Keepmoat Homes

Eakring Road, Bilsthorpe

ECOLOGICAL APPRAISAL

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NON-TECHNICAL SUMMARY

A desk study to identify the presence of any designated sites and existing protected / notable species records locally and an extended Phase 1 habitat survey was carried out in October 2019 to inform a planning application. Protected species surveys including bat activity surveys were also undertaken.

The desk study established that there is are no statutory designated sites of international or national nature conservation importance present within 5km or 2km respectively. Three non-statutory sites were identified within 1km. These designated sites are considered unlikely to be adversely affected by the development.

The Phase I survey identified that the core of the site is dominated by an improved grassland field with ruderal margins and small areas of scrub. An offsite woodland is found to the east and a species-poor hedgerow to the west.

Bat activity surveys (transects and static passive monitoring) found that the site is used for commuting and foraging by common and widespread species. Overall the loss of the predominately sub-optimal habitat on site will not adversely affect the conservation status of any local bat populations. No evidence of roosting bats was observed.

No on-site waterbodies are present and further waterbodies within the local area are of limited occurrence and are not considered suitable to support great crested newts and as such no constraints are identified in relation to this species.

No evidence of any other statutory protected species was identified on site and based on the limited extent, type and quality of habitat loss it is considered that there will not be any appreciable impact on biodiversity resulting from proposals. The findings of the surveys, were in agreement with those previously undertaken in 2017 to inform a consented Outline scheme.

Retention and buffering of the existing boundary habitats along with creation of green areas of varied structure with trees and shrubs, will provide a continuation of suitable habitat for generalist species which may currently use the site along with its connectivity to the wider area.

Measures have been recommended to ensure compliance with wildlife legislation in respect of wild birds; which in this case are likely to nest within scrub, hedgerow and trees on site.

1.0 INTRODUCTION

1.1 The following report has been prepared by FPCR Environment & Design Ltd. on behalf of Keepmoat Homes and provides details of an Extended Phase 1 habitat survey and protected species survey for bats undertaken on an area of land (hereafter referred to as the 'site') located off Eakring Road, Bilsthorpe, Nottinghamshire (Ordnance Survey (OS) Grid Reference SK 649 610).

1.2 The objective of the survey was to identify the habitats, protected species and any other features of ecological value present within the site, describe potential ecological constraints and impacts of the proposed development, and set out appropriate avoidance, mitigation, compensation and enhancement measures to be implemented where necessary.

Site Location and Context

1.3 The site is approximately 3.7ha and located along Eakring Road within the village of Bilsthorpe. The core of the site is dominated by improved grassland with tall ruderal around the field edges. Other habitats include areas of scrub and a woodland occurring offsite to the east.

1.4 The site is situated within a suburb setting with residential properties adjacent to the immediate south and west of the site. Along the northern boundary of the site lies a disused dismantled railway line and to the east and area of woodland. The surrounding landscape is formed of agricultural land to the north and east while the village of Bilsthorpe lies to the west and south.

1.5 A suite of Ecological surveys were undertaken on the site in 2017 to inform an Outline planning application which was subsequently approved (AES Ltd. Extended Phase 1 Habitat Survey 2017 and AES Ltd. Bat Survey Report 2017 (Appendix A and B respectively). Information from these reports have been included in this document (produced to support a new application) where appropriate.

2.0 METHODOLOGY

Desk Study

2.1 In order to compile existing baseline information, relevant ecological information was requested from Nottinghamshire Biological and Geological Records Centre (NBGRC) in October 2019.

2.2 In addition, the following resources were checked for additional information and context:

- Multi Agency Geographic Information for the Countryside (MAGIC) website[1];
- Colour 1:25,000 OS base maps;
- Aerial imagery from Google Earth©;
- The search area for biodiversity information was related to the significance of sites and species and potential zones of influence, as follows:
  - 5km around the site for sites of International nature conservation Importance (e.g. Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites).
  - 2km around the site for sites of National or Regional nature conservation Importance (e.g. Sites of Special Scientific Interest (SSSIs).
  - 1km around the site for sites of County nature conservation Importance (e.g. Sites of Importance for Nature Conservation (SINC)/Local Wildlife Sites (LWS)) and species records (e.g. protected, Local Biodiversity Action Plan (LBAP) or notable species).

Field Survey – Habitats/Flora

2.3 The extended Phase 1 habitat survey was undertaken on 22nd October 2019, following the standard survey methodology[2]. This involved a systematic walk over of the site to classify the broad habitat types and identify any 'Habitats of Principal Importance' for the conservation of biodiversity as listed within Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act 2006.

2.4 Hedgerows were surveyed using the Hedgerow Evaluation and Grading System (HEGS)[5]. This method of assessment includes noting down canopy species composition, associated ground flora and climbers, structure of the hedgerow including height, width and gaps, associated features including number and species of mature trees, banks, ditches and grass verges.

2.5 Each hedgerow is given a grade using HEGS with the suffixes '+' and '-', representing the upper and lower limits of each grade respectively. These grades represent a continuum on a scale from 1+ (the highest score and denoting hedges of the greatest nature conservation priority) to 4- (representing the lowest score and hedges of the least nature conservation priority) as follows:

- Grade 1 – High to very high value
- Grade 2 – Moderately high to high value

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[1] [Online]. http://magic.defra.gov.uk/ [Accessed 24/10/2019]
[2] JNCC (2010). Handbook for Phase 1 habitat survey – a technique for environmental audit. Peterborough: JNCC
[5] Clements, D. & Toft, R. (1992) *Hedgerow Evaluation and Grading System (HEGS) – a methodology for the ecological survey of hedgerows*. Countryside Planning and Management

- Grade 3 – Moderate value
- Grade 4 – Low value

2.6 Hedgerows graded 1 or 2 are considered to be a priority for nature conservation.

2.7 The hedgerows were also assessed against the Wildlife and Landscape criteria contained within Statutory Instrument No: 1160 – The Hedgerow Regulations 1997[6] to determine whether they qualified as 'Important Hedgerows' under the Regulations. This was achieved using a methodology in accordance with both the Regulations and DEFRA guidance[7].

Field Survey – Fauna

2.8 During the extended Phase 1 Habitat survey, observations, identification and signs of any species protected under the following list of Acts and Regulations were noted:

- Part 1 of the Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- The Conservation of Habitats and Species Regulations 2017 (as amended); and
- The NERC Act 2006 – S41 Species of Principal Importance for the conservation of biodiversity.

2.9 Given the nature of habitats within and adjacent to the site, particular consideration was given to the potential presence of bats, for which further specific protected species surveys where undertaken detailed as follows.

Bats

Habitat Suitability Assessment

2.10 The site was considered by AES-LTD to be of high foraging / commuting potential for bats[8] and consequently monthly bat surveys were carried out in 2017.

Ground Based Tree Assessment

2.11 All trees within and bordering the site were assessed from ground level for their suitability to support roosting bats using binoculars and a high-powered torch to aid the surveys by AES in 2017. These surveys were repeated by FPCR in 2019.

2.12 During the FPCR surveys trees were classified into general bat roost potential groups based on the presence of these features based upon Table 4.1 and Chapter 6 in Bat Surveys for Professional Ecologists: Good Practice Guidelines[8].

Transect Surveys

2.13 Activity surveys were carried out on the site by AES-Ltd in May, June, July, August and September 2017. The results of these surveys can be found in Appendix B: *Applied Ecological*

[6] Statutory Instrument No: 1160 – The Hedgerow Regulations 1997 Available at: http://www.legislation.gov.uk/uksi/1997/1160/contents/made [Accessed 10/01/2019].
[7] DEFRA (1997) *The Hedgerow Regulations 1997, A Guide to the Law and Good Practice.* London: HMSO
[8] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Service Ltd. Land off Eakring Road, Bilsthorpe, Nottinghamshire "Bat Survey Report; version 2".

2.14 An October survey was conducted by FPCR on site on 15th October 2019 in order to compliment the previous surveys undertaken.

2.15 The methodology takes into account the statutory guidance from English Nature (now Natural England)[10] and further guidelines introduced by the BCT and JNCC. The survey effort was informed by the current BCT survey guidance.

2.16 The FPCR transect route was determined prior to survey in order to sample all representative habitats within the site with any areas of higher suitability being the main focus. The survey commenced on the 15th October at sunset at 18:10, and was two hours in duration. Point count stops were incorporated into the transects to provide further information regarding bat activity levels. These were strategically located throughout the site to ensure coverage of habitats present, and included features of potential value to bats (e.g. hedgerows / tree lines etc.). Each point count was approximately five minutes long, during which time all bat activity was recorded.

2.17 The transect routes were walked at a steady pace and when a bat passed by, the species, time and behaviour was recorded on a site plan. This information provides a general view of the bat activity present on site and identifies the key foraging area and commuting routes.

2.18 During the survey bat activity is recorded using Echo Meter Touch2 PRO® bat detectors in conjunction with Echo Meter Touch® app software and an Apple Inc. iPad® to confirm species identification.

2.19 Visual observations of bats in flight are mapped onto a field record sheet to show direction of flight and type of activity (i.e. commuting or foraging). Post-survey, bat calls were analysed where appropriate using Kaleidoscope© (Wildlife Acoustics) software package, by taking measurements of the peak frequency, inter-pulse interval, call duration and end frequency. From this, the level of bat activity across the site in relation to the abundance of individual species foraging and commuting along habitats was assessed.

2.20 The survey was undertaken at suitable weather conditions with the air temperature remaining at 12 °C throughout the survey whilst the wind speed was 1 (on a scale of 0-5) and cloud cover remained at 90% without any rain.

Static (Passive) Monitoring

2.21 Passive monitoring was undertaken during the autumn (October) period using an automated logging system (Song Meter© SM4BAT FS, Wildlife Acoustics Inc.) with the output saved to an internal storage device. Two of these units were positioned at different locations across the site to simultaneously record bat activity for a minimum of five consecutive nights.

2.22 The units were deployed along features considered to be of value for bats, e.g. hedgerows, scrub and woodland edges, and lines of trees (Figure 4). Devices were placed in each location during typical weather conditions and were programmed to activate 30 minutes before dusk and record continuously until 30 minutes following sunrise for an extended period on each occasion (five consecutive nights). The output from the detectors was subjected to computer

[10] English Nature 2004. Bat Mitigation Guidelines.

analysis using AnaLookW© software (Titley™ Scientific) and Bat Sound (Version 4) to assess bat activity over this period.

2.23 The analysis of the SM2BAT+ files recorded can highlight the presence of more than one bat if recorded simultaneously on the same sound file. However, it is not possible to determine whether consecutive sound files have been recorded as the result of a single bat passing the detector as it commutes across the landscape or by one bat repeatedly triggering the detector as it forages in close proximately for an extended period. Therefore, each sound file is counted as a single bat registration. The number of bat registrations does however reflect the relative importance of the location of the detector by calculating the bat registrations per hour.

Limitation

2.24 The phase 1 survey was completed outside of the optimal survey period (April-September inclusive) however whilst the plant species lists obtained should not be regarded as exhaustive, sufficient information was obtained to determine broad habitat types present and their relative ecological value. Furthermore, historical information is available from the previous suite of surveys.

3.0 RESULTS

Desk Study

3.1 The following section provides a summary of the relevant received information with locations of statutory and non-statutory designated sites and protected/notable species referred to in the following section illustrated on Figure 1 with species records shown on Figure 2.

Designated Sites

3.2 No statutory designated sites of international or national nature conservation importance were present within the search areas of 5km or 2km respectively.

3.3 Three non-statutory designated sites are located within 1km of the site. Details of these sites are provided in Table 1 below.

Table 1: Summary of Non-statutory Designated Sites

Site Ref. / Name	Summary of Site	Distance / Orientation from Site
Local Wildlife Site – LWS / Ancient Semi-Natural Woodland ASNW		
Bilsthorpe Colliery LWS	Abandoned colliery site comprises a variety of habitats including: grassland; bare ground; ponds; scrub and developing woodland; and marsh adjacent to a stream. The site is noted for its importance to breeding waders.	0.04 km North-east

Site Ref. / Name	Summary of Site	Distance / Orientation from Site
Eakring Brail Wood LWS / ASNW	The site consists of ancient woodland that straddles the geological junction of the Coal Measures and the Mercian Mudstone. Although much of the site is planted with Corsican Pine the woodland has a rich under wood with native woody species and a rich ground flora with numerous ancient woodland indicators.	0.86 km East
Bilsthorpe Grassland LWS	The site supports and assemblage of butterflies characteristic of grassland habitat.	0.41 km South-west

Protected/Notable Species

3.4 Post 1990 Records provided by NBGRC from within 1 km of the site boundary pertaining to protected or otherwise notable fauna are summarised in Table 2 below. No records of protected species were identified on site.

Table 2: Protected and Notable Species Records

Species	Conservation Status	Number of Records / latest record	Closest record to Site (approximate distance) / Comments
Mammals - Bats			
Common Pipistrelle *Pipistrellus pipistrellus*	HabRegs, WCA Sch5, NERC S41	3 / 2017	0.45 km East / no roosts identified
Unidentified bat sp. Chiroptera	HabRegs, WCA Sch5	1 / 2006	0.73 km South / no roosts identified
Mammals - Other			
Brown hare *Lepus europaeus*	NERC S41	1 / 2005	0.83 km North-west
Hedgehog *Erinaceus europaeus*	NERC S41	3 / 2018	0.53 km South
Notable Invertebrates			
Brown argus *Aricia agestis*	NERC S41	2 / 2015	0.39 km North-east
Dingy skipper *Erynnis tages*	NERC S41	1 / 2009	0.47 km East
Herpetofauna			
Common toad *Bufo bufo*	NERC S41	9 / 2018	0.12 km North-east and within SK6561 that partially encompasses the Site boundary
Great crested newt	NERC S41	3 / 2015	0.59 km South-east

Species	Conservation Status	Number of Records / latest record	Closest record to Site (approximate distance) / Comments
Triturus cristatus			
Palmate newt *Lissotriton helveticus*	WCA Sch5	1 / 2004	0.42 km South-east
Nottinghamshire Rare Plants Register (NRPR)			
Annual beard-grass *Polypogon monspeliensis*	NRPR, Nationally scarce	2 / 2008	0.29 km North-east
Common cudweed *Filago vulgaris*	NRPR, Near threatened	1 / 2012	Within SK6461 that partially encompasses the Site boundary
Corn spurry *Spergula arvensis*	NRPR, Vulnerable	1 / 2010	Within SK6461 that partially encompasses the Site boundary
Nettle-leaved bellflower *Campanula trachelium*	NRPR	1 / 2013	0.44 km West
Shepherd's cress *Teesdalia nudicaulis*	NRPR, Near threatened	2 / 2010	Within SK6461 that partially encompasses the Site boundary
Invasive and Non-Native Species (INNS)			
New Zealand pygmyweed *Crassula helmsii*	INNS	2 / 2017	0.25 km East

Status Key: Habs Regs = The Conservation of Habitats and Species Regulations 2017 (as amended). WCA = Wildlife and Countryside Act (1981). Sch5 = Schedule 5 of WCA. NERC = Natural Environment and Rural Communities Act (2006), Section 41 list of Priority Species

3.5 In addition to the species identified within Table 2, NBGRC provided a number of bird species records within 1km of the site boundary. This includes several Birds of Conservation Concern such as song thrush *Turdus philomelos*, tree sparrow *Passer montanus* and yellowhammer *Emberiza citrinella*. The majority of bird records were found 0.24km south at Maplewood Farm from between 2009-2017. See Appendix C for full details.

Field Survey - Habitats/Flora

3.6 In general habitats on-site were broadly unchanged from the previous survey undertaken by AES-LTD in 2017. The locations of the habitats described below are illustrated in Figure 3: Phase 1 Habitat Plan and a botanical species list is provided in Appendix D.

Improved Grassland

3.7 The previous application noted that the site was dominated by an improved grassland field which is consistent with the recent findings (Photograph 1). The sward was dominated by grasses including perennial rye-grass *Lolium perenne*, cock's-foot *Dactylis glomerata*, false oat-grass *Arrhenatherum elatius,* a meadow-grass *Poa species* with rare Yorkshire-fog *Holcus lanatus*, Timothy *Phleum pratense,* crested dog's-tail *Cynosurus cristatus* and soft brome *Bromus hordeaceus*. Herb species including ribwort plantain *Plantago lanceolata*, meadow

buttercup *Ranunculus acris*, broad-leaved dock *Rumex obtusifolius* and red clover *Trifolium pratense* were present rarely while dandelion *Taraxacum agg.*, was frequently present.

Photograph 1 – Improved grassland field taken from the eastern boundary looking north-west

Field Margin – Ruderal

3.8 Tall ruderal vegetation was found at the margins of the improved grassland field extending up to 2m in width around the field. Species present included false oat-grass with occasional perennial rye-grass, yarrow *Achillea millefolium* and common nettle *Urtica dioica* and frequent cock's-foot and willowherb sp. *Epilobium sp,.* Rarely present species included garlic mustard *Alliaria petiolata*, perforate St. John's-wort *Hypericum perforatum*, creeping cinquefoil *Potentilla reptans*, crested dog's-tail and red clover.

TN1 – Bracken and dense scrub field boundary

3.9 To the north-west immediately adjacent to the site boundary (TN1) the field margin changed in composition with areas dominated by bracken *Pteridium aquilinum* and hawthorn *Crataegus monogyna* with abundant common nettle and ivy *Hedera helix* (Photograph 2). Occasional cock's-foot, bramble *Rubus fruticosus agg.,* and false oat-grass with rare smooth sow-thistle *Sonchus oleraceus*, cow parsley *Anthriscus sylvestris*, hogweed *Heracleum sphondylium* and willowherb sp.

Photograph 2 – TN1 Bracken dominated along the north section of the western field boundary

Scattered Scrub

3.10 Scattered scrub was present in patches around the boundary of the site and was predominantly bramble and common nettle with rare oak saplings and creeping thistle *Cirsium arvense* and honeysuckle *Lonicera periclymenum* locally dominant along the north-west boundary.

