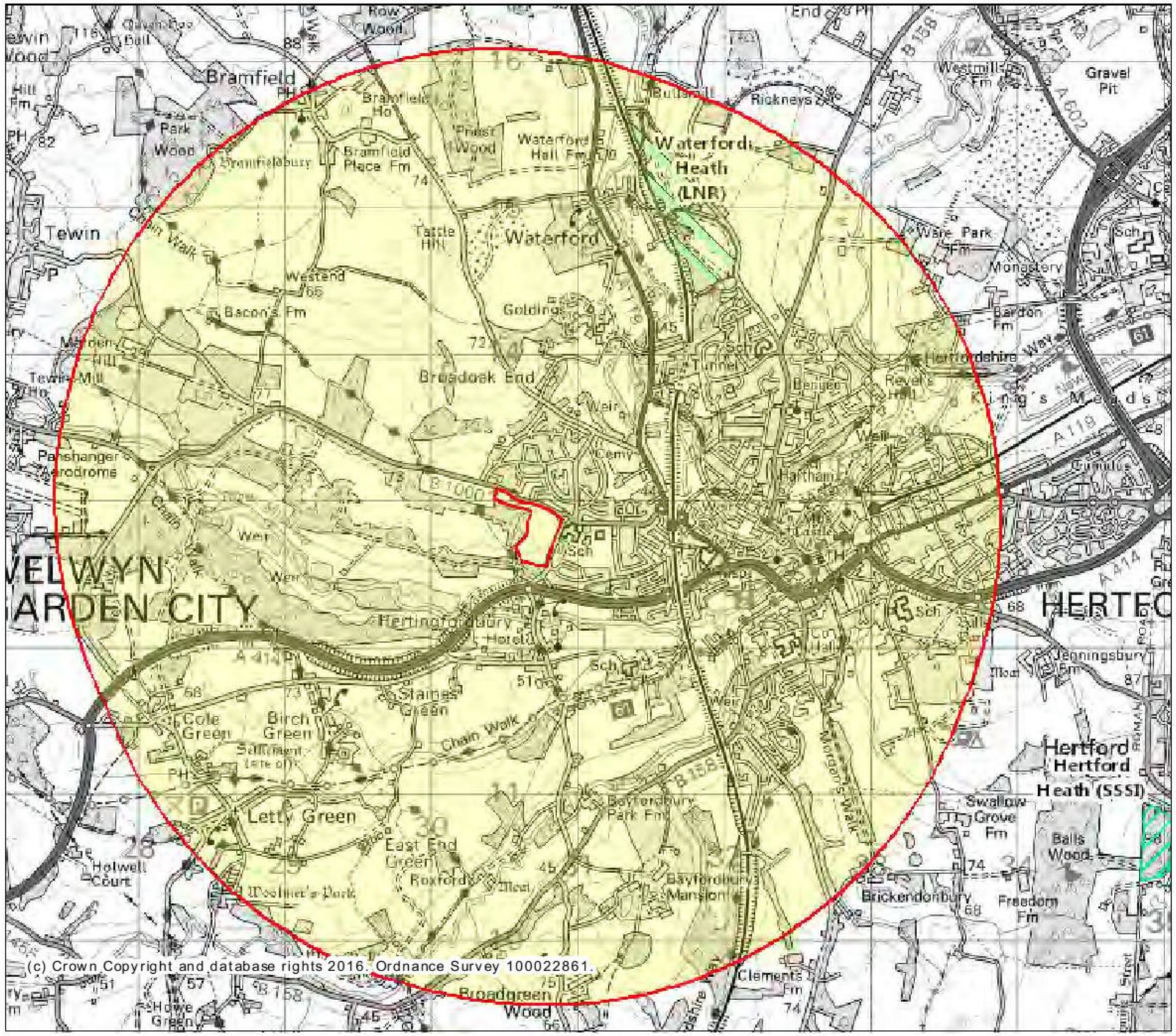
Special Areas of Conservation (England)

Name	WORMLEY-HODDESDONPARK WOODS
Reference	UK0013696
Hectares	335.99
Hyperlink	http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?eucode=UK0013696

Special Protection Areas (England)

Name	LEE VALLEY
Reference	UK9012111
Hectares	451.3

2028_3km Buffer



Legend

- Local Nature Reserves (England)
- National Nature Reserves (England)
- Sites of Special Scientific Interest (England)

Projection = OSGB36
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ymin = 207800
xmax = 541200
ymax = 217900
Map produced by MAGIC on 4 April, 2016.

Site Check Report Report generated on Mon Apr 04 2016
You selected the location: Centroid Grid Ref: TL306128
The following features have been found in your search area:

Local Nature Reserves (England)

Reference	1009564
Name	WATERFORD HEATH
Hectares	35.2
Hyperlink	http://www.lnr.naturalengland.org.uk/special/lnr/lnr_details.asp?themeid=1009564

National Nature Reserves (England)
No Features found

Sites of Special Scientific Interest (England)
No Features found

Appendix D

Extended Phase 1 Habitat Survey

Results

Table D.1 Habitats and Flora Species List

Habitat	Phase 1 Reference Codes	S41/Annex I status	Flora	
			Common name	Latin name
Arable Field	J1.1	-	Common bent	*Agrostis capillaris*
			Cow parsley	*Anthriscus sylvestris*
			Mugwort	*Artemisia* sp.
			Spear thistle	*Cirsium vulgare*
			Hemlock	*Conium maculatum*
			Cleavers	*Galium aparine*
			Yorkshire-fog	*Holcus lanatus*
			White dead nettle	*Lamium album*
			Red dead-nettle	*Lamium purpureum*
			Meadow grass	*Poa* sp.
			Bracken	*Pteridium aquilinum*
			Bramble	*Rubus fruticosus* agg.
			Broad-leaved dock	*Rumex obtusifolius*
			Sow thistle	*Sonchus* sp.
			Common nettle	*Urtica dioica*
			Field poppy	*Papaver rhoeas*
			Field pansy	*Viola arvensis*
			Scentless mayweed	*Tripleurospermum inodorum*
			Wall barley	*Hordeum murinum*
			Common field-speedwell	*Veronica persica*
Road Verges	-	-	Yarrow	*Achillea millefolium*
			Cow parsley	*Anthriscus sylvestris*
			False oat-grass	*Arrhenatherum elatius*
			Butterfly-bush	*Buddleja davidii*
			Hemlock	*Conium maculatum*
			Cleavers	*Galium aparine*
			Hogweed	*Heracleum sphondylium*
			Yorkshire-fog	*Holcus lanatus*
			Perennial rye grass	*Lolium perenne*
			Spear thistle	*Cirsium vulgare*
			Common ragwort	*Senecio jacobaea*
			White campion	*Silene latifolia*
			Garlic mustard	*Alliaria petiolate*
			Common nettle	*Urtica dioica*
			White dead nettle	*Lamium album*

