BLOSSOM FIELDS, COTEFIELD FARM

BAT ACTIVITY AND DUSK EMERGENCE SURVEY

Date: November 2014

Our Ref: 7993 Bat Activity Survey

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QUALITY MANAGEMENT

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Contents

SUMMARY

RPS Planning and Development has been commissioned to carry out a bat activity and dusk emergence survey of an area of land at Blossom Fields, Cotefield Farm, Bodicote, by the landowner, Mr. R Bratt. The area of land measures around 4.5ha.

A Phase 1 Habitat Survey undertaken on the site (RPS, 2013) identified the presence of habitats suitable for supporting bat activity and trees with features potentially suitable for bat roosts and therefore recommended bat surveys were undertaken on the site. The proposed development would retain the majority of the features identified in the Phase 1 Habitat Survey and therefore the bat survey focused on the potential effects on bats from changes to the overall habitat composition of the site and the removal of one tree with features potentially suitable for a bat roost.

An evening activity survey was undertaken on the site to determine how the site was being used by bats and a dusk emergence survey was undertaken on one tree identified as having bat roost potential to determine whether bats were roosting within it. The bat activity survey identified that the habitats on the site are used by low numbers of bats and predominantly by common pipistrelle. Activity was greatest around a small area of semi-natural broad-leaved woodland in the eastern corner of the site and around two in-field trees. During each survey, bat activity was also recorded at discrete locations along the plantation woodland around the boundaries.

No bat roosts were identified within the sycamore tree which is due to be removed as part of the development proposals.

Bat surveys were undertaken in accordance with the latest best practice guidelines and recommendations published by the Bat Conservation Trust in *Bat Surveys: Good Practice Guidelines* (BCT, 2012).

The site was found to be of limited value to bats in areas away from boundary features and in-field trees. The proposals for the site have the opportunity to protect the majority of the existing features of value and create new features which will enhance the overall value of the site for bats.

A license from Natural England is not required and no mitigation measures are required to protect bats when felling the sycamore tree. However, the tree may support nesting birds and therefore measures should be put in place to ensure they are protected, as recommended in Section 4 of the report. The tree was also identified as a foraging resource and navigation aid for bats and therefore additional tree planting has been recommended to mitigate for the loss of the tree.

1 INTRODUCTION

1.1 RPS Planning and Development (RPS) has been commissioned to carry out a bat activity and dusk emergence survey of an area of land at Blossom Fields, Cotefield Farm, Bodicote, by the landowner, Mr. R Bratt. The size measures around 4.5ha in size.

1.2 The site is located south of the village of Bodicote within an area of arable farmland. A Phase 1 Habitat Survey undertaken on the site (RPS, 2013) identified the presence of habitats suitable for supporting bat activity and trees with features potentially suitable for bat roosts. The report recommended bat surveys were undertaken on the site.

1.3 The proposals would retain the majority of the features identified and therefore bat surveys were undertaken to focus on the potential effects on bats from changes to the overall habitat composition of the site and the removal of one tree with features potentially suitable for a bat roost.

1.4 An evening activity survey was undertaken on the site to determine how the site was being used by bats. The objectives of the evening activity survey were to:

- Identify areas of bat activity and describe bat movements on and around the site;
- Determine species or species groups of bats present on and around the site; and,
- Identify the type of activity to determine foraging areas (by feeding buzzes) or commuting routes/flight paths.

1.5 A dusk emergence survey was undertaken on one sycamore tree (shown on Figures 1 to 3) identified as having bat roost potential to determine whether bats were roosting within it. The objectives of the survey were to:

- Establish whether the tree is currently used by roosting bats;
- Establish which species, if any, are using the roost, and;
- If bats are present, establish an approximate number of bats of each species using the roost.

1.6 Bats and bat roosts are protected under the Wildlife and Countryside Act 1981 (as amended) and under The Conservation of Habitats and Species Regulations 2010 which makes all species of bat in Great Britain European Protected Species.

1.7 Under the legislation it is an offence to intentionally or deliberately kill, injure or capture bats; deliberately disturb bats; recklessly or intentionally disturb roosting bats; obstruct access to their roosts and damage or destroy a bat roost. Any works that could potentially affect a bat or a bat roost can only be conducted under a licence obtained in advance from Natural England.

1.8 Some bat species have been identified as being threatened and requiring conservation action leading to their inclusion under the UK Biodiversity Action Plan (UK BAP) and listing under Section 41 of the NERC Act (2006) as Species of Principal Importance in England. This places an obligation on local and regional authorities, in implementing their statutory duties to have regard to the conservation of biodiversity, to take these species into account in the exercise of their normal functions.

1.9 This report includes a description of the survey methods employed (Section 2), results obtained (Section 3), and conclusions concerning the use of the site by bats and the likely effects of the development proposals (Section 4).

2 METHOD

Bat Activity Survey

2.1 Three evening bat activity surveys were carried out by suitably experienced ecologists (Louisa Medland MCIEEM & Elizabeth White ACIEEM) in accordance with the *Bat Surveys: Good Practice Guidelines* (BCT, 2012). For the purposes of the guidance, the site was assessed as being a medium-sized site of low quality habitat. Details of the guidance used to reach this designation are provided in Appendix 4.

2.2 Medium sized sites are those measuring 1ha to 15ha in size. The site was deemed to be of low value to bats from the findings of a Phase 1 Habitat Survey which found most of the site to be an arable field which was considered to be of limited value to bats. Areas of scrub and trees which were considered to be of greater value were largely confined to the boundaries with the exception of two in-field trees.

2.3 The guidelines suggest a medium size, low value site should be surveyed three times and that surveys should ideally be spread over each season (spring, summer and autumn). Due to project constraints surveys were undertaken in spring and summer. Due to the low value of the habitats present, this survey effort is considered sufficient to gain an understanding of how bats are using the site.

2.4 A transect route was devised to cover all of the habitat types found on the site and to incorporate areas thought likely to be of most value, such as woodland edge and mature trees. During each survey visit the transect route was walked to detect bat activity along it.

2.5 A total of three transect surveys were undertaken on 19th May, 19th June and 22nd July 2014.

2.6 Each visit involved a 2-3 hour bat activity survey, commencing at sunset or up to 15 minutes before. On each visit ecologists walked the transect at a steady speed. Listening station stops lasting 2-5 minutes each were incorporated along the route at regular intervals and at particular features of interest. On each visit start points were varied so as to reduce bias associated with time of day/night.

2.7 Visual observations for bats were undertaken by scanning the skyline, and bat detectors were used to listen to echolocation calls. Bat Box Duet and ANABAT SD2 CF (both frequency division) bat detectors were used and recordings were made on portable MP3 players or CF cards. For any bats encountered, notes were made on location, species or species group, behavioural observations (e.g. direction of flight, habitat) and activity heard (e.g. feeding buzzes or social calls).

2.8 Stationary automated surveys were also undertaken. ANABAT SD2 and ANABAT Express CF Bat Detectors were left for a period of three consecutive nights at a mature oak tree on the site to gain additional information about bat activity within areas not covered by the transect.

2.9 The transect route, and the location of the stationary automated surveys, are shown on Figures 1, 2 and 3.

Dusk Emergence Survey

2.10 Bat surveys were undertaken in accordance with the latest best practice guidelines and recommendations published by the Bat Conservation Trust in Bat Surveys: Good Practice Guidelines (BCT, 2012).

2.11 The Cotefield Farm Phase 1 Habitat Survey (RPS, 2013) identified a mature sycamore tree with medium (Category 1*) bat roost potential. This tree is to be removed as part of the proposed development and therefore two dusk emergence surveys were undertaken on the tree.