Woodland Edge / Dense Scrub

3.11 An off-site woodland is present immediately adjacent to the site on the eastern boundary. Areas of dense scrub could be found along this eastern edge dominated by bramble and hawthorn with occasional creeping thistle *Cirsium arvense*, red campion *Silene dioica*, ivy, common nettle and false oat-grass.

Dry Ditch

3.12 A single dry ditch was present along the eastern boundary adjacent to the off-site woodland. The ditch was dry at the time of survey with a similar vegetation composition to the improved grassland.

Bare ground

3.13 A small area of bare earth was present at the entrance to the site with some limited vegetation including common mouse-ear *Cerastium fontanum*, pineappleweed *Matricaria discoidea* and greater plantain *Plantago major* present.

Hedgerow

3.14 A hedgerow (H1) on the south-western boundary of the site was dominated by hawthorn. The hedgerow was previously laid and managed to a height of approximately 1.5m and 1m wide and contained approximately 20% gaps. Ground flora was dominated by common nettle with occasional false oat-grass.

Field Survey - Fauna

Amphibians

3.15 As found during the 2017 survey by AES-LTD no ponds were present within the site boundary. OS maps and aerial photography were reviewed for waterbodies within 250m of the site boundary. A single pond, P1 was located within agricultural land approximately 210m east of the site boundary however, based on aerial imagery is no longer considered to be present. New waterbodies however, have been created in mitigation for the solar farm to the east, however these are not considered suitable for great crested newts *Triturus cristatus* (GCN) as they are used as fishing ponds and are home to waders and wetland birds. In order to inform the solar park (Newark and Sherwood DC 12/01594/FULM) GCN surveys were previously undertaken on 16 waterbodies in the surrounding area, with no GCN recorded

3.16 The terrestrial habitat on site provided some suitability for amphibian species, particularly the hedgerow and scrub habitats which provided foraging opportunities with links into commuting habitat within the off-site broadleaved woodland to the east of the site.

[redacted]

Bats

Habitat Suitability Assessment

3.18 Although limited in size, the site was considered by AES-LTD to provide suitable foraging habitat for local bat population and connectivity to the wider landscape.

Ground Based Tree Assessment

3.19 As with the previous application, no trees or other features located on the site were considered to provide roosting potential for bats.

Transect Surveys

3.20 Common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* were the only species recorded during the survey. Bat activity was recorded throughout the site with increased activity along the eastern boundary adjacent to the off-site woodland. Behaviour during the survey was generally recorded as passes with some foraging (Figure 4).

3.21 Full details of the AES 2017 surveys can be found Appendix B.

Static monitoring

3.22 A summary of the static monitoring data is provided in Table 3. The locations of the detector units are shown in Figure 4.

Table 3: Static Bat Detector Survey Results

Static Detector number and Location	Total registrations	Most recorded species (number of registrations)	Other species recorded (number of registrations)
Autumn, Unit 1 – October On the western boundary within hedgerow H1	149	Common pipistrelle (125)	Noctule (17) Soprano pipistrelle (5) Brown long-eared (1) Myotis sp. (1)
Autumn, Unit 2 – October Next to the broadleaved woodland on the eastern boundary	4085	Common pipistrelle (2388)	Myotis sp. (1322) Soprano pipistrelle (353) Noctule (12) Brown long-eared (9) Pipistrelle Species (1)

The Overall Data-Set

3.23 Table 4 presents the percentage breakdown of the species recorded during the SM4BAT FS surveys.

Table 4: Species Recorded During the SM4BAT FS Surveys

Species	Percentage
Common pipistrelle	59.35%
Myotis species	31.25%
Soprano pipistrelle	8.45%
Noctule	0.69%
Brown long-eared	0.24%
Pipistrellus species	0.02%

Note

3.24 Where calls could not be identified to species level, for example due to the lower quality of those recordings or where there are similarities between species echolocation calls (particularly for *Myotis* and *Nyctalus/Eptesicus* genus bats) making a definite identification difficult, a likely species identification is provided. This is based on the features displayed by the calls when analysed using the AnalookW data analysis software package and taking in to account the geographical location of the site and the habitats present. It was therefore considered that:

- *Pipistrellus* species bats were predominantly either common or, soprano pipistrelles;
- *Myotis* species recorded were either whiskered bats which have been recorded locally (uncommon but widespread), Brandt's (rare), natterer's (uncommon) or Daubenton's (widespread).

Summary

3.25 The highest registration rates were recorded along the eastern boundary next to the woodland.

3.26 The dominant species recorded from the SM4BAT FS locations was common pipistrelle, accounting for 59.35% of the total registrations. The second most frequently recorded species was Myotis species with 31.25% of total registration rates during the survey period. Lower numbers of soprano pipistrelle formed 8.45% of the total registrations. The registrations rates for the remaining species were significantly lower and together make up 0.95% of the total bat registrations.

Birds

3.27 During the phase 1 survey, a number of common and widespread urban and suburban bird species were recorded on site. These included; wren *Troglodytes troglodytes*, robin *Erithacus rubecula*, crow *Corvus corone*, blackbird *Turdus merula* and woodpigeon *Columba palumbus*.

3.28 Established habitats within the site, such as the hedgerow, trees and scrub provide foraging and nesting opportunities for these and other species.

Reptiles

3.29 The site offers negligible suitable habitat for reptiles and no records of reptiles were highlighted by NBGRC.

Other Notable Fauna

3.30 The habitats on site provide suitable habitat for hedgehog *Erinaceus europaeus*, in particular the scrub and hedgerow habitat for nesting and shelter with grassland habitats for foraging.

3.31 No evidence of, or potential habitat for, any other protected species was recorded within the site boundary.

4.0 DISCUSSION & RECOMMENDATIONS

Designated Sites

4.1 The degree to which designated sites receive consideration under the planning system and legislative protection depends on the designation itself and its level of importance and value. This ranges from sites of international importance protected by UK legislation that transposes European directives, to protection under UK legislation or national and local planning policy.

4.2 No international or national sites of nature conservation interest are present within 5km or 2km respectively however the site falls within an Impact Risk Zone (IRZs) which have been developed by Natural England to provide an initial assessment of the potential risk to statutory designated sites from development proposals. They define zones around designated sites which reflect the sensitivity of the site and indicates the types of development within these zones which could potentially have adverse impacts. From reviewing the IRZs that the site falls within on Natural England's MAGIC website (http://magic.defra.gov.uk), this application does not fit the criteria of a development which may have an adverse impact upon any local designated sites.

4.3 Three non-statutory conservation sites were noted within 1km radius of the site. Bilsthorpe Colliery LWS is located 40m north-east and is designated for its variety of habitats (as described in Table 3) and its importance for breeding waders. As discussed within the 2017 report for the previous application, it is considered that the development is unlikely to have an impact on Bilsthorpe Colliery LWS or any other non-statutory sites of nature conservation due to increased public use. Furthermore, under the current landscaping plans a Public Open Space (POS) will be placed within the centre of the site which will further minimise the likelihood of increased footfall to the LWS. In addition, the northern boundary closest to the LWS could be buffered from the development with semi-natural habitats such as trees and scrub.

4.4 In addition the habitats within the LWS differ from those found on site and it is therefore considered the species found on the LWS would be unlikely to utilise the habitats within the development.

Habitats

4.5 The degree to which habitats receive consideration within the planning system relies on a number of mechanisms, including:

- Inclusion within specific policy (e.g. veteran trees, ancient woodland and linear habitats in National Planning Policy Framework (NPPF) or non-statutory site designation,
- Identification as a habitat of principle importance for biodiversity under the National Environment & Rural Communities Act (NERC) 2006 or identification as a Priority Habitat within the local Biodiversity Action Plan.

4.6 The proposals will result in the loss of grassland, scrub and tall ruderal habitat. These habitats are formed of common and widespread species/plant communities, not considered to be of high nature conservation value (these findings are in agreement with the previous survey information (AES, 2017).

4.7 Native hedgerows are listed as a Habitat of Principal Importance under the NERC Act (2006). Furthermore, they are likely to be of value to local wildlife for foraging commuting and shelter/nesting. Hedgerow H1 was not identified as being "Important" under the Hedgerow Regulations (1997).

4.8 Hedgerow H1 is to be retained as part of the proposals with only minor losses to create the access point to the site and to facilitate works. The enhancement of the existing hedgerow and filling in of existing gaps with native species with a commitment towards their long-term management will improve its value to local wildlife, providing foraging, commuting and shelter/nesting habitat.

4.9 Retained hedgerows, scrub and the woodland edge to the east should be protected from adverse impacts of development via the creation of Root Protection Zones along the length during development.

Fauna

4.10 Principal pieces of legislation protecting wild species are Part 1 of the Wildlife and Countryside Act 1981 (as amended) (WCA) and the Conservation of Habitats and Species Regulations 2017 (as amended). Some species, [redacted], also have their own protective legislation [redacted] The impact that this legislation has on the Planning system is outlined in ODPM 06/2005 Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System.

4.11 This guidance states that as the presence of protected species is a material consideration in any planning decision, it is essential that the presence or otherwise of protected species, and the extent to which they are affected by proposals is established prior to planning permission being granted. Furthermore, where protected species are present and proposals may result in harm to the species or its habitat, steps should be taken to ensure the long-term protection of the species, such as through attaching appropriate planning conditions for example.

4.12 In addition to protected species, there are those that are otherwise of conservation merit, such as species of principal importance for the purpose of conserving biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006. These are recognised in the NPPF which advises that when determining planning applications, LPA's should aim to conserve and enhance biodiversity by applying a set of principles including:

- If significant harm resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

- Development proposals where the primary objective is to conserve or enhance biodiversity should be encouraged.

4.13 The findings of the surveys and the implications they may have for developmental design and programming considerations are outlined below:

Amphibians

4.14 GCN are afforded legal protection by Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and as a European Protected Species. Under the Conservation of Habitats and Species Regulations 2017(as amended) it is an offence to deliberately capture or kill a GCN, deliberately disturb a GCN, deliberately take or destroy the eggs of a GCN, damage or destroy a breeding site or resting place of a GCN. This legislation applies to all life stages of GCN. GCN are also listed as a Species of Principal Importance under the NERC Act.

4.15 No on-site waterbodies are present and further waterbodies within the local area are considered unsuitable to support breeding populations of GCN, with historical surveys of the wider area finding no evidence of GCN. As such, and as per the AES report (2017) it is considered extremely unlikely that this species would be present on site and GCN are therefore considered not to provide a constraint to the proposals.

[redacted]

Bats

4.17 All bats and their roosts are afforded full legal protection under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife & Countryside Act 1981 (as amended). The purpose of the legislation is to maintain and restore protected species to a situation where their populations are favourable.

4.18 Under Regulation 43 of the Conservation of Habitats and Species Regulations 2017 it is illegal to:

- Deliberately capture, injure or kill any wild animal of a European Protected Species (EPS),
- Deliberately disturb wild animals of an EPS (affecting ability to survive, breed or rear young) – disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young,
- Deliberately disturb wild animals of an EPS (impairing ability to migrate or hibernate) – disturbance of animals includes in particular any disturbance which is likely to impair their ability in the case of hibernating or migratory species to hibernate or migrate,
- Deliberately disturb wild animals of an EPS (affecting local distribution and abundance) – disturbance of animals includes in particular any disturbance which is likely to affect significantly the local distribution or abundance of the species to which they belong,

- Deliberately disturb wild animals of an EPS (whilst occupying a structure of place used for shelter or protection) – intentionally or recklessly disturb any wild animal while it is occupying a structure or place which it uses for shelter or protection,
- Damage or destroy a breeding site or resting place of a wild animal an EPS.

4.19 No trees present within the site or at the site boundaries were considered to offer any roosting opportunities for bats as they lacked suitable features such as rot holes, cracks/fissures or loose bark.

4.20 Over the 2019 surveys six species were identified using the site. These species included common pipistrelle, soprano pipistrelle, brown long-eared, unidentified *Myotis* species, noctule and unidentified pipistrelle species. The dominant species during both the transect and the static detector surveys was common pipistrelle. This was followed by soprano pipistrelle in the transect surveys and *Myotis sp* in the static detector surveys with noctule, brown long-eared and pipistrelle sp recorded rarely.

4.21 The highest level of activity recorded during the transect survey was along the eastern boundary in association with the offsite woodland to the east. Some limited activity was recorded to the north west of the site. These results coincide with the surveys completed in 2017 by AES Ltd who also recorded the most amount of activity along the woodland to the east (see Appendix B).

4.22 The static bat detector surveys confirmed that the site is predominantly used by common pipistrelle bats. A high number of registrations were recorded along the eastern boundary adjacent to the off-site woodland suggesting the woodland heavily used as a foraging and commuting resource along this boundary.

4.23 The increased activity is likely due to the mature/dense nature of the boundary feature in this location (woodland) which is a much more substantial feature than the smaller, managed agricultural hedge to the west and the railway / fence lines to the north and south. In terms on context the woodland also forms the southern boundary of Bilsthorpe Colliery LWS which has a favourable combination of habitat mosaics (grassland, ponds, woodland, etc) which are likely to be attractive to foraging bats, and as such precipitates increased activity to and from the LWS. As listed in the methods section, the high level of registrations does not necessarily directly correspond to the number of bats, and could be accounted for by a smaller number of bats using the area for a sustained period instead.

4.24 Current landscaping plans show that this boundary feature will be retained and residential gardens will be backing onto the majority of the eastern boundary acting as a buffer along the woodland edge. Despite the increased bat activity along the eastern boundary, the retention of this feature should ensure that commuting and foraging for bats are not severed and impact on bats are minimised.

4.25 Overall, it is considered that the loss of predominantly sub-optimal foraging habitat resulting from the proposals will have a negligible impact upon foraging and commuting bats and their loss is not considered to be significant. The overall level of bat activity across the site was predominantly formed of common species despite the listing of noctule and soprano pipistrelle as Species of Principal Importance (NERC 2006) these species in addition to common pipistrelle and brown long-eared are common and widespread across the region and the wider United Kingdom. These species utilised the boundary habitats as would be anticipated for a

site of this type. It is considered that as a result that any impacts to the local bat population as a result of the proposals is likely to be minimal.

4.26 The hedgerow on the site offers suitable foraging and commuting habitat for bats such as those species highlighted in the desk study. In addition to the offsite woodland, hedgerow H1 and the tree line along the north west boundary are to be retained and these boundary features provide a valuable foraging and commuting resource to local bats. In order to minimise any impacts associated with light spill on potential commuting routes, foraging habitat, or roosting locations, the following good practice measures with regards to lighting (Eurobats 2018[11]) should be implemented:

- The avoidance of direct lighting of existing trees, scrub and proposed areas of landscape planting;
- Unnecessary light spill will be controlled through a combination of directional lighting, low lighting columns, hooded/shielded luminaires or strategic planting;
- Lighting columns would in general be as short as possible, although in some locations taller columns would allow reduced horizontal spill, and
- Lighting levels would be as low as guidelines permit and only used where required for public safety.

4.27 This will minimise light spill onto potential commuting/foraging routes and minimise potential disturbance caused through the lighting of corridors. This mitigation will ensure that the overall impact caused by lighting the site is negligible.

4.28 Site design should focus on maintaining/enhancing or creating commuting such as hedgerows or treelines. Native species should be used for any new planting and should include those that are particularly attractive to invertebrates in order to provide foraging resource for bats. Night-scented species should be included where possible.

4.29 Furthermore, the creation of additional green links through the site, the planting of additional trees and shrubs and management of increased area of species-rich grassland will improve habitat heterogeneity and connectivity for bats and the ephemeral wetland habitat provided by sustainable drainage features may provide additional foraging opportunities.

4.30 To enhance the value of the site for bats and provide additional roosting features to complement the retained and created habitat, it is recommended that bat boxes are installed throughout the site (Figure 5). A range of boxes could be installed to provide for a range of bat species such as pipistrelle and noctule. Boxes should be positioned at least 3m from the ground and located so as not to interfere with any existing potential roosting features. Lighting of natural roosting features and bat boxes must be avoided.

Breeding Birds

4.31 A number of birds were recorded using the site during the survey and the habitats within the site and immediately adjacent provide suitable breeding habitat for a range of common and widespread urban and suburban bird species (e.g. wren, blackbird, woodpigeon, robin).

[11] Eurobats (2018) Guidelines of Consideration for bats in lighting projects.

4.32 The site provides nesting opportunities for urban and suburban bird species including Species of Principal importance in England as listed on S41 of the NERC Act (2006). Any breeding bird assemblage present on site would be considered to be of low importance in context of the wider environment, given the size of the site and availability of similar habitats within the local area; any losses are unlikely to result in any significant impacts to the local bird population. (these findings are in agreement with the previous survey information (AES, 2017)).

4.33 All wild birds, their eggs and young are protected by the Wildlife and Countryside Act 1981 (as amended). Any areas seen as suitable for breeding birds such as scrub, hedgerows, mature trees, and ground vegetation should therefore be removed outside of the bird breeding season (March to August inclusive) if nests in these areas were to be disturbed due to works in the breeding season. If this is not possible, vegetation/buildings should be checked prior to removal/demolition by an experienced ecologist and if active nests are found vegetation/buildings should be left untouched and an appropriate buffer (species dependant) adopted until all birds have fledged. Specific advice should be sought prior to undertaking clearance.

4.34 Several types of bird boxes should be incorporated into the proposals to provide additional nesting opportunities for local species. It is recommended that these include small and large-hole nest boxes, open fronted boxes and social nest boxes. Nest features for species such as Sparrow *Passer domesticus* and swift *Apus apus* can also be integrated into the proposed development (Figure 5).

Reptiles

4.35 The desk study did not identify any records of reptiles within 1km radius of the site. Consistent with the previous application in 2017 habitats within the site are considered to be of negligible suitability for reptiles and therefore no further surveys are required.