Habitat	Phase 1 Reference Codes	S41/Annex I status	Flora	
			Common name	Latin name
			Common mallow	*Malva sylvestris*
			cut-leaved crane's-bill	*Geranium dissectum*
			sun spurge	*Euphorbia helioscopia*
			Lesser burdock	*Arctium minus*
			White bryony	*Bryonia dioica*
			Bracken	*Pteridium aquilinum*
Hedgerow (H1)	J3.3.1	S41 Priority	Field maple	*Acer campestre*
			Garlic mustard	*Alliaria petiolata*
			Cow parsley	*Anthriscus sylvestris*
			Lords-and-ladies	*Arum maculatum*
			Hornbeam	*Carpinus betulusheb*
			Hazel	*Corylus avellana*
			Hawthorn	*Crataegus monogyna*
			Lesser celandine	*Ficaria verna*
			Ash	*Fraxinus excelsior*
			Cleavers	*Galium aparine*
			Common ivy	*Hedera helix*
			Holly	*Ilex aquifolium*
			Dog's mercury	*Mercurialis perennis*
			Blackthorn	*Prunus spinosa*
			Oak	*Quercus* sp.
			Common nettle	*Urtica dioica*
Hedgerow (H2)	J2.1.2	-	Cotoneaster	*Cotoneaster* sp.
Hedgerow (H3)	J2.2	-	Field maple	*Acer campestre*
			Cow parsley	*Anthriscus sylvestris*
			Lords-and-ladies	*Arum maculatum*
			Lesser celandine	*Ficaria verna*
			Cleavers	*Galium aparine*
			Common ivy	*Hedera helix*
			Holly	*Ilex aquifolium*
			Blackthorn	*Prunus spinosa*
			Oak	*Quercus* sp.
Hedgerow (H4)	J2.2	-	Elm	*Ulmus* sp.
Hedgerow (H5)	J2.2	-	Hawthorn	*Crataegus monogyna*
			Spindle	*Euonymus europaeus*
			Common ivy	*Hedera helix*

Habitat	Phase 1 Reference Codes	S41/Annex I status	Flora	
			Common name	Latin name
			Holly	*Ilex aquifolium*
			Elder	*Sambucus nigra*
			Common nettle	*Urtica dioica*

Appendix E

Evaluation & Assessment Methodology

Ecological features are evaluated and assessed with due consideration for the Chartered Institute of Ecology and Environmental Management Guidelines for Ecological Impact Assessment (EcIA). For clarity, the evaluation and assessment process adopted within this Ecological Assessment is set out below.

Establishing Potentially Important Ecological Features

Potentially important ecological features of relevance to the development are determined in accordance with current CIEEM guidelines. Table E.1 below sets out a non-exhaustive list of ecological features that are typically considered, along with key examples:

Table E.1. List of Ecological Features

Potentially Important Ecological Features	Typical examples
Statutory nature conservation designations	SSSIs, SACs, SPAs, Ramsar sites, LNRs, NNRs
Non-statutory nature conservation designations;	Local Wildlife Sites (LWS); County Wildlife Sites (CWS)
Protected Species	European Protected Species
International, National or local priority habitats	S41 priority habitats and species; Annex I Habitats; sub-national BAP habitat
Notable species or sub-species	Individual red-listed species
Notable or large population or assemblage of species	Diverse bird assemblage; exceptional numbers of common amphibians;
Novel or locally distinct assemblage of species	Diverse non-native floral community on a brownfield site; populations of individual species showing distinct physical variation (e.g. colour morphs)
Habitats which form diverse mosaics, create important connection and/or have synergistic attributes;	Brownfield habitat mosaics; riparian habitat corridors; hedgerow network utilised by important bat population;
Habitats of potential importance (with regard to restoring or creating habitats to S41 priority or SSSI quality)	Previous Ancient Woodland (PAWs) sites;
Habitats of secondary or supportive importance (which safeguard important habitats or which support important populations of species)	Scrub habitats buffering calcareous grassland from agricultural improvement; pasture regularly utilised by bird populations for which an SPA is designated

Establishing Likely Zone of Influence

For the purposes of this assessment, the Site is considered to be inside the 'zone of influence' of:

- Internationally important designations within 10km of the Site boundary.
- Nationally important designations within 3km of the Site boundary.
- Locally important designations within 1km of the Site boundary.

- Non-statutory designations within 1km of the Site boundary.

The arbitrary distances identified set out above considered sufficient for identifying the majority of designations which may be effected by the proposals. However, it is acknowledged that in certain circumstances effects beyond these distances are possible and should be considered as far as is reasonably practicable to do so.

It should also be noted that certain ecological features have smaller 'zones of influence' than those mentioned above. For such features the appropriate zone of influence is described and justified as appropriate within the report, depending on their respective sensitivity to an environmental change.

The results of professionally accredited or published scientific studies have been used and referenced, where available, to establish the spatial and temporal limits of the biophysical changes likely to be caused by specific activities and to justify decisions about the zone of influence.

<u>Determining Importance of Ecological Features</u>

In determining the importance of ecological features a range of guidelines and reference materials have been utilised, including:

- Criteria against which statutory and non-statutory nature conservation designations are selected (e.g. SSSI designation criteria; LWS selection criteria).
- Definitions for national and priority habitats.
- Publications and guidelines against which to establish the importance of particular populations or assemblages of species groups (e.g. Wray et al for evaluating bat populations and roosts; ISIS for assessing conservation interest of invertebrate assemblages).
- Publications describing the conservation status of individual species (e.g. Red-data books).
- The Hedgerows Regulations to assess the importance of hedgerows.
- National, regional and local species Atlases.
- Species/group population trends.

It should be noted that the legal protection which some species and their habitats receive are considered separately from 'importance' within this assessment as not all legally protected species are necessarily rare (e.g. common pipistrelle bat). Legal issues and the appropriate mechanism for dealing with any such constraint are addressed in the report.

It should also be noted that the social, community, economic or multi-functional importance attributed to ecological features are not assessed as they fall out of the scope of this Ecological Assessment.

Geographic Frame of Reference

In assigning importance to an ecological resource the following geographic frames of reference are used:

- International
- National (i.e. England/Northern Ireland/Scotland/Wales)
- Regional (e.g. East Anglia)
- County (or Metropolitan e.g. in London)
- Local
- Site

The size, conservation status and the quality of features or species are all relevant in determining importance. Furthermore the importance of a species and/ or habitat may vary depending on its geographical location.

Characterising Effects and their Significance

Effects of the proposed project or operation are characterised using the following terminology:

- Direct or indirect
- Beneficial or adverse
- Magnitude and/or extent
- Duration
- Reversibility
- Timing and frequency

Appendix F

Bat Surveys

Methods

Transect Surveys

Transect surveys were undertaken between June and August 2016 to sample the distribution of bat activity across the Site, and the number of species present. Two transect routes were walked on each survey across the Site, with the aim of sampling all accessible parts of the Survey area on multiple occasions throughout each survey. Repeated transects were undertaken to increase the survey coverage of the Site both spatially and temporally.

Each transect was walked at a moderate and consistent speed with detection and observation of bat behaviour recorded during the survey. Each transect survey commenced at sunset, and continued for at least two hours, and were undertaken during suitable weather conditions as summarised in Table F1.

Hand-held *Elekon Batlogger M* detectors were used to aid detection and observation of bat activity (with heterodyne automatically-tuned audio output). In addition, all ultrasonic audio data was recorded by the Batlogger, with a one second delay between recordings. At the point of contact, each sound file is assigned a GPS location and temperature reading. Surveyor location was continually recorded by the Batlogger to create a 'track' of the walked transect (See Bat Transect Routes and Record Points plan, CSA/2028/106).