2.12 Dusk emergence surveys commenced ½ to ¼ hour before sunset and continued until 2 hours after sunset.

2.13 During each survey visit, the tree was surveyed continuously and visual observations were made to identify where bats emerged/re-entered and in what direction they were flying to or from, should they be found roosting. Behavioural observations were also recorded for any bats encountered on site or within the vicinity (but not roosting), including direction of flight, and activity observed e.g. foraging or commuting.

2.14 Bat detectors were used to detect echolocation calls from any bats emerging/entering the tree to assist with species identification. Bat Box Duet and ANABAT SD2 CF bat detectors (both frequency division) were used. Recordings of bat calls were made on portable mp3 players and CF cards.

Data Analysis

2.15 The data recorded during bat activity and evening emergence surveys was subsequently analysed on computer using BatScan v.9 and Analook software, which allows the display of sonograms and power spectra of bat calls, which together with the measurement of call parameters such as peak call frequency, pulse length and repetition rate, assist in identifying calls to species or species groups. Identification was guided by information provided in British Bat Calls, A Guide to Species Identification Russ (2012).

3 RESULTS

Site overview

3.1 The survey area and the habitats present are shown on Figures 1 to 3. The survey site comprised the south-eastern half of a large arable field. At the time of the survey the field comprised bare ground with only scattered grasses and tall ruderal vegetation, predominantly around the margins. A strip of amenity grassland was present along the north-east boundary with young planted trees within it.

3.2 Strips of semi-mature mixed plantation woodland lined the field boundaries to the south-east and south-west and a small area was also present along the north-eastern boundary. Two mature trees (oak and sycamore) were present within the field. A small area of mature broad-leaved woodland was present along the boundary in the eastern corner. Some trees with bat roost potential were present within the areas of woodland outside of the site boundary which are not due to be affected by the proposals.

3.3 The surrounding area comprised further large arable fields which were typically lined by hedgerows and appeared visually (from an assessment of aerial photography) likely to be of similar habitat value to bats to the habitats found on site. The Sor Brook, a reservoir and areas of grassland lay further afield to the south of the site which offer a greater diversity of habitats for bats than those found on site.

3.4 The south-east edge of the village of Bodicote lies approximately 85m from the northern boundary of the site. There are likely to be buildings within the village which are suitable for bat roosts and gardens and mature trees are likely to be of some value to bats for foraging.

Bat Activity Survey

3.5 The majority of the site comprised a field of bare ground and was therefore considered to be of very low value to bats for foraging. Woodland habitats along the boundaries were considered to be of greater value and therefore the transect route was designed to follow the woodland edge which formed the site boundaries. The transect also crossed the field through an area of bare ground and followed a strip of amenity grassland. The transect diverted away from the field boundaries to incorporate the location of a mature sycamore tree within the route.

3.6 An automatic stationary survey was undertaken at the location of a mature oak tree within the field.

3.7 The transect route and the location of the stationary survey are shown on Figures 1 to 3.

3.8 The surveys were conducted in weather conditions appropriate for bat activity surveys (i.e. no heavy, persistent rain or strong wind). A summary of the survey dates, weather conditions and sunset times is provided in Appendix 1.

Bat Activity Survey Results

3.9 A summary of the bat activity survey results are given in the paragraphs that follow. The full results are provided in Appendix 2 and the activity patterns are shown on Figures 1 to 3.

Survey 1 – 19th May 2014

Transect Survey 1

3.10 Survey 1 commenced at 20.40, twenty minutes before sunset, and finished at 23.00. Bat activity was recorded between 21.30 and 22.38.

3.11 Bats were recorded foraging along mixed plantation woodland in the south-east and north-east of the site. Bats were observed foraging back and forth along a 'beat' which followed the line of the woodland and diverted from it over the woodland canopy and 5m to 10m into the field.

3.12 Similar activity was recorded in the eastern corner of the site where bats were foraging along the edge of the broadleaved woodland and at times over the canopy.

3.13 Foraging activity was also recorded around the sycamore tree in the field and bats were observed commuting away from the tree towards the western boundary.

3.14 Bat activity was generally recorded only once at the same location during the survey with the exception of around the semi-natural broadleaved woodland in the eastern corner of the site where activity was recorded during two periods. Bat activity was concentrated around the sycamore tree and boundary features in the east of the site. Overall levels of activity were low. All of the bats recorded were common pipistrelle *Pipistrellus pipistrellus*.

Stationary Survey 1

3.15 Common pipistrelle was recorded in the vicinity of the oak tree during Stationary Survey 1. A total of 21 contacts were recorded on the night of the 19th May 2014 and 18 contacts were recorded on the nights of the 20th and 21st May 2014.

3.16 The majority of contacts were brief and well-spaced, suggesting bats briefly approached the tree and then flew away from it. This is indicative of commuting behaviour and suggests that bats use the tree as a navigation feature in the landscape.

3.17 Occasional, short periods of continuous activity at the tree suggested that bats also forage around the tree.

Survey 2 – 19th June 2014

Transect Survey 2

3.18 Survey 2 commenced at 21.15, fifteen minutes before sunset and finished at 23.45. Bat activity was recorded between 22.04 and 23.37.

3.19 The majority of the bat activity recorded was concentrated around the mixed plantation woodland in the north-east of the site where foraging, commuting and several brief contacts were noted. Long periods of foraging activity were recorded around the semi-natural broadleaved woodland in the eastern corner. Foraging was also frequently heard around the sycamore tree in the centre of the site.

3.20 Lower levels of activity were observed along the woodland edge on the rest of the site, including foraging activity in two locations and several faint contacts, suggesting bats may have been on the opposite side of the woodland strips, outside of the site.

3.21 Bats were recorded several times at some locations, particularly around the sycamore tree and the edge of the woodlands in the east and north-east of the site but, overall bat activity on the site was considered to be low. Common pipistrelle was recorded most frequently and a *Myotis* bat was recorded twice. Some bat contacts were too faint or brief to identify to species level.

Stationary Survey 2

3.22 Common pipistrelle was again recorded in the vicinity of the oak tree during Stationary Survey 2. A total of 6 contacts were recorded on the night of the 19th June 2014, 47 contacts were recorded on the night of the 20th June 2014 and 8 contacts were recorded on the night of the 21st June 2014.

3.23 On the 19th June 2014 the contacts were recorded between 22.20 and 00.50, whereas on the following two nights contacts were distributed throughout the night. A much higher number of contacts were recorded on the night of the 20th June 2014 and these were also well distributed through the night, with short periods of continuous activity occurring being indicative of foraging.

3.24 A number of calls were brief and well-spaced, indicating they were from bats which were only briefly within the vicinity of the tree and therefore likely to be commuting.

Survey 3 – 22nd July 2014

Transect Survey 3

3.25 Survey 3 commenced at 20.55, 18 minutes before sunset and finished at 23.25. Bat activity was recorded between 21.38 and 23.02.

3.26 Activity was greatest in the eastern side of the site around semi-natural and plantation woodland and around the in-field sycamore tree. Common pipistrelle was recorded most frequently in these areas foraging and commuting. Several contacts were too brief to identify the type of behaviour being displayed.

3.27 A *Myotis* bat was recorded once in the south-east of the site, along the woodland edge, and two noctule bats *Nyctalus noctula* were observed flying high over the west of the site.

3.28 The overall level of activity was again considered to be relatively low and a number of faint contacts suggested bats were foraging on the other side of linear features and not directly on the site.

