

Hopkins Ecology

Site: Land North and South of
Dereham Road, Easton

Work Baseline Ecology Description
Item: 2019

Client: Persimmon Homes

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Date: 19 May 2020

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Summary

Hopkins Ecology Ltd was appointed by Persimmon Homes to prepare an ecological assessment of the Land North and South of Dereham Road, Easton. The scheme is for the erection of 890 homes and associated works and received outline planning approval in November 2016.

The consent has two conditions relating to ecology, including the preparation of management plans for the on-Site ecology and green infrastructure. To inform these plans an updated baseline description of the Site is presented, based on survey work in 2019.

The Site is largely unchanged from that described previously, although a number of fields that were arable are now improved sward. The key changes are that an off-Site pond supporting a moderate population of great crested newts in 2014 was without newts in 2019 (this is the pond located within the showground site). Also, the 2019 survey work includes a detailed botanical description and this identified an assemblage of species associated with arable margins and open, disturbed grassland.

Feature	Summary	Change since 2013-14
Hedgerows	14 lengths qualify as priority Hedgerow Habitat of Principal Importance. One length qualifies as an Important Hedgerow.	Probably unchanged
Arable herbs	Two Near Threatened and one scarce species: common cudweed, corn spurrey and hoary mullein. Likely to be similar to other arable sites around Norwich.	Not surveyed previously, but probably unchanged.
Great crested newts	One occupied pond with a peak count of 3, located off-Site to the south-west.	Pond A previously supported a moderate population, but none were recorded in 2019.
Bats: roosting and commuting	No roosts identified on-Site. Soprano pipistrelle roost of moderate size likely to be present within Diocese buildings.	Probably unchanged.
Bats: foraging	Six species: common pipistrelle, soprano pipistrelle, Myotis species, noctule, brown long-eared and barbastelle.	Probably unchanged.
Nesting birds	Five species of conservation concern: skylarks, song thrush, dunnock, stock dove and linnet. Density of skylarks lower than previously reported (when there were 7 pairs) and below the reported average for winter cereals.	Similar, but reduction in numbers of skylarks.
Reptiles	Low population of slow worms, between A47 and Dereham Road only. Only recorded within westernmost parcel.	Similar, but none recorded in the east parcel north of Dereham Road.
Hedgehogs	Likely to be present.	Probably unchanged.
Invertebrates	Small assemblage of widespread but declining priority moths.	Probably unchanged.

The Site is considered to be typical of farmland habitats in the vicinity of Norwich. A suite of protected species and species of conservation concern are present, but these are likely to be species that are widespread within the vicinity as larger populations across the landscape.

1. INTRODUCTION

BACKGROUND

- 1.1 Hopkins Ecology Ltd was appointed by Persimmon Homes to prepare an ecological assessment of the Land North and South of Dereham Road, Easton. The scheme received outline planning approval in November 2016¹, and is for “the erection of 890 homes, the creation of a village heart an extended primary school, a new village hall, a retail store and areas of public open space, the relocation add increased capacity of the allotments and associated infrastructure including public open space and highway works”.
- 1.2 The outline consent has two conditions relating to ecology, in essence requiring:
 - Condition 31 - The preparation and implementation of an Ecological Management Plan for matters relating to on-Site ecology
 - Condition 32 - A Green Infrastructure Management Plan relating to the context of the scheme at a landscape scale.
- 1.3 However, for the purposes of informing these management plans, the ecological advisor to South Norfolk has recommended that baseline surveys are repeated, to provide an up-to-date baseline and to ensure that the mitigation and associated management plans are appropriate, relevant and legally compliant. This report presents the results of relevant surveys undertaken in 2019.

SITE CONTEXT AND STATUS

- 1.4 The Site comprises a swathe of farmland broadly forming an arc around the south of Easton, with two parcels to the north, between the A47 and the Dereham Road. The Site straddles two national character areas:
 - Central North Norfolk National Character Area². The eastern part is within this area, which is characterised as a: *“gently undulating rural landscape [that] stretches from the slightly flatter, more open land of [mid-Norfolk], to the prominent glacial landform of the Cromer Ridge and the dynamic exposed coastline of coastal cliffs... This is ancient countryside with a long-settled agricultural character, where arable land is enclosed by winding lanes and hedgerows, interspersed with woodland and remnant heath and dissected by lush pastoral river valleys”*.
 - Mid-Norfolk National Character Area³. The western part is within this area, which is characterised as a *“broadly flat rural landscape ... This is ancient countryside with a long-settled character, where arable fields are enclosed by winding lanes and hedgerows interspersed with woodland and heath and dissected by lush pastoral river valleys”*.

LEGISLATION AND PLANNING POLICY

- 1.5 The following key pieces of nature conservation legislation are relevant to legally protected species (with a more detailed description in Appendix 8):

¹ 2014/2611

² Natural England (2014) *NCA Profile 78: Central North Norfolk*. Available from: <http://publications.naturalengland.org.uk/publication/6232246738485248>

³ Natural England (2014) *National Character Area. Mid-Norfolk, 84*. Available from: <http://publications.naturalengland.org.uk/publication/4560839075954688?category=587130>

- The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations); and
 - The Wildlife and Countryside Act, 1981 (as amended).
- 1.6 Also, the National Planning Policy Framework (MHCLG, 2019⁴) requires local authorities to avoid and minimise impacts on biodiversity and, where possible, to provide net gains in biodiversity when making planning decisions. A substantial number of species are of conservation concern in the UK. A small number of these species are fully protected under the legislation listed above, but others in England are recognised as Species of Principal Importance under the Natural Environment and Rural Communities Act 2006 and reinforced by the National Planning Policy Framework. For these species local planning authorities are required to promote the “*protection and recovery*” via planning and development control. Examples include the widespread reptiles, skylarks, soprano pipistrelle and brown long-eared bats.
- 1.7 Although the NPPF has an overarching aim of minimising impacts to biodiversity, the majority of species of conservation concern are not specifically recognised by legislation or planning policy. The level of protection afforded to these is undefined and should be considered within the overall aim of minimising impacts on biodiversity.

⁴ MHCLG (2019) *A National Planning Policy Framework for England*. Ministry for Housing, Communities and Local Government, London.

2. METHODS

DESK STUDY

- 2.1 The desk study comprised a formal data search from the local records centre and a review of relevant data and information from other sources (Table 1).

Table 1. Overview of desk study data sources.

Source	Information
Norfolk Biodiversity Information Service	Designated sites, species of conservation concern; 5km search radius
MAGIC (www.magic.gov.uk)	Additional information on statutory sites, habitats of principal importance and wider countryside information
Local Planning Applications, manual map-based searching of the South Norfolk DC website	Recent survey data for protected species locally, including negative data
Various literature and web-based searches	Information on local projects and initiatives of potential relevance as well as some species-level data
Historic maps Norfolk (http://www.historic-maps.norfolk.gov.uk/)	Aerial photographs from 1988 and 1946; OS maps from 1880s and earlier

FIELD SURVEYS

- 2.2 The suite of surveys was informed by the earlier assessment and are listed in Table 2, with additional information provided in the Appendices. The lead field surveyor was Dr Graham Hopkins, who holds full bat and great crested newt survey licences and was present on all surveys other than the bird and botany surveys, and some reptile surveys. He was supported by experienced assistants as appropriate. The breeding bird and specialist botany surveys were undertaken by Mr Dave Showler, and he is a recognised authority on both groups.

Table 2. Summary of survey methods (see Appendices for more details).

Taxon	Summary	Survey standard / guidelines followed	Additional detail
Phase 1 and hedgerows	29 May 2019.	JNCC (2010) ⁵ and DEFRA (2007) ⁶	-
Botany	Four transects and incidental recording for arable herbs.	Plantlife (2015) ⁷	Appendix 2
Great crested newts	Habitat Suitability Index assessment of ponds within 250m. Manual surveys in May 2019 with E-DNA survey for confirmation of a negative result in June 2019.	ARG (2010) ⁸ ; English Nature (2001 ⁹ , 2016 ¹⁰)	Appendix 3

⁵ JNCC (2010) *Handbook for Phase 1 Habitat Surveys*. Joint Nature Conservation Committee, Peterborough.

⁶ DEFRA (2007) *Hedgerow Survey Handbook*. DEFRA, London

⁷ Plantlife (2015) *England's Important Arable Plants*. Available from: www.plantlife.org.uk/application/files/4715/2061/1183/Englands_Important_Arable_Plants_Report.pdf

⁸ ARG (2010) *Great Crested Newt Habitat Suitability Index*. May 2010. ARG UK Advice Note 5. Available online www.arguk.org

⁹ English Nature (2001) *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

¹⁰ <https://www.gov.uk/guidance/great-crested-newts-surveys-and-mitigation-for-development-projects>

Taxon	Summary	Survey standard / guidelines followed	Additional detail
Bats: foraging	Site-wide bat surveys were undertaken in May – September 2019, comprising a transect and five static detectors deployed for five nights per month.	Collins (2016) ¹¹	Appendix 4
Bats: roosting	Emergence surveys of 15 trees in June.	Collins loc. cit.	Appendix 4
Birds	Four breeding bird surveys in June 2019.	BTO (online) ¹²	Appendix 5
Reptiles	Inspection of 65 refuge felts in September – October 2019.	Froglife (1999) ¹³	Appendix 6
Badgers, brown hares and hedgehogs	Visual inspection and incidental observations.	Badgers, Harris et al. (1989) ¹⁴ ; brown hares, Harris et al. (2016) ¹⁵ ; hedgehogs, Roos et al. (2012) ¹⁶	-
Invertebrates	Visual appraisal for key habitats and microhabitats.	English Nature (2005) ¹⁷ , Drake et al., (2007) ¹⁸	-

GUIDANCE

- 2.3 This report has been prepared with reference to best practice guidance published by the Chartered Institute for Ecology and Environmental Management (CIEEM) and as detailed in British Standard 42020:2013 Biodiversity - Code of Practice for Biodiversity and Development. Current guidance with respect to different features and taxa has also been followed as described for each feature/species group.

CONSTRAINTS

- 2.4 There were no constraints to the surveys as described.

¹¹ Collins, J. (2016) *Bat Surveys for Professional Ecologists*. Bat Conservation Trust, London.

¹² BTO (online) *British Trust for Ornithology website*: Downloaded May 2016. Available from: www.bto.org/about-birds/birdtrends/2014/methods/common-birds-census and www.bto.org/sites/default/files/u36/downloads/breedingcodes.pdf

¹³ Froglife (1999) *Reptile Survey. Froglife Advice Sheet 10*. Froglife, Halesworth.

¹⁴ Harris, S., Cresswell, P. and Jefferies, D. (1989) *Surveying Badgers*. Mammal Society, Aberdeen

¹⁵ Harris, S.J., Massimino, D., Newson, S.E., Eaton, M.A., Marchant, J.H., Balmer, D.E., Noble, D.G., Gillings, S., Procter, D. and Pearce-Higgins, J.W. (2016) *The Breeding Bird Survey 2015. BTO Research Report 687*. British Trust for Ornithology, Thetford.

¹⁶ Roos, S., Johnston, A. and Noble, D. (2012) *UK Hedgehog Datasets and their Potential for Long-Term Monitoring. BTO Research Report No. 598*. BTO, Thetford.

¹⁷ English Nature (2005) *Organising Surveys to Determine Site Quality for Invertebrates A Framework Guide for Ecologists*. Available from: <http://publications.naturalengland.org.uk/file/116024>

¹⁸ Drake C.M., Lott, D.A., Alexander, K.N.A. & Webb, J. (2007) *Surveying Terrestrial and Freshwater Invertebrates for Conservation Evaluation*. Natural England, Sheffield.

Name	Location	Description
River Tud at Easton and Honingham (250)	560m north	A 4.6km length of the River Tud with aquatic, marginal and emergent flora, otters and water voles.
Harman's Grove & adj. grassland (2104)	660m north	Semi-natural ancient woodland with species-rich acid grassland.
Holly Woods (2103)	730m north	Semi-natural ancient woodland.
Old Hall Meadow (232)	800m south	Semi-improved grassland.
Lord's Hill & Easton Reeds and Blackhill Wood (257)	830m north east	Semi-natural ancient woodland with oak, hornbeam and some field maple coppice
Long Dale (247)	930m north east	Old gravel pits with developing woodland on acid soil.
Pasture at Easton College (2174)	960m south	Water meadows and ditches
Yare Valley (Marlingford) (230)	1.1km south	Grassland, woodland, marsh and tall fen flanking the River Yare.
River Yare at Marlingford (231)	1.2km south	Section of the Yare with species-rich marginal and riverine flora.
Algarsthorpe Marshes (2288)	1.3km south	Grazing marsh and semi-improved neutral grassland with ditches
Yare Valley (Bawburgh) (239)	1.3km south	Fen and ditches with diverse macrophytes
Ringland Hills (1336)	1.4km north	Semi-natural oak-birch woodland
Ringland Pits (1339)	1.45km north	Flooded gravel pits surrounded by oak-birch woodland
Ave's Gap (2306)	1.6km north	Semi-natural and mixed plantation woodland
Snakes Hills (248)	1.53km north-east	Semi-natural broad-leaved woodland.
Brickfield Farm (252)	1.64km north-east	Neutral grassland.
Blyth's Wood (2115)	1.88km north-east	Broad-leaved, semi-natural woodland.
Hall Hills/Ringland Covert (2105)	1.86km north-west	Broad-leaved woodland, listed as ancient woodland.