Ultrasonic recordings were subsequently analysed using BatExplorer software, where audio data is presented in sonographic format and can be reviewed in real time and at full spectrum. Sonograms were reviewed to identify any bat call 'pulses' and/or the presence of non-bat audio data. Non-bat 'noise' files were removed from the data set. Where possible, confirmed bat calls were assigned a bat species (e.g. noctule *Nyctalus noctula*), genus (e.g. *Nyctalus* sp.) or group (e.g. 'big bat') label based on known parameters (e.g. peak frequency of call, call duration, inter-pulse interval etc).

Bat call location data is presented graphically including a Utilisation Distribution (UD) of all bat activity (Figures F2, F3, CSA/2028/106 and CSA/2028/105).

Remote Monitoring

Two Wildlife SM2 static detectors were deployed at MP1 and MP2 (Figure F1) on three occasions during June, July and August 2016 to record the (relative) level of bat activity at the Site and the number of species present.

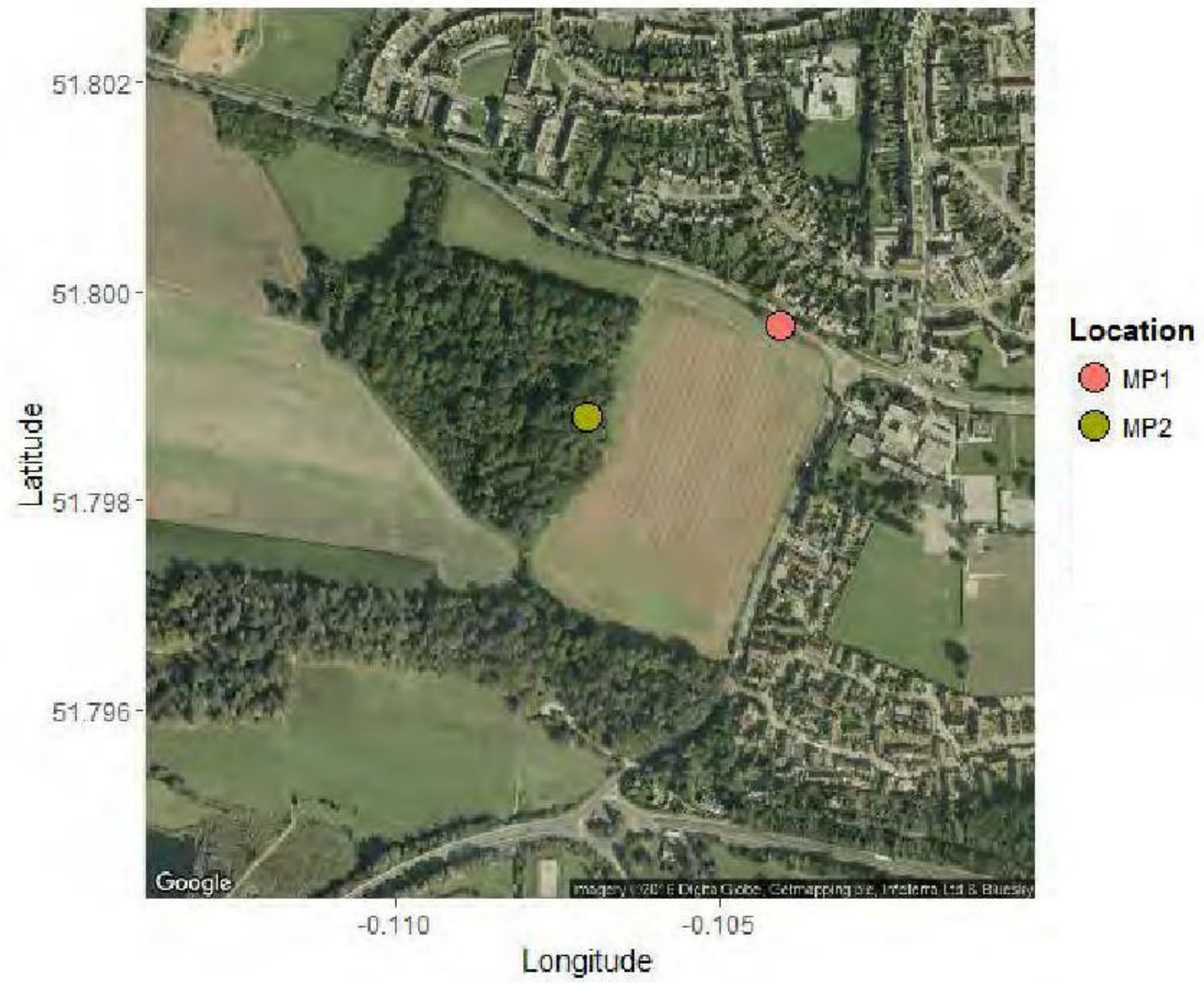


Figure F1. Locations of each Monitoring Point (MP) June, July & August (MP1-2).

The detectors were installed on-site and programmed to record ultrasonic audio data from half an hour before sunset until half an hour after sunrise each night, for a period of at least five consecutive nights.

Weather conditions during recording periods were obtained using historic weather data from the World Weather Online website, with observations taken from the nearest weather station in Hertford. Where detectors were deployed for more than five nights, those five nights with the most optimal weather conditions (in terms of temperature, precipitation and wind speed) were selected for analysis.

Ultrasonic recordings were analysed using the AnalookW Version 4.1z software where audio data is presented in sonographic format and can be reviewed through zero-crossings frequency analysis. This software was used to identify bat calls to species (noctule *Nyctalus noctula*), genus (e.g. *Nycatlus* sp.) or group (e.g. 'big bat') level based on known parameters (e.g. peak frequency of call, call duration, inter-pulse interval etc). Non-bat 'noise' files were removed from the data set.

Each recorded file was considered to represent a single bat 'pass', although it is acknowledged that each 'pass' varies in the number of bat call 'pulses'.

Bat activity levels were then determined by calculating the mean number of bat passes per hour for each species / genus / group.

Limitations

Batlogger M detectors automatically assign a GPS location to each bat contact, allowing distribution maps to be plotted (see Results section of this report). The accuracy of the GPS locations provided for each contact is variable and may depend on the number of satellites available and the strength of the signal received. This in turn is affected by environmental conditions such as cloud or tree canopy cover. The accuracy of GPS coordinates may vary between 5-15m during a transect survey and, as a result, this must be taken into account when viewing the distribution maps within this report.

It should be noted that the findings described herein for remote monitoring surveys are based on the bat activity recorded at the location immediate to each static detector, and therefore only describe localised activity at the Site.

Results

Transect Surveys

The dates and weather conditions for each transect survey are provided in Table F1 below.

Table F1. Bat transect survey weather conditions

Survey Date	Sunset Start Time	End Time	Temperature (°C)		Cloud Cover (Oktas)		Wind (Beaufort Scale)		End
			Start	End	Precipitation	Start	End	Start	
09/06/2016	21:18	23:18	18	15	Dry	3	3	1	0
05/07/2016	21:22	23:22	15	13	Dry	4	1	0	2
11/08/2016	20:32	22:32	20	18	Dry	3	3	1	1

At least six species of bat were recorded at the site during transect surveys undertaken in 2016, comprising common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, serotine *Eptesicus serotinus*, *Myotis* species and brown long-eared *Plecotus auritus*. The number of bat contacts recorded for each species are summarised in Table F2 below. The locations of each bat contact and the overall distribution of activity across the Site are illustrated in Figures F2 and F3.