Hedgehog

4.36 The site has the potential to be used by hedgehogs for foraging and/or nesting given the number and proximity of records highlighted in the desk study and the size of their home ranges.

4.37 The species has undergone recent population decline and as such is listed as Species of Principal Conservation Importance in England on S41 of the NERC Act 2006, with urban areas something as a strong hold for the species.

4.38 Access between residential gardens is critical for hedgehogs in order to maintain their resources and can be established by removing the barriers within our control – for example, using hedgerows for plot boundaries or making holes or channels in or under garden fences and walls for them to pass through. These passes should be 13cm by 13cm suitable for hedgehog passage but generally too small for most pets (Figure 5).

Key

- Site Boundary
- 1km Buffer
- 2km Buffer
- Local Wildlife Site (LWS)
- Ancient Semi-Natural Woodland (ASNW)

1 - Bilsthorpe Colliery LWS
2 - Eakring Brail Wood LWS, ANSW
3 - Bilsthorpe Grassland LWS

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0 0.5 1 km

N

client: Keepmoat Homes

project: Eakring Road, Bilsthorpe

drawing title: SITE LOCATION AND CONSULTATION RESULTS PLAN - DESIGNATED SITES

scale: 1:17500@A3 | drawn: LG / RCO | date: 28/11/2019

drawing / figure number: **Figure 1** | rev: **9264-E-01**

K:\9200\9264\QGIS 2.14\Plans\consultation plans\9264-E-01 Site Location and Consultation Results Plan - Designated Sites.qgs

Key

- Site Boundary
- 1km Buffer

Bats

- Common Pipistrelle
- Unidentified bat sp.

Birds

- Black-headed Gull
- Brambling
- Bullfinch
- Common Gull
- Cormorant
- Cuckoo
- Curlew
- Dunnock
- Fieldfare
- Goldcrest
- Goosander
- Grey Partridge
- Greylag Goose
- Herring Gull
- House Martin
- House Sparrow
- Kestrel
- Kingfisher
- Lapwing
- Lesser Black-backed Gull
- Lesser Redpoll
- Linnet
- Little Ringed Plover
- Mallard
- Marsh Tit
- Meadow Pipit
- Mistle Thrush
- Redwing
- Skylark
- Snipe
- Song Thrush
- Starling
- Stock Dove
- Swift
- Tawny Owl
- Tree Sparrow
- Turtle Dove
- Willow Tit
- Woodcock
- Yellow Wagtail
- Yellowhammer

Herpetofauna

- Common Toad
- Great Crested Newt
- Palmate Newt

Invasive and Non-Native Species (INNS)

- New Zealand pygmyweed

Mammals

- Brown Hare
- Hedgehog

Notable Invertebrates

- Brown Argus
- Dingy Skipper

Nottinghamshire Rare Plants Register (NRPR)

- Nettle-leaved bellflower
- Annual beard-grass

Species Records of 1km Accuracy

- Species within SK6461: Common cudweed; Corn spurry; Shepherd's cress
- Species within SK6561: Common toad; 43 notable bird species

0 250 500 m

client: Keepmoat Homes

project: Eakring Road, Bilsthorpe

drawing title: SITE LOCATION AND CONSULTATION RESULTS PLAN - SPECIES RECORDS

scale: 1:10000 @A3 | drawn: LG / RCO | date: 28/11/2019

drawing / figure number: **Figure 2** | rev: **9264-E-02**

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Key

- Site Boundary
- Survey Area
- Bare ground
- Bracken - continuous
- Improved grassland
- Scrub - dense/continuous
- Intact hedge - species-poor (with reference)
- Fence
- Dry ditch (with refernece)
- Scrub - scattered line
- Target note (with reference)
- Broadleaved tree

client
Keepmoat Homes

project
Eaking Road,
Bilsthorpe

drawing title
PHASE 1 HABITAT PLAN

scale 1:1500 | drawn RCO | issue 28/11/201

drawing / figure number
Figure 3

rev
9264-E-03

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P:\9264\QGIS\Plans\9264-E-03 Phase 1 plan

Sunset	Start	Finish	Wind
18:10	18:10	20:10	1
Temp start	Temp end	Cloud cover	Rain
12C	12C	90%	0

Key:

- Site Boundary
- Survey Area
- Start Point
- Finish Point
- Transect Route
- Point Count (with ref.)

Bat Contacts*

- Common Pipistrelle
- Soprano Pipistrelle
- Common and / or Soprano Pipistrelle
- Flight Path
- Static detector locations (with ref.)

Ref.	Time	Species	Behaviour	Passes
PC1	18:10 - 18:15	No Bats		
PC2	18:19 - 18:25			
i	18:23	C.pip	Pass	1
ii	18:23	S.pip	Pass	1
A	18:28	S.pip & C.pip	Foraging	Multiple
PC3	18:30 - 18:35			
iii	18:33	C.pip	Pass	1
PC4	18:40 - 18:45	No Bats		
PC1	18:49 - 18:54	No Bats		
PC2	18:58 - 19:05	No Bats		
A	19:08	C.pip	Foraging	2
B	19:10	C.pip	Foraging	2
PC3	19:12 - 19:15	No Bats		
PC4	19:20 - 19:25			
iv	19:21	C.pip	Foraging	2
PC1	19:28 - 19:35			
NV	19:30	C.pip	Foraging	2
PC2	19:38 - 19:45			
NV	19:42	Pip. Species	Foraging	1
A	19:44	C.pip	Foraging	3
PC3	19:50 - 19:55	No Bats		
PC4	20:00 - 20:05	No Bats		

*Roman numerals denote bat contact within point count

client: Keepmoat Homes

project: Bilsthorpe Road, Newark

drawing title: BAT TRANSECT PLAN (OCTOBER)

scale @ A3: 1:1200 | drawn: RCO | issue: 28/11/2019

drawing / figure number: **Figure 4** | rev: **9264-E-04**

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0 25 50 75 100 m

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Key

Site Boundary

Ibstock Enclosed Bat Box C x 1
One bat box to be fixed on the gable ends or south facing aspects of one house

Ibstock Free Access Bat Box A x 6
Six bat boxes to be fixed on the gable ends or south facing aspects

Schwegler Brick Nest Box Type 24 x 8
Eight boxes fixed to houses on the northern or eastern aspect

1SP Schwegler Sparrow Terrace x 4
Four boxes fixed to garages on the northern or eastern aspect

Ibstock Swift Bricks x 3
Three boxes fixed under the eaves of houses on the north or eastern aspect

Hedgehog Hole
13cm x 13cm holes in garden boundaries

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P:\9264\QGIS\Plans\9264-E-05 Bird and bat box plan

client
Keepmoat Homes

project
Eaking Road,
Bilsthorpe

drawing title
SPECIES ENHANCEMENT PLAN

scale 1:1200 @ A3 | drawn RCO | issue 27/5/2020

drawing / figure number
Figure 5

rev
9264-E-05

Appendix A: AES LTD. Extended Phase 1 Habitat Survey 2017

EXTENDED PHASE 1 HABITAT SURVEY

Land off Eakring Road, Bilsthorpe, Newark, Nottinghamshire

Harworth Group

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County Durham
DL14 0NG

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Field Investigations and Data

Where field investigations have been carried out these have been restricted to a level of detail required to achieving the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by AES-LTD for inaccuracies in the data supplied by any other party.

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Client issue		05/06/17

CONTENTS

1.0 INTRODUCTION

1.1 Applied Ecological Services Ltd. was commissioned to undertake an Extended Phase 1 Habitat Survey including a protected species risk assessment and search for invasive/non-native species on an area of land off Eakring Road, Bilsthorpe, Newark, Nottinghamshire, the site. The purpose of the survey was to map and identify habitats and species that are present within the site boundary and to provide baseline data of the site and highlight areas for further investigation that may provide a constraint to development. This report presents an assessment of these potential ecological constraints to development based on the results of the survey, along with recommendations for further more detailed surveys to be undertaken, as appropriate.

1.2 The site extends to 3.7ha, which is shown within a red line boundary on **Figure 1**. The site is situated immediately to the east of the village of Bilsthorpe and 50m to the west of the former Bilsthorpe Colliery. The centre of the proposed development site is at OS grid reference SK 649 610.

1.3 The proposed development site was comprised of improved grassland grown as an annual fodder crop which is enclosed by a variety of different fencing types, a hedgerow and scrub and on one side by a woodland.

2.0 THE PROPOSED DEVELOPMENT

SITE LOCATION

2.1 The proposed development site (red line boundary) covers approximately 3.7ha and is located at grid reference SK 649 610 (approximate central point).

Figure 1: Site Location

2.2 The development proposals for the site are the provision of approximately 83 residential properties with associated gardens and infrastructure including roads and pavements and a water attenuation feature.

3.0 SURVEY AND SITE ASSESSMENT METHODS

DESK STUDY

3.1 In order to compile existing baseline information for the site, relevant ecological information was requested from the following organisations which for the purposes of this report, included:

- Multi Agency Geographic Information for the Countryside (Magic) website, and
- Nottinghamshire Biological & Geological Records Centre (NBGRC).

3.2 A 5km radius from the boundary of the site was searched for sites of International nature conservation importance, such as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). A 2km radius from the boundary of the site was searched for statutory sites of national, regional and local importance, such as Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves (LNRs), and non-statutory designated sites such as Local Wildlife Sites (LWS) and also for records of protected and notable species.

3.3 Further inspection, using colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk), was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider area.

FIELD SURVEY

HABITATS / FLORA

3.4 The site was surveyed on the 11th of April and the 22nd May, 2017 by Gary Tudor MCIEEM principal ecologist with Applied Ecological Services Ltd. (AES-LTD) and an experienced field biologist. The habitat survey was undertaken using the standard Extended Phase 1 Habitat Survey methodology (JNCC, 2010)[1] as recommended by Natural England to identify specific habitats of ecological interest. Target notes were used to record features of interest or specific habitats and species identified during the survey. Whilst a species list should not be regarded as exhaustive, sufficient information was gained during the survey to enable classification and assessment of major habitat types.

[1] JNCC, (2010), Handbook for Phase 1 habitat survey - a technique for environmental audit

3.5 Any habitats suitable for, or features with the potential to support, protected or notable species were also assessed and recorded.

3.6 Checks for notifiable plant species, such as Japanese knotweed *Fallopia japonica* were also made during the survey.

FAUNA

[redacted]

SURVEY LIMITATIONS

3.8 The habitat survey reported here was undertaken at the appropriate time in the season (April – late May) to allow for those habitat types present in the site to be readily identified.

SITE ASSESSMENT

3.9 In order to determine the value of the habitats and species found through the surveys detailed above, the baseline and survey results were assessed against the criteria in **Table 1**:

[redacted]

Table 1: Hierarchy of Receptors

Designation
International (Europe);
National (UK);
Regional (East Midlands);
County (Nottingham);
Local (up to approximately 2km from the Proposed Site);
Less than local or value in the Proposed Site only

3.10 Receptors of less than local value are referred to as being of 'less than local' value. Effects are only assessed for receptors of sufficient value that impacts upon them could be significant in terms of either legislation or policy, i.e. in this case, those considered to be of local, or greater, ecological value.

4.0 RELEVANT LEGISLATION & POLICY

LEGISLATION

HABITAT REGULATIONS

4.1 The Conservation of Habitats and Species Regulations 2010 transpose Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive) into English law, making it an offence to deliberately capture, kill or disturb[3] wild animals listed under Schedule 2) of the Regulations (such as all bat species and great crested newts). It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time).

WILDLIFE & COUNTRYSIDE ACT

4.2 The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act (CRoW) 2000 and the Natural Environment and Rural Communities Act (NERC) 2006, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, making it an offence to:

- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection; and
- Pick or uproot any wild plant listed under Schedule 8 of the Act. Sites of Special Scientific Interest (SSSI) are designated under this Act.

POLICY

NATIONAL PLANNING POLICY FRAMEWORK

4.3 The Government published the National Planning Policy Framework (NPPF) on 27th March 2012. This sets out new guidance for local authorities, focusing on helping to produce planning policies that are clear and easier to understand. The NPPF is effective immediately; however the local plans are still valid, for the time being, even if they have

[3] Disturbance, as defined by the Conservation of Habitats and Species Regulations 2010, includes in particular any action which impairs the ability of animals to survive, breed, rear their young, hibernate or migrate (where relevant); or which affects significantly the local distribution or abundance of the species.

been produced prior to the NPPF. There is emphasis on the need for economic growth through designing planning policies which are in favour of development but this will not be achieved in isolation from social and environmental development. Section 11 sets out the requirements for conserving and enhancing the natural environment. Land previously used for development (brownfield sites) should be favoured as long as they are not considered to be of high environmental value. Of particular note is paragraph 152 of the Plan-Making Section which states, "Local planning authorities should seek opportunities to achieve each of the economic, social and environmental dimensions of sustainable development, and net gains across all three. Significant adverse impacts on any of these dimensions should be avoided and, wherever possible, alternative options which reduce or eliminate such impacts should be pursued. Where adverse impacts are unavoidable, measures to mitigate the impact should be considered. Where adequate mitigation measures are not possible, compensatory measures may be appropriate". The Framework is guidance for local planning authorities on the content of their Local Plans, but is also a material consideration in determining planning applications. The NPPF has replaced much existing planning policy guidance, including Planning Policy Statement 9: Biological and Geological Conservation. However, the government circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and their Impact within the Planning System, which accompanied PPS9 remains valid.

BIODIVERSITY ACTION PLANS / BIODIVERSITY 2020

4.4 The UK Biodiversity Action Plan (UKBAP) (Anon, 1995) was organised to fulfil the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. A list of national priority species and habitats has been produced with all listed species/habitats having specific action plans defining the measures required to ensure their conservation. Regional and local BAPs have also been organised to develop plans for species/habitats of nature conservation importance at regional and local levels.

4.5 The 'UK Post-2010 Biodiversity Framework', published in July 2012, succeeds the UK BAP and 'Conserving Biodiversity – the UK Approach', and is the result of a change in strategic thinking following the publication of the CBD's 'Strategic Plan for Biodiversity 2011–2020' and its 20 'Aichi Biodiversity Targets', at Nagoya, Japan in October 2010, and the launch of the new EU Biodiversity Strategy (EUBS) in May 2011. The Framework demonstrates how the work of the four countries and the UK contributes to achieving the Aichi Biodiversity

Targets, and identifies the activities required to complement the country biodiversity strategies in achieving the targets. The UKBAP is no longer an active strategy, and has been replaced by biodiversity strategies in England, Northern Ireland, Scotland and Wales. While the UKBAP is no longer an active policy, species listed on the UKBAP have been incorporated into the new biodiversity strategies for each country. In England under Biodiversity 2020: A strategy for England's wildlife and ecosystem services and undersection 41 of The Natural Environment and Rural Communities (NERC) Act 2006, where UKBAP species were recognised as of principal importance for the conservation of biodiversity. Section 40 of the NERC Act 2006 requires all public bodies to have regard for biodiversity conservation when carrying out their function. This is commonly referred to as the '**biodiversity duty**'.

LOCAL STRUCTURE PLANS

4.6 County, District and Local Councils have Structure Plans and other policy documents that include targets and policies which aim to maintain and enhance biodiversity. These are used by Planning Authorities to inform planning decisions.

NATURAL ENVIRONMENT AND RURAL COMMUNITIES (NERC) ACT (2006)

4.7 Public authorities have a duty to conserve biodiversity under the Natural Environment and Rural Communities (NERC) Act, which came into force in 2006. This states that 'any public body or statutory undertaker in England and Wales must have regard to the purpose of conservation of biological diversity in the exercise of their function and that decisions of public bodies work with the grain of nature and not against it' (Part 3, Paragraph 60). The Act also includes a range of measures to strengthen the protection of wildlife and habitats.

WILDLIFE LEGISLATION

4.8 In addition to the above, a range of legislation is in place to ensure that habitats and species of conservation importance are protected from harm, either directly or indirectly. A summary of this legislation is given in Table 1.

4.9 Due to its location the site may have the potential to support or provide habitat for a number of those species protected by the various pieces of legislation summarised in **Table 2**. A summary of the key legislation for protected species is given in **Table 3**.

Table 2: Overview of Key Legislation

Legislation	Relevance
The Conservation of Habitats and Species Regulations 2010	This transposes the EC Habitats Directive 1992 (*Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna)* and the EC Birds Directive 1979 (*Council Directive 79/409/EEC on the protection of wild birds*) into UK law. Annexes I and II of the Habitats Directive list (respectively) habitats and species for which member states are required to establish and monitor SACs. The EC Birds Directive provides a similar network of sites (SPAs) for all rare or vulnerable species listed in Annex I and all regularly occurring migratory species, with particular focus on wetlands of international importance. Together with SACs, SPAs form a network of pan-European protected areas known as 'Natura 2000' sites. The Habitats Regulations also make it an offence (subject to exceptions) to deliberately capture, kill, disturb, or trade in the animals listed in Schedule 2, or pick, collect, cut, uproot, destroy, or trade in the plants listed in Schedule 4.
The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1979)	The Bern Convention aims to ensure conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species).
The Wildlife and Countryside Act (WCA) 1981 (as amended)	The WCA is the primary UK mechanism for statutory site designation (Sites of Special Scientific Interest, SSSIs) and the protection of individual species listed under Schedules 1, 2, 5 and 8 of the Act, each subject to varying levels of protection
The Countryside and Rights of Way Act 2000	This legislation strengthens the provision of the 1981 WCA (as amended), both in respect of statutory sites such as SSSIs and protected species. It also places a statutory obligation on Local Authorities and other public bodies to further conservation of biodiversity in the exercise of their functions, thus providing a statutory basis to the Biodiversity Action Plan (BAP) process, which began in 1994. Section 74 of the Act lists the habitat types and species of principal importance in England.
Hedgerow Regulations 1997	The Hedgerow Regulations 1997 are intended to protect important countryside hedges from destruction or damage in England and Wales.
Natural Environment and Rural Communities Act 2006	The 'NERC' Act makes provision in respect of biodiversity, pesticides harmful to wildlife, protection of birds and invasive non-native species. Section 40 of the act also introduced a new duty on public bodies to have regard to the purpose of conserving biodiversity in the exercise of their functions.