LANDSCAPE SCHEMES

- 3.4 The status of the Site with respect to landscape schemes was not addressed within the earlier assessments. These are now covered in the accompanying report to discharge Conditions 31 and 32.

4. HABITATS AND BOTANY

OVERVIEW

- 4.1 Compared to the 2014 assessment the main change has been an increase in the extent of improved swards, with these having previously been arable (Figure 2). Also, a specialist botanical survey was undertaken to inform the current work and this identified a small number of noteworthy plants that were not identified previously: common cudweed, corn spurrey and hoary mullein.

Figure 2. Habitat survey map.



HABITATS

- 4.2 The habitats on-Site are described as follows:

- Arable. The fields of arable are mainly under cereals, both wheat and barley, with limited areas of sugar beet. There has been an overall decrease in the extent of arable.
- Improved grass swards have increased in area:
 - South-west of Four Acre Plantation, along the west boundary, a perennial ryegrass *Lolium perenne* pasture (sheep-grazed at time of survey).
 - Centrally on the Site, south of Easton village. A single large field with tall, dense grass cover (soft-brome *Bromus hordeaceus* and perennial ryegrass dominated) with some herbs, e.g. creeping thistle *Cirsium arvense* and nodding thistle *Carduus nutans*, plus three hoary mullein *Verbascum pulverulentum* plants.
 - East of Easton. Three fields, the two largest of which (immediately south of Dereham Road) comprised very short, improved grassland (with nettle *Urtica dioica* patches, mown periodically). The third field comprises short improved grassland (sheep-grazed).

- Semi-improved grass swards cover two areas:
 - East of the allotments is a field of rough grass sward with oak *Quercus robur* saplings. This sward appears to have been unmanaged for several years, with a rank false oat grass *Arrhenatherum elatius* and Yorkshire fog *Holcus lanatus* dominated sward with frequent tall ruderals such as nettle, creeping thistle *Cirsium arvense* and rosebay willowherb *Chamerion angustifolium*.
 - The block north of Dereham Road is classed as a semi-improved sward, but it is a moderately floristically species-rich fallow field. An arable herb transect runs through this area, which describes the flora in greater detail (see below).
- Deciduous plantation. There are four areas of plantation:
 - Four Acre Plantation is located in the south-west of the Site. The trees comprise mature broad-leaved trees including silver birch *Betula pendula*, sweet chestnut *Castanea sativa* and oak. The understorey comprises species such as bramble *Rubus fruticosus*, elder *Sambucus nigra* and hawthorn *Crataegus monogyna*.
 - To the west of Bawburgh Road is a young plantation of mainly field maple *Acer campestre* and oak.
 - West of the Diocesan buildings is a block of mature plantation dominated by mature oak and hawthorn with sycamore. The understorey is quite open and comprises species such as elder and hawthorn. The ground flora comprises common woodland species and ruderals such as red campion *Silene dioica*, herb Robert *Geranium robertianum* and nettle.
 - At the western end of the west parcel to the north of Dereham Road is a belt of sycamore and oak plantation.
- Coniferous plantation. The western part of Four Acre Plantation is planted with conifers, mainly pine *Pinus* spp. with occasional planted broad-leaved trees including silver birch, sweet chestnut and oak.
- Tall ruderal. The westernmost parcel north of Dereham Road has a belt of tall ruderal vegetation mainly nettle and rosebay willowherb.
- Hedgerows are distributed throughout much of the Site, with most field boundaries marked by hedgerows. Along the boundary to residential housing are lengths of ornamental hedging. The hedgerows are described in Table 4. only one length is considered to qualify as an Important Hedgerow under the Hedgerow Regulations, and in contrast to the earlier assessment¹⁹, hedgerow H5 is not considered to qualify as an Important Hedgerow, with fewer woody species and actually fewer associated features than determined previously.

¹⁹ Amec (2014) *Easton Village growth Location. Hedgerow Survey Report*. Unpublished report.

Table 4. Hedgerow descriptions (reference numbers cross-reference to Figure 2).

Reference	Woody species	Priority and Important status	
		Priority	Important
H1	Hawthorn and elder	Yes	No
H2	Hawthorn and field maple	Yes	No
H3	Hawthorn, blackthorn and field maple. Apple also present.	Yes	No
H3a	Hawthorn, field maple and dogwood		No
H4	Hawthorn, field maple and blackthorn	Yes	No
H5	Defunct. Hawthorn with blackthorn, lime, cherry, elm and oak. New infill planting is present.	No	No
H6	Hawthorn, field maple, lime and oak	Yes	No
H7	Hawthorn, field maple and dog rose.	Yes	No
H8	Hawthorn, elm, field maple and blackthorn	Yes	No
H9	Hawthorn	Yes	No
H10	Hawthorn, oak, gappy, defunct	Yes	No
H11	Hawthorn, blackthorn, and field maple	Yes	No
H12	Hawthorn, blackthorn, field maple, and dog rose	Yes	Yes
H13	Hawthorn, oak, plum and blackthorn.	Yes	No
H14	Hawthorn, oak, plum and blackthorn	Yes	No
H15	Hawthorn, blackthorn, field maple, and dog rose.	Yes	No

ARABLE HERBS SURVEY

- 4.3 The broader landscape has a moderate diversity of arable margin species (Walker et al. 2012²⁰). The arable herbs were surveyed along four transects (Figure 3), with 29-69 species recorded on each. Ten species with a score of 1 or greater were recorded on the transects, and two are of conservation concern nationally (Table 5).
- 4.4 Outside of transects, one other arable plant observed, allocated a score of 1, was green field speedwell *Veronica agrestis* noted at very low abundance (< 5 plants). Additionally, a few hoary mullein *Verbascum pulverulentum* plants were present in Transect 4; this is a nationally scarce plant mostly confined to Norfolk but not considered an arable plant.

²⁰ Walker, H., Cunningham, S., Ellis, B., Neal, S. and Swan, E. (2012) *Important Arable Plant Areas in Norfolk*. Available from:
http://www.nbis.org.uk/sites/default/files/documents/Important%20Arable%20Plant%20Areas%20in%20Norfolk_SCREEN.pdf

Figure 3. Arable herb survey transects.



Table 5. Plants in each transect with an arable plant rarity score of 1 or greater and abundance (DAFOR scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare).

Species	T1	T2	T3	T4	Score	Conservation status (national)
<i>Anchusa arvensis</i> Bugloss	R	O	R	F	1	
<i>Erodium cicutarium</i> Common stork's-bill	-	-	-	O	1	
<i>Erysimum cheiranthoides</i> Treacle mustard	-	-	-	R	2	
<i>Filago vulgaris</i> Common cudweed	-	-	-	O	6	Near Threatened
<i>Geranium pusillum</i> Small-flowered crane's-bill	-	O	-	R	2	
<i>Mercurialis annua</i> Annual mercury	R	-	-	-	2	
<i>Orobanche minor</i> Common broomrape	-	-	-	R	2	
<i>Raphanus r. raphanistrum</i> Wild radish	R	-	-	-	1	
<i>Sherardia arvensis</i> Field madder	-	R	-	O	1	
<i>Spergula arvensis</i> Corn Spurrey	O	-	-	-	7	Near Threatened
Total number of species in transect:	40	29	29	69	24	

5. GREAT CRESTED NEWTS

DATA SEARCH AND PONDSCAPE

5.1 No records of great crested newts were returned by the data search. Surveys were previously undertaken in 2013²¹, covering a total of 13 waterbodies within a 500m radius, recording great crested newts within two ponds (referred to here as Pond A and B):

- Pond A supported a peak count of 79 adults.
- Pond B supported a peak count of 9 adults.

LOCAL PONDSCAPE

5.2 The scoping of ponds with this assessment extended to 250m (Figure 4). The only ponds within 250-500m are to the south of the building of the Easton campus or otherwise at a distance of >450m and separated by a large tract of arable land. A second pond marked as being previously within the showground site is not longer present.

Figure 4. The local pondscape to 250m.



²¹ AMEC (2014) *Easton Village Growth Location. Great Crested Newt Survey Report*. Unpublished report.

2019 SURVEYS

- 5.3 Direct surveys were undertaken of five ponds (A to E), with great crested newts recorded in Pond B only (Table 6). The population is low. Of note is that Pond A returned negative surveys by both manual and DNA surveys, whereas previously this supported a peak count of 79 individuals.

Table 6. Survey results from 2019.

Pond	Method	Result
A	Manual surveys and E-DNA.	Negative.
B	Manual surveys.	Peak count of 3.
C	Not surveyed – fishing lake.	-
D and E	Manual surveys.	Negative.
F	Not surveyed – farm lagoon with polluted water and lined.	-
G	Dry.	-

6. BATS

DATA SEARCH

- 6.1 Records were returned for barbastelle, serotine, Daubenton's, whiskered, noctule, Natterer's, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and brown long-eared, mostly derived from systematic surveys for the Norfolk Bat Survey²².

PREVIOUS SURVEYS

- 6.2 Previous survey work in 2013 was extensive and included:
- Tree surveys of 47 trees using a swarming approach, where groups of trees were monitored before dawn for any activity suggestive of roosting, with the roost then located by concentrating the survey effort to areas of activity.
 - Transect surveys – two routes undertaken in spring summer and autumn.
- 6.3 Key findings:
- Foraging by soprano pipistrelle, common pipistrelle, noctule, serotine, brown long-eared, and *Myotis* species.
 - Tree roosts were not recorded.
 - Building roosts of brown long-eared (peak count 11), common pipistrelle (peak count of 3) and soprano pipistrelle (peak count 94) in the Diocese buildings.

TREES

- 6.4 Fifteen trees are considered to have potential roost features, a slight decrease from the estimate in 2014 attributable to the lower importance assigned to ivy *Hedera helix* cover in this current assessment (Figure 5). The direct emergence surveys covered 11 trees in 2019, with a single visit to each, and no bats were seen to emerge or were suspected of roosting.

Figure 5. Trees with bat roost potential. Trees marked with a 'T' are shown on the arboricultural plans for Phase 1, with the numbering of other trees starting at 100.



²² <http://www.batsurvey.org/>

COMMUTING

- 6.5 Commuting activity was noted at the north-west of the Site, consistent with the previous recording of a moderate soprano pipistrelle roost in the Diocesan buildings. Commuting brown long-eared bats and common pipistrelles were not recorded, but there was a higher level of activity in the vicinity which is suggestive that these two species both continue to roost in the Diocese buildings.

SITE-WIDE FORAGING

- 6.6 Much of the Site is open arable farmland or short improved sward with very little foraging habitat for bats and without the linear features (i.e. hedgerows) that many bats need for commuting or foraging along. The patches of grassland are low in quality and extent, but the blocks of woodlands offer habitat of moderate suitability for several species. High quality foraging habitat, such as extensive wetlands, wet humus-rich soil, herb-rich grassland or extensive woodland are absent. The overall quality of the Site for foraging bats is therefore low but it has higher value towards the western side.
- 6.7 Six species were recorded: *Myotis* species, common pipistrelle, soprano pipistrelle, noctule, brown long-eared and barbastelle. All species were recorded by the static detectors but *Myotis* species, brown long-eared and barbastelle bats were not recorded along the transects. The survey information is summarised in Table 7 and Figure 6.
- 6.8 All species are present within the western part of the Site but only common and soprano pipistrelle were recorded east of Bawburgh Road, in the eastern part of the Site (other than overflying noctules).
- 6.9 There was no evidence of commuting across the Site, rather the activity appears to comprise foraging, with more sustained foraging activity along hedgerows and at woodland edges. Common and soprano pipistrelles were by far the most frequently recorded species, and were present across the Site but with greater activity in the east, where there are larger hedgerows and more woodland edge habitat. *Myotis* species and brown long-eared were also recorded along the eastern boundary, but with substantially fewer registrations. Noctules were recorded across much of the Site and this is thought to reflect over-flying and some foraging.

Table 7. Occurrences of bats in static detector surveys in 2019.

Species	Static detector survey	
	Total passes (5 detectors for 25 nights each over May to September 2019)	Comment
Common pipistrelle	5805	The second most frequent species, with regular activity along the hedgerows and woodland edge habitat. A similar level of activity across the Site.
Soprano pipistrelle	8777	The most frequent species, with regular activity along the hedgerows and woodland edge habitat throughout, but greater activity at the west of the Site (consistent with the off-Site roost).
<i>Myotis</i> species	68	A low level of activity, in the west of the Site only.
Brown-long eared	121	A low level of activity, in the west of the Site only.
Noctule	981	A low level of activity with infrequent passes of presumably overflying bats. Recorded throughout the Site.
Barbastelle	119	A low level of activity with occasional registrations in the west of the Site.

Figure 6a-f. Summary of registrations per night, per month at each static recorder station.