Stationary Survey 3

3.29 Common pipistrelle was recorded most frequently in the vicinity of the oak tree during Stationary Survey 3. Noctule bat was recorded on three occasions on the 11th July 2014 and a *Myotis* bat was recorded once. A total of 15 contacts were recorded on the night of the 11th July 2014, 14 contacts were recorded on the night of the 12th July 2014 and 25 contacts were recorded on the night of the 14thJuly 2014. Only one bat was recorded on the night of the 13th July 2014 and this is likely to be due to rain. Therefore the results from the 14th July 2014 have also been included, to provide three 'full' nights of data.

3.30 Periods of frequent and prolonged contacts indicated foraging around the tree at times. Brief and well-spaced contacts also occurred, which was more indicative of commuting.

Dusk Emergence Survey

3.31 Two dusk emergence surveys were undertaken on the mature sycamore tree which is located within the arable field. The tree contained six holes at the top of the bole and at the bottom of the lower limbs, approximately 4m to 6m above ground level. The holes included rot holes which had developed in scars, where limbs had been removed, and woodpecker holes. Several rot holes were small and likely to offer only a small space for bats to roost, and some were slightly upward facing so exposed to rain. The tree was assessed as having MEDIUM (Category 1*) bat roost potential based on guidance provided in bat survey guidance BCT (2012). The holes were also suitable nesting sites for breeding birds.

3.32 The results of the survey visits are described in the paragraphs that follow:

Survey 1 – 19th June 2014

3.33 The survey commenced at 21.15, 15 minutes before sunset and continued until 23.45.

3.34 No bats were observed emerging from the tree.

3.35 Bat activity was observed during the survey, comprising common pipistrelle foraging around the tree. A number of bats were observed commuting towards the tree from the eastern

corner of the site, foraging briefly and then returning to the eastern corner. A total of 8 contacts were recorded between 22.29 and 23.27.

Survey 2 – 19th July 2014

3.36 The survey commenced at 20.55, 18 minutes before sunset and continued until 23.25.

3.37 No bats were observed emerging from the tree.

3.38 Bat activity was observed during the survey and mostly comprised common pipistrelle contacts. Common pipistrelle were observed flying from the direction of the oak tree, in a north-westerly direction, towards the sycamore tree and then returning towards to oak tree or flying on towards the woodland in the eastern corner. Brief foraging was recorded around the tree at times. A noctule bat was also recorded once in the vicinity of the tree but was not seen.

4 CONCLUSIONS

4.1 The bat activity survey identified that the habitats on the site are used by low numbers of bats and predominantly by common pipistrelle. Activity was greatest around a small area of semi-natural broad-leaved woodland in the eastern corner of the site and around two in-field trees. The locations of bat activity are shown on Figures 1 to 3. During each survey, bat activity was also recorded at discrete locations along the mixed plantation woodland belt which forms the south-east and south-west boundary and parts of the north-east boundary.

4.2 The majority of the site comprised bare ground and levels of bat activity in these areas were low. No activity was recorded along the section of transect which crossed the field but, bats were observed commuting across the field between the boundaries and the in-field trees.

4.3 The locations of activity varied between surveys and this is likely to be due to small changes in weather conditions and wind direction, meaning different parts of the site were sheltered at different times, thereby affecting the availability of invertebrate prey. The eastern half of the site was found to support most bat activity.

4.4 *Myotis* bats were recorded once during the transect survey around mixed plantation woodland along the north-east boundary and twice around the in-field oak tree during the stationary survey. Noctule bat was recorded during a transect survey in the south-west of the site and on the same evening during an emergence survey around the in-field sycamore tree. Noctule bat was also recorded during stationary surveys at the in-field oak tree.

4.5 No bat roosts were identified within the sycamore tree which is due to be removed as part of the development proposals. It was however found to be used by bats for foraging and as a landmark for commuting across the site. Bats were observed commuting to and from it, from the oak tree located to the west, and to and from the woodland to the east.

4.6 A licence from Natural England is not required and no mitigation measures are required to protect bats when felling the sycamore tree. However, the tree may support nesting birds.

4.7 The proposals for the site would retain the majority of the habitats found to be of value to bats during the survey. The plantation woodland around the boundaries would be retained with the exception of possible small scale pruning works and the creation of a narrow footpath through it at one location. This is considered unlikely to affect the use of the woodland by bats as common pipistrelle, which were the most frequent bat recorded, were observed flying across the open arable field. A small gap in the vegetation is therefore unlikely to present a barrier preventing bat movement across it. *Myotis* bats are known to stay close to vegetation and avoid crossing large, well lit, open spaces but do cross small gaps such as the one proposed.

4.8 The semi-natural broadleaved woodland in the eastern corner and the in-field oak tree in the west of the site would also be retained in the proposals.

Recommendations

4.9 The recommendations provided below are based on the findings of the bat activity and bat emergence surveys and the proposed site layout, as shown on Figure 4.

Lighting scheme

4.10 Common pipistrelle, which were recorded most frequently on the site, are one of the species of bat least deterred by artificial street lighting and may forage around them for invertebrates attracted to the light. However, artificial lighting can affect the distribution and availability of prey in the wider landscape, which can in turn have an impact on bats. Species such as *Myotis* bats, which were recorded in low numbers on the site, typically stay close to vegetation and avoid artificial lighting and could be directly affected by increased levels of lighting along vegetation.

4.11 The illustrative proposed layout, shown on Figure 4, would see the retained strips of plantation woodland boundaries lining access roads and facing the frontages of properties and the oak tree would be surrounded by the access roads and housing. Levels of artificial lighting around these features are therefore expected to increase. A house would be located close to the semi-natural broad-leaved woodland in the east of the site but changes to lighting levels here are likely to be less significant.

4.12 Changes to lighting can have an impact on the behaviour of bats and therefore, it is recommended that a sympathetic lighting scheme is designed to prevent light spill onto the woodlands and oak tree and to ensure the level of lighting around them is not substantially increased. This should take into account best practice guidelines and recommendations published by the Bat Conservation Trust in *Bats and Lighting in the UK* (BCT, 2009).

4.13 High pressure sodium lamps or light emitting diodes (LEDS) should be used as these emit lower levels of ultra violet (UV) light than many other types of lights. The height of lighting columns should be as short as possible and lighting should be directed to where it is needed to avoid light spillage onto the woodlands and tree. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area. Planting or manmade features can also be used as a barrier to prevent light spill. The level of light should be kept as low as possible and, where practicable, the times during which the lighting is on should be limited to provide some dark periods.

4.14 The proposals include the creation of a grass margin between the plantation woodland and houses and roads which acts as a buffer between the two. Positioning lighting columns along road edges should leave the grassland margin behind unlit thereby forming a darker corridor along the woodland edge. Scattered tree planting along the grassland boundary and throughout the site would also help to create darker areas by screening artificial lighting.

4.15 It is recommended that artificial lighting is minimised along the footpath crossing the site from north-west to south-east, where practical, such as by using low height lighting to light the path but preventing upward light spill.

Site layout

4.16 An in-field sycamore tree will be felled as part of the proposals, which will result in a direct, although relatively small, loss of a foraging and commuting resource for bats. Common pipistrelle were observed crossing the field to reach the sycamore tree to forage, but were also observed continuing on to other features, indicating that they were using the tree to navigate across the wider landscape too.

4.17 The proposed layout of the site includes the creation of a green corridor through the centre of the site running from north-west to south-east. The corridor comprises a strip of grassland on each side of a pedestrian footpath with scattered trees along it. The corridor connects to a larger area of grassland due to be created in the centre of the site around the retained oak tree. Additional trees would also be planted in this location. The grassland and trees would create a foraging resource for bats as well as providing a well vegetated route for bats to commute across the site which incorporates the oak tree and connects to the eastern side of the site, thereby recreating the route currently used by bats.