4.10 Due to its location the site has the potential to provide habitat for a number of species protected by the various pieces of legislation summarised in Table 1. A summary of the key legislation is given in Table 2.

Table 3: Key Legislation for protected species

Species	Key legal protection
Bats (all species)	All European species of bat are listed on Annex IV of the EC Habitats Directive as being in need of "strict protection". This is implemented in Britain under The Conservation of Habitats and Species Regulations 2010. All British bats are included on Schedule 5 of the WCA (1981) and the whole of Section 9 of The Act applies to European bat species. In summary, the above legislation collectively prohibits the following: • Deliberately or recklessly capturing, injuring, taking or killing of a bat; • Deliberately or recklessly harassing a bat; • Intentionally or recklessly disturbing of a bat in its place of rest (roost), or which is used for protection or rearing young; • Deliberately or recklessly damaging, destroying or obstructing access to any resting place or breeding area used by bats; • Deliberately or recklessly disturbing a bat in any way which is likely to significantly affect the local populations of the species, either through affecting their distribution or abundance, or affect any individuals ability to survive, reproduce or rear young; • Possession or advertisement/sale/exchange of a bat (dead or alive) or any part of a bat. In England, licences are issued by Natural England for any actions that may compromise the protection of a European protected species, including bats, under the Habitats Regulations 2010. This includes all developments, regardless of whether or not they require planning permission. Bats are also protected by the Wild Mammals (Protection) Act 1996 and selected species are listed on the UK Biodiversity Action Plan (BAP) and the Hull Biodiversity Action Plan (LBAP)
Great crested newt	Great crested newts are protected under European and British law, having the same level of protection as bats (see above). Licenses are issued by Natural England for any actions that may compromise the protection of this species, under the Habitat Regulations 2010. This includes all developments, regardless of whether or not they require planning permission. The species is also listed on the UK and Local BAPs.
Otter	Otter are protected under European and British law and receive the same level of protection as bats (see above.) The species is listed under Annex II and IV of the Habitats Directive, which is implemented in Britain under The Conservation of Habitats and Species Regulations 2010. Otter are also protected under Schedules 5 and 6 of the WCA 1981, The Wild Mammals (Protection) Act 1996 and are listed as a priority species in Appendix II of the Bern Convention. The species is also listed on the UK and Local BAPs.

Species	Key legal protection
Water Vole	Water vole is protected under Schedule 5 of the WCA 1981 (as amended). This makes it an offence to: • Intentionally kill, injure of take water voles; • Possess or control the species; • Damage or destroy any place used by water vole for shelter or protection; • Disturb water vole while they occupy such places of shelter; • Sell, possess or transport water vole for the purpose of sale; and • Advertise the buying or selling of water vole. The species is also protected under the Wild Mammals (Protection) Act 1996 and listed on the UK and Local BAPs.
Birds	The majority of bird species, with the exception of some species listed on Schedule 2, are protected under the WCA 1981 (as amended). This makes it an offence to intentionally or recklessly: • Kill, injure or take any wild bird; • Take, damage or destroy any nest which is in use or being built; and • Take, damage or destroy the eggs of any such bird. Additional protection against disturbance whilst at the nest is also afforded to any bird species, whether an adult bird or their dependant young, which is listed on Schedule 1 of the Act. Council Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') provides for the conservation and management of all wild bird species naturally occurring in the European Union, their nests, eggs and habitats. The Birds Directive bans activities that directly threaten birds (e.g. deliberate killing and destruction of nests and young), regulates hunting of selected species, bans non-selective and large scale killing of birds, and promotes research for bird conservation and management. Article 4(4) of the Birds Directive requires that member states "should strive to avoid pollution or deterioration of habitats." The Conservation of Habitats and Species (Amendment) Regulations 2012 provide a fuller transposition of the Birds Directive into English law. Regulation 8 introduces a new Regulation 9A to the Habitats Regulations for duties of appropriate authorities in relation to wild bird habitat. Regulation 9A(3) addresses the transposition of Article 2 of the Birds Directive, while Regulation 9A(8), requiring competent authorities to "use all reasonable endeavours" to "avoid any pollution or deterioration of habitats of wild birds." Certain species are also listed as being of priority conservation importance on the UK and Local BAPs.

[redacted]

5.0 RESULTS

DESKTOP ASSESSMENT

STATUTORY DESIGNATED SITES

5.1 The desktop assessment indicates that there are no sites of International Nature Conservation Importance within 5km of survey area and one statutory site of Local Conservation Interest within 2km of the survey area (**Table 4**).

Table 4: Statutory designated sites

Designation	Site Name & Description	Grid Ref.	Distance & Direction from Site
LNR	**Southwell Trail** A former railway line and important route for wildlife providing a habitat corridor through the landscape. The trail supports a wide range of habitats because it crossed two distinct geological areas. These are the Sherwood Sandstone to the North around Bilsthorpe and Farnstead and the Mercia Mudstone further south from Kirklington towards southwell.	SK 649602 (24.8 ha)	1.18km S

5.2 Local Nature Reserve (or LNR) is a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the Natural Environment and Rural Communities Act 2006, by principal local authorities. LNRs are designated for their nature conservation interest, local importance for education or research, and they provide an opportunity for informal enjoyment of nature by the public.

NON STATUTORY DESIGNATED SITES

5.3 There are 10 non-statutory designated sites (Local Wildlife Sites) within a 2km radius of the boundary of the proposed development site (**Table 5**).

5.4 Local Wildlife Sites (LWS) are areas of land which are rich in wildlife and are equivalent to Sites of Importance for Nature Conservation (SNCI). Criteria for selection take in threats and declines in certain species, national priorities and local distinctiveness. The LWS system is managed, in partnership, by The Wildlife Trust, local authorities, statutory nature conservation agencies, local naturalists and landowners. Local Wildlife Sites were previously

known as County Wildlife Site (CWS) in the past. LWS are non-statutory sites of County level importance, and protected under planning policies of the component district authorities.

Table 5: Non-Statutory Designated sites

Designation / No.	Site Name & / Description	Interest	Grid Ref. / Area	Distance & Direction from Site
LWS 5/2161	**Bilsthorpe Colliery** An important site for breeding waders	Bird, Butterfly (Dingy Skipper, 2009; Brown Argus, Common Blue, 2015), Amphibian and/or Reptile	SK 653 614 (23.12 ha)	50m NE
LWS 2/547	**Eakring Brail Wood** An old woodland site retaining considerable interest in spite of large scale replanting	Botanical	SK 664607 (47.18 ha)	860m E
LWS 2/671	**Cutt's Wood (Part)** A mature deciduous compartment of semi-natural character	Botanical	SK 654 626 (2.00 ha)	1.41km NNE
LWS 2/545	**Alder Carr, Inkersall** A thin canopy of mixed deciduous species over an acidic community of some interest	Botanical	SK 633 604 (4.73 ha)	1.46km SW
LWS 5/3384	**Fox Holes** Woodland	Botanical	SK 664 601 (1.70 ha)	1.56 km SE
LWS 1/90	**Clipstone Forest Area** An expanse of , mostly coniferous forestry within which occur numerous ephemeral heathland areas	Botanical, Moth, Amphibian and/or Reptile	SK 613 621 (1027.01 ha)	1.61NW
LWS 5/310	**Mill Hill, Green Lane** A species-rich green lane	Botanical	SK 667 617 (0.30 ha)	1.70kmNE
LWS 5/3356	**Rainworth Water, Inkersall** A mosaic of lowland heathland, acid grassland, plantation woodland and fen habitats along Rainworth Water	Botanical	SK 621602 (68.11 ha)	1.97km E
LWS 2/739	**Mill Lane, Eakring** A species-rich green lane	Botanical, Moth	SK 671 617 (0.469 ha)	2.00km NE
LWS 5/3385	**Whip Ridding Dumble** Woodland	Botanical	SK 669 599 (0.98 ha)	2.07 km SE

ECOLOGICAL RECORDS

5.5 The data set returned from NBGRC on the 7th April 2017 was filtered to include contemporary records spanning the last 10 years' (2007 – 2017) leaving a total of 80 protected, priority and notable species records from NBGRC and 664 records from Nottingham Birdwatchers.

PROTECTED SPECIES

Herpetofauna

Amphibians

5.6 There are two records of GCN, from 2008 (1.5km S) and 2010 (0.81 km ESE) respectively.

5.7 A search on Multi Agency Geographic Information for the Countryside (Magic) website for granted European Protected Species Applications indicates that there are no licence applications relating to GCN within 2km of the site.

Reptiles

5.8 There is one record of a common lizard *Zootoca vivipara* from 2010 recorded on the roadside of the A614 approximately 1.26km to the WNW of the site. Common Lizard are protected under schedule 5 of the Wildlife & Countryside Act (1981)

Mammals

Bats

5.9 59 records of bats were returned within a 2km radius of the site. There were no roost records. All records are of bats in flight, foraging or commuting and include common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctule,* Leiser's *Nyctalus leisleri* and Brown Long eared *Plecotus-auritus*.

5.10 A search on Magic website for granted European Protected Species Applications indicates that there are no licence applications relating to bats within 2km of the site.

[redacted]

Bird species

5.12 There were 664 bird records returned by Nottingham Birdwatchers for the last 10 years (2007 – 2017). Of the 83 species represented in the data set, five are protected species; Merlin (single record 2009) is listed on Annex 1 of the EC Birds Directive (79/409/EEC) and schedule 1 of the Wildlife & Countryside Act 1981. Barn owl (single record 2010), little ringed plover (4 records 2008 – 2011), fieldfare (14 records and redwing (8 records, 2009 - 2014) are all listed on schedule 1 of the wildlife & countryside Act 1981. None of the records for protected bird species are from within the site boundary but some are from within the 1km grid square (SK 65 61)

PRIORITY SPECIES

Amphibians

5.13 There are 4 records of common frog *Rana temporaria,* 4 records of smooth newt *Lissotriton vulgaris* and 4 records of common toad *Bufo bufo* from the Bilsthorpe Colliery development site from survey undertaken during 2008. Common toad are UK BAP and LBAP priority species.

Mammals

Brown Hare

5.14 There are 2 records of brown hare *Lepus europaeus* within 2km of the site both were reported in 2015 and are from Eakring Brail Wood (LWS) and near Bilsthorpe (1.97km SSW)

Hedgehog

5.15 There was a single record of hedgehog *Erinaceus europaeus* observed in 2016 in Bilsthorpe (1.53km SSE).

Butterflies

5.16 There is one record of Brown Argus (2010), one record of common blue (2010) and one record of dingy skipper (2009) all associated with Bilsthorpe Colliery.

INVASIVE/NON-NATIVE SPECIES

5.17 NBGRC did not return any records of invasive/non-native plants or animals listed on Schedule 9 of the Wildlife & Countryside Act (1981), as amended.

FIELD SURVEY

GENERAL SITE DESCRIPTION - HABITATS

5.18 The proposed development site exists as a single field supporting improved agricultural grassland sown as a fodder crop. The site is bounded along its west edge by a continuous hedgerow and on its north and south edges by scattered scrub. The east edge of the site is bordered by dense scrub and amenity woodland planted beyond the site boundary. All boundaries were reinforced with a mix of fencing materials.

5.19 The locations of the habitats described in the following sections can be found on the Phase I Habitat Plan **Drawing 1**.

IMPROVED GRASSLAND

5.20 The main area of the site was covered entirely by improved grassland comprising of an agricultural mix (**TN1**) which was cut annually. Species present included perennial rye-grass *Lolium perenne*, crested dog's-tail, cock's-foot *Dactylis glomerata*, annual meadow-grass *Poa annua*, false oat-grass *Arrenatherum elatius*, common bent *Agrostis capillaris* and sheeps fescue *Festuca ovina.* Herbaceous species such as dandelion *Taraxacum officinale agg.*, white clover *Trifolium repens*, broad-leaved dock *Rumex obtusifolius* and spear thistle *Cirsium vulgare* were occasionally present.

TALL RUDERAL VEGETETION / FIELD MARGINS

5.21 The improved grassland field had uncut margins (**TN2**) associated with it that extended to an average width of three metres around the entire field. Species diversity was greater in the field margin than it was in the open field and tall ruderal species were dominant. Species present in the field margins included: common bent *Agrostis capillaris*, creeping bent *Agrostis stolonifera*, occasional cock's-foot, red fescue and crested dog's-tail *Cynosurus cristatus*, *Rubus fruiticosus agg.*, nettle *Urtica dioica*, cow parsley *Anthriscus sylvestris*, ivy *Hedera helix*, great willowherb *Epilobium hirsutum*, rosebay willowherb *Chamaenerion angustifolium*, cleavers *Galium aparine,* Mugwort *Artemesia vulgaris,* yarrow *Achillea millefolium,* meadow vetchling *Lathyrus pratensis*, daisy *Bellis perennis*, dandelion, meadow buttercup *Ranunculus acris*, creeping buttercup *Ranunculus repens*, common ragwort *Senecio jacobaea*, prickly sow-thistle *Sonchus asper* and bracken *Pteridium aquilinum.*

DENSE SCRUB

5.22 There was no dense scrub present internally in the site it was present occasionally along the east edge of the site along the west edge of the woodland bordering the site (**TN3**). Other stands of dense scrub were present along an unmanaged section of a hedgerow on the north end of the western hedgerow boundary (**TN4**) and along the northern edge of the site. Species recorded were hawthorn *Crataegus monogyna,* Elder *Sambucus nigra,* dog rose *Rosa canina,* rose aggregate, *Rosa spp*., broom *Cytisus scoparius,* Gorse *Ulex europeaeus.*

SCATTERED SCRUB

5.23 Scattered scrub (**TN5**) comprised of hawthorn, dogwood *Cornus sanguineum*, elder, goat willow *Salix capreae* and broom and gorse were present on the footpath side of the northern boundary outside of the site. Honeysuckle *Lonicera periclymenum* was also present on fencing on the north of the site. Three individual mature hawthorn trees were present on the southern edge of the site and these were likely to have been remnants of a former hedgerow.

FIELD DRAIN

5.24 There were no field drains present in the site but a dry ditch (**TN6**) was present along the east boundary between the edge of the site and the adjacent woodland. The ditch was dry and vegetation within it was contiguous with the adjoining field.

INTACT HEDGEROW

5.25 The hedgerow located between the west edge of the site and Eakring Road (**TN7**) was species poor hawthorn dominated with occasional elder present and very occasional holly *Hedera helix*. This feature was managed by cutting to a height of approximately 1.5m – 1.8m and it contained the main access to the field centrally and was estimated to have approximately 20% gaps. Ground flora associated with this hedge was that given above for the tall ruderal vegetation / field margins.

DEFUNCT HEDGEROW

5.26 Hedgerows located on the north and south boundaries (**TN8**) of the site were defunct and are described as scattered scrub above.

AMENITY WOODLAND

5.27 There was no woodland located in the site. The west edge of the site is bordered by mixed amenity woodland / plantation (**TN9**) possibly planted to screen the former colliery. The mixed amenity woodland has been planted on a soil / spoil mound which from ground level gives the impression that the woodland is very dense. Species within the canopy included Silver birch *Betula pendula*, oak *Quercus sp*., alder *Alnus glutinosa,* Rowan *Sorbus aucuparia* with occasional commercially available pine and spruce additional species including hazel *Corylus avellana,* hawthorn and elder were present at edge. The ground flora comprised mostly of grasses and species such as bramble, nettle, hogweed, cleavers and dandelion.

FAUNA

5.28 Fauna noted during the phase 1 habitat survey include magpie *Pica pica*, long tailed tit *Aegithalos caudatus*, blackbird *Turdus merula* and wren *Troglodytes troglodytes*, bluetit *Cyanistes caeruleus* and common buzzard *Buteo buteo*. Rabbits were abundant both in and around the edges of the field (**TN10**).

PROTECTED AND PRIORITY SPECIES

PLANTS/HABITATS

5.29 There were no protected or notable plants within the proposed development area.

5.30 Potential UK BAP, NERC S.41 and Local BAP priority habitats within the survey area include:

- Lowland mixed - deciduous woodland (UK BAP, S.41 & Nottingham BAP);
- hedgerows (UK BAP, S.41 & Nottingham BAP);
- Arable field margins (UK BAP, S.41 and Nottingham BAP)

5.31 The field margins located within the survey would not be considered Priority Habitat, but hedgerows and the mixed amenity woodland would be a locally important habitat.

FAUNA

Bats

5.32 There were no trees or other features located in the site that would provide roosting potential for bats. None of the trees within the woodland located adjacent to the site had potential for roosting bats as they were generally of insufficient girth (<0.7m). None of the

woodland is required to be removed to facilitate the development proposals, there is no potential for loss of tree roosts but residential properties in close proximity to a woodland edge could have an impact on foraging and commuting bats. The woodland edge has the potential to provide foraging habitat and flyways for local bats and areas of dense and scattered scrub and the hedgerow also provide potential foraging habitat and offer some connectivity across the landscape to areas of excellent bat foraging habitat such as the wetland areas and ponds in the former colliery site. A series of bat transect surveys have commenced and will continue through the 2017 season.

Otter/water vole

5.33 Riparian mammals are not considered an ecological constraint for the development of the site due to the absence of suitable habitats in the site.

[redacted]

Amphibians

5.35 There are no ponds or other features within the proposed development site that would provide suitable breeding habitat or attract great crested newt or other amphibian species into the site. There are two records of great crested newt 800m distant of the site. There were no waterbodies within 500m of the proposed site considered suitable for great crested newt; ponds shown to be present on OS maps in the former colliery site are no longer present and new ponds created in mitigation for the solar farm are now home to waders and other wetland birds or are used for the rearing of fish.