7. BREEDING BIRDS

DATA SEARCH

7.1 The data search returned a diverse range of species records, including species potentially likely to utilise open fields and hedgerows / verges for nesting:

- Nesting in open fields: skylarks.
- Nesting in hedgerows and field margins: grey partridge, turtle dove, willow warbler, dunnock, mistle thrush, song thrush, bullfinch, and yellowhammer.

BREEDING BIRDS

7.2 Five species of conservation concern were recorded as breeding species on-Site (Table 8, Figure 7). The skylarks are associated with the open fields while the remainder are scrub or hedgerow nesting species, of which all but dunnock are likely to be foraging within field margins and verges rather than woody vegetation itself.

Table 8. Summary of birds of conservation concern.

Species	Habitat	Breeding status	Number of pairs	Priority status and Red or Amber list status
Dunnock (D.)	Allotment, plantation and hedgerows	Probable	3-6	Priority species Amber
Linnet (LI)	Near allotments.	Possible	2	Priority species Red
Skylark (S.)	Western part of Site.	Probable	3	Priority species Red
Song thrush (ST)	Western part of Site.	Possible	2	Priority species Red
Stock dove (SD)	Western part of Site.	Possible	3-4	Amber

7.3 Twenty four species that are common and widespread – i.e. Green-list and not of conservation concern – were recorded as possible or probable breeders (Table 9).

Table 9. Species not of conservation concern (Green-list) and probable or possible breeders.

Species	Breeding status	Number of pairs
Blackbird	Probable	6-8
Blackcap	Probable	2-3
Blue tit	Possible	5
Carrion crow	Probable	1
Chaffinch	Probable	4
Coal tit	Possible	1
Collared dove	Possible	2
Common pheasant	Probable	1
Common whitethroat	Probable	3-6
Garden warbler	Possible	1
Goldfinch	Possible	4
Great spotted woodpecker	Possible	1
Great tit	Possible	5
Green woodpecker	Possible	2
Long-tailed tit	Possible	1
Magpie	Possible	2
Pied wagtail	Possible	1
Red-legged partridge	Possible	1
Robin	Possible	5
Sparrowhawk	Probable	1

Species	Breeding status	Number of pairs
Treecreeper	Possible	1
Woodpigeon	Probable	7-12
Wren	Probable	11-15

Figure 7. Breeding birds of conservation concern.



8. OTHER SPECIES OF CONSERVATION CONCERN

REPTILES

Data Search and Previous Surveys

8.1 The data search returned records for slow worms and grass snakes, the majority from Costessey >1.5 km from the site and none within 1km. The previous assessment undertook surveys in 2013 recorded:

- Slow worms in the west parcel (a peak count of 1 individual, but at two refuges)
- Slow worms in the east parcel (a peak count of 1 individual, but at only one refuge).

8.2 Surveys of the parcel of land adjacent to the A47, between the two parcels of the Site²³ recorded a small population of slow worms along its western boundary.

2019 Surveys

8.3 The 2019 surveys deployed 65 refuges and only recorded reptiles in the western parcel between the A47 and the Dereham Road (Figure 8). The peak count on any one survey was five, with slow worms recorded under 11 separate refuges.

Figure 8. Reptile survey, including positive records for slow worms.



BADGERS

8.4 Several records of badgers are known from within 2km, many from roadkills. There is no evidence of badgers on-Site or adjacent areas.

BROWN HARES

²³ 2019/1251 | Residential development of 64 dwellings, together with associated open space, highway and landscaping works. | Land To The North Of Dereham Road Easton Norfolk

- 8.5 Numerous records were returned from within 2km. None were seen during the various Site surveys and they are concluded to be absent.

HEDGEHOGS

- 8.6 Hedgehogs are known widely locally, including in nearby residential areas. The hedgerows and woodland blocks offer shelter and foraging habitat and they are probably present in low numbers.

INVERTEBRATES

- 8.7 Records for 44 species of invertebrate of conservation concern were returned from within 2km, all of which were moths, the majority from trapping stations in Marlingford or Queen's Hills.
- 8.8 There were records of two scarce species, a Breckland specialist that is likely to be a vagrant and a species that feeds on lichens on trees. The other 42 species are generalist moths – with caterpillars that feed on a range of common shrubs and herbs – that include a number of Species of Principal Importance that have undergone national declines but remain widespread (Butterfly Conservation, 2007²⁴).
- 8.9 The extent of habitat for noteworthy invertebrates on the Site is low, and specialist microhabitats such as heartwood decay or open sward grassland without grazing are absent or scarce. The Site is likely to be of low value for invertebrates, but it is likely to support a small; assemblage of the priority moths.

²⁴ Butterfly Conservation (2007) *Biodiversity Action Plan – Moths*. Available from: <http://butterfly-conservation.org/files/uk-bap-species-moths-research-only.pdf>

9. BASELINE SUMMARY

HEDGEROWS AND OTHER HABITATS

- 9.1 Across the Site there are fifteen lengths of hedgerow, of which all but one qualifies as the priority Hedgerow habitat of Principal Importance (cf Maddock, 2011²⁵). No other priority habitats are present.

ARABLE HERBS

- 9.2 The Site achieves a plant assemblage score of 25, thus qualifying as an Important Arable Plant Area at the county level (threshold scores for clay/silt soils 20-29, and sandy loams/freely draining acidic soils 20-34) but not national level (Table 10). The two species that are of greatest value have national status of Near Threatened but are both widespread and frequently encountered in Norfolk: common cudweed and corn spurrey. Also present on-Site is hoary mullein *Verbascum pulverulentum* plants which is scarce nationally but widespread on river gravel terraces and similar habitats around Norwich. The Site therefore supports an assemblage including scarce species but is not necessarily atypical of similar sites around Norwich.

Table 10. Summary of the status of the arable plants (with score >1).

Species	Location (if not transect)	Arable plant score	Conservation status	Status in Norfolk ^{26 27}
Corn spurrey <i>Spergula arvensis</i>	Transect 1	7	Near Threatened	Widespread, usually on lighter soils. Almost always arable.
Wild radish <i>Raphanus r. raphanistrum</i>	Transect 1.	1	-	Widespread. Common. Usually arable.
Field madder <i>Sheradia arvensis</i>	Transects 2 and 4	1	-	Widespread. Locally frequent. Usually arable but also other habitats.
<i>Anchusa arvensis</i> Bugloss	Transects 1, 2,3 and 4.	1	-	Widespread.
<i>Erodium cicutarium</i> Common stork's-bill	Transect 4	1	-	Widespread.
<i>Erysimum cheiranthoides</i> Treacle mustard	Transect 4	2	-	Widespread.
<i>Filago vulgaris</i> Common cudweed	Transect 4	6	Near Threatened	Widespread on lighter soils. Often arable but more often in other disturbed habitats.
<i>Geranium pusillum</i> Small-flowered crane's-bill	Transects 2 and 4	2	-	Widespread.
<i>Mercurialis annua</i> Annual mercury	Transect 1	2	-	Widespread.

²⁵ Maddock, A. (2011) *UK Biodiversity Action Plan Priority Habitat Descriptions*. Available from: http://jncc.defra.gov.uk/PDF/UKBAP_PriorityHabitatDesc-Rev2011.pdf

²⁶ Walker, H., Cunningham, S., Ellis, B., Neal, S. and Swan, E. (2012) *Important Arable Plant Areas in Norfolk*. Available from: http://www.nbis.org.uk/sites/default/files/documents/Important%20Arable%20Plant%20Areas%20in%20Norfolk_SCREEN.pdf

²⁷ Beckett G., Bull A. and Stevenson R. (1999) *A Flora of Norfolk*. Privately published.

Species	Location (if not transect)	Arable plant score	Conservation status	Status in Norfolk ^{26 27}
<i>Orobanche minor</i> Common broomrape	Transect 4	2	-	Widespread.

BATS

- 9.3 As appraised visually much of the Site is of low or negligible value for foraging bats, comprising extensive arable cropland or short sward grassland. The western part of the site is likely to be of greatest value for foraging, with a more extensive hedgerow network, and small woodland / plantation blocks.
- 9.4 Although no evidence of roosting was found in the trees surveyed, it is very difficult to rule out roosts from trees. However, it is likely that if there are tree roosts on-Site that they are small.
- 9.5 The scheme presented by Wray et al. (2010)²⁸ is used to evaluate the Site for bats, based on the rarity of species, numbers of individuals, roosting potential of a locality, and the landscape character. The completed evaluation is shown in Table 11 and it is considered that the Site is of local value for bats. Of note is that the score for barbastelle justifies a rating of County importance, but this is considered to be an over-estimate given the widespread occurrence of the species in Norfolk (Newson, et al., 2015²⁹) and the sporadic occurrence on-Site.

Table 11. Evaluation of the Site for individual bat species.

Species	Criterion scores				Summed score	Value
	Rarity	No. of individuals	Roosting potential	Landscape value		
<i>Myotis</i> species	5 (rarer)	5 (individuals)	3 (low potential)	2 (moderate sized fields / gappy hedgerows)	15	Local
Common pipistrelle	2 (common)	5 (individuals)	3 (low potential)	2 (moderate sized fields / gappy hedgerows)	12	Local
Soprano pipistrelle	2 (common)	10 (small numbers)	3 (low potential)	2 (moderate sized fields / gappy hedgerows)	17	Local
Brown long-eared	2 (common)	5 (individuals)	3 (low potential)	2 (moderate sized fields / gappy hedgerows)	12	Local
Noctule	5 (rarer)	5 (individuals)	3 (low potential)	2 (moderate sized fields / gappy hedgerows)	15	Local
Barbastelle	20 (rarest)	5 (individuals)	3 (low potential)	2 (moderate sized fields / gappy hedgerows)	30	Local (downgraded from County,

²⁸ Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010) Valuing bats in ecological impact assessment. *In Practice* 70, 23-25.

²⁹ Newson, S. E., Evans, H. E., & Gillings, S. (2015). A novel citizen science approach for large-scale standardised monitoring of bat activity and distribution, evaluated in eastern England. *Biological Conservation*, 191, 38-49.

Species	Criterion scores				Summed score	Value
	Rarity	No. of individuals	Roosting potential	Landscape value		
						see text above)

BREEDING BIRDS

- 9.6 The assemblage of breeding birds within the Site and survey area is considered to be relatively typical of Norfolk farmland and rural-countryside interface and mostly comprises widespread species that are of conservation concern due to recent declines and which are associated with broad habitat types rather than having high levels of habitat specificity and fidelity (Table 12).
- 9.7 Skylarks are the most numerous species of conservation concern, with 3 pairs. Published density estimates in winter cereals and other crops are (Browne et al., 2000³⁰):
- Winter cereals, 10 per km² (=10 per 100ha) or 1 per 10ha.
 - Spring cereals, 12.2 per km².
 - Agricultural set-aside, 30.6 per km².
- 9.8 With 3 pairs on the Site, the density (using a Site area of 45ha) is 1 per 15ha. The density of skylarks is therefore below the typical density reported in the literature for winter cereals and the numbers have declined since the earlier assessment.

Table 12. Status of species of conservation concern on-Site and in wider survey area.

Species	Conservation status		National status ³¹	Norfolk status ³²	Pairs on-Site
	Priority species	Red- / Amber-listing			
Skylark	✓	Red	1.4 million territories (summer)	Common resident	3
Song thrush	✓	Red	1.1 million territories (summer)	Common resident	3
Stock dove	-	Red	165 thousand territories (summer)	Common resident	3-4
Dunnock	✓	Amber	2.3 million territories (summer)	Abundant resident	2-4
Linnet (LI)	✓	Red	410 thousand territories (summer)	Common resident	2

REPTILES

- 9.9 The population of reptiles is similar to that described previously; a small population of slow worms between Dereham Road and the A47, but only within the west parcel.

OTHER SPECIES

- 9.10 The status of other species is as follows:

³⁰ Browne, S., Vickery, J. and Chamberlain, D. (2000) Densities and population estimates of breeding skylarks *Alauda arvensis* in Britain in 1997. *Bird Study*, 47, 52-65.

³¹ Robinson, R.A. (2005) *BirdFacts: Profiles of Birds Occurring in Britain and Ireland (BTO Research Report 407)*. BTO, Thetford. Available from: <http://www.bto.org/birdfacts>, accessed on November 2018).

³² NNNS (2019) *Norfolk Bird and Mammal Report. 2018*. Norfolk and Norwich Naturalists' Society, Norwich.

- Hedgehogs. Likely to be present in low numbers.
- Invertebrates. Small assemblage of widespread but declining priority moths. Specialist species unlikely to be present.

SUMMARY

9.11 A summary of the survey findings for 2019 are presented in Table 13. In broad terms the Site appears to be unchanged in terms of the features and species of conservation concern, although the most significant change is likely to be the absence in 2019 of great crested newts within Pond A, located off-Site, to the east within the showground site.

Table 13. Summary of findings in 2019.