Table F2. Summary of bat contacts recorded during the transect surveys

Month	Brown long-eared	Common pipistrelle	Myotis sp.	Noctule	Serotine	Soprano pipistrelle
Jun	0	64	18	8	16	12
Jul	2	145	4	1	0	38
Aug	1	170	1	6	0	26

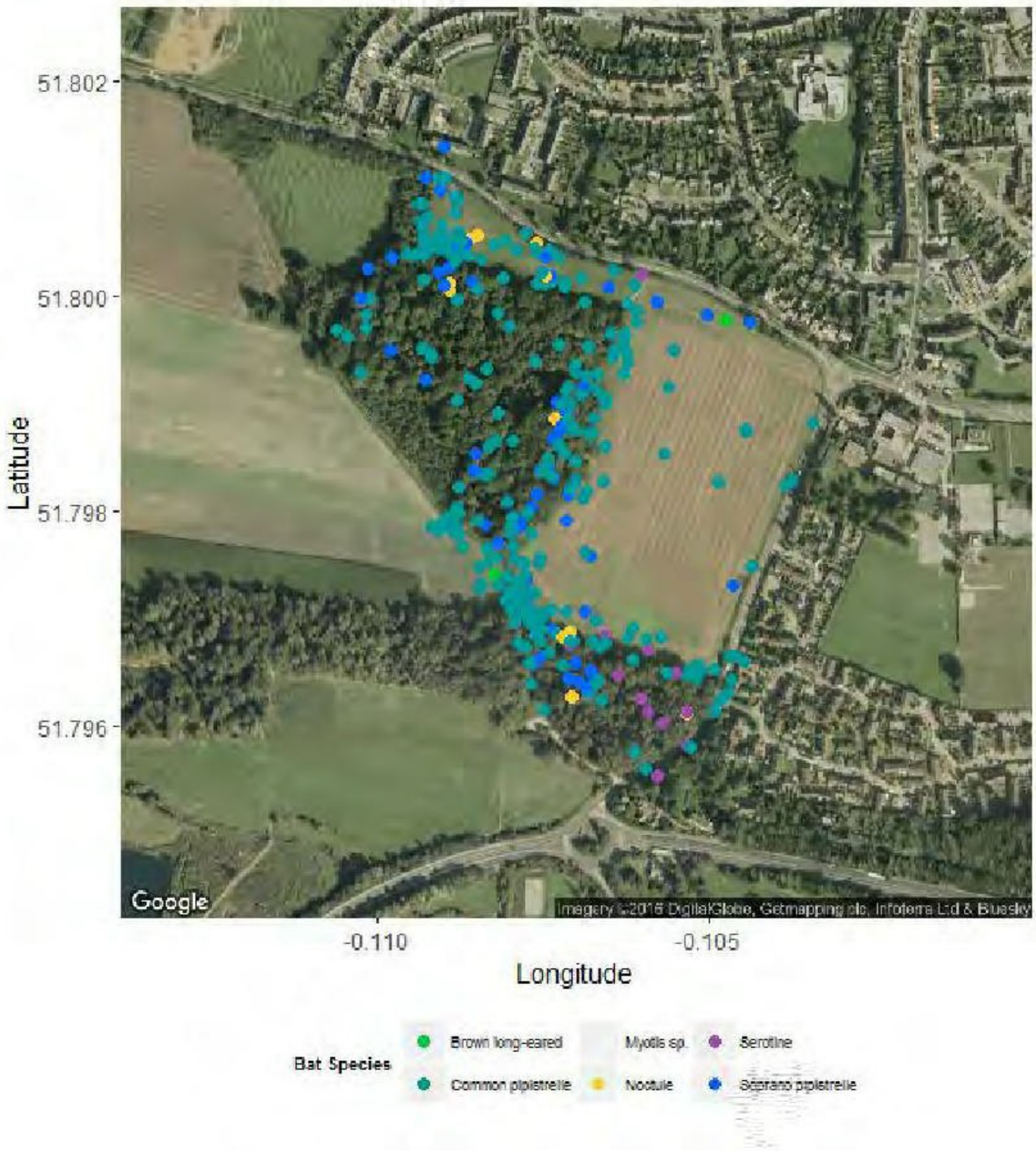


Figure F2. Locations of individual bat contacts recorded during transect surveys

Figure F3. Utilisation Distribution (UD) of Bat Activity (all species) recorded during transect surveys. Contours give a relative indication of the likelihood of encountering bats, with 'higher' contours indicating a greater likelihood, and 'lower' contours giving a lesser likelihood.

Remote Monitoring

The weather conditions experienced during the five nights where data was analysed are provided in Table F3 below.

Table F3. Overnight weather conditions during static monitoring periods

Survey Month	Dates Sampled	Temperature (°C)		Precipitation (mm)	Cloud Cover (%)		Wind (mph)	
		Min	Max		Min	Max	Min	Max
June	10/06/2016	14	18	0.1-0.7	100	100	5	7
June	11/06/2016	16	17	0.1-3.8	100	100	5	8
June	12/06/2016	9	16	0.0-2.7	36	97	9	12
June	13/06/2016	12	15	0.0-0.1	83	97	5	7
June	14/06/2016	11	14	0.0-0.1	54	100	6	9
July	15/07/2016	17	18	0.0-0.0	78	95	9	11
July	16/07/2016	16	19	0.0-0.0	24	100	7	9

July	17/07/2016	14	19	0.0-0.0	4	32	3	4
July	18/07/2016	15	23	0.0-0.0	0	8	4	6
July	19/07/2016	20	22	0.0-0.0	0	13	9	11
Aug	04/08/2016	13	16	0.0-0.1	26	100	7	9
Aug	05/08/2016	15	17	0.0-0.2	11	20	6	8
Aug	06/08/2016	16	19	0.0-0.0	14	85	10	11
Aug	07/08/2016	15	18	0.0-0.0	10	100	12	14
Aug	08/08/2016	12	16	0.0-0.0	4	8	6	9

The total number of bat passes recorded across all monitoring locations for each bat species are provided in Figure F4 and Table F4 below. The majority of the passes recorded were from common pipistrelle with a comparatively low number of soprano pipistrelle and individual passes from myotis, noctule, serotine and brown long-eared bats.

It should be noted that comparisons drawn from the number of passes by different species can only give an indication of relative species abundance at the Site, as detectability varies between species.