Birds / nesting birds

5.36 The site offers only limited opportunities for nesting birds, those species noted during the survey period are given above. No ground nesting species were observed during the surveys. Hedgerows and scrub and the woodland bordering the site will offer nesting potential to a range of common garden bird species and to other species (a corvid roost is

present within the woodland to the south east of the site boundary), although these areas will not be affected by the development.

Reptiles

5.37 A single record was returned from the LRC relating to a common lizard observed in 2010 along the A614. The site does not support any habitat suitable for reptile species.

Terrestrial invertebrates

5.38 Three single records were returned relating to dingy skipper, common blue and brown argus being recorded at Bilsthorpe Colliery in 2009 and in 2010, respectively. The site has limited potential to attract any of these species.

Hedgehog

5.39 There was one record of hedgehog returned by NBGRC. Hedgehogs are widespread mammals found in most lowland habitats, but are most commonly seen in areas where there is grassland close to woodland, scrub or hedgerow. Urban and suburban gardens have become particularly important to hedgehogs seeking food and nest sites. The arable field provides sub-optimal foraging habitat for hedgehogs, only the peripheral habitats such as the broadleaved woodland, dense scrub and semi-improved grassland could potentially provide some foraging habitat for hedgehogs. The area is likely to be used as a resource by any local population. When the development is completed the residential gardens, provided access for hedgehogs is provided, would provide better foraging habitat for the local population of hedgehogs than the improved grassland field.

Brown Hare

5.40 Two records of brown hare were returned for the local area. Mixed agricultural land including grassland does provide habitat suitable for brown hare, but due to the high quality open habitats in the surrounding area this one field is unlikely to be an important resource for brown hare.

6.0 SUMMARY & RECOMMENDATIONS

SUMMARY

6.1 There was one statutory site (Local Nature Reserve, LNR) recorded within a 2km radius of the proposed development site, Southwell Trail. This statutory site is located 1.18km to the south of the site and there is no feasible mechanism by which the small housing development could impact negatively upon it.

6.2 There were 10 non-statutory sites within a 2km search radius of the proposed development site. The nearest non-statutory site was Bilsthorpe Colliery Local Wildlife Site (LWS) situated 50m to the north east of the site. The development does have the potential to impact on Bilsthorpe Colliery LWS possibly due to increased public use. No impact is expected on any of the other non-statutory sites of nature conservation interest within the search area.

6.3 The proposed development site at Bilsthorpe supports a limited range of habitat types and has some potential for protected/priority species to be present, these include:

- bats, and
- breeding/nesting birds.

RECOMMENDATIONS

6.4 The hedgerow, mixed plantation woodland, woodland edges, scrub provide potential foraging habitat for bats and there is some habitat connectivity across the landscape via hedgerows, woodland edges etc. Bat surveys were recommended and are currently being undertaken to assess how the site is being used by bats and to inform the planning application, any impacts on bats and the mitigation proposals.

6.5 It is recommended that any vegetation clearance be undertaken outside of the bird breeding season. This includes all ground level vegetation as scrub, hedgerows and standard trees. The bird breeding season can extend from March until August (inclusive), weather and species depending, but generally birds have completed breeding by the end of July. Where vegetation clearance cannot be undertaken outside the bird breeding season, all such areas would be subject to a thorough walkover survey by a suitably qualified ecologist prior to any clearance or disturbance work being undertaken.

6.6 Site clearance has the potential to impact on hedgerows, scrub or woodland edge where they are being retained. Adhering to the guidelines in British Standard BS 5837: 2012 Trees in relation to design, demolition and construction is recommended in situations such as this, in particular implementing measures to prevent root damage, for example, protective measures to prevent heavy plant vehicles etc. from entering the root protection area. This usually involves identifying the root protection area and erecting a protective barrier around the trees, hedgerow or woodland to be retained.

6.7 It is recommended that habitat enhancement is undertaken wherever possible. This should include the use of native plants, shrubs and trees of local provenance in the landscape scheme, house sparrow terraces provided on a proportion of the houses. Hedgehog passes will be created in fences and garden walls. A 13cm x 13cm hole is required in fencing or a brick should be left out from walls between gardens to allow hedgehogs to safely move around the site and between gardens, in addition four hedgehog domes / houses will be provided within and outside the site. Mitigation for bats will be provided within the bat activity report to be issued upon completion of the surveys.

KEY

IG	Improved grassland
X X	Scattered scrub
	Species poor hedge
+++	Fenceline
⊙	Target note

Land off Eakring Road, Bilsthorpe

Drawing 1	Phase 1 Habitat Survey Plan

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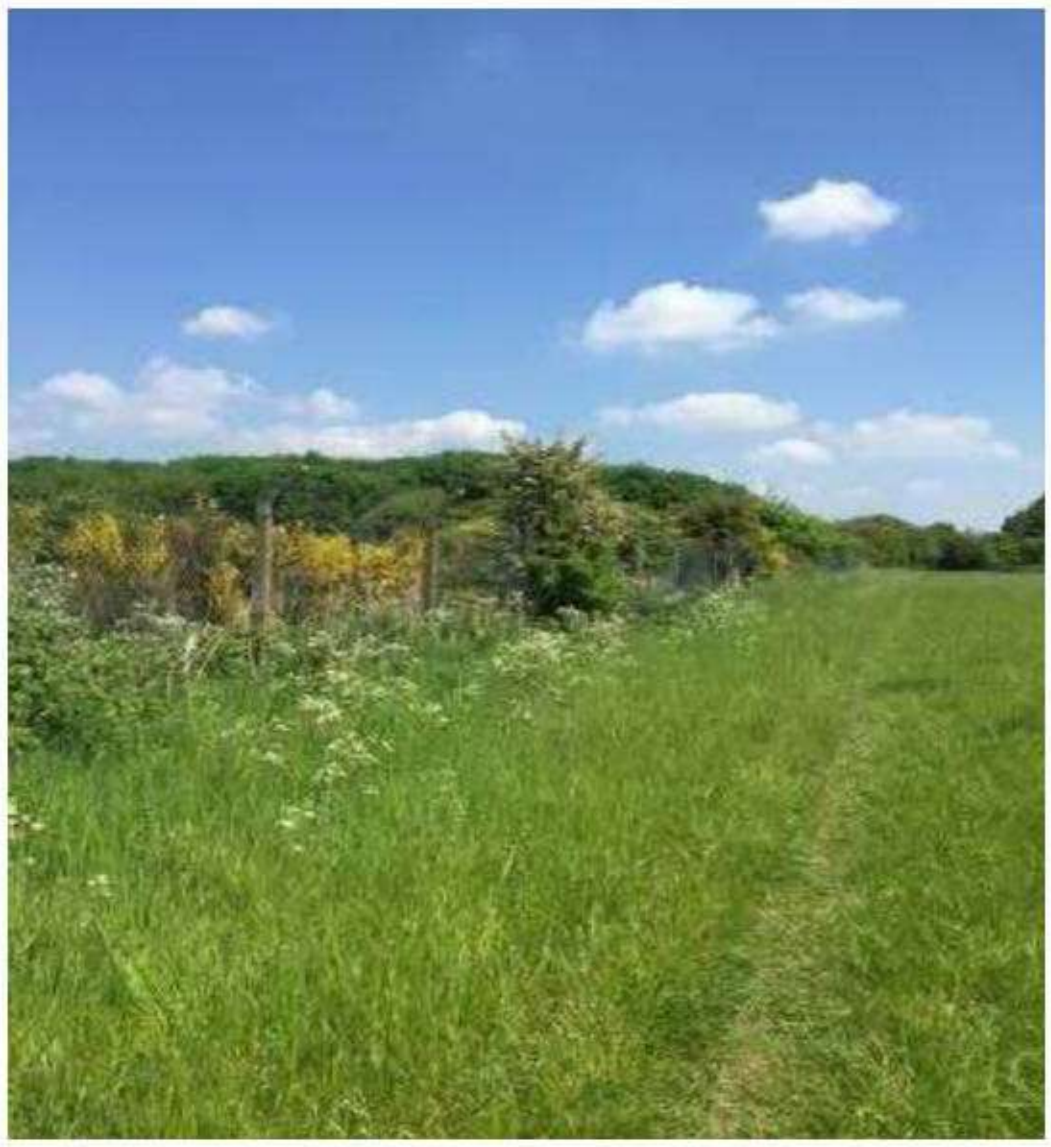
APPENDIX 1 PHOTOGRAPHS / TARGET NOTES (TN)

TN1: Improved grassland field

TN2 & TN4: Tall ruderal species / field margins

TN3: Scrub at the edge of the woodland

TN5: Scrub on north edge of northern boundary



TN6: No Photo

TN7: Hedgerow along boundary with Eakring Road

TN8: Defunct hedge on the south boundary of the site

TN9: Mixed amenity woodland

TN9: Mixed amenity woodland

Appendix B: AES LTD. Bat Survey Report 2017

BAT SURVEY REPORT

Version 2
(updated with additional survey information)

Land off Eakring Road, Bilsthorpe, Newark, Nottinghamshire

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Field Investigations and Data

Where field investigations have been carried out these have been restricted to a level of detail required to achieving the stated objectives of the work. Where any data supplied by the client or from other sources have been used it has been assumed that the information is correct. No responsibility can be accepted by AES - LTD for inaccuracies in the data supplied by any other party.

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CONTENTS

1.0 INTRODUCTION

1.1 Applied Ecological Services Ltd. (AES-LTD) was commissioned by Harworth Group to undertake bat activity surveys within an arable field off Eakring Road, Bilsthorpe, Nottinghamshire NG22 EPZ. The bat surveys were carried out in accordance with current guidelines (Collins, 2016)[1]. The bat surveys were undertaken by Caroline Hillier (NE survey licence 2015-15581-CLS-CLS) and David Gash.

SITE DESCRIPTION

1.2 The survey area (red line boundary) covers approximately 3.7ha and is located at grid reference SK 64969 61075 (approximate central point). The site is situated east of Eakring Road. The site lies to the north of Bilsthorpe village and is south east of the sewage works and south west of Bilsthorpe Business Park.

Figure 1: Site Location

1.3 The main area of the site is improved grassland grown as an annual fodder crop with a species poor intact hedge on the western boundary, defunct hedgerows to the south and

[1] Collins J. (Ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

north, a metal railing fence to the south and a broadleaved plantation woodland on the eastern boundary.

PROPOSED WORKS

1.4 The development proposals for the site are the provision of approximately 83 residential properties with associated gardens and infrastructure including roads and pavements and a water attenuation feature.

AIMS OF FIELD SURVEY

1.5 The objective of the survey was to determine the presence/absence of bats, if present where and how they were using the site (see Figure 1). The bat surveys were designed to collect the following information:

- The presence or absence of bats within the site boundary in or close proximity to the survey boundary;
- The presence of roosts or potential roost locations, and
- The assemblage of bat species using the site.

2.0 METHODS

SUMMARY OF SURVEY METHODS

2.1 A daytime survey of the site was undertaken in order to investigate the potential of the habitats on site to support bats. There were no buildings or mature trees within the survey boundary, so there were no opportunities for roosting bats within the site.

PRE-SURVEY DATA SEARCH

2.2 In order to compile existing baseline information for the site, relevant ecological information was requested from the following organisations which for the purposes of this report, included:

- Multi Agency Geographic Information for the Countryside (Magic) website, and
- Nottinghamshire Biological & Geological Records Centre (NBGRC).

2.3 A 5km radius from the boundary of the site was searched for sites of International nature conservation importance, such as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). A 2km radius from the boundary of the site was searched for statutory sites of national, regional and local importance, such as Sites of Special Scientific Interest (SSSIs) and Local Nature Reserves (LNRs), and non-statutory designated sites such as Local Wildlife Sites (LWS) and also for records of protected and notable species, including bats. **Drawing 1** illustrates bat records within 2km of the site.

2.4 Further inspection, using colour 1:25,000 OS base maps (www.ordnancesurvey.co.uk) and aerial photographs from Google Earth (www.maps.google.co.uk), was also undertaken in order to provide additional context and identify any features of potential importance for nature conservation in the wider area.

SURVEYOR INFORMATION

2.5 The Initial inspection of the site was carried out by Gary Tudor MCIEEM principal ecologist with Applied Ecological Services Ltd. (AES-LTD) and an experienced field biologist. The bat surveys were led by Dr Caroline Hillier MSc BSc (Hons) MCIEEM senior ecologist at AES-LTD, a member of Durham Bat Group and a licensed bat surveyor (2015-15581-CLS-CLS). Caroline has over 10 years' experience carrying out bat surveys.

FIELD SURVEYS

Habitat Survey

2.6 An ecological appraisal of the site enables the classification of features within the site for their suitability for roosting, commuting and foraging bats. Table 1 below is taken from Collins (2016) detailing what makes features on site more, or less suitable for bats.

Table 1: Potential Suitability of Proposed Development Sites.

Suitability	Description Roosting Habitats	Commuting And Foraging Habitat
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and or suitable surrounding habitat to be used on a regular basis or by a large number of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features (PRF) but with none seen from the ground or features seen only with limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but are unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaf woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.7 A high potential building would typically be an older building situated close to high quality bat foraging habitats such as woodland, water features or substantial hedgerows. Buildings falling within this class will usually offer a variety of roosting opportunities suitable for use by a range of bat species. Conversely a low potential building will typically be well sealed and of modern construction, offering no or few clear access points or roosting opportunities. The risk of a building housing a bat roost is further reduced if located within an area of poor quality habitat such as hard standing or amenity grassland.

2.8 The surrounding habitat was assessed for its suitability as bat foraging or commuting habitat.

Activity surveys

2.9 A programme of 5 transect surveys were scheduled at the site as the development area is assessed as being of high foraging/commuting potential. The site has connectivity to better foraging/commuting habitat and there is good connectivity to the wider landscape with some fragmentation due to lit roads and being situated north of an industrial estate which does fragment some of the local habitat. The woodland edge to the east of the site does provide suitable habitat for foraging and commuting bats. For the surveys from sunset, surveyors, equipped with bat detectors, walked a pre-arranged route around the habitat features within the site so that foraging/commuting bats could be detected. Bats were counted and the species, time and location of detected bats were noted, as was their direction of flight.

2.10 AES-Ltd staff were equipped with Echo Meter (EM3+) detectors which were used to record the calls of bats on site, these bat calls were transferred to Kaleidoscope for analysis of species composition. Elekon Batscanner or Batbox III bat detectors were used by the other surveyors to assist in bat detection. **Drawing 2** depicts a summary of bat activity across the site and shows the transect route taken by surveyors.

2.11 The surveys were carried out in May, June, July, August and September. Survey times and weather conditions for surveys undertaken to date are summarised in **Tables 2 and 3**. A key for the Beaufort Scale is provided in **Table 4**.

Table 2: Survey Times

Date	Sunset / Sunrise	Start Time	Finish Time
22/05/17	21:07	21:07	22:47
25/06/17	21:25	21:20	23:20
25/07/17	21:11	21:11	23:11
15/08/17	05:44	04:15	05:47
26/09/17	18:54	18:50	20:40

Table 3: Weather Conditions

Date	Start Temp °C	Finish Temp °C	Wind speed / direction	Cloud cover %	Precipitation (mm)
22/05/17	18	18	B2:SW	30	0
25/06/17	17	17	B3:W	75	0
25/07/17	18	18	B3:SE	75	0
15/08/17	14	14	B3:SSW	15	0
26/09/17	15	14	B2:E	50	0

2.12 There were insects flying during all surveys.

Table 4: Key for Beaufort Scale

Beaufort wind scale	Limits of wind speed Metres per second	Descriptive terms
0	<1	Calm
1	1-2	Light air
2	2-3	Light breeze
3	4-5	Gentle breeze
4	6-8	Moderate breeze
5	9-11	Fresh breeze
6	11-14	Strong breeze
7	14-17	Near gale
8	17-21	Gale
9	21-24	Severe gale
10	25-28	Storm
11	29-32	Violent storm
12	33+	Hurricane

Data analysis

2.13 The RAW files recorded by the EM3+ were analysed using Wildlife Acoustics' Kaleidoscope post-processing software. The free version of this software can convert from WAC, WAV and

Zero Crossing (ZC) formats whilst filtering out unwanted signals. Bat calls recorded in the field were analysed using AnaLook Analysis software. The output is recorded as WAC files which were analysed to produce sonograms and frequency spectra. The heterodyne channel also provided further audible verification of identity, especially for species with distinctive heterodyne calls.

3.0 RESULTS

PRE-SURVEY DATA SEARCH

3.1 Nottinghamshire Bat Group note that of the 17 British species of bat 12 have been recorded in Nottinghamshire since 1970. Pipistrelle bats are the most abundant and widespread bat species in the UK, but are thought to have undergone a significant decline in numbers in the last century. Estimates from the National Bat Colony Survey suggest a population decline of approximately 70% between 1978 and 1993. The current pre-breeding population estimate for the UK stands at approximately 2,000,000. The problems of estimating population trends have been compounded by the recent discovery that there are 3 distinct species of Pipistrelle bat in the UK. Brown long-eared bat is the second most widespread bat in Nottinghamshire. Bats known to occur in Nottinghamshire and their status in the county is shown in **Table 5.**

Table 5: Bats of Nottinghamshire

Species	Frequency
Brandt's bat *Myotis brandtii*	Rare
Brown Long Eared *Plecotus auritus*	Frequent
Common Pipistrelle *Pipistrellus pipistrellus*	Common
Daubenton's bat *Myotis daubentonii*	Frequent on water
Leisler's bat *Nyctalus leisleri*	Uncommon
Nathusius' Pipistrelle *Pipistrellus nathusii*	Rare
Natterer's bat *Myotis nattereri*	Scarce
Noctule bat *Nyctalus noctula*	Scattered
Soprano Pipistrelle *Pipistrellus pygmaeus*	Common
Whiskered bat *Myotis mystacinus*	Uncommon
Barbastelle *Barbastella barbastellus*	Rare

3.2 Many of Nottingham's bat species are spread throughout the county whilst others have more restricted ranges. Two species, Nathusius' pipistrelle and Barbastelle, are very recent additions to Nottinghamshire's bat fauna and the serotine has only been recorded once. The national population trend for the majority of Nottinghamshire's bat species is stable and it is reasonable to expect the local situation to be similar. The baseline for these figures, however, come from the late 1990s after the major decline in bat numbers had happened. Two new species, Nathusius' pipistrelle and barbastelle, have been added to the county list since 1998, and Leisler's bat seems to be showing an increase in range although this could

also be due to increased observer efforts. Several local surveys are part of the wider national monitoring project and Nottinghamshire Bat Group have begun to use transects and remote recording to monitor key bat habitats. Bat box schemes around the county are also providing increased roosting and monitoring opportunities.