Feature	Summary	Change since 2013-14
Hedgerows	14 lengths qualify as priority Hedgerow Habitat of Principal Importance. One length qualifies as an Important Hedgerow.	Probably unchanged
Arable herbs	Two Near Threatened and one scarce species: common cudweed, corn spurrey and hoary mullein. Likely to be similar to other arable sites around Norwich.	Not surveyed previously, but probably unchanged.
Great crested newts	One occupied pond with a peak count of 3, located off-Site to the south-west.	Pond A previously supported a moderate population, but none were recorded in 2019.
Bats: roosting and commuting	No roosts identified on-Site. Soprano pipistrelle roost of moderate size likely to be present within Diocese buildings.	Probably unchanged.
Bats: foraging	Six species: common pipistrelle, soprano pipistrelle, Myotis species, noctule, brown long-eared and barbastelle.	Probably unchanged.
Nesting birds	Five species of conservation concern: skylarks, song thrush, dunnock, stock dove and linnet. Density of skylarks lower than previously reported (when there were 7 pairs) and below the reported average for winter cereals.	Similar, but reduction in numbers of skylarks.
Reptiles	Low population of slow worms, between A47 and Dereham Road only. Only recorded within westernmost parcel.	Similar, but none recorded in the east parcel north of Dereham Road.
Hedgehogs	Likely to be present.	Probably unchanged.
Invertebrates	Small assemblage of widespread but declining priority moths.	Probably unchanged.

10. CONCLUSION

- 10.1 The Site is considered to be typical of farmland habitats in the vicinity of Norwich. A suite of protected species and species of conservation concern are present, but these are likely to be species that are widespread within the vicinity as larger populations across the landscape.
- 10.2 The Site appears to be broadly unchanged compared to the previous assessment, the most significant change being the absence in 2019 of great crested newts within Pond A, to the east of the Site.

11. APPENDIX 1: PHOTOGRAPHS



Figure 9. Transect 1, margin of field under barley in the NW corner of site (just S of St. Peter's Church); 1 July 2019.



Figure 10. Transect 2, margin of field under barley along the E edge of Four Acre Plantation; 1 July 2019.



Figure 11. Transect 3, margin of field under sugar beet at the S end of the site and about 250 m W of Marlingford Road; 1 July 2019.



Figure 12. Transect 4, rotovated strip along E edge of the fallow field, NE corner of the site (much of the tall vegetation is weld and thistles, with a hoary mullein plant also visible; 1 July 2019).

12. APPENDIX 2: ARABLE PLANTS

SURVEY SITE LOCATION

The survey site lies within a predominantly agricultural landscape and is located south of the A47 Norwich – King's Lynn road, in the environs of the village of Easton. It is approximately centred on Ordnance Survey grid reference TG 136108 but comprises five separate parcels of land, two E of the village, one to the SE, one to the S and one to the SW. Only two of these parcels, the E-most (fallow) and SW (barley and sugar beet, plus sheep-grazed perennial ryegrass *Lolium perenne* pasture) had arable areas (hence where surveys focussed). The others comprised improved grassland and one (the smallest) a line of horse chestnut *Aesculus hippocastanum* trees, bramble scrub and grass.

SURVEY TIMING

During bird surveys (12, 18, 21 and 23 June 2019) *ad hoc* observations were made of vascular plants growing along arable field margins. Plant transect surveys (see Methods) were conducted on 1 July. During this mid-summer period in the East Anglian region, many arable-associated species are flowering. It is acknowledged that a few species will have been missed, e.g. small early flowering annuals (but evidence of presence still possible, e.g. seed heads on dead stems), and due to the large size of the survey area. Despite these constraints, it is considered that the surveys give a good overview as to the quality of the arable flora on site.

OBJECTIVES

The main objectives were to identify if any 'Nationally Threatened' (i.e. listed in GB Red Data Book (RDB) as: Critically Endangered, Endangered or Vulnerable (Cheffings et al. loc. cit.) arable-associated vascular plant species were present, and to assess whether the species assemblage constitutes an 'Important Arable Plant Area' (IAPA) following Plantlife criteria (Byfield & Wilson . loc. cit.; Plantlife . loc. cit.), and see Important Arable Plant Areas, below). A secondary objective was to record any other notable vascular plant species. (Note: constituent woody species of the hedgerows, and plants within the woodlands were not investigated as beyond survey remit).

METHODS

On 1 July 2019, four transects (each 30 m long by about 1.5 m wide) were surveyed (Figs. 1 – 4): Transect 1, barley margin NW corner of site, S of St. Peter's Church (TG 12977 10853 – 12950 10853); Transect 2, barley margin along E edge of Four Acre Plantation (TG 13155 10534 – 13151 10563); Transect 3, edge of sugar beet field S end of site about 250 m W of Marlingford Road (TG 13180 10360 – 13208 10371); and Transect 4, part of a fairly recently (within last 12 months) rotovated margin along the E edge of the fallow field, NE corner of site (TG 14524 10909 – 14524 10888). These locations were selected on the basis that they appeared, via prior observation, to be the most floristically-rich within the survey area and most likely to hold less common species, bearing in mind the focus was to ascertain if any nationally threatened arable plants were present and whether the site constituted an IAPA based on the arable plant community as a whole (see Important Arable Plant Areas, below). Within transects, as well as arable plants, all other non-woody species (often more typical of grasslands and hedgerow/woodland edge) were recorded. A simple 'DAFOR scale' ranking (where D = dominant, A = abundant, F = frequent, O = occasional and R = rare) was assigned to give an indication of abundance.

Transect surveys were supplemented by wider observations made whilst walking the site during bird surveys (four in all, conducted 12 – 23 June). An arable plant species score (based on rarity and decline in GB) was also assigned (Plantlife 2015) to assess whether the site qualified as an IAPA (see Important Arable Plant Areas, below).

IMPORTANT ARABLE PLANT AREAS

In 2005, Plantlife International developed a simple method to identify areas of importance for arable plants, coined 'Important Arable Plant Areas' (IAPAs). A rarity score based system (taking into account soil type) is applied. Nationally Threatened species, i.e. Critically Endangered, Endangered or Vulnerable, score 9, 8 and 7 respectively. Less rare species score 6 (Near Threatened) down to 1 for the most common (Table 14). As well as presence of threatened species (qualifying a site as an IAPA under Criterion A), scores are tallied to assess if the plant communities represent 'outstanding assemblages' (IAPA qualification under Criterion B) based on national and county level threshold

scores. For the soil types present, threshold scores are: clay/silt soils National 30-69, County 20-29; and sandy loams/freely draining acidic soils National 35-69, County 20-34.

Table 14. Scores and definitions within the IPA scheme.

Score	Status
9	Critically Endangered (CR) or Extinct (EX).
8	Endangered (EN).
7	Vulnerable (VU).
6	Near threatened (NT) OR additional Nationally Rare (i.e. 1-15 10-km squares).
5	Additional Nationally scarce: 16 to 50 10-km squares OR 51 to 100 10-km squares and change index of –1.0 or less.
4	Additional Nationally scarce: other Nationally scarce species not covered by the above category.
3	Species of local concern: 101 to 500 10-km squares.
2	Species of local concern: 501 to 1000 10-km squares.
1	Species of local concern: 1001 to 1500 10-km squares and change index less than 0.0 (i.e. negative).

RESULTS

Plants observed in each transect, their abundance (DAFOR) and arable plant scores are summarised in Table 15. One 'Nationally Threatened' species was recorded, corn spurrey *Spergula arvensis* (a few plants in Transect 1 and beyond either end of this transect, around the field margin). Although 'Vulnerable' listed (thus scoring 7), corn spurrey is widespread in Norfolk and nationally (see Discussion).

Within the transects, nine other species were recorded that are allocated a score: bugloss *Anchusa arvensis* (score 1), common stork's-bill *Erodium cicutarium* (score 1), treacle mustard *Erysimum cheiranthoides* (score 2), common cudweed *Filago vulgaris* (score 6; RDB Near Threatened although widespread in Norfolk), small-flowered crane's-bill *Geranium pusillum* (score 2), annual mercury *Mercurialis annua* (score 2), common broomrape *Orobancha minor* (score 2), wild radish *Raphanus r. raphanistrum* (score 1) and field madder *Sherardia arvensis* (score 1).

Table 15. Plants in each transect, abundance (DAFOR scale) and arable plant rarity score, Easton, 1 July 2019. Key: DAFOR scale: D = Dominant; A = Abundant; F = Frequent; O = Occasional; R = Rare

Species	T1 - barley S of St Peter's Church	T2 - barley E of Four Acre Plantation	T3 - sugar beet W of Marlingford Road	T4 - E fallow field rotovated margin	Score
<i>Agrostis capillaris</i> Common bent-grass				O	0
<i>Agrostis stolonifera</i> Creeping bent-grass	O	F	R	F	0
<i>Bromus hordeaceus</i> Soft brome	O				0
<i>Bromus sterilis</i> Barren brome	O		R		0
<i>Dactylus glomerata</i> Cock's-foot			R		0
<i>Festuca ovina</i> Sheep's fescue				R	0
<i>Festuca rubra</i> Red fescue				R	0
<i>Holcus lanatus</i> Yorkshire fog	O			O	0
<i>Holcus mollis</i> Creeping soft-grass				O	0
<i>Poa annua</i> Annual meadow-grass	O	O	O	F	0

Species	T1 - barley S of St Peter's Church	T2 - barley E of Four Acre Plantation	T3 - sugar beet W of Marlingford Road	T4 - E fallow field rotovated margin	Score
<i>Poa pratensis</i> Smooth meadow-grass	R				0
<i>Poa trivialis</i> Rough meadow-grass				O	0
<i>Stipa tenuissima</i> Mexican feather-grass				R	0
<i>Juncus bufonius</i> Toad rush		O			0
<i>Vulpia bromoides</i> Squirrel-tail fescue				O	0
<i>Alliaria petiolata</i> Garlic mustard				R	0
<i>Anagallis arvensis</i> Scarlet pimpernel	F	F	R	O	0
<i>Anchusa arvensis</i> Bugloss	R	O	R	F	1
<i>Aphanes arvensis</i> Parsley-piert				O	0
<i>Artemisia campestris</i> Common mugwort	R	R	R		0
<i>Arctium lappa</i> Greater burdock	R		R		0
<i>Arenaria serpyllifolia</i> Thyme-leaved sandwort				O	0
<i>Bryonia dioica</i> White bryony		R		R	0
<i>Capsella bursa-pastoris</i> Shepherd's purse	R				0
<i>Carduus crispus</i> Wetted thistle				R	0
<i>Carduus nutans</i> Nodding thistle				O	0
<i>Cerastium fontanum</i> Common mouse-ear				R	0
<i>Chenopodium album</i> Fat-hen		R	A		0
<i>Cirsium arvense</i> Creeping thistle	R	R	O	O	0
<i>Cirsium vulgare</i> Spear thistle	R			O	0
<i>Conyza canadensis</i> Canadian fleabane				R	0
<i>Coronopus squamatus</i> Swine-cress	O	O			0
<i>Crepis capillaris</i> Smooth hawk's-beard	R			O	0
<i>Dipsacus fullonum</i> Teasel				R	0
<i>Epilobium parviflorum</i> Hoary willow-herb				R	0
<i>Erodium cicutarium</i> Common stork's-bill				O	1
<i>Erysimum cheiranthoides</i> Treacle mustard				R	2
<i>Euphorbia helioscopia</i> Sun spurge	O			R	0
<i>Fallopia convolvulus</i> Black bindweed	R	R	R		0

Species	T1 - barley S of St Peter's Church	T2 - barley E of Four Acre Plantation	T3 - sugar beet W of Marlingford Road	T4 - E fallow field rotovated margin	Score
<i>Filago vulgaris</i> Common cudweed				O	6
<i>Fumaria officinalis</i> Common fumitory	O	R			0
<i>Galium aparine</i> Cleavers		R	R		0
<i>Geranium dissectum</i> Cut- leaved crane's-bill	O		R		0
<i>Geranium molle</i> Dove's-foot crane's-bill	R	R	R	O	0
<i>Geranium pusillum</i> Small- flowered crane's-bill		O		R	2
<i>Glechoma hederacea</i> Ground-ivy				F	0
<i>Hypericum perforatum</i> Perforate St-John's-wort				R	0
<i>Hypochaeris radicata</i> Cat's- ear			R		0
<i>Lamium hybridum</i> Cut- leaved dead-nettle	R		R		0
<i>Leontodon saxatalis</i> Lesser hawkbit				R	0
<i>Malva Sylvestris</i> Common mallow			O		0
<i>Matricaria discoidea</i> Pineapple mayweed	R				0
<i>Medicago lupulina</i> Black medick				R	0
<i>Mercurialis annua</i> Annual mercury	R				2
<i>Myosotis arvensis</i> Field forget-me-knot	F			O	0
<i>Oenothera glazioviana</i> Large-flowered evening primrose				R	0
<i>Orobanche minor</i> Common broomrape				R	2
<i>Papaver rhoeas</i> Common poppy			R	R	0
<i>Papaver somniferum</i> Opium poppy				R	0
<i>Persicaria maculosa</i> Redshank	O	O			0
<i>Plantago coronopus</i> Buck's- horn plantain				R	0
<i>Plantago lanceolata</i> Ribwort plantain	R			R	0
<i>Plantago major</i> Greater plantain		R			0
<i>Plantago media</i> Hoary plantain	R	O	R		0
<i>Polygonum aviculare</i> Common knotgrass	R		F	R	0
<i>Potentilla repens</i> Creeping cinquefoil				O	0
<i>Prunella vulgaris</i> Self-heal				R	0