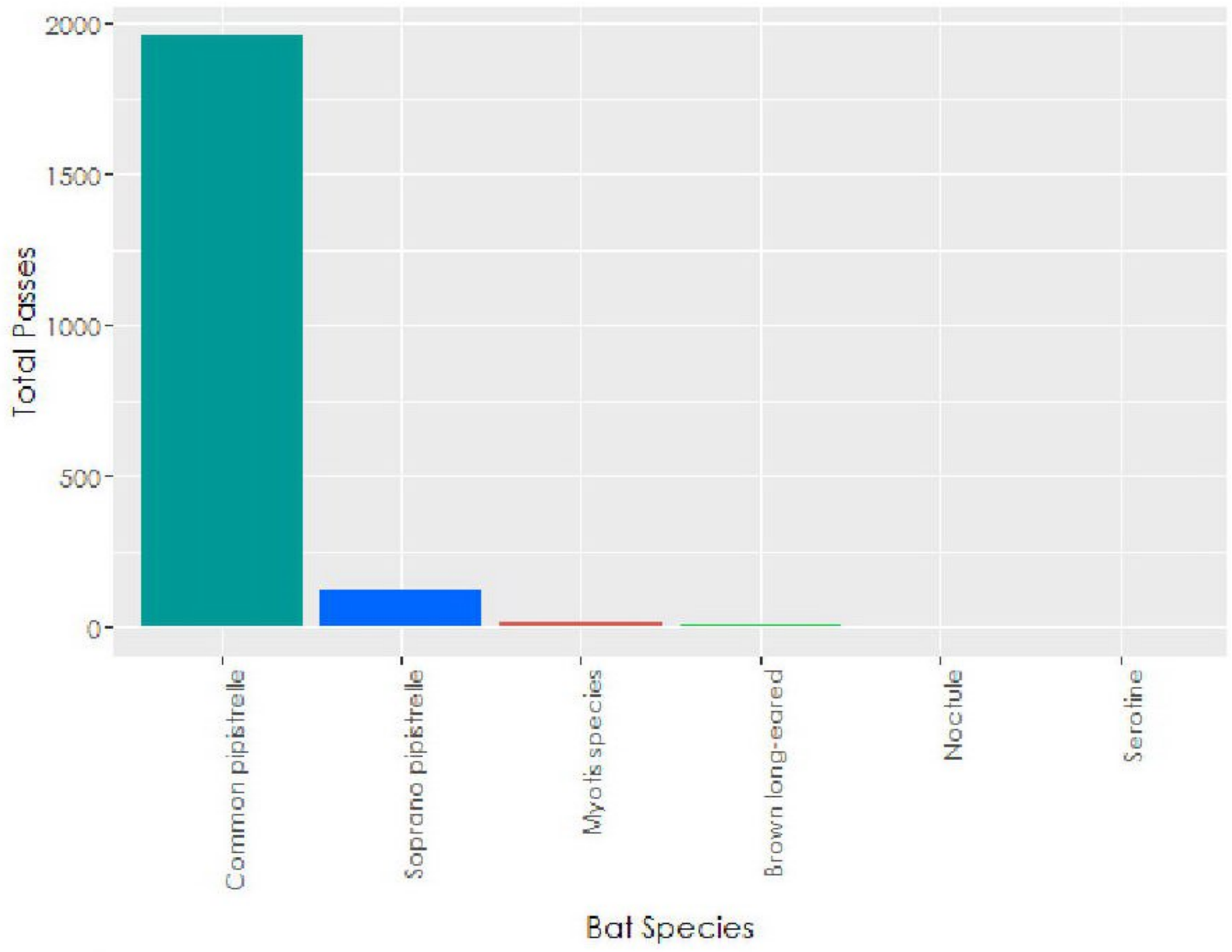


Figure F4. Bat passes per species recorded in total across all monitoring points during the static monitoring surveys.

Table F4. Bat passes per species recorded across all monitoring points during static monitoring periods.

Common pipistrelle	Soprano pipistrelle	Myotis species	Brown long-eared	Noctule	Serotine
1958	123	12	7	4	1

Figure F5 and Table F5 show the mean number of bat passes per hour recorded at monitoring points 1 and 2.

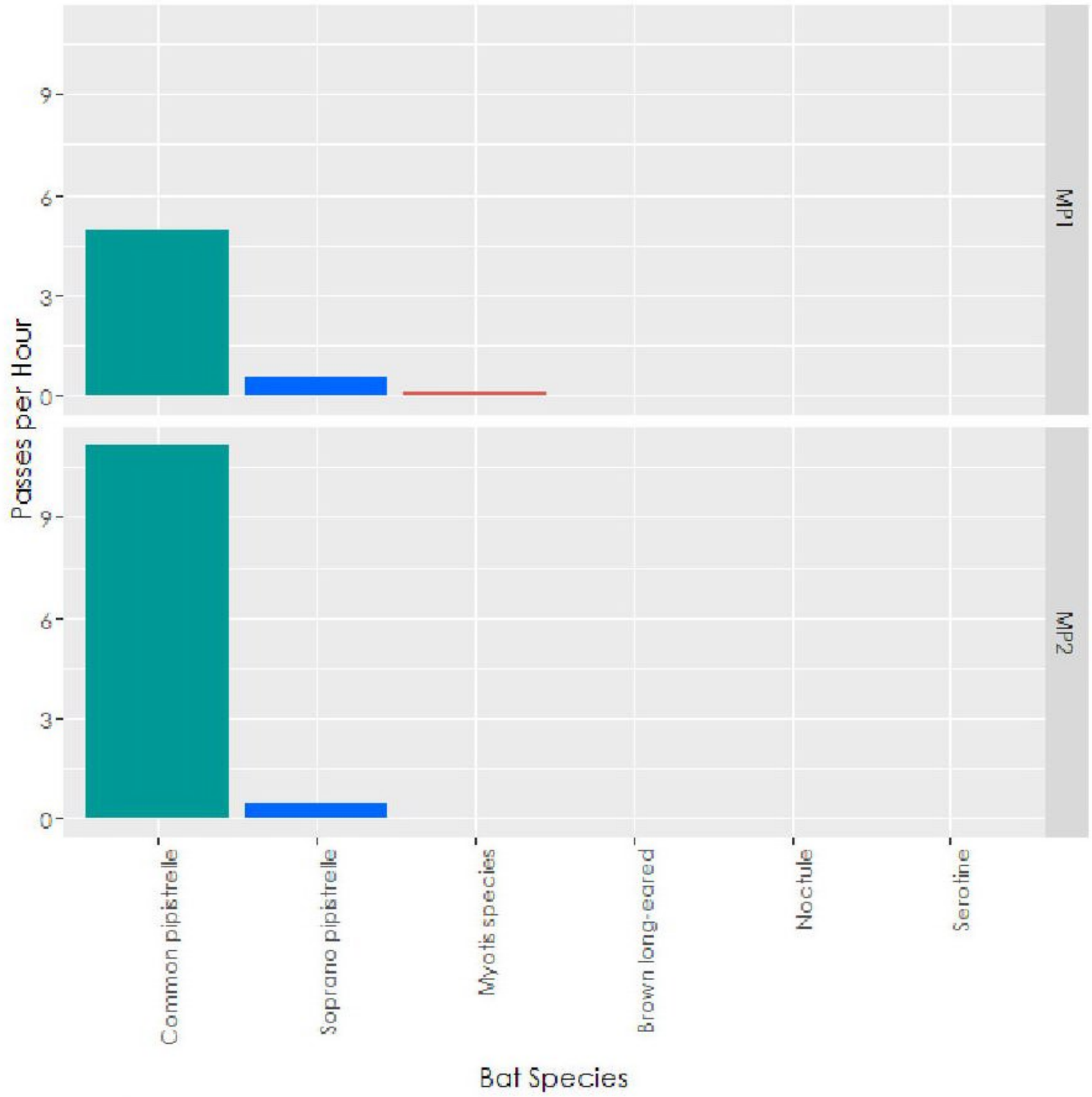
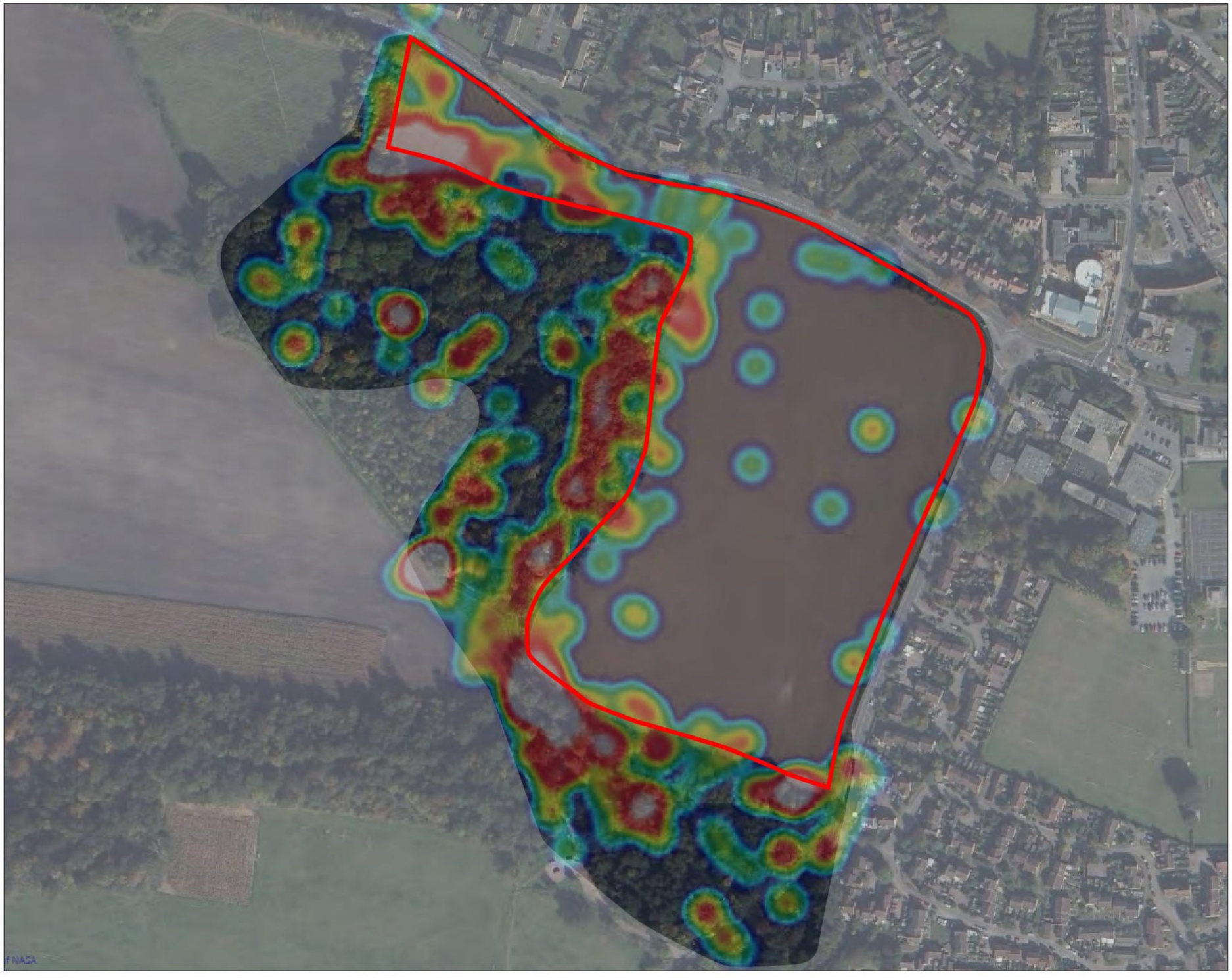