Designated sites

3.3 The desktop assessment indicates that there are no sites of International Nature Conservation Importance within 5km of survey area and one statutory site of Local Conservation Interest within 2km of the survey area (**Table 6**).

Table 6: Statutory Designated Sites

Designation	Site Name & Description	Grid Ref.	Distance & Direction from Site
LNR	**Southwell Trail** A former railway line and important route for wildlife providing a habitat corridor through the landscape. The trail supports a wide range of habitats because it crossed two distinct geological areas. These are the Sherwood Sandstone to the North around Bilsthorpe and Farnstead and the Mercia Mudstone further south from Kirklington towards southwell.	SK 649602 (24.8 ha)	1.18km S

3.4 Local Nature Reserve (or LNR) is a statutory designation made under Section 21 of the National Parks and Access to the Countryside Act 1949, and amended by Schedule 11 of the Natural Environment and Rural Communities Act 2006, by principal local authorities. LNRs are designated for their nature conservation interest, local importance for education or research, and they provide an opportunity for informal enjoyment of nature by the public.

NON STATUTORY DESIGNATED SITES

3.5 There are 10 non-statutory designated sites (Local Wildlife Sites) within a 2km radius of the boundary of the proposed development site (**Table 7**).

3.6 Local Wildlife Sites (LWS) are areas of land which are rich in wildlife and are equivalent to Sites of Importance for Nature Conservation (SNCI). Criteria for selection take in threats and declines in certain species, national priorities and local distinctiveness. The LWS system is managed, in partnership, by The Wildlife Trust, local authorities, statutory nature

conservation agencies, local naturalists and landowners. Local Wildlife Sites were previously known as County Wildlife Site (CWS) in the past. LWS are non-statutory sites of County level importance, and protected under planning policies of the component district authorities.

Table 7: Non-Statutory Designated sites

Designation / No.	Site Name & / Description	Interest	Grid Ref. / Area	Distance & Direction from Site
LWS 5/2161	**Bilsthorpe Colliery** An important site for breeding waders	Bird, Butterfly (Dingy Skipper, 2009; Brown Argus, Common Blue, 2015), Amphibian and/or Reptile	SK 653 614 (23.12 ha)	50m NE
LWS 2/547	**Eakring Brail Wood** An old woodland site retaining considerable interest in spite of large scale replanting	Botanical	SK 664607 (47.18 ha)	860m E
LWS 2/671	**Cutt's Wood (Part)** A mature deciduous compartment of semi-natural character	Botanical	SK 654 626 (2.00 ha)	1.41km NNE
LWS 2/545	**Alder Carr, Inkersall** A thin canopy of mixed deciduous species over an acidic community of some interest	Botanical	SK 633 604 (4.73 ha)	1.46km SW
LWS 5/3384	**Fox Holes** Woodland	Botanical	SK 664 601 (1.70 ha)	1.56 km SE
LWS 1/90	**Clipstone Forest Area** An expanse of, mostly coniferous forestry within which occur numerous ephemeral heathland areas	Botanical, Moth, Amphibian and/or Reptile	SK 613 621 (1027.01 ha)	1.61NW
LWS 5/310	**Mill Hill, Green Lane** A species-rich green lane	Botanical	SK 667 617 (0.30 ha)	1.70kmNE
LWS 5/3356	**Rainworth Water, Inkersall** A mosaic of lowland heathland, acid grassland, plantation woodland and fen habitats along Rainworth Water	Botanical	SK 621602 (68.11 ha)	1.97km E
LWS 2/739	**Mill Lane, Eakring** A species-rich green lane	Botanical, Moth	SK 671 617 (0.469 ha)	2.00km NE
LWS 5/3385	**Whip Ridding Dumble** Woodland	Botanical	SK 669 599 (0.98 ha)	2.07 km SE

NGBRC bat records

3.7 59 records of bats were returned within a 2km radius of the site. There were no roost records. All records are of bats in flight, foraging or commuting and include common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus*

noctule, Leiser's *Nyctalus leisleri* and brown long-eared *Plecotus auritus*. Bat records are illustrated on **Drawing 1**.

EPS licence applications

3.8 A search on Magic website for granted European Protected Species Applications on 1st August 2017 indicates that there are no NE licence applications relating to bats within 2km of the site.

FIELD SURVEYS

Activity surveys

3.9 Bat activity across the site was variable. Bats recorded during the surveys included common pipistrelle, soprano pipistrelle, noctule, Myotis and brown long-eared bat. Sonograms of species recorded are included in **Appendix 2**. **Drawing 2** summarises bat activity recorded during the transect surveys.

Activity survey – 22nd May 2017

3.10 The first survey commenced at 21:07 under good weather conditions. The first bat recorded was a common pipistrelle (Ppip) commuting from west to east across the site near the southern boundary at 21:37, 30 minutes after sunset. Common pipistrelle were then noted foraging along the southern boundary at 21:47 and 21:49 and foraging up and down the woodland edge to the east of the site at 22:13. At 22:17 a brown long-eared bat (Paur) was noted foraging along the woodland edge but not recorded. Two common pipistrelle were noted foraging along the woodland edge at 22:21 and 22:26. At 22:31 a common pipistrelle was noted foraging along the northern boundary and at 22:37 a myotis sp. At 22:44 two common pipistrelle were recorded foraging over scrub in the north west corner of the site. Low levels of bat activity were recorded with a maximum of two bats seen at any one time. The survey finished at 22:57.

Activity survey – 25th June 2017

3.11 The survey started at 21:20 under good weather conditions. Only 5 bats were recorded during the survey. The first bats recorded were two soprano pipistrelle (Ppyg) foraging along the woodland edge and hedgerow to the north east of the site. Common pipistrelle were recorded foraging in this area at 22:14 and 22:48. A single soprano pipistrelle was recorded foraging in the north west corner of the site at 22:41 and 22:48. Low levels of bat activity

were recorded with only five bats being noted and a maximum of two bats seen at any one time. The survey finished at 23:20.

Activity survey – 25th July 2017

3.12 The survey started at 21:11 under good weather conditions. The first bat recorded was a noctule that was heard but not seen at 21:27 16 minutes after sunset, and again at 21:31. The next bats recorded were common pipistrelle noted foraging up and down the woodland edge at 21:41 then foraging in the south east corner of the field at 21:46, 21:51, 21:52, 21:54. Then at 21:55 a common pipistrelle was recorded foraging around hawthorn scrub to the south of the site. At 22:01 and 22:03 a common pipistrelle was recorded foraging along the hedgerow and into the field at the south west corner of the site. At 22:08 a common pipistrelle was recorded foraging over the field then at 22:12 and 22:15 foraging in the south east corner of the site then along the woodland edge at 22:17 and 22:20. At 22:21 a noctule was noted foraging over the field then moving off site to the south. Common pipistrelle were recorded foraging along the woodland edge at 22:22, 22:26 and 22:27, at 22:27 a soprano pipistrelle was also recorded here. At 22:31 common pipistrelle were noted foraging in the north east corner of the site at and again at 22:34 and 22:37, with a soprano pipistrelle also noted at 22:37. At 22:41 a brown long-eared bat was noted foraging at the northern boundary and to the north west common pipistrelle were recorded foraging at 22:49, 22:55, 22:56 22:59 and 23:02. At 23:05 a noctule was recorded foraging over the field to the south west of the survey area. At 23:07 a common pipistrelle was recorded foraging in the south and the last bat recorded was a common pipistrelle foraging along the hedgerow to the west of the site adjacent to Eakring Road at 23:09. The survey finished at 23:11 two hours after sunset. There was once again low levels of bat activity with a maximum of one bat noted at any one time.

Activity survey – 15th August 2017

3.13 The survey started at 04:14 one hour and thirty minutes before sunrise under suitable weather conditions. The first bat recorded was a noctule at 04:18 which was heard but not seen. Common pipistrelle were heard but not seen at the woodland edge at 04:18, 04:19, 04:23 and 04:34. At 04:36 a common pipistrelle was recorded foraging up and down along the track to the north of the site and again at 04:57 and 04:58. At 05:01 two common pipistrelle commuted west to east along the track to the north of the site, and a single commom pipistrelle commuted back east to west shortly afterwards. At 05:02 a common pipistrelle was noted foraging over the track near the bridge. At 05:12 a common pipistrelle

was recorded foraging in the south east corner of the site, at 05:12 two common pipistrelle were recorded foraging at the woodland edge. At 05:18 a common pipistrelle was recorded commuting north along the woodland edge then west along the track to the north of the survey area. At 05:20 a common pipistrelle was noted commuting north to south east of the site over the woodland then at 05:24, 05:26, 05:27, 05:30, 0531 and 05:32 common pipistrelle were noted commuting east to west along the track with several bats stopping to forage/swarm under the bridge before moving away from the site. The survey finished at 05:47 in daylight.

Activity survey – 26th September 2017

3.13 The survey started at 18:50 four minutes before sunset under good weather conditions. The first bat recorded was a soprano pipistrelle foraging along the hedgerow to the north of the site at 19:12, 18 minutes after sunset. A common pipistrelle was then recorded foraging along the woodland edge to the east of the site at 19:29 and in the south east corner at 19:43. A common pipistrelle was then noted foraging in the north west corner of the site at 20:04 and foraging up and down the track to the north of the site at 20:08. The last bat recorded was a soprano pipistrelle which was heard but not seen foraging at the woodland edge to the east of the site at 20:26. There were low levels of bat activity with only one bat seen by surveyors at any one time. The survey finished at 20:40.

4.0 SITE ASSESSMENT

CONSTRAINTS ON SURVEY INFORMATION

4.1 There were no constraints associated with the survey information; the site was accessible and all survey work was led by suitably qualified/licensed ecologists during the optimum season for recording bat activity, and was undertaken within recommended weather parameters (BCT, 2011). This avoided periods of heavy rain, strong winds (maximum gentle breeze) and dusk temperatures below 7°C (minimum dusk starting temperature 17°C, pre-dawn temperature 14°C).

CONSTRAINTS ON EQUIPMENT USED

4.2 The site was freely accessible and very disturbed, as a result static recorders were not deployed at this site. However, the survey effort was deemed sufficient to gain a good understanding of the species and usage of the site by bats. There were no additional constraints associated with the equipment used.

POTENTIAL IMPACTS OF THE DEVELOPMENT

Designated sites

4.3 The illustrative layout design of the proposed residential development shows a good sized buffer area (gardens of the properties) between the houses and the track to the north of the site and between the houses and the woodland edge. The only statutory site is Southwell Trail LNR which lies 1.18km to the south of the site. No impact is expected on the statutory site as a result of the housing development. There are 10 non-statutory designed sites, the nearest being Bilsthorpe Colliery LWS 50m to the north east of the site. No impact is expected on the Bilsthorpe Colliery or any of the other Local Wildlife Sites as a result of the housing development.

Roosts

4.4 The impact on roosting bats as a result of development of the site is assessed as negligible. There are no potential roost sites within the survey area, any impact is not likely to be significant and is unlikely to have a negative impact on the conservation status of bats in the local area.

Foraging and commuting habitat

4.5 The woodland edge and peripheral scrub/hedgerows in particular were used by foraging and commuting bats. Any additional lighting of the woodland edges and hedgerows could have an impact on either the foraging patterns or commuting routes of local bats.

LEGISLATION AND POLICY GUIDANCE

4.6 This legal information is a summary and intended for general guidance only. It is recommended that the original documentation is referred to for detailed and definitive information. Web addresses are located in the References section of this report.

HABITAT REGULATIONS

4.7 The Conservation of Habitats and Species (Amendment) Regulations 2012 SI No 1927 (Habitat Regulations) transpose into UK law Council Directive 92/43/EEC of 21st May 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (often referred to as the 'Habitats [and Species] Directive'). All bats are listed on Annex IV of the Directive and some are also listed on Annex II. The latter annex relates to the designation of Special Areas of Conservation (SACs) and covers greater and lesser horseshoe bats, barbastelle and Bechstein's bat. Inclusion on Annex IV ('European protected species') means that member states are required to put in place a system of strict protection as outlined in Article 12; this is done through inclusion on Schedule 2 of the Regulations. Regulation 39 makes it an offence to:

- Deliberately capture or kill a bat [Regulation 39(1)(a)]
- Deliberately disturb a bat [R. 39(1)(b)]
- Damage or destroy a breeding site or resting place of a bat [R. 39(1)(d)]
- Keep, transport, sell or exchange, or offer for sale or exchange a live or dead bat or any part of a bat [R. 39(2)]

4.8 Licences permit otherwise unlawful activities, and can only be granted for certain purposes.

WILDLIFE & COUNTRYSIDE ACT 1981

4.9 All bat species are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are therefore subject to provisions under Section 9 which makes it an offence to:

- Intentionally kill, injure or take a bat [Section 9(4)(a)]
- Possess or control any live or dead specimen or anything derived from a bat [Section 9(2)]

- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a bat [Section 9(3)]
- Intentionally or recklessly disturb a bat while it is occupying a structure of place that it uses for that purpose [Section 9(4)(b)]

4.10 The addition of reckless destruction or disturbance was also made through Schedule 12 of the 2000 CRoW Act.

4.11 All wild birds are protected under Section 1 of the Wildlife & Countryside Act (1981), as amended when they are nesting. Some species are given additional protection under part 1 of the act where it is also an offence to intentionally or recklessly disturb the birds close to their nest during the breeding season. Violation of the law can attract fines up to £5,000 per offence and/or a prison sentence of up to six months. Council Directive 2009/147/EC on the conservation of wild birds (the 'Birds Directive') provides for the conservation and management of all wild bird species naturally occurring in the European Union, their nests, eggs and habitats. The Birds Directive bans activities that directly threaten birds (e.g. deliberate killing and destruction of nests and young), regulates hunting of selected species, bans non-selective and large scale killing of birds, and promotes research for bird conservation and management.

4.12 Article 4(4) of the Birds Directive requires that member states "should strive to avoid pollution or deterioration of habitats." The Conservation of Habitats and Species (Amendment) Regulations 2012 provide a fuller transposition of the Birds Directive into English law. Regulation 8 introduces a new Regulation 9A to the Habitats Regulations for duties of appropriate authorities in relation to wild bird habitat. Regulation 9A(3) addresses the transposition of Article 2 of the Birds Directive, while Regulation 9A(8), requiring competent authorities to "use all reasonable endeavours" to "avoid any pollution or deterioration of habitats of wild birds."

4.13 In summary, it is an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or

recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection.

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

4.14 The NPPF outlines the Governments national planning policies. The NPFF places an emphasis on sustainable development, encouraging the re-use of land that has previously been developed over using land that has a higher environmental value and by minimising impacts on biodiversity. It states that developments should aim to conserve or enhance biodiversity and encourages opportunities to incorporate biodiversity in and around developments.

4.15 In England the National Planning Policy Framework (NPPF) references the ODPM Circular 06/2005 (Biodiversity and Geological Conservation - Statutory Obligations and Their Impact Within The Planning System) which states that 'The presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat'.

BIODIVERSITY ACTION PLANS

4.16 The original objective of the UK Biodiversity Action Plan (UKBAP) was to fulfil the requirements of the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. A list of national priority species and habitats has been produced with specific action plans defining the measures consider necessary to ensure their conservation. Regional and local BAPs have also been developed for species/habitats of nature conservation importance both regionally and locally.

4.17 National BAP species of bat are barbastelle bat *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule *Nyctalus noctula*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*. In the Nottinghamshire Biodiversity Action Plan nine species of bat are listed as priority species, these are Daubenton's bat, whiskered, Brandt's, Natterer's, noctule, Leisler's, serotine, common pipistrelle and brown long-eared (http://www.nottsbag.org.uk/pdfs/BAP/sap_bats.pdf).

LOCAL PLANS

4.18 District and Local Councils have Local Plans and other policy documents that include targets and policies which aim to maintain and enhance biodiversity through the planning system.

5.0 RECOMMENDATIONS AND MITIGATION

FURTHER SURVEY

5.1 No further survey work is proposed at this site. If there is significant time lapse between survey and planning it may be necessary to update surveys.

MITIGATION MEASURES

Mitigation for roosting habitat

5.2 None required on site. It is good practice to enhance/introduce roosting opportunities for bats in new developments. It is therefore recommended that roosting opportunities are incorporated into a proportion of the new dwellings.

Proposed mitigation for foraging and commuting habitat

5.3 To minimise impact on foraging and commuting bats a sympathetic lighting strategy which avoids strong illumination of the woodland edge and tree lines is recommended. The Institute of Lighting Engineers and The Bat Conservation Trust (BCT & ILE 2008) have produced guidance on lighting to minimise impact on bats and an excerpt is reproduced below.

2. FORAGING AND COMMUTING

Type of lamp (light source)

The impact on bats can be minimised by the use of low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its UV filtration characteristics.

Luminaire and light spill accessories

Lighting should be directed to where it is needed and light spillage avoided. 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 only. Planting can also be used as a barrier or manmade features that are required within the build can be positioned so as to form a barrier.

Lighting column

The height of lighting columns in general should be as short as is possible as light at a low level reduces the ecological impact. However, there are cases where a taller column will

enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low level lighting that is as directional as possible and below 3 lux at ground level. The acceptable level of lighting may vary dependent upon the surroundings and on the species of bat affected.