Species	T1 - barley S of St Peter's Church	T2 - barley E of Four Acre Plantation	T3 - sugar beet W of Marlingford Road	T4 - E fallow field rotovated margin	Score
<i>Ranunculus acris</i> Meadow buttercup				R	0
<i>Ranunculus repens</i> Creeping buttercup	R				0
<i>Raphanus r. raphanistrum</i> Wild radish	R				1
<i>Reseda luteola</i> Weld				F	0
<i>Rumex crispus</i> Curled dock				R	0
<i>Rumex obtusifolius</i> Broad- leaved dock		R	R	R	0
<i>Sagina apetala</i> Annual pearlwort				O	0
<i>Scrophularia auriculata</i> Water figwort				R	0
<i>Senecio jacobaea</i> Common ragwort				F	0
<i>Senecio vulgaris</i> Groundsel	F	O	O		0
<i>Sherardia arvensis</i> Field madder		R		O	1
<i>Silene dioica</i> Red campion		R		R	0
<i>Silene latifolia</i> White campion	R			R	0
<i>Sisymbrium officinale</i> Hedge mustard	R	R	R		0
<i>Solanum nigrum/sarachoides</i> Black/green nightshade	R	R	R		0
<i>Sonchus asper</i> Prickly sow- thistle	O		O	R	0
<i>Sonchus oleraceus</i> Smooth sow-thistle	R			R	0
<i>Spergula arvensis</i> Corn Spurrey	O				7
<i>Stellaria media</i> Common chickweed		R		R	0
<i>Taraxacum agg.</i> dandelion	R		R	R	0
<i>Trifolium repens</i> White clover	R			R	0
<i>Trifolium striatum</i> Knotted clover				R	0
<i>Tripleurospermum inodorum</i> Scentless mayweed	O			O	0
<i>Urtica urens</i> Small nettle		O	R		0
<i>Verbascum pulverulentum</i> Hoary plantain				O	0
<i>Verbena bonariensis</i> Verbena				R	0
<i>Veronica arvensis</i> Wall speedwell				R	0
<i>Veronica chamaedrys</i> Germander speedwell		O		R	0
<i>Veronica persica</i> Common field speedwell		O	F	R	0

Species	T1 - barley S of St Peter's Church	T2 - barley E of Four Acre Plantation	T3 - sugar beet W of Marlingford Road	T4 - E fallow field rotovated margin	Score
<i>Veronica serpyllifolia</i> Thyme-leaved speedwell				R	0
<i>Viola arvensis</i> Field pansy		R	O	O	0
<i>Viola tricolor</i> x <i>arvensis</i> hybrid Wild pansy hybrid (or cultivar)				R	0
Total number of species in transect:	40	29	29	69	Score: 24

13. APPENDIX 3: GREAT CRESTED NEWTS

HABITAT SUITABILITY INDEX

The ponds were evaluated using the Habitat Suitability Index (HSI) methodology (ARG, loc. cit.). The HSI of a pond is determined by calculating a geometric mean of 10 component factors of 'Suitability Indices' (SI) that are known to have an influence on its suitability as a breeding location for great crested newts (see Table 16), thus:

$$\text{HSI} = (\text{SI1} \times \text{SI2} \times \text{SI3} \times \text{SI4} \times \text{SI5} \times \text{SI6} \times \text{SI7} \times \text{SI8} \times \text{SI9} \times \text{SI10})^{1/10}$$

Once calculated, the HSI score for a waterbody can be categorised as follows:

- Excellent (>0.8)
- Good (0.7 – 0.79)
- Average (0.6 – 0.69)
- Below Average (0.5 – 0.59)
- Poor (<0.5)

Table 16. Habitat Suitability Index: component factors or SIs.

Index	Name	Description
SI1	Geographic Location	Lowland England or upland England, Scotland and Wales
SI2	Pond area	To the nearest 50m ²
SI3	Permanence	Number of years pond dry out of ten
SI4	Water quality	Measured by invertebrate diversity
SI5	Shade	Percentage shading of pond edge at least 1m from shore
SI6	Fowl	Level of waterfowl use
SI7	Fish	Level of fish population
SI8	Pond count	Number of ponds within 1km ²
SI9	Terrestrial habitat	Quality of surrounding terrestrial habitat
SI10	Macrophytes	Percentage extent of macrophyte cover on pond surface

The HSI scores for the ponds are shown in Table 17, survey information in Tables 18 – 20, and the results in Table 21.

Table 17. Habitat Suitability Index assessments (as presented in the preliminary ecological appraisal).

Factor	Pond A		Pond B	
	Field Score	Factor Score (SI)	Field Score	Factor Score (SI)
Location	Optimal	1	Optimal	1
Pond area (m ²)	800	0.95	200	0.4
Pond permanence	Permanent	0.9	Sometimes dries	0.5
Water quality	Moderate	0.67	Moderate	0.67
Shade %	50	1	90	0.3
Fowl	Absent	1	Absent	1
Fish	Absent	1	Absent	1
Pond density km ⁻²	3	0.95	3	0.95
Terrestrial habitat	Moderate	0.67	Good	0.67
Macrophyte cover % (likely, estimated)	50	0.85	0	0.85
HSI score	-	0.88	-	0.68
Rating	Excellent		Average	

Factor	Pond C		Pond D	
	Field Score	Factor Score (SI)	Field Score	Factor Score (SI)
Location	Optimal	1	Optimal	1
Pond area (m ²)	5000	0.5	700	1
Pond permanence	Permanent	0.9	Sometimes dries	0.95
Water quality	Moderate	0.67	Moderate	0.67
Shade %	20	1	0	1
Fowl	Absent	1	Absent	1
Fish	High	0.01	Absent	1
Pond density km ⁻²	3	0.95	3	0.95
Terrestrial habitat	Poor	0.33	Poor	0.33
Macrophyte cover % (likely, estimated)	5	0.35	5	0.35
HSI score	-	0.45	-	0.76
Rating	Poor		Good	

Factor	Pond E	
	Field Score	Factor Score (SI)
Location	Optimal	1
Pond area (m ²)	800	1
Pond permanence	Sometimes dries	0.5
Water quality	Moderate	0.67
Shade %	0	1
Fowl	Absent	1
Fish	Absent	1
Pond density km ⁻²	3	0.95
Terrestrial habitat	Poor	0.33
Macrophyte cover % (likely, estimated)	5	0.3
HSI score	-	0.71
Rating	Good	

DIRECT SURVEYS

The direct surveys used an appropriate combination of methods, with torching and egg search on each visit and with bottle trapping on the final three. Netting was the third method on the first visit.

Table 18. Weather conditions

Date	Weather
11 May 2019	12°C, partial cloud cover (60%), light wind (Beaufort 1)
12 May 2019	11°C, partial cloud cover (40%), light wind (Beaufort 1)
13 May 2019	10°C, partial cloud cover (30%), light wind (Beaufort 1)
14 May 2019	12°C, partial cloud cover (20%), light wind (Beaufort 1)
19 May 2019	13°C, partial cloud cover (40%), light wind (Beaufort 2)
20 May 2019	13°C, partial cloud cover (30%), light wind (Beaufort 1)

Table 19. Summary of survey conditions.

Pond	Date	Turbidity (0=completely clear, 5=very turbid)	Vegetation cover (0=no vegetation obscuring, 5=water completely obscured)
A	All visits	2	2
B	All visits	2	0

Pond	Date	Turbidity (0=completely clear, 5=very turbid)	Vegetation cover (0=no vegetation obscuring, 5=water completely obscured)
D	All visits	2	1
E	All visits	2	1

Table 20. Summary of methods.

Pond	Date	Method	Comment
A	All visits	Torching, egg search and netting	Access constraints limited bottle trapping.
B	10 May 2019	Torching, egg search and netting	-
	All later visits	Torching, egg search and bottle trapping	10 traps
D	All visits	Torching, egg search and netting	Safety (soft substrates) prevented bottle trapping.
E	All visits	Torching, egg search and netting	Safety (soft substrates) prevented bottle trapping.

Table 21. Survey results.

Pond	Date	Great crested newts		Common frog		Common toad		Smooth newt	
		Torch	Traps	Torch	Traps	Torch	Traps	Torch	Traps
A	10 May 2019	0	-	1	-	0	-	12	-
	12 May 2019	0	0	2	-	0	-	15	-
	13 May 2019	0	0	0	-	0	-	19	-
	16 May 2019	0	0	0	-	0	-	15	-
B	10 May 2019	1 (male)	-	1	-	0	-	3	-
	12 May 2019	2 (1 male, 1 female)	0	2	0	0	0	3	1
	13 May 2019	3 (2 males, 1 female)	1 (male)	2	0	0	0	2	1
	16 May 2019	1 (male)	0	0	0	0	0	4	1
	19 May 2019	1 (male)	0	1	0	0	0	2	2
	20 May 2019	1 (male)	0	1	0	0	0	3	1
D	10 May 2019	0	-	1	-	0	-	1	-
	12 May 2019	0	-	0	-	0	-	3	-
	13 May 2019	0	-	0	-	0	-	1	-
	16 May 2019	0	-	1	-	0	-	2	-
E	10 May 2019	0	-	1	-	0	-	1	-
	12 May 2019	0	-	2	-	0	-	4	-
	13 May 2019	0	-	1	-	0	-	5	-

	16 May 2019	0	-	1	-	0	-	2	-
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A sample for E-DNA testing was taken from Pond A on 23 June 2019. This was tested by Sure Screen Scientific in Derby.

14. APPENDIX 4: BATS

METHODS

The survey methods are in accordance with Bat Conservation Trust recommendations (Collings, loc. cit.).

For the 15 trees with potential roost features not to be located within open space in the development, single emergence surveys were undertaken (Table 22). Foraging surveys comprised monthly transect and static recording surveys (using 5 nights of survey per month with six Anabat Express units) (Table 23, Figure 13). Summary data from the static recorders are given in Table 24.

Table 22. Details for tree emergence surveys.

Date	Trees	Weather
05 June 2019	T26, T28, T22 and T20	18°C, warm, calm and dry
06 June 2019	T14 and T12	18°C, warm, calm and dry
07 June 2019	103, 104 and 105	17°C, warm, calm and dry
11 June 2019	101 and 102	17°C, warm, calm and dry
14 June 2019	106, 107, 108 and 109	18°C, warm, calm and dry

Table 23. Details for bat foraging surveys.

Date	Survey type	Weather
20 May 2019	Transect and start of static recordings	18°C, warm, calm and dry
04 June 2019	Transect and start of static recordings	19°C, warm, calm and dry
07 July 2019	Transect and start of static recordings	21°C, warm, calm and dry
13 August 2019	Transect and start of static recordings	17°C, warm, calm and dry
10 September 2019	Transect and start of static recordings	16°C, mild, calm and dry

The evaluation scheme for bats is as described by Wray et al. (2010)³³. This considers the rarity of the species encountered, numbers of individuals roosting potential at a locality and the landscape character.

Briefly, rarity is scored as 2, 5 or 20 (for common, rare and rarest species); the number of bats as 5, 10 or 20 (individuals, small numbers or large numbers); roosting potential as 1, 3, 4, 5 or 20 (none, low potential, moderate, large number of roosts or close to a Special Conservation Area for the species); and landscape value of 1, 2, 3, 4 or 5 (limited habitat, large fields with poor hedges; moderate field sizes and gappy hedgerows of isolated tall hedgerows, small fields with many hedgerows and a high value landscape with small fields, streams and many hedgerows). For each criterion a score is assigned and the sum of scores is used as the value score thus: 1-10, zone of influence only; 11-20, Local; 21-30, County; 31-40, Regional; 41+, National or International.

RESULTS

Table 24. Summary of bat activity from static recorders.

Station	Total registrations over 5 nights							Mean registrations per night				
	M	J	J	A	S	Σ		M	J	J	A	S
Myotis species												
1	0	0	0	0	0	0		0	0	0	0	0
2	0	0	0	0	0	0		0	0	0	0	0
3	0	0	0	8	0	8		0	0	0	1.6	0
4	0	0	0	0	22	22		0	0	0	0	4.4
5	0	0	18	9	11	38		0	0	3.6	1.8	2.2

³³ Wray, S., Wells, D., Long, E. and Mitchell-Jones, T. (2010) Valuing bats in ecological impact assessment. *In Practice* 70, 23-25.