Figure F5. Bat passes per hour recorded for each bat species at each static monitoring point

Table F5. Bat passes per hour recorded for each bat species at each static monitoring point

SM2	Common pipistrelle	Soprano pipistrelle	Myotis species	Brown long-eared	Noctule	Serotine
MP1	4.95	0.57	0.1	0.02	0.02	0.01
MP2	11.13	0.44	0.0	0.04	0.02	0.00



N

Key

Site boundary

High levels of utilisation

Low levels of utilisation

N.B. Faded areas fall outside of study area.

CSA environmental

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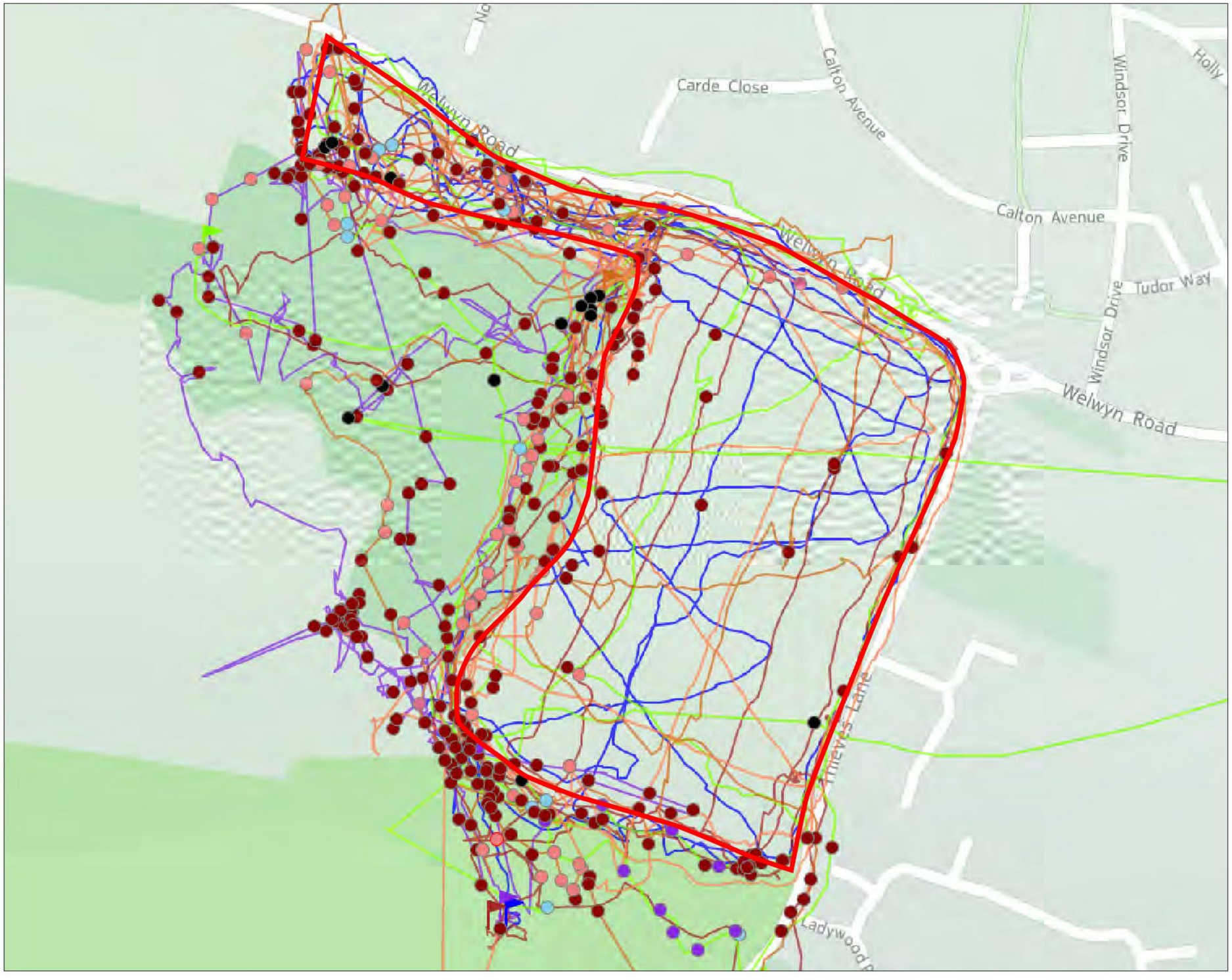
Ashwell, Hertfordshire SG7 5NT

t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land at Thieves Lane, Hertford	Date Dec' 2016	Drawing No. CSA/2028/105
Drawing Title	Bat Habitat Utilisation Plan	Scale @ A3 NTS	Rev -
Client	Croudace Homes	Drawn TJC	Checked JW