4.18 The proposed layout also comprises relatively straight access roads running parallel and perpendicular to the woodland strips with housing lining them. Scattered trees would be planted along the access roads. The roads are likely to provide new linear features which bats would use to navigate across the site.

4.19 New soft landscaping will be provided for within the proposals which will propose scattered tree and shrub planting and grassland creation across the site and along access roads. As the trees and shrubs mature, they will attract invertebrates and provide sheltered foraging areas for bats. This will compensate for the loss of the sycamore tree and also provide more varied foraging opportunities across the site, rather than at one location.

4.20 It is recommended that a variety of native trees and shrubs are used which are characteristic of the site and surrounding area, such as oak *Quercus rober*, sweet chestnut *Castanea sativa*, horse chestnut *Aesculus hippocastanum,* hazel *Corylus avellana*, holly *Ilex aquifolium*, privet *Ligustrum vulgare*, hawthorn *Crataegus monogyna*, silver birch *Betula pendula* and rose *Rosa sp.*

4.21 The site could be further enhanced for bats by creating areas of species-rich, wildflower grassland, which would attract additional invertebrates.

4.22 The introduction of species-rich grassland would also benefit other wildlife by providing nectar and seeds for birds and invertebrates to forage and by attracting invertebrates which would provide a food source for birds and mammals such as badger, should they present in the area.

4.23 The site is currently of limited value to bats in areas away from boundary features and in-field trees. The proposals for the site protect the majority of the existing features of value and create new features which will enhance the overall value of the site for bats through providing additional vegetation to attract invertebrates for bats to forage on and to create new commuting routes.

Enhancement measures

4.24 The site was not found to support bat roosts. Therefore there is an opportunity to enhance the site for bats by providing new roost features. It is recommended that a total of six bat boxes are installed. Three boxes should be positioned on the oak tree in the centre of the site and three should be positioned on mature trees within the semi-natural broad-leaved woodland to the east. They should be positioned three to six metres above the ground and in a sunny, south-east to south-west facing position

4.25 It is recommended that the bat boxes are made from woodcrete, which is a blend of wood, concrete and clay which will not rot, leak, crack or warp, and will last for at least 20 - 25 years. Woodcrete is also breathable and maintains a stable temperature inside the box. The boxes used should be suitable for the bat species recorded on the site and therefore the Schwegler 1FF and Schwegler 2FN are recommended (further details are provided in Appendix 5). Both boxes are open at the bottom meaning there is no need to clean them which will help ensure the boxes stay in good condition for longer.

4.26 The owner of the land where the bat boxes would be positioned must be in agreement with them being sited there and must be committed to retaining them and the habitat they are in for at least the lifetime of the boxes. Once bats have inhabited a roost site they may only be disturbed by licensed bat workers.

4.27 Recommendations have not been made to install integral bat boxes into new dwellings due to the difficulties in insuring the boxes are retained and left undisturbed once in private ownership.

4.28 Nesting birds may use the sycamore tree which is due to be removed. All birds and their nests and eggs are protected under the Wildlife and Countryside Act 1981 (as amended) and it is therefore recommended that the tree is felled outside of the nesting season which runs from mid-February to September inclusive. If the tree is due to be felled during the nesting season it is recommended that it is checked immediate prior by an ecologist to identify whether any nests are present. If nests are present, the tree the nest is in and a 5m buffer area around it should not be disturbed until an ecologist has confirmed that the young have fledged.

4.29 The proposed landscaping plans for the new development would introduce new trees and shrubs onto the site and increase the amount of this vegetation type currently present. In the long-term, this would result in an increase in nesting opportunities for birds.

4.30 In the short- and medium-term it is recommended that bird boxes are installed on retained vegetation around the boundaries of the site and in the mature oak tree to provide additional nest sites until the new trees and shrubs have matured. A total of eight boxes should be installed and these should comprise various designs to suit different bird species. It is recommended that four Schwegler 1N, three Schwegler 1B (x2 32mm, x1 26mm opening) and one No. 5 Schwegler Owl Box be installed around the site.

4.31 It is recommended that an ecologist is present during the installation of the bat and bird boxes to ensure they are positioned in the most favourable locations.

5 REFERENCES

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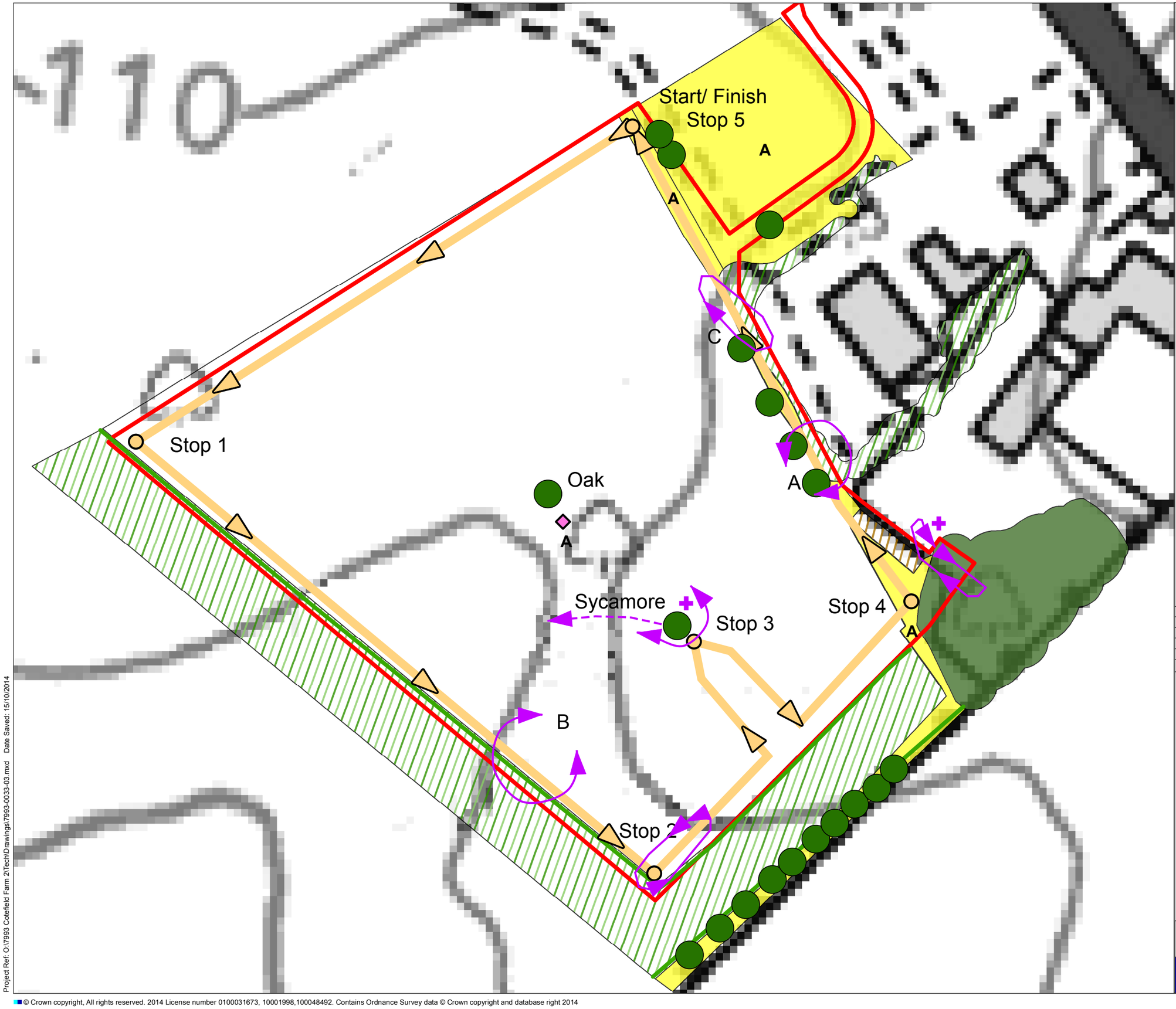
Figure 1

Bat Activity Survey 1



Legend

- Site boundary

Phase 1 Habitat Survey

- Tree
- Intact species poor hedge
- Amenity grassland
- Arable
- Mixed plantation woodland
- Semi-natural mixed woodland
- Tall ruderal

Bat Activity Survey

- Transect and Direction
- Common Pipistrelle
- Foraging
- Commuting
- Behaviour/Direction of Flight Unknown
- Stop
- Stationary Bat Survey

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2014

Status: --

RPS

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Client: - -

Project: Cotefield Farm, Bodicote

Title: Bat Activity Survey 1

Scale: A3 @ 1:1,250

0 0.03 0.06km

N

Date: Oct 2014 Datum: OSGB36 Projection: BNG

Drawn: JC Checked: PE Job Ref: OXF7993

Figure: 1 Revision: .