Station	Total registrations over 5 nights							Mean registrations per night				
	M	J	J	A	S	Σ		M	J	J	A	S
68												
	M	J	J	A	S	Σ		M	J	J	A	S
Common Pipistrelle												
1	186	308	425	189	219	1327		37.2	61.6	85	37.8	43.8
2	180	193	324	258	185	1140		36	38.6	64.8	51.6	37
3	185	204	163	182	140	874		37	40.8	32.6	36.4	28
4	102	325	404	180	222	1233		20.4	65	80.8	36	44.4
5	120	241	258	315	297	1231		24	48.2	51.6	63	59.4
5805												
	M	J	J	A	S	Σ		M	J	J	A	S
Soprano pipistrelle												
1	425	185	324	210	98	1242		85	37	64.8	42	19.6
2	189	352	211	321	268	1341		37.8	70.4	42.2	64.2	53.6
3	210	189	329	402	182	1312		42	37.8	65.8	80.4	36.4
4	185	269	301	245	218	1218		37	53.8	60.2	49	43.6
5	625	785	824	868	562	3664		125	157	164.8	173.6	112.4
8777												
	M	J	J	A	S	Σ		M	J	J	A	S
Noctule												
1	0	0	19	6	5	30		0	0	3.8	1.2	1
2	22	32	43	21	9	127		4.4	6.4	8.6	4.2	1.8
3	8	42	55	32	49	186		1.6	8.4	11	6.4	9.8
4	46	32	19	65	95	257		9.2	6.4	3.8	13	19
5	65	55	101	68	92	381		13	11	20.2	13.6	18.4
981												
	M	J	J	A	S	Σ		M	J	J	A	S
Brown long-eared												
1	0	0	0	0	0	0		0	0	0	0	0
2	0	0	0	0	0	0		0	0	0	0	0
3	0	0	0	19	0	19		0	0	0	3.8	0
4	0	0	0	0	8	8		0	0	0	0	1.6
5	0	0	32	48	41	121		0	0	6.4	9.6	8.2
148												
	M	J	J	A	S	Σ		M	J	J	A	S
Barbastelle												
1	0	0	0	0	0	0		0	0	0	0	0
2	0	0	0	0	0	0		0	0	0	0	0
3	0	0	0	11	0	11		0	0	0	2.2	0
4	0	0	0	25	8	33		0	0	0	5	1.6

Station	Total registrations over 5 nights						Mean registrations per night				
	M	J	J	A	S	Σ	M	J	J	A	S
5	0	0	19	24	32	75	0	0	3.8	4.8	6.4
119											

Figure 13. Static recorder stations.



15. APPENDIX 5: BIRDS

SURVEY SITE LOCATION

The survey site lies within a predominantly agricultural landscape and is located south of the A47 Norwich – King's Lynn road in the environs of the village of Easton. It is approximately centred on Ordnance Survey grid reference TG 136108 but comprises five separate areas of land, two E of the village, one to the SE, one to the S and one to the SW.

HABITATS

Habitats are only very briefly summarised here as addressed in previous reports. For ease of reference to the site can be divided into five separate areas, hereafter A1 - A5 (from W to E).

- **A1** (SW of Easton): The largest area (approx. 580 N-S x 650 m W-E). The N-part comprises two arable fields (under barley at time of survey), allotments, a field of rough grassland (with oak *Quercus* saplings), and mixed woodland (Four Acre Plantation) with a small strip of young conifer plantation adjoining its NW corner. S of the W-E orientated track to Four Acre Plantation from Marlingford Road, is a perennial rye-grass *Lolium perenne* pasture (sheep-grazed at time of survey); the S-most part of A1 comprises the NW corner of an arable field under sugar beet. The area has numerous hedgerows (hawthorn *Crataegus monogyna* and sloe *Prunus spinosa* dominated), with occasional hedgerow trees, primarily pedunculate oak *Quercus robur* and ash *Fraxinus excelsior*.
- **A2** (S of Easton): A single large field (approx. 210 x 400 m) with tall, dense grass cover (soft-brome *Bromus hordaceus* and perennial rye-grass dominated with some herbs, e.g. creeping thistle *Cirsium arvense* and nodding thistle *Carduus nutans*, plus 3 hoary mullein *Verbascum pulverulentum* plants – a nationally scarce species – along NW edge), with a patch of scrub (NE corner) and small young deciduous plantation strip (SE corner). It is surrounded mostly by hedgerows (with a few small hedgerow trees), but the W end is bordered by bramble *Rubus fruticosus* agg. and stinging nettles *Urtica dioica* with semi-mature lime *Tilia* sp. trees (N end), and the E end by a hedgerow/scrub backed by tall deciduous trees (including pedunculate oak and ash).
- **A3** (SE of Easton): Three fields, two largest of which (S of Dereham Road; combined 290 x 350 m) comprised very short, improved grassland (with nettle patches at S end - mown prior to last survey), bordered by a hawthorn hedge along the N margin, fence along E edge (with grass-covered bund running parallel just off site). A mixed-species hedge runs along the W edge (and E edge of 3rd field) with scrub and some mature (mainly pedunculate oaks) and younger trees along the S border. The third field (approx. 100 x 190 m; SW corner of A3) comprised short improved grassland (sheep-grazed) surrounded by hedges, with trees/scrub along the S edge.
- **A4** (E of Easton): The smallest survey area (a rectangular block, 60 x 130 m) comprising a line of mature horse chestnut *Aesculus hippocastanum* trees (W edge), bramble scrub and rough grassland. The A47 main road lies just to the N.
- **A5** (E of Easton): A moderately floristically species-rich fallow field (150 x 280 m) bordered to the N by a roadside ditch and embankment, and the A47. Along the N field margin is a strip of bramble and nettles (occasional small oak, ash and hawthorns) with a line of small oak trees along the W-half. The W end is bordered by a post and wire fence, the S edge by a gappy hedge (with oak tree) mostly of bramble, dog rose *Rosa canina*, hawthorn and sloe (thicker at E end), with a rotovated strip along its E margin (Scot's pine *Pinus sylvestris* beyond, off site).

SURVEY TIMING

The site was surveyed for breeding birds from 12 to 23 June 2019. Although for some species the magnitude of singing will have declined (e.g. robin, mistle thrush) and some species would no longer be maintaining territories, for most, other indications of nesting, e.g. adults carrying food, fledglings recently out of the nest (often with some down feathers still evident) and older more independent juveniles (i.e. young of year with first set of true feathers), would still be apparent.

METHODOLOGY

Four morning bird surveys were undertaken: 12, 18, 21 and 23 June 2019. Mornings were selected when weather conditions were good for survey, i.e. no precipitation and wind speed ranging from Beaufort Scale 0 to 2: calm (< 2 km/h) to light breeze (6 to 12 km/h). Surveys commenced 04:45 - 05:00 h (i.e. soon after dawn), each survey taking about 3 h 45 min to complete. Features in the survey area likely to support nesting birds, i.e. woodland, and hedgerow, scrub and field margins (as well as incursions into the fallow field, Parcel 5) were walked at moderate pace; fields were also scanned with binoculars (Leica 8 x 32 BA). All contacts (i.e. 'registrations') with birds, sight and sound, indicative of territoriality/breeding were plotted on field maps. Bird species codes (following those of the British Trust for Ornithology; BTO) were used to denote each species, and simple abbreviations/symbols used to record activity (e.g. song, alarm calling, carrying food) and observations of fledged young (see Appendix 1). Additional species in the survey area but not showing behaviour indicative of breeding and those overflying were also noted, and an assessment as to whether suitable nesting habitat was present in the survey area for these was made.

Observations were collated post-survey and the numbers of birds of each species exhibiting signs of territoriality/breeding were assessed. An assessment was made as to whether 'possible', 'probable' or 'confirmed' (active nest) as breeding in the survey area, and the number of breeding pairs estimated. This follows BTO criteria except that 'Probable' was allocated to where a bird was singing twice or more through the survey period, rather than 'Permanent Territory presumed through registration of territorial behaviour (song etc.) on at least two different days a week'. Birds singing on one survey only (following guidelines) are included as 'Possible' nesting species if suitable nesting habitat was deemed present. Note, as juvenile birds may be very mobile, observations may refer to young derived from nests off site, hence only 'Possible' breeding status is assigned in such cases.

RESULTS

Over the whole site survey area, a total of 28 bird species (species codes: PH, RL, SH, CD, SD, WP, G., GS, S., PW, WR, D., R., ST, B., C., MG, WH, BC, GW, TC, BT, CT, GT, LT, CH, GO, LI) considered possible, probable or confirmed breeding were recorded.

All species encountered were of those that would be typically expected to nest in the types of habitat present on site and given surrounding land use (mainly farmland and housing, with some woodland). Three were Red list species (skylark, song thrush and linnet) and two were Amber list species (stock dove and dunnock).

As the site is so large and spread out, observations are summarised in five tables (Tables 25 – 29) according to the five separate areas, with an assessment of breeding status and estimate of number of breeding pairs, and species of conservation concern (i.e. Red- or Amber-listed) indicated. Locations of observations are shown on redrawn survey field maps (Appendix B). It should be borne in mind that surveys were conducted outside the peak song period of many species, thus a few were undoubtedly missed (see summaries after each table for likely candidates). Most such species will have been recorded on site but not observed showing behaviour indicative of breeding.

Table 25. Observations of bird species considered possible, probable or confirmed breeders, and estimated number of breeding pairs in A1 (woodland, hedges, allotment, arable & grassland) based on surveys conducted 12 – 23 June 2019.

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
Red-legged partridge (RL)	1 of pair 'singing' by allotments, 18/6.	Possible	1	
Sparrowhawk (SH)	1 calling, Four Acre Plantation where nest in Scot's pine (uncertain if active); pair (or adult and juv) alarm calling, 23/6.	Probable	1	
Collared dove (CD)	1 singing E edge, 21/6; several pairs singing from adjacent house roofs etc., off site.	Possible	1	

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
Stock dove (SD)	1 singing by Marlingford Road, 12/6; 2 singing Four Acre Plantation (plus pair flying out of wood) 18/6; 1 foraging S end by The Brooms wood (plus 1 display flight by/over the wood just off site, 18 and 21/6). Possible nest cavity in oak SE end of sheep pasture. Occasional overflying.	Possible	3-4	Amber
Woodpigeon (WP)	5 singing, 12/6; 4 singing, 18/6; 3 singing (plus egg shell in Four Acre Plantation), 21/6; 3 singing, 23/6. Also several singing immediately adjacent and many general observations.	Probable	4-6	
Green woodpecker (G.)	1 calling/singing by allotments and 1 calling/singing along S edge, 18/6.	Possible	2	
Great spotted woodpecker (GS)	1 calling in Four Acre Plantation, 21 and 23/6, (plus 1 calling off site from The Brooms, 21/6).	Possible	1	
Skylark (S.)	1 singing over barley field NW corner and 1 over sheep pasture S end, 12/6; presumably same birds singing in these areas, 18/6 (plus 1 to S over sugar beet); 1 singing over field NW corner (plus 1 over sugar beet to S), 21/6; 1 over barley field but further to S (off site) than previously, 23/6.	Probable	2	Red
Pied wagtail (PW)	Male with food (E edge), 12/6.	Possible	1	
Wren (WR)	6 singing, 12/6; 5 singing, 18/6; 4 singing, 21/6; 3 singing, 23/6. (Also 2 singing just offsite).	Probable	5-7	
Dunnock (D.)	1 singing Four Acre Plantation, 1 singing allotments, 12/6; adult alarm calling in allotments, 18/6, 1 taking food into hedge where presumably a nest or fledglings (plus 1 singing just off site E end of The Brooms wood).	Probable	1-3	Amber
Robin (R.)	Adult with fledgling near allotments, and juv in Four Acre Plantation, 12/6.	Possible	2	
Song thrush (ST)	1 singing Four Acre Plantation and juv by allotments, 12/6; 1 singing from allotments, 23/6.	Possible	2	Red
Blackbird (B.)	1 singing and 2 juvs in allotments, juv in Plantation, 1 alarm calling S end of A1 (plus 1 off site singing E edge of The Brooms, also 18/6 and 23/6), 12/6; 1 singing and 1 alarm calling in allotments and juv to E, 1 singing in Plantation (1 also calling), 18/6; 1 singing in Plantation, 1 calling E of allotments, 21/6.	Probable	2-3	

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
Carrion crow (C.)	1 calling (considered territorial call) just N of Four Acre Plantation, 12/6 and 1 calling nearby from Plantation, adult with juv S end, 21/6.	Probable	1	
Magpie (MG)	2 adults with juv, 18/6; 1 taking food into ivy-covered oak (possibly to nest or fledgling) 21/6 and pair alarm calling here, 23/6.	Possible	2	
Common whitethroat (WH)	1 singing along track to Plantation all 4 surveys; 1 singing SE corner and 1 alarm calling just W of it, 1 singing S end by The Brooms, 1 alarm calling E of allotments, 18/6; adult pair with 2 juvs allotments; adult alarm calling by and 1 alarm calling to SE, of allotments, and juv by track to Plantation, 23/6.	Probable	1-4	
Blackcap (BC)	1 singing from allotments and 1 singing in Plantation (plus 1 in The Brooms, off site), 18/6 and 21/6; juv SE corner of Plantation and 2 juvs in hedge to S, 21/6; 1 singing in allotments (plus 2 juvs E edge of The Brooms just off site), 23/6.	Probable	2-3	
Garden warbler (GW)	1 singing S end of allotments, 23/6.	Possible	1	
Chiffchaff (CC)	1 singing Four Acre Plantation, 21/6.	Possible	1	
Treecreeper (TC)	1 calling/singing, Four Acre Plantation, 21/6.	Possible	1	
Coal tit	2 juvs Four Acre Plantation, 12/6.	Possible	1	
Great tit (GT)	1 juv in Plantation, 23/6. Also calling adults SE corner and in Plantation (amongst general observations).	Possible	1	
Blue tit (BT)	4 juvs in Plantation, adult with 4 juvs in hedge to S, 12/6; adult with juv (location as 12/6), 2 juvs N edge, 18/6; 2 juvs in allotments, adult and juv in Plantation, adult and 2 juvs S end by The Brooms, 21/6.	Possible	2	
Long-tailed tit (LT)	2 juvs by The Brooms, 21/6.	Possible	1	
Chaffinch (CH)	1 singing by allotments, 1 singing in Plantation all 4 surveys (plus 1 singing by church, 1 singing SE corner of The Brooms, and juv N edge, all just off site 12/6); also female with juv and pair with juv along N edge just off site, 21/6.	Probable	2	
Goldfinch (GO)	1 singing S end of allotments and juv N end, 21/6; numerous observations of 1-3 birds throughout.	Possible	1	
Linnet (LI)	Pair on hedge SE of allotments, 1 calling along track E of Plantation, 12/6; male	Possible	1	Red

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
	singing from hedge SE of allotments (plus male on wires just beyond SE corner of A1), 23/6.			