N

Key

- Site boundary
- Transect routes
- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Noctule *Nyctalus noctula*
- Brown long-eared *Plecotus auritus*
- Myotis bat *Myotis* sp.
- Serotine *Eptesicus serotinus*

IMPORTANT: Transect routes shown are subject to inherent GPS signal error, with a minimum c.3m for the Elekon Batlogger M devices used. Greater error margins are also likely as result of poor satellite coverage and/or environmental conditions (tree cover, topography, built structures and/or cloud cover). Therefore where transect routes appear to extend beyond the permitted survey area this is the result of GPS signal error and not surveyors walking off-site."

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Project	Land at Thieves Lane, Hertford	Date October 2016	Drawing No. CSA/2028/106
Drawing Title	Bat Transect Routes and Record Points	Scale @ A3 NTS	Rev -
Client	Croudace Homes	Drawn TJC	Checked JW

Appendix G

Badger Survey

Methods

A detailed check of all boundary habitats and the adjacent woodland was undertaken by Tom Clemence MSc GradCIEEM on 9 June 2016 using standard survey methods to search for evidence or field signs to suggest the on-site presence of badger including:

- Setts
- Feeding signs such as snuffle holes made during foraging
- Well-worn paths and/or footprints
- Push-throughs
- Hairs caught on vegetation or fences, or dropped outside of setts
- Latrines, usually positioned on territorial boundaries

Where setts are identified the number of holes are recorded as well as the level of usage and the type of sett they comprise. Recording this information give an indication of the type of sett by categorising it according to the criteria listed in Table G.1 below.

Table G.1. Categorisation of badger setts

Sett Type
Main Setts - These usually have a large number of holes with large spoil heaps, and the sett generally looks well used. There will be well-used paths to and from the sett and between sett entrances. Although normally the breeding sett is in continuous use, it is possible to find a main sett that has become disused due to excessive digging or some other reason; it should be recorded as a disused main sett. In the first survey, the average size of an active main sett was twelve holes (including all categories of use).
Annexe setts - They are often close to a main sett, usually less than 150 metres away, and are usually connected to the main sett by one or more obvious well-worn paths. They usually have several holes, but may not be in use all the time even if the main sett is very active. In the first survey the average size was five holes (including all categories of use).
Subsidiary setts - These often only have a few holes; four (including all categories of use) was the average number in the first survey. They are usually at least 50 metres from a main sett, and do not have an obvious path connecting with another sett. They are not continuously active.
Outlying setts - These usually have only one or two holes, often have little spoil outside the hole, have no obvious path connecting with another sett, and are only used sporadically. When not in use by badgers, they are often taken over by foxes or even rabbits. However, they can still be recognised as badger setts by the shape of the tunnel (not the actual entrance hole), which is usually at least 250mm in diameter, and is rounded or a flattened oval shape. Fox and rabbit tunnels are smaller and often taller than broad.
Hole Type
Well used holes - These are clear of any debris or vegetation, are obviously in regular use, and may or may not have been excavated recently.
Partially used holes - These are not in regular use and have debris such as leaves and twigs in the entrance, or have moss and / or other plants growing in or around the entrance. Partially used holes could be in regular use after a minimal amount of clearance.
Disused holes - These have not been in use for some time, are partially or completely blocked, and could not be used without a considerable amount of clearance. If the hole has been disused for some time, all that may be visible is a depression in the ground where the hole used to be, and the remains of the spoil heap, which may be covered in moss or plants.

Where badger setts were identified an infra-red camera trap was deployed to determine whether or not the setts were active.

Results

No badger setts were recorded on-site or within the adjacent areas of woodland. A number of rabbit holes were identified within Blakemore Wood and Chester's Plantation, these were confirmed not to be used by badger.

[redacted]

The results of the field survey confirm low levels of on-site badger foraging activity. These findings are in-line with the levels of badger activity recorded in the November 2013 Protected Species Report. Therefore, long-term low-levels of badger activity within the Site can be confirmed.

Appendix H

Dormouse Surveys

Methods

Dormouse nest tubes were installed at the site on 9 June 2016 by Tom Clemence MSc GradCIEEM. The intention of these surveys is to determine the presence or likely absence of dormice within suitable habitat within all areas that will be impacted. A total of 50 dormouse nest tubes were distributed across the Site, along boundary vegetation, including hedgerows and woodland edge habitats. The location of these nest tubes is shown in the Dormouse Survey Plan (CSA/2028/107).

Nest tubes are made from stiff, double-walled black plastic sheets or similar material, 25cm long with a 5cm x 5cm cross-section. A thin plywood tray is inserted into the tube with a short projection at one end and an end block at the other which seals the tube. The tubes are then tied in a suitable location along a horizontal branch in vegetation. Dormice are known to readily use these tubes to build their nests (Natural England, 2006).

The tubes were checked monthly from July to November 2016 for the presence of dormice and/or their nests. The checks were undertaken by Michelle Bullock MSc MCIEEM, Alex Cole MSc GradCIEEM and Tom Clemence MSc GradCIEEM and were undertaken on 15 July, 19 August, 19 September, 31 October and 14 November 2016. Bird droppings and other material such as wood mouse nests were cleaned out if found, to maintain the potential of each tube to be used by dormice.

Results

No dormice, or evidence or dormouse, were found during any of the surveys.

The surveys were extended into November following consultation with Suffolk Wildlife Trust, and based on current knowledge of more active dormouse behaviour in late-autumn.