Project Ref: O:\7993 Cotefield Farm 2\Tech\Drawings\7993-0033-03.mxd Date Saved: 15/10/2014

Figure 2

Bat Activity Survey 2

Stop 2
Stop 3
Stop 1
Start/ Finish
Stop 5
Stop 4
Oak
Sycamore
A
B

Legend

Phase 1 Habitat Survey

- Tree
- Intact species poor hedge
- Site boundary
- A — Amenity grassland
- A — Arable
- Mixed plantation woodland
- Semi-natural mixed woodland
- Tall ruderal

Bat Activity Survey

- Transect and Direction
- Common Pipistrelle
- Myotis Bat
- Unidentified Bat
- Foraging
- Commuting
- Behaviour/Direction of Flight Unknown
- Stop
- Emergence Survey 1
- Stationary Bat Survey
- A — Location Reference

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2014

Status: --

RPS
20 Western Avenue Milton Park Abingdon Oxon OX14 4SH
T 01235 821888 F 01235 820351 E rpsox@rpsgroup.com W rpsgroup.com

Client: - -

Project: Cotefield Farm, Bodicote

Title: Bat Activity Survey 2

Scale: A3 @ 1:1,250

0 0.03 0.06km

N

Date: Oct 2014 Datum: OSGB36 Projection: BNG

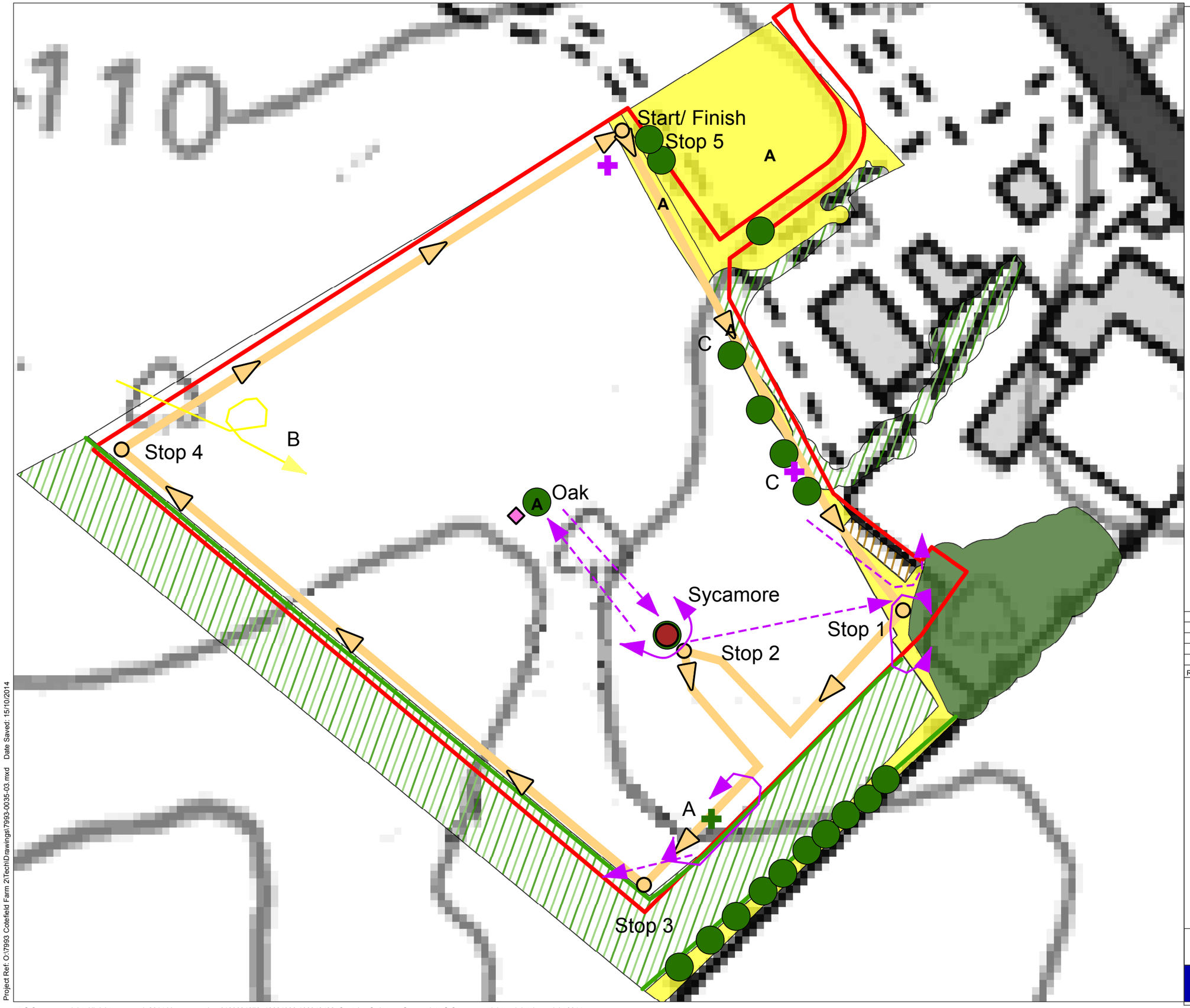
Drawn: JC Checked: PE Job Ref: OXF7993

Figure: 2 Revision: .

Project Ref: O:\7993 Cotefield Farm 2\Tech\Drawings\7993-0034-04.mxd Date Saved: 30/10/2014

Figure 3

Bat Activity Survey 3



Legend

Phase 1 Habitat Survey

- Tree
- Intact species poor hedge
- Site boundary
- A — Amenity grassland
- A — Arable
- Mixed plantation woodland
- Semi-natural mixed woodland
- Tall ruderal

Bat Activity Survey

- Transect and Direction
- Common Pipistrelle
- Noctule
- Foraging
- Commuting
- Behaviour/Direction of Flight Unknown
- Stop
- Stationary Bat Survey
- Emergence Survey 2

Rev:	Date:	Amendment:	Name:	Checked:

Data Source: RPS 2014

Status: --

RPS
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Client: - -

Project: Cotefield Farm, Bodicote

Title: Bat Activity Survey 3

Scale: A3 @ 1:1,250

0 0.03 0.06 km

N

Date: Oct 2014 Datum: OSGB36 Projection: BNG

Drawn: JC Checked: PE Job Ref: OXF7993

Figure: 3 Revision: .

Project Ref: O:\7993 Cotefield Farm 2\Tech\Drawings\7993-0035-03.mxd Date Saved: 15/10/2014

Figure 4

Proposed Site Layout

Notes
1. This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
2. If received electronically it is the recipients responsibility to print to correct scale. Only written dimensions should be used.