Predicting where the light cone and light spill will occur

There are lighting design computer programs that are widely in use which produce an image of the site in question, showing how the area will be affected by light spill when all the factors of the lighting components listed above are taken into consideration. This should be a useful tool to inform the mitigation process.

Light levels

The light should be as low as guidelines permit. If lighting is not needed, don't light.

Timing of lighting

The times during which the lighting is on should be limited to provide some dark periods. Roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route.

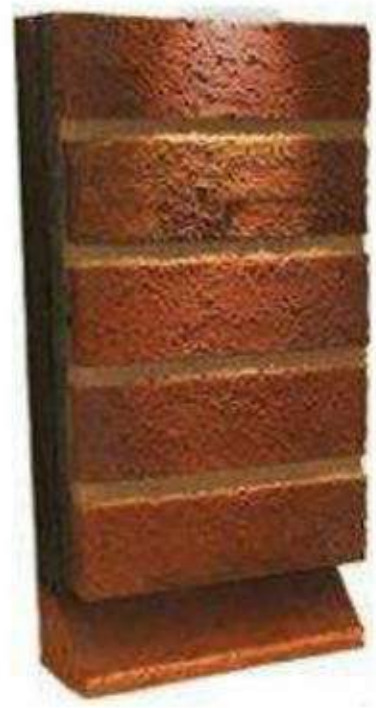
Habitat Enhancement

5.4 Potential habitat enhancement for the development will include gapping up the hedgerow to the north of the site adjacent to the disused railway track to enhance habitat continuity around the north of the site and to maintain the route as a flyway for local bats.

Bat box

5.5 An excellent way to enhance habitat for bats is to introduce new roosting habitat into the new builds. The Habibat bat box (http://www.habibat.co.uk/) is recommended by the Bat Conservation Trust for enhancing homes for bats. Manufactured to suit any existing brick or stonework finish. Unobtrusive and aesthetically pleasing, Habibats can be joined side by side to increase the roost space. This box is made to order and faced in brick to match your building. Facing products include brick, granite, slate, tile timber, stone, masonry and terracotta or they can be bespoke if provided with a specific facing material.

5.6 It is recommended that a habibat bat box is incorporated into the southern aspect of two of the houses situated adjacent to the woodland edge (east of the site) to enhance the opportunities for local bats. It is recommended that they are not positioned over windows or doors and that they are at a height of 3 – 5m from the ground. In addition two 2F Schwegler bat boxes will be placed in trees to the east of the site.



Habibat bat box

MITIGATION LICENCES

5.7 A NE protected species licence is not required.

6.0 SUMMARY

6.1 There is one statutory site within 2km of the proposed development and 10 non statutory sites. No significant negative impacts are expected on any of the statutory and non-statutory sites as a result of the proposed residential development.

6.2 59 records of bats were returned within a 2km radius of the site. There were no roost records. All records are of bats in flight, foraging or commuting and include common pipistrelle, soprano pipistrelle, noctule, Leiser's and brown long-eared.

6.3 There were no structures within the site that had the potential to support roosting bats. No impact on roosting bats was likely as a result of the proposed development.

6.4 Bat activity across the site was low, activity was generally restricted to the woodland edge to the east and the other boundaries, with minor foraging over the site by noctule and common pipistrelle.

6.5 A lighting strategy was recommended to avoid impacting on foraging and commuting bats.

6.6 In line with best practice, recommendations were made to enhance roosting habitat for bats as part of the development of the site.

7.0 REFERENCES

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

UK LEGISLATION AND POLICY WEB ADDRESS:

Conservation of Habitats and Species Regulations 2010:

http://www.opsi.gov.uk/si/si2010/uksi_20100490_en_1

Wildlife and Countryside Act 1981:

www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1

Countryside and Rights of Way Act 2000:

www.legislation.hmso.gov.uk/acts/acts2000/20000037

Natural Environment and Rural Communities Act 2006:

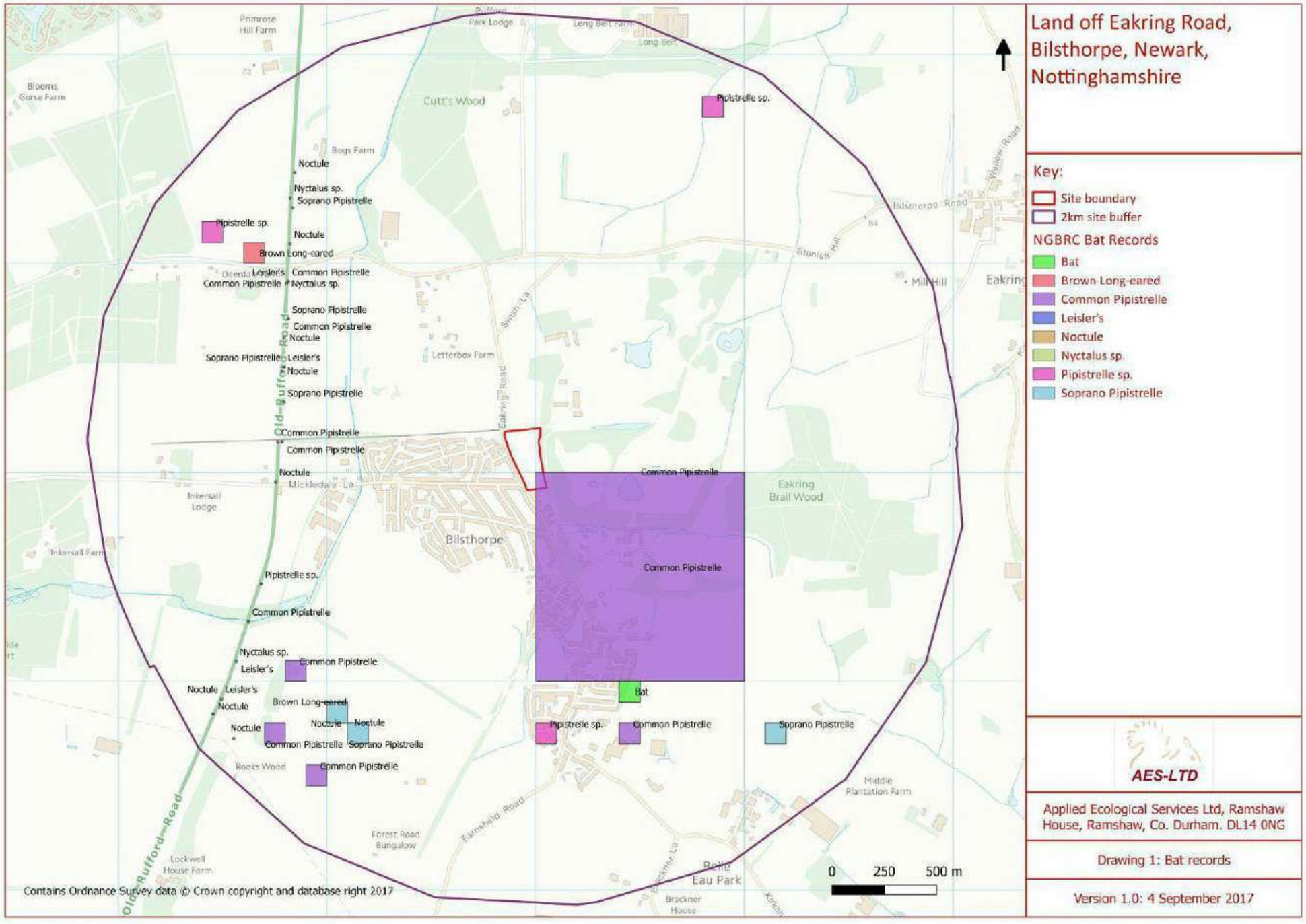
http://www.opsi.gov.uk/acts/acts2006/ukpga_20060016_en_1

National Parks and Access to the Countryside Act 1949:

http://www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1949/cukpga_19490097_en_1

National Planning Policy Framework:

http://www.communities.gov.uk/publications/planningandbuilding/nppf



Land off Eakring Road, Bilsthorpe, Newark, Nottinghamshire

Key:

- Site boundary
- 2km site buffer

NGBRC Bat Records

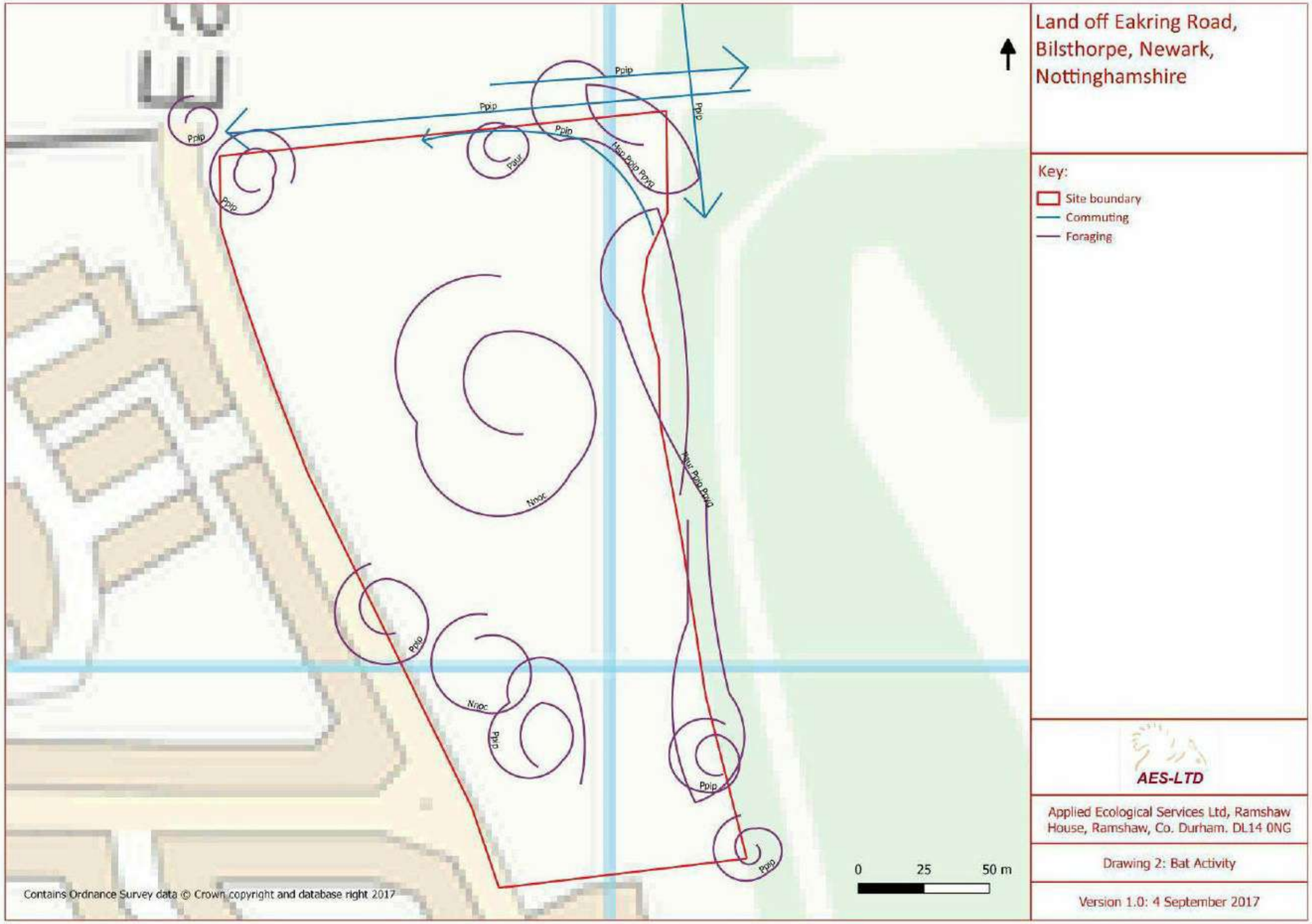
- Bat
- Brown Long-eared
- Common Pipistrelle
- Leisler's
- Noctule
- Nyctalus sp.
- Pipistrelle sp.
- Soprano Pipistrelle

AES-LTD

Applied Ecological Services Ltd, Ramshaw House, Ramshaw, Co. Durham. DL14 0NG

Drawing 1: Bat records

Version 1.0: 4 September 2017



Land off Eakring Road, Bilsthorpe, Newark, Nottinghamshire

Key:

- Site boundary
- Commuting
- Foraging

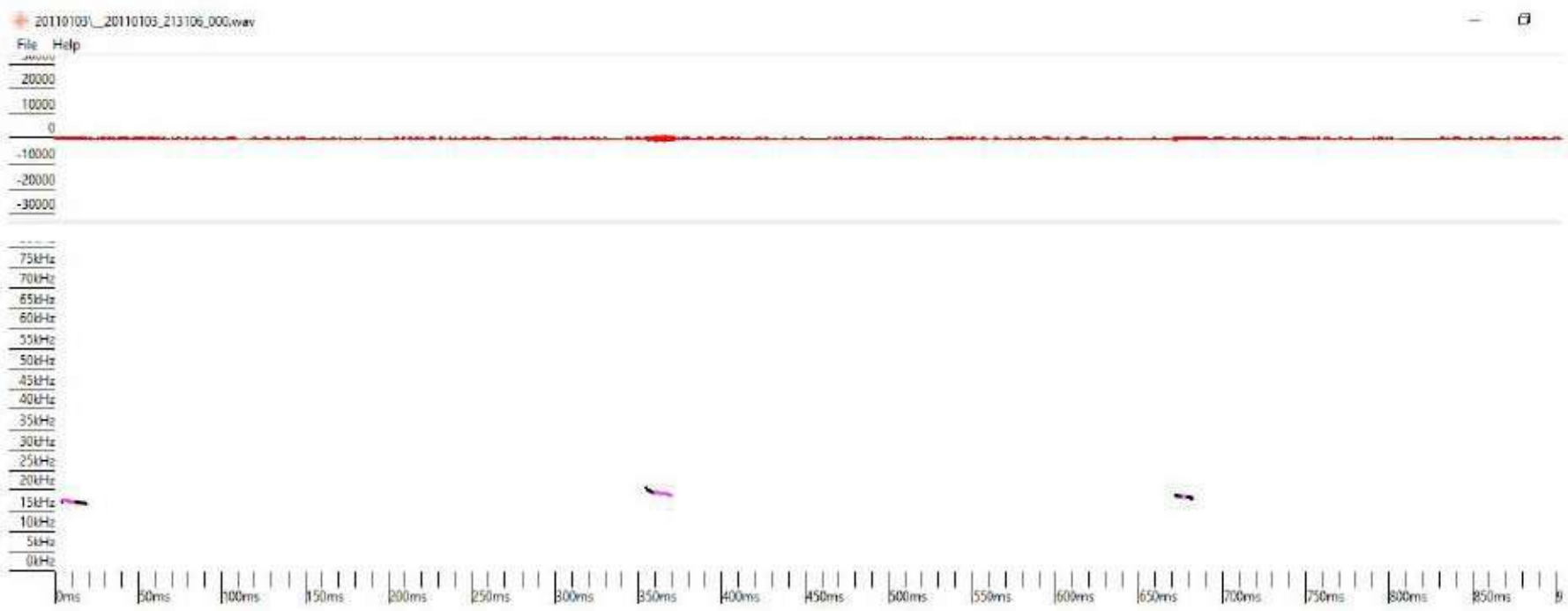
AES-LTD

Applied Ecological Services Ltd, Ramshaw House, Ramshaw, Co. Durham. DL14 0NG

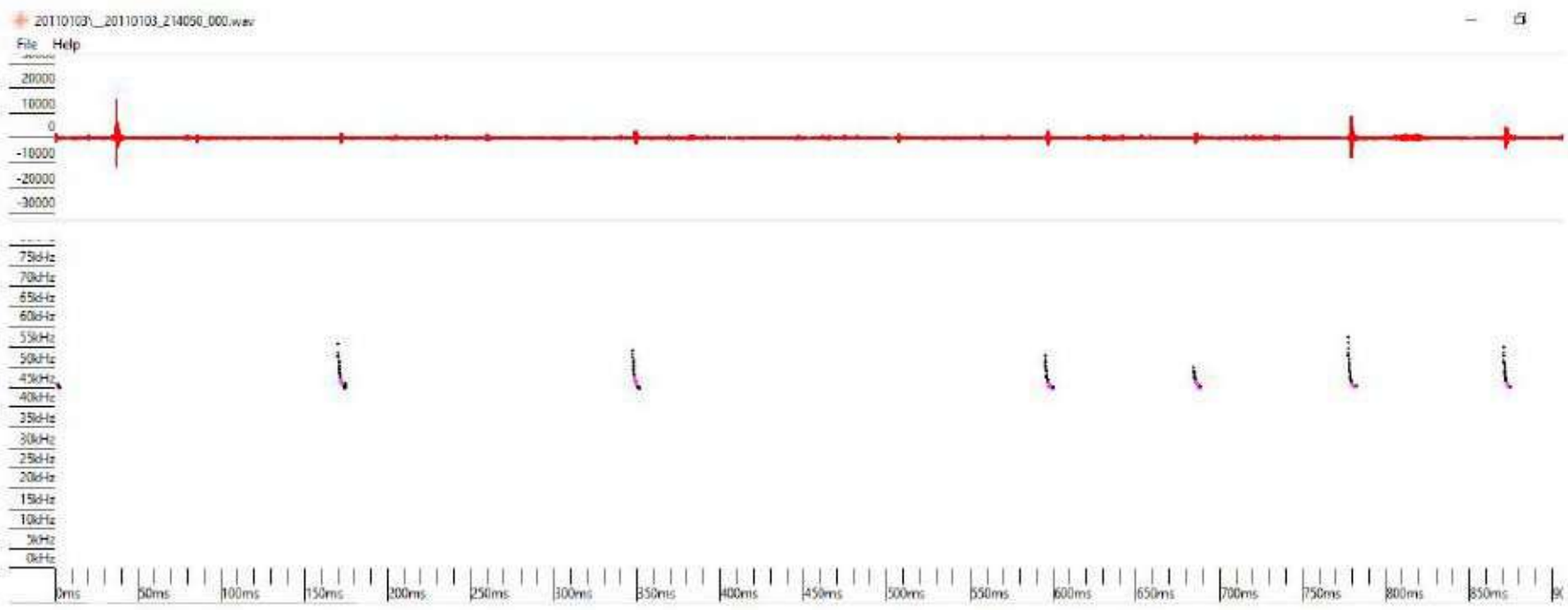
Drawing 2: Bat Activity

Version 1.0: 4 September 2017

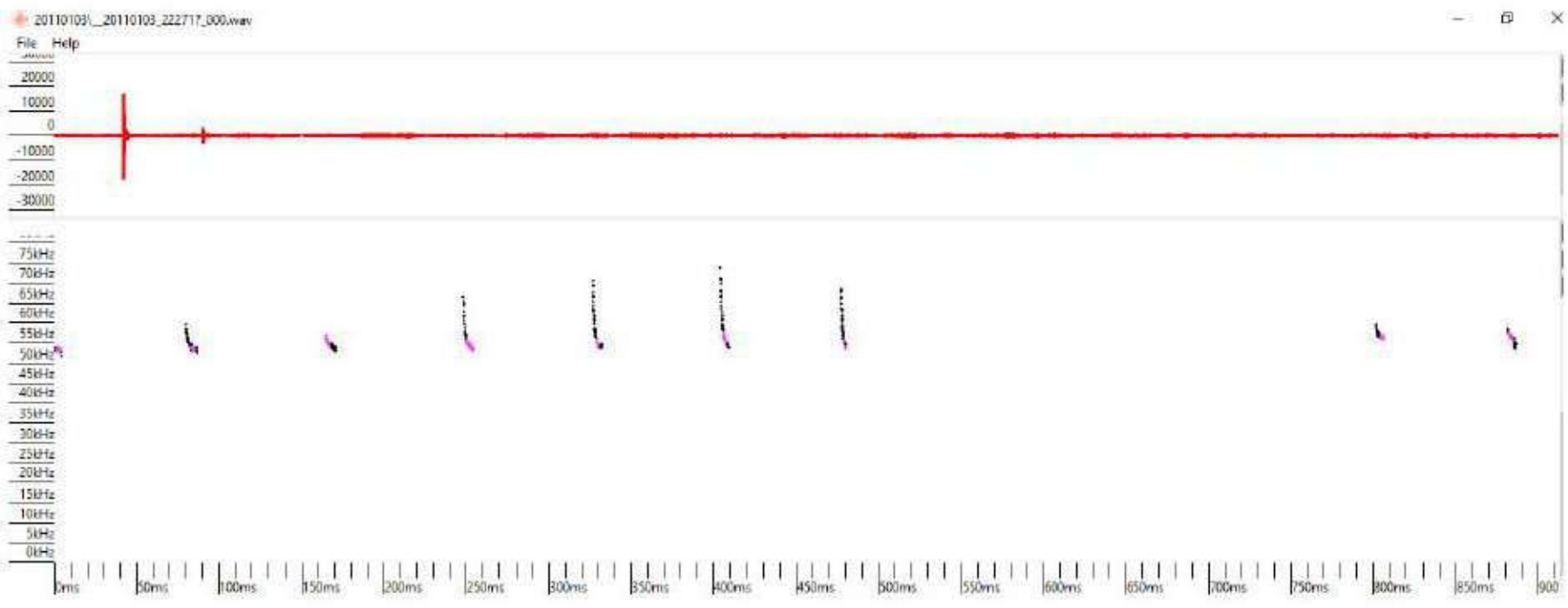
APPENDIX 1: SONOGRAMS



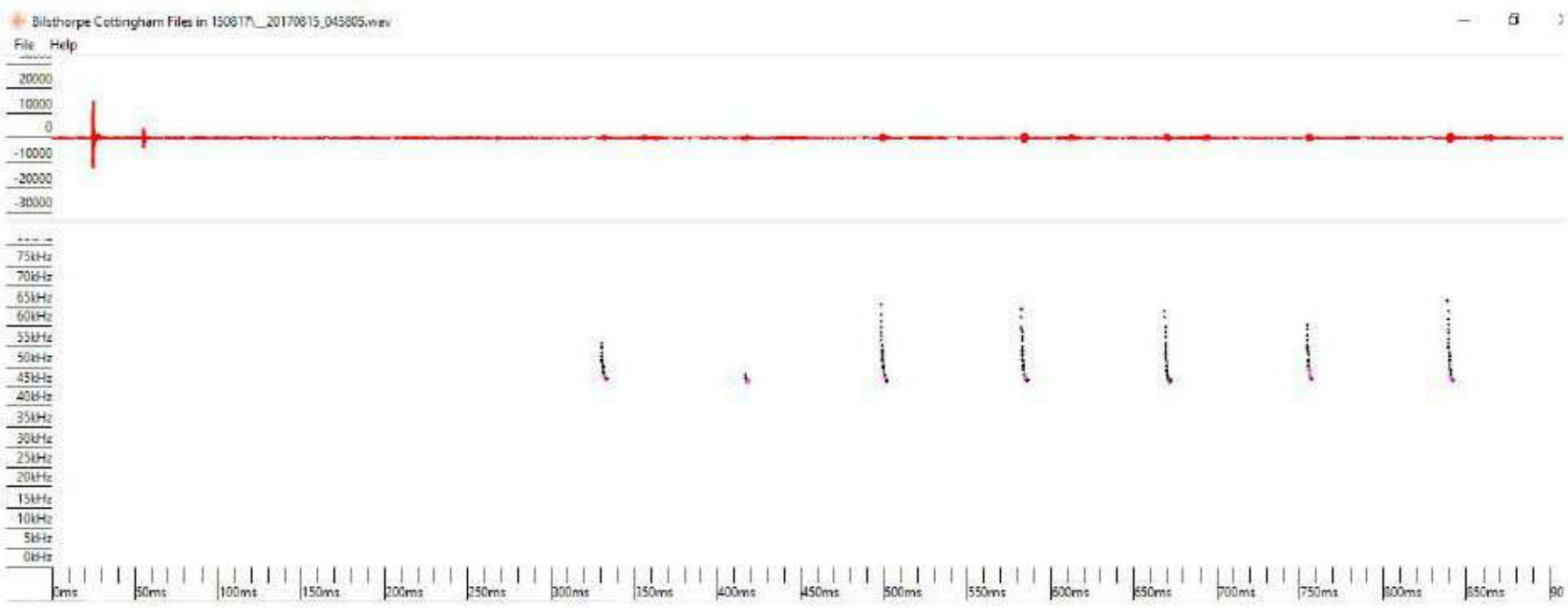
Sonogram 1 Noctule 25/07/17 at 21:31.



Sonogram 2 Common pipistrelle 25/07/17 at 21:41.



Sonogram 3 Soprano pipistrelle 25/07/17 at 22:27.



Sonogram 4 Common pipistrelle 15/08/17 at 04:58.

Appendix C: Desk Study Results: Bird Species

Species	Conservation Status	Number of Records / latest record	Closest record to site (approximate distance) / Comments
Bats			
Barn owl *Tyto alba*	WCA Sch1, BGr	3 / 2010	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Black-headed gull *Chroicocepholus ridibundus*	BAmb	11 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Brambling *Fringilla montifringilla*	WCA Sch1, BGr	4 / 2010	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Bullfinch *Pyrrhula pyrrhula*	BAmb, NERC S41	24 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Common gull *Larus canus*	BAmb	4 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Cormorant *Phalacrocorax carbo*	BAmb	3 / 2016	0.24 km Southeast
Cuckoo *Cuculus canorus*	BRd, NERC S41	1 / 2011	0.76 km Northeast
Curlew *Numenius arquata*	BRd, NERC S41	1 / 2010	0.24 km Southeast
Dunnock *Prunella modularis*	BAmb, NERC S41	20 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Fieldfare *Turdus pilaris*	WCA Sch 1, BRd	26 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Goldcrest *Regulus regulus*	BGr	14 / 2016	0.24 km Southeast
Goosander	BGr	1 / 2017	0.24 km Southeast

Appendix C: Desk Study Results: Bird Species

Species	Conservation Status	Number of Records / latest record	Closest record to site (approximate distance) / Comments
Mergus merganser			
Great black-backed gull *Larus marinus*	BAmb	1 / 2008	Within SK6561 that partially encompasses the site boundary
Grey partridge *Perdix perdix*	NERC S41, BRd	14 / 2011	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Greylag goose *Anser anser*	BAmb	1 / 2010	0.24 km Southeast
Grey wagtail *Motacilla cinerea*	BRd	2 / 2008	Within SK6561 that partially encompasses the site boundary
Herring gull *Larus argentatus*	WCA Sch1, BRd	4 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
House martin *Delichon urbicum*	BAmb	4 / 2009	0.24 km Southeast
House Sparrow *Passer domesticus*	BRd, NERC S41	3 / 2009	0.24 km Southeast
Kestrel *Falco tinnunculus*	BAmb	59 / 2012	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Kingfisher *Alcedo atthis*	WCA Sch1, BAmb	1 / 2016	0.24 km Southeast
Lapwing *Vanellus vanellus*	BRd, NERC S41	5 / 2016	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Lesser black-backed gull *Larus fuscus*	BAmb	17 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary

Appendix C: Desk Study Results: Bird Species

Species	Conservation Status	Number of Records / latest record	Closest record to site (approximate distance) / Comments
Lesser redpoll *Acanthis cabaret*	BRd, NERC S41	11 / 2011	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Lesser-spotted woodpecker *Dendrocopos minor*	NERC S41, BRd	1 / 2009	Within SK6561 that partially encompasses the site boundary
Linnet *Linaria cannabina*	NERC S41, BRd	14 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Little-ringed plover *Charadrius dubius*	WCA Sch1, BGr	4 / 2011	Within SK6561 that partially encompasses the site boundary
Mallard *Anas platyrhynchos*	BAmb	12 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Marsh tit *Poecile palustris*	BRd, NERC S41	43 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Meadow pipit *Anthus pratensis*	BAmb	4 / 2016	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Merlin *Falco columbarius*	WCA Sch1, BRd	1 / 2009	Within SK6561 that partially encompasses the site boundary
Mistle thrush *Turdus viscivorus*	BRd	6 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Mute swan *Cygnus olor*	BAmb	2 / 2008	Within SK6561 that partially encompasses the site boundary
Peregrine *Falco peregrinus*	WCA Sch1, BGr	1 / 2013	Within SK6561 that partially encompasses the site boundary
Pink-footed goose *Anser brachyrhynchus*	BAmb	1 / 2008	Within SK6561 that partially encompasses the site boundary

Appendix C: Desk Study Results: Bird Species

Species	Conservation Status	Number of Records / latest record	Closest record to site (approximate distance) / Comments
Redwing *Turdus iliacus*	WCA Sch1, BRd	9 / 2009	Within SK6561 that partially encompasses the site boundary
Reed bunting *Emberiza schoenicius*	BAmb, NERC S41	1 / 2009	Within SK6561 that partially encompasses the site boundary
Shelduck *Tadorna tadorna*	BAmb	1 / 2008	Within SK6561 that partially encompasses the site boundary
Skylark *Alauda arvensis*	WCA Sch1, BRd	12 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Snipe *Gallinago gallinago*	BAmb	2 / 2010	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Song thrush *Turdus philomelos*	BRd, NERC S41	29 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Starling *Sturnus vulgaris*	BRd, NERC S41	9 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Stock dove *Columba oenas*	BAmb	29 / 2009	0.24 km Southeast
Swift *Apus apus*	BAmb	21 / 2009	0.24 km Southeast
Tawny owl *Strix aluco*	BAmb	5 / 2016	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Teal *Anas crecca*	BAmb	1 / 2009	Within SK6561 that partially encompasses the site boundary
Tree sparrow *Passer montanus*	BRd, NERC S41	96 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary

Appendix C: Desk Study Results: Bird Species

Species	Conservation Status	Number of Records / latest record	Closest record to site (approximate distance) / Comments
Turtle dove *Streptopelia turtur*	NERC S41, BRd	3 / 2015	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Wigeon *Anas penelope*	BAmb	2 / 2008	Within SK6561 that partially encompasses the site boundary
Willow tit *Poecile montana*	BRd, NERC S41	9 / 2009	0.24 km Southeast
Willow warbler *Phylloscopus trochilus*	BAmb	2 / 2009	Within SK6561 that partially encompasses the site boundary
Woodcock *Scolopax rusticola*	BRd	6 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Yellowhammer *Emberiza citrinella*	BRd, NERC S41	18 / 2009	0.24 km Southeast and within SK6561 that partially encompasses the site boundary
Yellow wagtail *Motacilla flava*	BRd, NERC S41	3 / 2012	0.24 km Southeast and within SK6561 that partially encompasses the site boundary

Conservation Status Key: BRed = Red on the RSPB list of Birds of Conservation Concern (BoCC), BAmb = Amber on BoCC, BGr = Green on BoCC. NERC = Natural Environment and Rural Communities Act (2006), Section 41 list of Priority Species. WCA = Wildlife and Countryside Act (1981). Sch1 = Schedule 1 of WCA.

Appendix D: Botanical Species List

The DAFOR values used in the report correspond to the following ranges of percentage cover:

Dominate (D)	75-100% cover
Abundant (A)	25-75% cover
Frequent (F)	10-24% cover
Occasional (O)	5-9% cover
Rare (R)	<5% cover or <5 individuals / clumps within the survey unit

Improved Grassland

Scientific Name	Common Name	Cover
Achillea millefolium	Yarrow	O
Arrhenatherum elatius	False oat-grass	O
Bromus hordeaceus	Soft brome	R
Bryophyte sp	A moss	R
Cerastium fontanum	Common mouse-ear	R
Cirsium arvense	Creeping thistle	R
Cynosurus cristatus	Crested dogs tail	R
Dactylis glomerata	Cock's-foot	F
Heracleum sphondylium	Hogweed	R
Holcus lanatus	Yorkshire-fog	R
Lolium perenne	Perennial ryegrass	D
Malvaceae sp	A mallow	R
Phleum pratense	Timothy	R
Plantago lanceolata	Ribwort plantain	R
Poa species	Meadow grass species	O
Ranunculus acris	Meadow buttercup	R
Rumex crispus	Curled dock	R
Rumex obtusifolius	Broad-leaved dock	R
Taraxacum agg.	Dandelion	F
Trifolium campestre	Hop trefoil	R
Trifolium pratense	Red clover	R
Urtica dioica	Common nettle	R

Scattered Scrub

Scientific Name	Common Name	Cover
Anthriscus sylvestris	Cow parsley	R
Artemisia vulgaris	Mugwort	O
Cirsium arvense	Creeping thistle	R
Lonicera periclymenum	Honeysuckle	LD
Quercus robur	Oak saplings	R
Rubus fruticosus agg.	Bramble	F
Rumex obtusifolius	Broad-leaved dock	O
Senecio jacobaea	Common ragwort	R
Urtica dioica	Common nettle	F

Tall Ruderal Grassland Edge

Scientific Name	Common Name	Cover
Achillea millefolium	Yarrow	O
Alliaria petiolata	Garlic mustard	R
Arrhenatherum elatius	False oat-grass	F
Cynosurus cristatus	Crested dogs tail	R
Dactylis glomerata	Cock's-foot	F
Epilobium sp	Willowherb Sp.	F
Hypericum perforatum	Perforate st John's-wort	R
Lolium perenne	Perennial ryegrass	O
Plantago lanceolata	Ribwort plantain	R
Potentilla reptans	Creeping cinquefoil	R
Taraxacum agg.	Dandelion	R
Trifolium pratense	Red clover	R
Urtica dioica	Common nettle	O

Woodland Edge / Dense Scrub

Scientific Name	Common Name	Cover
Achillea millefolium	Yarrow	R
Anthriscus sylvestris	Cow parsley	R
Arrhenatherum elatius	False oat-grass	F
Cirsium arvense	Creeping thistle	O
Convolvulus sp	Bindweed sp.	R
Crataegus monogyna	Hawthorn saplings	O
Dactylis glomerata	Cock's-foot	R
Epilobium sp	Willowherb Sp.	R
Fraxinus excelsior	Ash sapling	R
Geranium robertianum	Herb robert	R
Hedera helix	Ivy	O
Heracleum sphondylium	Hogweed	R
Pteridium aquilinum	Bracken	R
Ranunculus acris	Meadow buttercup	O
Rubus fruticosus agg.	Bramble	D
Rumex obtusifolius	Broad-leaved dock	R
Senecio jacobaea	Common ragwort	R
Silene dioica	Red campion	R
Trifolium campestre	Hop trefoil	R
Trifolium pratense	Red clover	R
Urtica dioica	Common nettle	F

TN1 – Bracken and Dense Scrub Boundary

Scientific Name	Common Name	Cover
Anthriscus sylvestris	Cow parsley	R
Arrhenatherum elatius	False oat-grass	O
Alliaria petiolata	Garlic mustard	R
Cirsium arvense	Creeping thistle	R
Crataegus monogyna	Hawthorn	A
Dactylis glomerata	Cock's-foot	O
Epilobium sp	Willowherb Sp.	R
Hedera helix	Ivy	LA / O
Heracleum sphondylium	Hogweed	R
Galium aparine	Cleavers	R
Pteridium aquilinum	Bracken	D
Poa species	Meadow grass species	R
Rubus fruticosus agg.	Bramble	O
Sonchus oleraceus	Smooth sow-thistle	R
Urtica dioica	Common nettle	A

Bare Earth

Scientific Name	Common Name	Cover
Bryophyte sp	A moss	R
Cerastium fontanum	Common mouse-ear	R
Matricaria discoidea	Pineappleweed	R
Poa species	Meadow grass species	R
Plantago major	Greater plantain	R