N

Key

- Site boundary
- Dormouse tube locations (50 tubes)
- Broad-leaved woodland
- Broad-leaved plantation woodland
- Ancient semi-natural woodland
- Hedgerow
- H1 Hedgerow reference

0 50 100metres

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Project	Thieves Lane, Hertford	Date Dec' 2016	Drawing No. CSA/2028/107
Drawing Title	Dormouse Survey Plan	Scale @ A3 RTS	Rev -
Client	Croudace Strategic Ltd	Drawn TJC	Checked JW

Appendix I

Biodiversity Impact Assessment Calculator

Warwickshire Coventry and Solihull - Biodiversity Impact Assessment Calculator

v. 18.3 08/08/2014
Amendment from v18.2 only affects green roofs, for other habitats v18.2 still usable.
Please fill in both tables

KEY	
	No action required
	Enter value
	Drop-down menu
	Calculation
	Automatic lookup
	Result

Local Planning Authority:	
Site name:	Thieves Lane, Hertford
Planning application reference number:	
Assessor:	TC
Date:	20/12/2016

Please do not edit the formulae or structure
To condense the form for display hide vacant rows, do not delete them
If additional rows are required, or to provide feedback on the calculator please contact WCC Ecological Services

Habitat Biodiversity Value

T. Note	code	Phase 1 habitat description	Habitat area (ha)	Distinctiveness	Score	Condition	Score	Habitats to be retained with no change within development: Area (ha)	Existing value	Habitats to be retained and enhanced within development: Area (ha)	Existing value	Habitats to be lost within development: Area (ha)	Existing value	Comment
		Direct Impacts and retained habitats			A		B	C	A x B x C = D	E	A x B x E = F	G	A x B x G = H	
	J11	Other: Arable	8.80	Low	2	Poor	1	0.00		0.00		8.80	**17.60**	
	B22	Grassland: Semi-improved neutral grassland	0.08	Medium	4	Poor	1	0.07	0.28	0.00		0.01	**0.04**	
		Total	8.88				Total	0.07	0.28	0.00	0.00	8.81	17.64	J
													∑D + ∑F + ∑H	
											Site habitat biodiversity value		17.92	
		Indirect Negative Impacts						Value of loss from indirect impacts						
Before/after impact		Including off site habitats	K					K x A x B = Li Lii	Li - Lii					
Before		Woodland: Broad-leaved semi-natural woodland	9.00	High	6	Moderate	2	**108.00**	**0.00**					
After						Moderate	2	**108.00**						
Before														
After														
Before														
After														
Before														
After														
Before														
After														
		Total	9.00					M	0.00				HIS = J + M	
											Habitat Impact Score (HIS)		17.64	

T. Note	code	Proposed habitats on site (Onsite mitigation): Phase 1 habitat description	Area (ha)	Target habitats distinctiveness: Distinctiveness	Score	Target habitat condition: Condition	Score		Time till target condition: Time (years)	Score	Difficulty of creation / restoration: Difficulty	Score	Habitat biodiversity value	Comment
		Habitat Creation	N		O		P			Q		R	(N x O x P) / Q / R	
	A112	Woodland: Broad-leaved plantation	1.27	Medium	4	Moderate	2		10 years	1.4	Medium	1.5	**4.84**	
	n/a	Built Environment: Buildings/hardstanding	0.66	none	0	Moderate	2		5 years	1.2	Low	1	**0.00**	
	B22	Grassland: Semi-improved neutral grassland	0.27	Medium	4	Moderate	2		5 years	1.2	Medium	1.5	**1.20**	
	n/a	Built Environment: Gardens (lawn and planting)	3.83	Low	2	Moderate	2		5 years	1.2	Low	1	**12.77**	
	n/a	Built Environment: Buildings/hardstanding	2.76	none	0	Moderate	2		5 years	1.2	Low	1	**0.00**	
		Total	**8.81**											
		Habitat Enhancement						Existing value S (= F)					((N x O x P) - S) / Q / R	
		Total	**0.00**								Trading down correction value		0.00	
											Habitat Mitigation Score (HMS)		**18.80**	
													HBIS = HMS - HIS	
											Habitat Biodiversity Impact Score		**1.16**	Gain
											Percentage of biodiversity impact loss			

KEY			
	No action required		
	Action required		
	Drop-down menu		
	Calculation		
	Automatic lookup		
	Overall Result		Loss to biodiversity
			Gain to biodiversity

Warwickshire Coventry and Solihull - Biodiversity Impact Assessment Calculator - Linear Features

KEY	
	No action required
	Enter value
	Drop-down menu
	Calculation
	Automatic lookup
	Result

Linear Features
Hedges and other linear features can offer a higher biodiversity value per length than a standard area of habitat due to factors such as connectivity and must therefore be compensated for in parallel to the standard metric.

Please fill in both tables

Please do not edit the formulae or structure
To condense the form for display hide vacant rows, do not delete them
If additional rows are required, or to provide feedback on the calculator please contact WCC Ecological Services

	Existing linear features on site			Linear distinctiveness		Linear condition		Linear Biodiversity Value: Linear features to be retained with no change within development		Linear features to be retained and enhanced within development		Linear features to be lost within development		
T. Note	code	Phase 1 habitat description	*Feature length (km)*	*Distinctiveness*	*Score*	*Condition*	*Score*	*Length (km)*	*Existing value*	*Length (km)*	*Existing value*	*Length (km)*	*Existing value*	*Comment*
		Direct Impacts and retained features			A		B	C	A x B x C = D	E	A x B x E = F	G	A x B x G = H	
	J231	Hedges: Native species rich hedge with trees	0.25	High	6	Moderate	2	0.00		0.23	**2.76**	**0.02**	**0.24**	
	J231	Hedges: Native species rich hedge with trees	0.10	High	6	Moderate	2			0.10	**1.20**			
	J22	Hedges: Defunct hedge	0.04	Low	2	Poor	1			0.04	**0.08**			
		Total	0.39				Total	0.00	0.00	0.37	4.04	0.02	0.24 J	
													∑D + ∑F + ∑H	
											Site Linear Biodiversity Value		4.28	

Before/after impact	Indirect Negative Impacts	K	Value of loss from indirect impacts: K x A x B = Li, Lii	Li - Lii
Before				
After				
Before				
After				
Before				
After				
Before				
After				
Before				
After				
	Total	0.00	M	0.00
				HIS = J + M
			Linear Impact Score (LIS)	**0.24**

CAUTION - Destruction of features of medium or high distinctiveness, e.g. hedgerows and streams, may be against local policy. Has the mitigation hierarchy been followed, can impact to these habitats be avoided?
Any unavoidable loss of valuable habitats must be replaced like-for-like. E.G. Loss of hedgerows must be replaced with similar or better hedgerows. All newly planted hedges should be native species-rich hedgerows.

	Proposed linear features on site (Onsite mitigation)			Target linear distinctiveness		Target linear condition			Time till target condition		Difficulty of creation / restoration		*Linear biodiversity value*	
T. Note	code	Phase 1 habitat description	*Length (km)*	*Distinctiveness*	*Score*	*Condition*	*Score*		*Time (years)*	*Score*	*Difficulty*	*Score*	*(N x O x P) / Q / R*	*Comment*
		Linear Creation	N		O		P			Q		R		
						Moderate	2		5 years	1.2				
		Total	**0.00**											
		Linear Enhancement						Existing value S (= F)					((N x O x P) - S) / Q / R	
	J231	Hedges: Native species rich hedge with trees	0.23	High	6	Moderate	2		5 years	1.2	Low	1	**2.30**	
		Total	**0.23**	ERROR - Total length of features enhancement must equal total length of features to be enhanced above							Trading down correction value		0.00	
				ERROR - Please enter respective existing values for features to be enhanced							**Linear Mitigation Score (LMS)**		**2.30**	
													LBIS = LMS - LIS	
											Linear Biodiversity Impact Score		2.06	Gain
											Percentage of linear impact loss			

KEY			
	No action required		
	Action required		
	Drop-down menu		
	Calculation		
	Automatic lookup		
	Overall Result		Loss to biodiversity
			Gain to biodiversity

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