Legend

Note:
Sketch produced by Mark Powell

Rev	Description	Date	Initial	Checked

20 Western Avenue, Milton Park, Abingdon, Oxfordshire, OX14 4SH
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Project: Cotefield Farm, Bodicote

Title: Blossom Fields, Cotefield Farm

Status	Drawn By	PM/Checked by
Final	RM	BOD
Job Ref	**Scale @ A3**	**Date Created**
OXF	1:1,250	Nov-14

Figure Number	Rev
4	-

rpsgroup.com

O:\7993 Cotefield Farm 2\Tech\Drawings\7993-0047-02.dwg

O:\7993 Cotefield Farm 2\Tech\Drawings\7993-0047-02.dwg

Appendix 1

Bat Activity Survey dates, weather and sunset/rise times

Weather conditions and sunset times during bat activity transect surveys.

Date	Survey	Weather	Temp (°C)	Sunset time
19/05/14	1	Dry, patchy cloud, gently breeze	19 - 15	2100
19/06/14	2	Dry, clear, still	13	2130
22/07/14	3	Dry, clear, gentle breeze	20	2113

Weather conditions and sunset/sunrise times during bat activity stationary surveys.

Date	Survey	Average Night-time Weather	Min. Night Temp (°C)	Sunset-sunrise time
19/05/14 – 21/05/14	1	Dry, mostly clear, occasional light rain shower, gently breeze	10	2100 – 0506
19/06/14 – 21/05/14	2	Dry, patchy cloud, gentle breeze	12	2130 – 0444
11/07/14 – 13/07/14	3	Dry, clear although occasional light rain on 13th, gentle breeze	13	2113 - 0511

Appendix 2

Bat Activity Survey Results

Activity transect 1

19 March 2014
Sunset 2100 Start time 2040
Weather: Dry, scattered cloud, 19-15°C
Surveyors: LM & EW

Time	Location	Description	Species
20:47	Stop 1	-	
20:54	Stop 2	-	
20:59	Stop3 (Tree)	-	
21:08	Stop 4	-	
21:18	Stop 5	-	
21:25	Stop 1	-	
21:30	(A)	Brief Pip and again. Foraging in hedge, briefly fly over.	Common Pipistrelle
21:34	(B)	A couple of Pips foraging along hedge and near small tree.	Common Pipistrelle
21:35	Stop 2	Pip fly's along hedge. North east to southwest, back southwest to northeast along hedge.	Common Pipistrelle
21:38	Stop 2	Brief pip.	Common Pipistrelle
21:40	Stop 3 (Tree)	-	
21:47	Stop 4.	Two Pips foraging in wood, unsighted. Then pips seen foraging around edge of tree canopy, northeast to southwest. In and out low and then back into wood, southwest to northeast.	Common Pipistrelle
21:52	(A)	Pip heard briefly foraging at hedge intermittently. (Quite faint)	Common Pipistrelle
21:57	(C)	Pip heard again slightly further down hedge, then sighted flying east to west then back east.	Common Pipistrelle
22:00	Stop 5	-	
22:07	Stop 1	-	
22:13	Stop 2	-	
22:20	Stop 3 (Tree)	-	
22:22	Stop 3	Bat heard commuting past tree.	Common Pipistrelle
22:26	Stop 3	Bat foraging around tree then flying off into open field to the west.	Common Pipistrelle
22:29	Stop 4	Bat heard briefly foraging on edge of wood.	Common Pipistrelle
-	Stop 4	Brief bat heard (in wood) intermittently.	Common Pipistrelle
22:38	Stop 5		

Stationary survey 1

19 May 2014

Time	Species
21:54	Common Pipistrelle
22:58	Common Pipistrelle
23:09	Common Pipistrelle
23:10	Common Pipistrelle
23:36	Common Pipistrelle
01:07	Common Pipistrelle
01:08	Common Pipistrelle
01:15	Common Pipistrelle
01:20	Common Pipistrelle
01:25	Common Pipistrelle
01:26	Common Pipistrelle
01:27	Common Pipistrelle
01:28	Common Pipistrelle
01:29	Common Pipistrelle
03:01	Common Pipistrelle
03:07	Common Pipistrelle
03:08	Common Pipistrelle
03:09	Common Pipistrelle
03:13	Common Pipistrelle
04:14	Common Pipistrelle
04:19	Common Pipistrelle

20th May 2014

Time	Species
22:01	Common Pipistrelle
22:40	Common Pipistrelle
22:56	Common Pipistrelle

22:57	Common Pipistrelle
22:58	Common Pipistrelle
22:59	Common Pipistrelle
23:00	Common Pipistrelle
23:01	Common Pipistrelle
23:02	Common Pipistrelle
23:05	Common Pipistrelle
23:06	Common Pipistrelle
00:03	Common Pipistrelle
00:09	Common Pipistrelle
00:10	Common Pipistrelle
00:11	Common Pipistrelle
00:25	Common Pipistrelle
00:41	Common Pipistrelle
00:53	Common Pipistrelle

21st May 2014

Time	Species
21:57	Common Pipistrelle
22:11	Common Pipistrelle
22:41	Common Pipistrelle
23:18	Common Pipistrelle
23:21	Common Pipistrelle
23:46	Common Pipistrelle
02:10	Common Pipistrelle
02:10	Common Pipistrelle
02:14	Common Pipistrelle
02:21	Common Pipistrelle
02:26	Common Pipistrelle

02:27	Common Pipistrelle
02:28	Common Pipistrelle
02:29	Common Pipistrelle
02:30	Common Pipistrelle
02:34	Common Pipistrelle
02:35	Common Pipistrelle
02:46	Common Pipistrelle

Activity transect 2- Cotefield farm.

19 June 2014
Sunset 2130 Start time 2115
Weather: Dry, cloudy, still wind, 13°C

Activity Log

Time	Location	Description	Species
21:22-21:25	Stop 1	-	
21:30-21:35	Stop 2	-	

21:40-21:45	Stop 3	-	
21:48-21:53	Stop4	-	
21:55-22:00	Stop 5	-	
22:04-22:09	Stop 1	-	
22:04	Stop 1/A	Bat sighted foraging along woodland edge from direction of house, down between two woodlands to southeast.	Common pipistrelle
22:05	Stop 1/A	Bat sighted briefly foraging at edge of woodland.	Common pipistrelle
22:08	Stop 1/A	Bat foraging southwest to east, opposite direction but same route as 22.04.	Common pipistrelle
22:08	Stop 1/A	Bat exits woodland and forages west towards house along edge.	Common pipistrelle
22:09	Stop 1/A	Bat forages east to southwest same route as before.	Common pipistrelle
22:13	(B)	Bats foraging along woodland edge, full length.	Common pipistrelle
22:14	(B)	Another bat commutes along hedge south-east to north-west.	Call too faint to Identify
22:15	(B)	Continuous brief contacts along entire length of woodland edge with some observations of foraging.	Common pipistrelle
22:18-22:23	Stop 2	-	
22:27-22:32	Stop 3	-	
22:37-22:42	Stop4	-	
22:40	Stop4	Bat heard, possibly myotis, other side of hedge.	Call too faint to Identify, possible Myotis sp. (from field ID)
22:45-22:48	Stop 5	Faint pip call heard several times, but no observation.	Common pipistrelle
22:50-22:55	Stop 1	Foraging pip travelling along woodland edge and then back down between woodlands.	Common Pipistrelle
22:57	(B)	Faint, brief contact.	Myotis. Myotis call: Call Duration: 2ms Interpulse duration:93 ms Frequency range: 85-35 kHz Maximum energy:46kHz
22:59-23:04	Stop 2		Call too Faint to Identify.
23:07-23:13	Stop 3	Faint contact along woodland edge, not seen. Possible pip foraging on other side.	Common Pipistrelle.
23:17	Stop 4	Faint contacts, pips foraging nearby, not seen.	Common Pipistrelle.
23:24	Stop 4	Brief contact.	To faint to identify.
23:27	Stop 5	Foraging around tree.	Common Pipistrelle

Stationary survey 2.