¹Note, where a range is given for estimated number of breeding pairs, 'Breeding status' represents the highest level of likelihood of breeding category ascertained and takes into account other pairs that might be breeding at the lower category level(s); e.g. 1 pair confirmed, 1 probable and 2 possible = 1-4; '+' denotes more pairs likely to be present (see also notes for each species for clarification).

Bird species observed in (or immediately adjacent to) A1 but not showing behaviour indicative of breeding (on site), or overflying, and nesting habitat appraisal.

Common buzzard (BZ) – 1 overflying, 12/6 (suitable nesting habitat).

Kestrel (K.) – 1 hunting just off site, 18/6 (suitable nesting habitat; Amber list).

Greylag goose (GJ) – 2 overflying (feral birds), 12/6 (no suitable nesting habitat; wild birds Amber list).

Mallard (MA) – female overflying, 21/6 (no very suitable nesting habitat; Amber list).

Feral pigeon (FP) – flock of c. 30 overflying, 21/6 (no suitable nesting habitat).

Swift (SI) – occasional overflying (no very suitable nesting habitat in A1 but probably nesting in adjacent houses/buildings; Amber list).

House martin (HM) – 3 overflying/foraging, 21/6 (no very suitable nesting habitat in A1, probably nesting on nearby houses; Amber list).

Jackdaw (JD) – numerous observations overflying but surprisingly no indications of nesting (some suitable nesting habitat, i.e. tree cavities).

Jay (J.) - 1 calling from The Brooms wood, just off site (suitable nesting habitat in A1).

Starling (SG) - Occasional overflying E end, including with food on 12 and 23/6, and 5 juvs, 21/6 (some nest site opportunities in tree cavities, but more likely nesting off site in nearby buildings; Red list).

Goldcrest (GC) – 1 calling from young conifer plantation (suitable nesting habitat).

Bullfinch (BF) - 1 calling S end of allotments, 21/6 (suitable nesting habitat; Amber listed).

Greenfinch (GR) – 1 singing from garden NE edge and 2 overflying, 12/6, and 1 calling same area, 21/6; pair along W edge, 18/6 (suitable nesting habitat).

House sparrow (HS) – many observations of birds foraging/loafing along E edge and off site around houses and gardens (15+ birds); also male carrying nest material, 12/6 (no very suitable nesting habitat in A1 but undoubtedly nesting in adjacent house roofs etc.; Red list).

Table 26. Observations of bird species considered possible, probable or confirmed breeders, and estimated number of breeding pairs in A2 (improved tall grassland, hedges, small area of scrub & young deciduous plantation) based on surveys conducted 12 – 23 June 2019.

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
Common Pheasant (PH)	'Resident' male calling on each survey.	Probable	1	
Woodpigeon (WP)	2 singing, 12/6; 1 singing 18/6; 1 singing 21/6; 1 singing 23/6. (Numerous	Probable	2-3	

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
	observations including 3-4 birds singing just off site).			
Collared dove (CD)	1 singing E end 21/6; also 4+ pairs on/around adjacent buildings.	Possible	1	
Wren (WR)	1 singing (plus 1 singing adjacent SE corner), 12/6; juv (close to singing bird of 12/6) and 1 singing SE corner (probably same bird singing off site on 12/6), 23/6.	Possible	2	
Dunnock (D.)	1 singing SE corner, 12 and 18/6, pair also in hedge along S edge, 18/6.	Probable	1	Amber
Robin (R.)	1 briefly singing and juv, 18/6.	Possible	1	
Blackbird (B.)	Numerous observations of adults with juvs and juvs alone within and immediately adjacent, and 1 singing NE corner, 21/6.	Possible	3	
Blackcap (BC)	1 singing from plantation, SE corner, 18/6 (pus 1 singing nearby just off site, 12/6); 1 singing just off site to N, 21/6.	Possible	1	
Great tit (GT)	1 briefly singing, 12/6.	Possible	1	
Goldfinch (GO)	Adult with juv and pair with 3 juvs, 12/6; 1 singing, 21/6 (plus several observations overflying and foraging on site).	Possible	2	

¹Note, where a range is given for estimated number of breeding pairs, 'Breeding status' represents the highest level of likelihood of breeding category ascertained and takes into account other pairs that might be breeding at the lower category level(s); e.g. 1 pair confirmed, 1 probable and 2 possible = 1-4; '+' denotes more pairs likely to be present (see also notes for each species for clarification).

Bird species observed in (or immediately adjacent to) A2 but not showing behaviour indicative of breeding (on site), or overflying, and nesting habitat appraisal.

- Mallard (MA) – pair overflying, 12/6; male overflying, 23/6 (unsuitable nesting habitat; Amber list).
- Red kite (KT) – 1 overflying, 23/6 (potential nesting habitat immediately adjacent but not within A2).
- Feral pigeon (FP) – 1 overflying, 12/6; flock of 28 overflying, 18/6 (no suitable nesting habitat).
- Stock dove (SD) – pair on barn roof (Dunn's/Upper Farm) within which potentially nesting, 21/6 (when 1 singing) and also 23/6 (nesting habitat adjacent to A2, but not within; Amber list).
- Great spotted woodpecker (GS) – 1 calling by Dunn's/Upper Farm, 12/6 (very limited potential nesting trees on site, suitable habitat adjacent).
- Swift (SI) – 5 overflying, 18/6 and 1 on 23/6 (no suitable nesting habitat within A2 but perhaps using nearby buildings; Amber list).
- House martin (HM) – regularly foraging over A2; 5 on 12/6 and 18/6, 9 on 21/6 and 2 on 23/6 (no suitable nesting habitat within A2 but perhaps nesting on nearby buildings; Amber list).
- Swallow (SL) – 1-2 around barns at Dunns/Upper Farm where perhaps nesting (no suitable nesting habitat within A2).
- Pied wagtail (PW) – male calling from barn roof at Dunns/Upper Farm (potentially nesting habitat), 18/6 (no suitable nesting habitat within A2).

- Jackdaw (JD) – numerous adults and juvs overflying (nesting habitat adjacent to A2, but not within).
- Rook (RO) - many adults and juvs overflying (nesting immediately adjacent to A2, but not within – rookery, mainly to E of Bawburgh Road, but with at least 1 nest W of road, E edge of A2).
- Blue tit (BT) – adult calling on two dates along S hedgerow (very limited nest sites available within A2).
- Starling (SG) – 2 adults and juv on adjacent house roof, 12/6; 5 adults and juv W end, 21/6; adult with food overflying, and 25 adults and juv overflying, 23/6 (probably no suitable nest sites within A2, nesting in nearby buildings; Red list).
- Chaffinch (CH) – 1 calling S margin and 1 singing just off site (Dunn's/Upper Farm), 23/6 (suitable nesting habitat).
- Greenfinch (GR) – 5 overflying, 12/6; 1 calling to SW from garden, 23/6 (suitable nesting habitat).
- Linnet (LI) Pair perched on hedge N side, 18/6 (suitable nesting habitat; Red list).
- House sparrow (HS) – male with nest material just off site, 12/6; up to 20 or so regularly observed in area, including female with juv on site, 23/6 (no suitable nesting habitat within A2 but undoubtedly nesting in nearby buildings; Red list).

Table 27. Observations of bird species considered possible, probable or confirmed breeders, and estimated number of breeding pairs in A3 (improved short grassland & hedgerows) based on surveys conducted 12 – 23 June 2019.

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
Woodpigeon (WP)	1 singing SW corner, 12 and 21/6. Several singing just off site.	Probable	1	
Wren (WR)	2 singing S edge, 12/6; 1 singing NW corner (plus 1 singing just off site to S, 18/6).	Possible	3	
Blackbird (B.)	1 singing (pus 3 singing just off site), 12/6; 1 singing plus 2 males in territorial chase, 18/6; juv, 21/6; 1 singing (plus 1 singing just off site) 23/6. (Numerous additional observations, alarm calling, pair, juvs, just off site).	Probable	1-2	
Great tit (GT)	Adult with 4 juvs S edge and 2 juvs W edge, 21/6. (Note, only allocated 'Possible 1' as very limited nesting opportunity within A3).	Possible	1	
Blue tit (BT)	Adult with 3 juvs, 12/6; juv 18/6; adult with 2 juvs, 21/6. (Note, only allocated 'Possible 1' as very limited nesting opportunity within A3).	Possible	1	
Goldfinch (GO)	1 singing W side, 23/6.	Possible	1	
Linnet (LI)	Pair 12/6 and same area 23/6, agitated, perhaps nest in nearby hedge.	Possible	1	Red

¹Note, where a range is given for estimated number of breeding pairs, 'Breeding status' represents the highest level of likelihood of breeding category ascertained and takes into account other pairs that might

be breeding at the lower category level(s); e.g. 1 pair confirmed, 1 probable and 2 possible = 1-4; '+' denotes more pairs likely to be present (see also notes for each species for clarification).

Bird species observed on (or immediately adjacent to) A3 but not showing behaviour indicative of breeding (on site), or overflying, and nesting habitat appraisal.

- Greylag goose (GJ) – 2 overflying (feral birds), 12/6 (no suitable nesting habitat; wild birds Amber list).
- Oystercatcher (OY) – pair overflying, 18/6 (no suitable nesting habitat; Amber list).
- Common tern (CN) – 1 overflying carrying small fish (no suitable nesting habitat; Amber list).
- Black-headed gull (BH) – 1 overflying, 18/6 (no suitable nesting habitat; Amber list).
- Herring gull (HG) – occasional overflying, 1 and 4 foraging in adjacent field 21/6 and 23/6 respectively (no suitable nesting habitat; Red list).
- Lesser black-backed gull (LB) – several overflying each survey, 21 and 38 foraging in adjacent field 21/6 and 23/6 respectively (no suitable nesting habitat; Amber list).
- Grey partridge (P.) – pair, 18/6 (low quality nesting habitat; Red list).
- Collared dove (CD) – 3+ singing from adjacent houses and overflying (suitable nesting habitat).
- Stock dove (SD) – 1 overflying 18/6 and 23/6 (no suitable nesting habitat but likely opportunities in cavities in adjacent trees; Amber list).
- Great spotted woodpecker (GS) – 1 calling from W edge, 23/6 (no suitable nesting habitat but opportunities in adjacent trees).
- Green woodpecker (G.) - 1 calling/singing S edge of site, 18/6, and from Dunham's Plantation in SE corner (just offsite), 23/6 (no suitable nesting habitat within A3 but opportunities in adjacent trees; Amber list).
- Carrion crow (C.) – singles calling 12/6 and 21/6 from trees S edge just off site; 1 calling NE corner, 23/6 (very limited suitable nesting habitat on site but opportunities in adjacent trees).
- Jackdaw - (JD) – many observations (adults and juvs) foraging in SW field (a few in other fields), on adjacent trees and houses (pair nest building in chimney of house, 23/6), and overflying; (minimal suitable nesting habitat within A3 but opportunities in adjacent trees/buildings off site).
- Rook (RO) – many observations of adults and juvs foraging in SW field (a few in other fields), in adjacent trees where rookery located just E of Bawburgh Road (30+ adults/juvs seen each survey except last when most birds gone), on houses and overflying (very limited suitable nesting habitat within A3).
- Magpie (MG) – 1 calling (plus 1 overflying), 21/6 (possibly nesting just off site), plus 1 in same area overflying, 12 and 18/6 (limited suitable nesting habitat within A3 but opportunities in adjacent trees).
- Starling (SG) – 1-5 overflying each survey, including adult with food to nest in nearby house roof (very limited suitable nesting habitat within A3 but nesting in adjacent buildings; Red list).
- Chaffinch (CH) – occasional overflying (suitable nesting habitat).
- House sparrow (HS) – numerous observation (10+) on/around adjacent housing (no suitable nesting habitat within A3 but undoubtedly nesting in nearby buildings; Red list).