19th June 2014

Time	Species
22:22	Common Pipistrelle
22:27	Common Pipistrelle
22:30	Common Pipistrelle
22:32	Common Pipistrelle
00:22	Common Pipistrelle
00:50	Common Pipistrelle

20th June 2014

Time	Species
21:28	Common Pipistrelle
21:39	Common Pipistrelle
21:42	Common Pipistrelle
22:07	Common Pipistrelle
22:08	Common Pipistrelle
22:11	Common Pipistrelle
22:22	Common Pipistrelle
22:24	Common Pipistrelle
22:34	Common Pipistrelle
22:35	Common Pipistrelle
22:55	Common Pipistrelle
23:04	Common Pipistrelle
23:15	Common Pipistrelle
23:21	Common Pipistrelle
23:22	Common Pipistrelle
23:42	Common Pipistrelle
23:46	Common Pipistrelle
23:48	Common Pipistrelle

23:50	Common Pipistrelle
23:51	Common Pipistrelle
23:54	Common Pipistrelle
23:55	Common Pipistrelle
00:04	Common Pipistrelle
00:05	Common Pipistrelle
00:15	Common Pipistrelle
00:21	Common Pipistrelle
00:45	Common Pipistrelle
00:47	Common Pipistrelle
00:56	Common Pipistrelle
00:59	Common Pipistrelle
01:00	Common Pipistrelle
01:05	Common Pipistrelle
01:20-01:26	Common Pipistrelle
01:31-01:32	Common Pipistrelle
01:39	Common Pipistrelle
01:45	Common Pipistrelle
01:54	Common Pipistrelle
01:56	Common Pipistrelle
02:04	Common Pipistrelle
02:08	Common Pipistrelle
02:10	Common Pipistrelle
02:14	Common Pipistrelle
02:15	Common Pipistrelle
02:22	Common Pipistrelle
02:24	Common Pipistrelle
02:23	Common Pipistrelle
02:28	Common Pipistrelle

21st June 2014

Time	Species
23:52	Common Pipistrelle
00:58	Common Pipistrelle
01:43	Common Pipistrelle
03:09	Common Pipistrelle
03:10	Common Pipistrelle
03:16	Common Pipistrelle
03:45	Common Pipistrelle
04:56	Common Pipistrelle

Activity transect 3- Cotefield farm.

22 July 2014
Sunset 2113 Start time 2100
Weather: Dry, clear, gentle breeze, 20°C

Activity Log

Time	Location	Description	Species
2105-2110	Stop 2		
2115-2120	Stop 3		
2123-2128	Stop 4		
2132-2135	Stop 5		
2138-2143	Stop 1		
2139		Bat flew south-eastwards up to and then along woodland edge off site (commuting).	Common pipistrelle
2142		Brief foraging along woodland edge	Common pipistrelle
2145-2150	Stop 2		
2152-2155	A	Foraging along woodland edge	Common pipistrelle
2155-2200	Stop 3		
2202-2207	Stop 4		
2208-2216	Stop 5		
2110		Brief contact, in relatively open part of the site. Possibly foraging around nearby young trees	Common pipistrelle
2216		Brief contact, as above	Common pipistrelle
2218-2224	Stop 1		
2122		Intermittent brief contacts, likely foraging around woodland edge	Common pipistrelle
2227-2230	Stop 2		
2229-2230		Occasional contacts, likely bat foraging around tree canopy, not seen	Common pipistrelle
2131	A	Brief contact along woodland edge	Myotis sp.
2232-2247	Stop 3		
2232		Bat flying along woodland edge, commuting	Common pipistrelle
2238-2243	Stop 4		
2138	B	Two bats flying high over site north-west to south-east and foraging	Noctule
2245-2250	Stop 5		
2251	C	Brief contact along woodland edge	Common pipistrelle
2252-2257	Stop 1		
2254		Brief contact along edge of woodland	Common pipistrelle
2258-2305	Stop 2		
2159		Bat foraging around tree canopy	Common pipistrelle
2202		Bat foraging around tree canopy	Common pipistrelle

Stationary survey- Cotefield farm.

11th July 2014

Time	Species
21:25	Noctule
21:28	Noctule
21:29	Common Pipistrelle
21:32	Noctule
22:45	Common Pipistrelle
22:46	Common Pipistrelle
22:48	Common Pipistrelle
22:49	Common Pipistrelle
22:50	Common Pipistrelle
22:51	Common Pipistrelle
22:53	Common Pipistrelle
22:58	Common Pipistrelle
23:28	Common Pipistrelle
00:51	Common Pipistrelle
02:25	Myotis (Brief)
12th July 2014	
21:33	Common Pipistrelle
21:55	Common Pipistrelle
22:22	Common Pipistrelle
22:29	Common Pipistrelle
22:30	Common Pipistrelle
22:31	Common Pipistrelle
22:36	Common Pipistrelle
22:46	Common Pipistrelle
22:49	Common Pipistrelle
22:52	Common Pipistrelle

23:31	Common Pipistrelle (Brief)
23:47	Common Pipistrelle
00:03	Common Pipistrelle
00:19	Common Pipistrelle
00:32	Common Pipistrelle
00:33	Common Pipistrelle
00:35	Common Pipistrelle
00:47	Common Pipistrelle
01:25	Common Pipistrelle
01:26	Common Pipistrelle
01:27	Common Pipistrelle
01:32	Common Pipistrelle
01:36	Common Pipistrelle
01:43	Common Pipistrelle

13th July 2014

22:03	Common Pipistrelle

14th July 2014

Time	Species
21:15	Common Pipistrelle
21:19	Common Pipistrelle
21:21	Common Pipistrelle
21:38	Common Pipistrelle
22:44	Noctule
22:46	Common Pipistrelle
22:50	Common Pipistrelle
22:51	Common Pipistrelle
22:53	Common Pipistrelle
22:54	Common Pipistrelle
23:10	Common Pipistrelle

23:11	Common Pipistrelle
23:12	Common Pipistrelle
23:14	Common Pipistrelle
23:16	Common Pipistrelle
23:20	Common Pipistrelle
23:40	Common Pipistrelle
23:42	Common Pipistrelle
23:45	Common Pipistrelle
00:38	Common Pipistrelle
00:42	Common Pipistrelle
01:17	Common Pipistrelle
01:18	Common Pipistrelle
01:19	Common Pipistrelle
01:26	Common Pipistrelle

Appendix 3

Bat Emergence Survey Results

Tree Emergence Survey 1

19 June 2014
Sunset 2100 Start time 2118
Weather: Dry, cloud, still, 13°C

Time	Description	Species
22:29	Bat from the east foraged around tree briefly then left.	Common pipistrelle
22:41	Two bats from same direction as above. Foraged briefly around tree and returned eastwards.	Common pipistrelle
22:49	Bat foraging around tree.	Common pipistrelle
23:02	Bat foraging around tree.	Common pipistrelle
23:15	Bat foraging around tree.	Common pipistrelle
23:20	Bat contact.	Common pipistrelle
23:24	Bat foraging around tree.	Common pipistrelle
23:27	Bat Foraging in tree	Common pipistrelle

Tree Emergence Survey 2

21 July 2014
Sunset 2113 Start time 2055
Weather: Dry, clear, gentle breeze, 20°C

Time	Description	Species
2214	Bat flying from oak tree to edge of sycamore tree and back again	Common pipistrelle
2221	Bat flying from oak tree to sycamore tree and then eastwards towards woodland	Common pipistrelle
22:22	Brief contact	Common pipistrelle
22:28	Faint foraging heard intermittently around tree.	Common pipistrelle
22:37	Brief contact	Common pipistrelle
22:40	Brief contact	Common pipistrelle
	Bat contact in vicinity of tree	Noctule
22:53	Bat foraging around tree.	Common pipistrelle
22:58	Bat Foraging around tree	Common pipistrelle

Appendix 4

Minimum recommended visit frequency and timing for activity surveys

	Bat habitat quality		
	Low habitat quality	**Medium habitat quality**	**High habitat quality**
Small sites • **Site area < 1 ha (where deemed necessary)**	**Transect surveys**		
	One transect on 2 visits[1] Mar[2] – Sept[3] Optimum period Jun - Aug	One transect on 3 visits[1] Mar[2] – Sept[3] Optimum period Jun - Aug At least one of the three surveys should comprise dusk and pre-dawn surveys (or a dusk-to-dawn survey) within one 24-hour period.	One transect on 4 visits[1] Mar[2] – Sept[3] Optimum period Jun - Aug At least one of the four surveys should comprise dusk and pre-dawn surveys (or a dusk-to-dawn survey) within one 24-hour period.
	Automated surveys		
	1 location for 3 consecutive nights on 2 occasions Mar[2] – Sept[3]	1 location for 3 consecutive nights on 3 occasions Mar[2] – Sept[3]	1 location for 3 consecutive nights on 4 occasions Mar[2] – Sept[3]
Medium-sized sites • **Site area[4] 1-15 ha** • **Project value £1M - £20M**	**Transect surveys**		
	One visit per transect each season (spring, summer and autumn)	One visit per transect each month (Apr-Sep or Apr-Oct) At least one of the surveys should comprise dusk and pre-dawn surveys (or a dusk-to-dawn survey) within one 24-hour period.	Up to two visits per transect each month may be requested (Apr-Sep or Apr-Oct) At least one of the surveys should comprise dusk and pre-dawn surveys (or a dusk-to-dawn survey) within one 24-hour period.
	Automated surveys		
	1 location per transect. Data to be collected on 3 consecutive nights each season (spring, summer and autumn)	1 location per transect. Data to be collected on 3 consecutive nights each month (Apr-Sep or Apr to Oct)	2 locations per transect. Data to be collected on 4 consecutive nights each month (Apr-Sep or Apr to Oct)
Large sites, proposed for major infrastructure developments • **Site area[4] >15ha (or 5ha for brownfield sites)** • **Project value >£20M**	**Transect surveys**		
	One visit per transect each season (spring, summer and autumn)	One visit per transect each month (Apr-Sep or Apr to Oct) At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.	Up to two visits per transect each month may be requested (Apr-Sep or Apr to Oct) At least one of the surveys should comprise dusk and pre-dawn (or dusk to dawn) within one 24-hour period.
	Automated surveys		
	1 location per transect. Data to be collected on 4 consecutive nights each season (spring, summer and autumn)	2 locations per transect. Data to be collected on 5 consecutive nights each month (Apr-Sep or Apr to Oct)	Up to 3 locations per transect. Data to be collected on 5 consecutive nights each month (Apr-Sep or Apr to Oct)

Notes:
1 Surveys should be approximately spaced through the period of sampling.
2 Surveys should not start before April in the north of the UK, and should start later in years when the weather is inclement
3 Season can be extended to October - November if working in southern England, or if surveys for mating activity are required, unless the weather is particularly cold.

Extract from BCT (2012)

Appendix 5

Bat and bird box design recommendations

Bat Boxes

It is recommended that the following bat boxes are installed on the site.

Information available from: http://www.nhbs.com/browse/subject/421/bat-boxes

1FF Schwegler Bat Box With Built-in Wooden Rear Panel

The Schwegler 1FF bat box is spacious enough for bats to use as a summer roost or nursery site and is open at the bottom, allowing droppings to fall out so it does not need cleaning. The 1FF is, therefore, especially suitable for hanging in inaccessible places such as high in trees.

To compensate for fluctuations in temperature in spring and autumn, the 1FF is provided with a roughened rear panel made of hard-wearing wood. Depending on their individual temperature requirements, the bats can choose between the cooler Woodcrete surface or the warmer wooden panel. The inner dimensions of the 1FF have a reducing width making it ideal for bat species which inhabit crevices such as pipistrelle and noctule bats. The 1FF bat box is best positioned at a height of between 4 to 6 metres.

2FN Schwegler Bat Box

The 2FN Bat Box has two entrances - one at the front and one at the rear against the tree. Bats often creep into the rear entrance but leave by the front. It has a domed roof to allow the bats to form roosting clusters for warmth, and an increased internal height compared to the Schwegler 2F bat box. This design has proved highly successful with noctule and Bechstein's bats; up to 28 noctule bats with 9 young have been recorded in a 2FN. This bat box is also designed to be effective against small predators and excludes draughts and light. Due to the opening on the bottom, this bat box does not require cleaning.

The 2FN bat box should be sited in trees and is best positioned at a height of between 3 to 6 metres. Bat boxes should ideally be sited in open sunny positions.

Bird Boxes

It is recommended that the following bird boxes are installed on the site.

Information available from: http://www.nhbs.com/browse/subject/426/bird-boxes

1N Schwegler Deep Nest Box

Birds which nest in recesses or cavities are at risk where there are large numbers of magpies, jays, cats and martens. The 1N has two entrances and a removable wooden insert and offers excellent protection. With two entrances the interior is well lit and birds will readily use it. In areas where there are many small predators it is equally as popular as models such as the 2H and 2HW

Robins are particularly attracted to this type of box, especially if it is placed approx. 1 to 1.5m above the ground, preferably in a moist, shady area. The wooden insert, which can be removed for inspection and cleaning purposes, gives protection against predators because nesting takes place at the far end of the box.

Where there is a shortage of suitable nesting areas in parks and forests, this type of box will also be successfully used by all types of tits, tree and house sparrows and many other species.

The two nest box entrance holes, each measuring 30mm x 50mm, are suitable for redstarts and black redstarts, spotted flycatchers, pied wagtail, robins and wrens.

1B Schwegler Nest Box

Natural cavity nest sites have declined dramatically so providing a nest box can provide much-needed breeding and roosting space for cavity-nesting species. The 1B nest box will attract a wide range of species and is available with different entrance hole sizes to prevent birds from competing with each other for the boxes. The nest box can be attached to the tree or wall using an aluminium nail or by hanging over a branch and is made from Woodcrete to ensure that it lasts for decades. The front panel is removable for inspection and cleaning.

Entrance hole sizes:

* **32mm entrance hole** will attract Great, Blue, Marsh, Coal and Crested Tit, Redstart, Nuthatch, Collared and Pied Flycatcher, Wryneck, Tree and House Sparrow and bats.
* **26mm entrance hole** suits Blue, Marsh, Coal and Crested Tit and possibly Wren. All other species are prevented from using the nest box due to the smaller entrance hole.
* **Oval entrance hole** (29 x 55mm) suits Redstarts because more light enters the brood chamber. It is also suitable for all other species which nest in the 32mm boxes.

No. 5 Schwegler Owl Box

The No. 5 Owl Box is designed to mimic natural holes in trees in which the tawny owl will typically roost. This nest box is also suitable for stock doves and jackdaw.

This box should be installed 4 - 6m above ground and birds can be encouraged to use the box if a thick layer of wood shavings or sawdust is spread over the recess in the floor.