Table 28. Observations of bird species considered possible, probable or confirmed breeders, and estimated number of breeding pairs in A4 (small block with horse chestnuts, bramble & grassland) based on surveys conducted 12 – 23 June 2019.

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs ¹	Red or Amber list species
Wren (WR)	2 singing (1 of which in pair, alarm calling), 12/6; 1 singing, 2 fledglings just out of nest, 18/6; adult alarm calling, 1 juv, 21/6; adult and juv, 23/6.	Confirmed	1-2	
Dunnock (D.)	Adult food to nest, 12/6; 1 singing, 21/6.	Confirmed	1	Amber
Robin (R.)	1 juv, 18/6.	Possible	1	
Blackbird (B.)	Male and fledgling, and male alarm, 12/6; adult with food, and single juv, 21/6.	Possible	2	
Common whitethroat (WH)	1 singing/pair alarming, plus 1 alarm calling, 12/6 (and 1 flying from same area, 21/6).	Possible	1	
Blackcap (BC)	1 singing, 12/6.	Possible	1	
Blue tit (BT)	3 juvs, 23/6.	Possible	1	
Great tit (GT)	Adult with 2 juvs, 23/6.	Possible	1	
Chaffinch (CH)	1 singing, 12/6.	Possible	1	

¹Note, where a range is given for estimated number of breeding pairs, 'Breeding status' represents the highest level of likelihood of breeding category ascertained and takes into account other pairs that might be breeding at the lower category level(s); e.g. 1 pair confirmed, 1 probable and 2 possible = 1-4 (see also notes for each species for clarification).

Bird species observed on (or immediately adjacent to) A4 but not showing behaviour indicative of breeding (on site), or overflying, and nesting habitat appraisal.

- Mallard (MA) – male overflying, 23/6 (no suitable nesting habitat; Amber list).
- Red-legged partridge (RL) - 1 adjacent, 21/6 (suitable nesting habitat).
- Feral pigeon (FP) – 1 overflying, 23/6 (no suitable nesting habitat).
- Woodpigeon (WP) – occasional flushed from trees and overflying (suitable nesting habitat).
- Jackdaw (JD) – occasional overflying (possibly suitable nesting habitat if cavities in trees present).
- Goldfinch (GO) - singing opposite and overflying, 12/6; 3 overflying, 18/6, singing opposite, 21/6; (suitable nesting habitat).

Table 29. Observations of bird species considered possible, probable or confirmed breeders, and estimated number of breeding pairs in survey area A5 (fallow field, bramble scrub & gappy hedgerow) based on surveys conducted 12 – 23 June 2019.

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs	Red or Amber list species
Skylark (S.)	1 singing, 18/6; 1 singing and 1 on ground, 21/6; 1 singing, 23/6.	Probable	1	Red
Robin (R.)	1 singing, 23/6.	Possible	1	

Species (BTO code)	Observations indicative of territoriality/breeding and additional notes	Breeding status	Estimated no. breeding pairs	Red or Amber list species
Blackbird (B.)	1 singing, 1 alarm calling, 12/6; 1 calling 18/6; 1 taking food to nest (or fledgling) in hedge, 23/6.	Probable	1	
Common whitethroat (WH)	1 alarm calling, 12/6; adult with 3 juvs, 18/6.	Probable	1	
Blue tit (BT)	Adult and juv, 21/6. (Note: young probably from nest elsewhere as some but very limited nesting opportunity within A5).	Possible	1	
Great tit (GT)	Adult and juv, 18/6. (Note: young probably from nest elsewhere as some but very limited nesting opportunity within A5).	Possible	1	

Bird species observed on (or immediately adjacent to) A5 but not showing behaviour indicative of breeding (on site), or overflying, and nesting habitat appraisal.

- Oystercatcher (OY) – pair overflying, 18/6 (low quality nesting habitat; Amber list).
- Black-headed gull (BH) – 1 overflying, 18/6 (no suitable nesting habitat; Amber list).
- Herring gull (HG) – occasional overflying (no suitable nesting habitat; Red list).
- Lesser black backed gull (LB) – several overflying each survey (no suitable nesting habitat; Amber list).
- Grey partridge (P.) – pair flushed, 12/6 (suitable nesting habitat; Red list).
- Red-legged partridge (RL) – observed in adjacent field, 21/6 (suitable nesting habitat).
- Green woodpecker (G.) – 1 calling opposite side of A 47, 21/6 (very limited suitable nesting habitat within A5; Amber list).
- Feral pigeon (FP) – 1 overflying, 18/6 (no suitable nesting habitat).
- Stock dove (SD) – 1 overflying, 12/6 (no suitable nesting habitat; Amber list).
- Woodpigeon (WP) – 1 singing adjacent, 12/6, occasional overflying (minimal suitable nesting habitat).
- Mistle thrush (M.) – 1 overflying, 21/6 (very limited suitable nesting habitat; Red list).
- Carrion crow (C.) – 2 adults and juv perched, 23/6; occasional overflying and adjacent (very limited suitable nesting habitat).
- Jackdaw (JD) – occasional overflying (no suitable nesting habitat).
- Magpie (MG) – 1 calling, 21/6 (very limited nesting habitat; no nest apparent).
- Rook (RO) – occasional overflying (very limited suitable nesting habitat).
- Starling (SG) – 1 overflying, 21/6 (no suitable nesting habitat; Red listed).
- Goldfinch (GO) – 2 overflying, 21/6 (suitable nesting habitat).

Discussion

All potentially breeding birds encountered were species that one would typically expect to occur in the arable, grassland, scrub and woodland habitats present within a rural landscape with nearby housing in the East Anglian region. The number of breeding species (confirmed, probable or possible) over the

whole survey site was 28 (of which 3 Red- and 2 Amber-listed), and by survey area (highlighting Red and Amber list species) as follows:

A1 – 28 species (10 probable; 18 possible). The fairly high number of potentially breeding species is reflective of the large area and the varied habitats within, including allotments, arable fields, sheep-grazed pasture, hedgerows and deciduous woodland. Birds of conservation concern were stock dove (Amber) with 3-4 possible pairs, skylark (Red) 2 probable pairs; dunnock (Amber) 1 probable (adult taking food to likely nest) plus 2 others singing, song thrush (Red) 2 possible and a singing linnet (Red) plus a pair in the same area.

A2 – 10 species (3 probable; 7 possible). Habitat comprised primarily a field of improved tall grassland (mown just after last survey) with bordering hedges, plus a small patch of scrub, small young deciduous plantation and bordering trees (E margin). Probable nesting birds included dunnock (Amber). Also of note were small numbers (up to 9) of house martins (Amber) foraging over the field, a pair of linnets (Red) during one survey, and regular observations of house sparrows (Red) including an adult with a juvenile foraging on site.

A3 – 7 species (2 probable, 5 possible). Despite large area, only seven species recorded exhibiting behaviour indicative of breeding, this reflective of the mainly very short, improved grassland habitat, although several long lengths of hedgerow, including N edge where a pair of linnets (Red) may have been nesting, afford potential nesting habitat for several species. Of note, a pair of grey partridge (Red) was seen on one occasion (probably same as pair in A5), and (but just offsite) a calling green woodpecker along the S margin (trees here afford nesting opportunity) and a rookery (many adult and juvenile rooks present during the first three surveys) located just to the SW alongside Bawburgh Road.

A4 – 9 species (2 confirmed; 7 possible). This small block, with a line of horse chestnut trees, dense bramble scrub and rough grassland, affords good nesting opportunity for several passerine species, including dunnock (Amber) for which a nest was confirmed.

A5 – 6 species (3 probable, 3 possible). A fallow field with a sparse hedgerow along S margin, bramble scrub along its N margin and a few trees, probably held a pair of nesting skylarks (Red), and a pair of grey partridges (Red) was flushed (reasonable nesting habitat present but no behaviour indicative of breeding noted).

Three gull species (all of conservation concern, but no suitable nesting habitat on site) were observed. Black-headed gull (Amber) with 1-2 foraging/overflying A1 and one over A5, but more notably herring gull (Red) with one and four foraging (21/6 and 23/6 respectively) in the field E of A3, likewise lesser black-backed gull (Amber) 21 and 38 foraging (as well as numerous observations overflying during each survey).

Whilst not nesting on site (but using nearby buildings, nest boxes etc.), many observations were made of adult and juvenile starlings and house sparrows (both Red list species), mainly along the E edge of S1, W edge of S2 and W edge of S3 (associated with houses and gardens), including foraging on the survey areas. It is also undoubtedly the case that that house martins and swifts (both Amber) are nesting on/in buildings close by, and possibly a pair of swallows at Dunn's/Upper Farm.

APPENDIX A. CODES USED ON FIELD MAPS, USING WREN (WR) AS AN EXAMPLE.

WR circled = singing wren

WR encircled by dashes = territorial dispute (2 or more individuals, as indicated on field map)

WR — — — WR = 2 wrens singing consecutively

WR ——— WR = same individual singing from different positions

WR = scolding/alarm calling

WR = calling (i.e. a call not necessarily indicative of breeding/territoriality)

WR_{food} = carrying food

WR_{forage} = foraging (note: not necessarily indicative of breeding/territoriality)

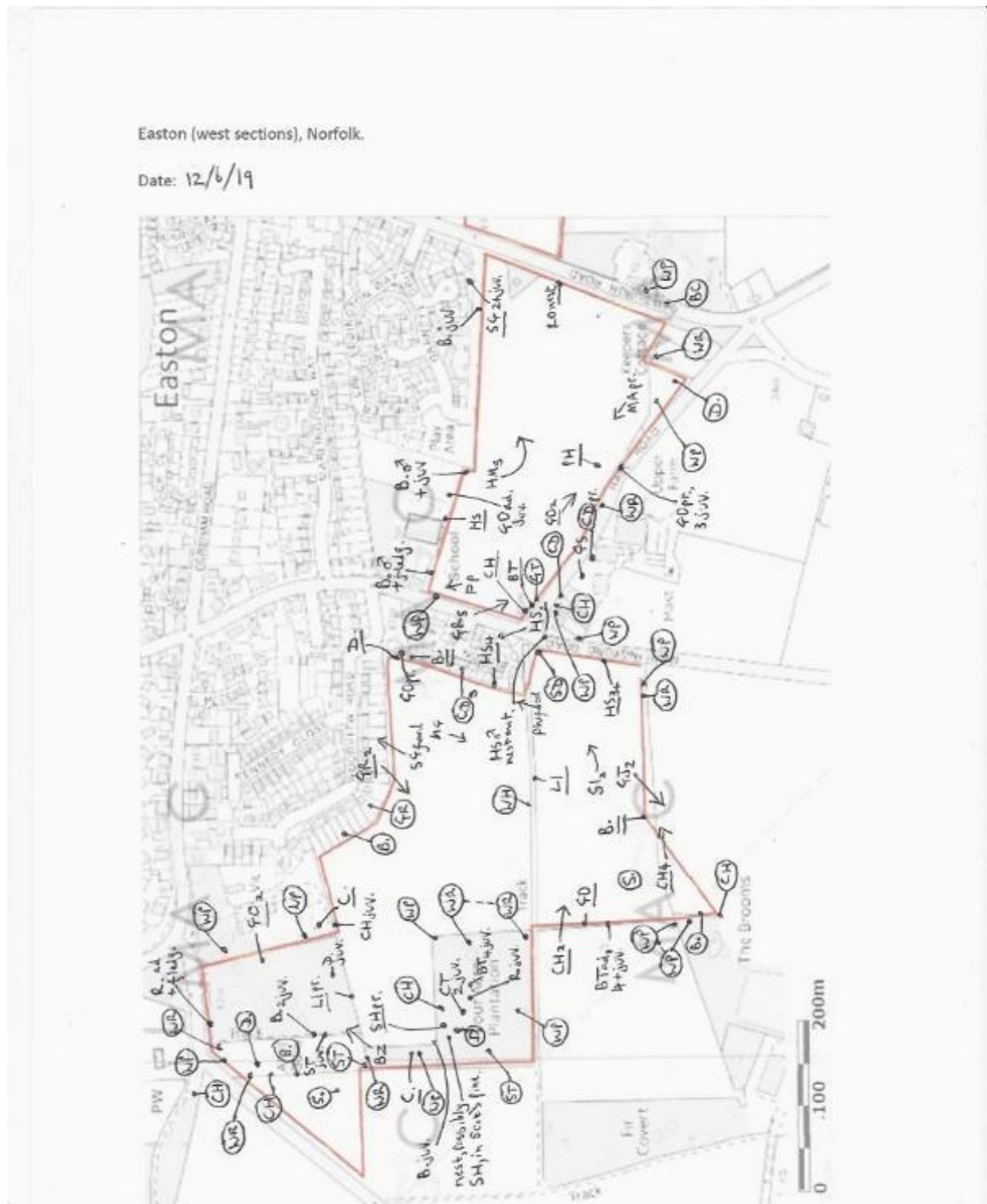
WR_{fledg.} = fledgling (young recently left nest, still with some down feathers)

WR_{juv.} = juvenile (older young of year with 1st set of true feathers, able to fly well)

WR_{nest} = nest confirmed

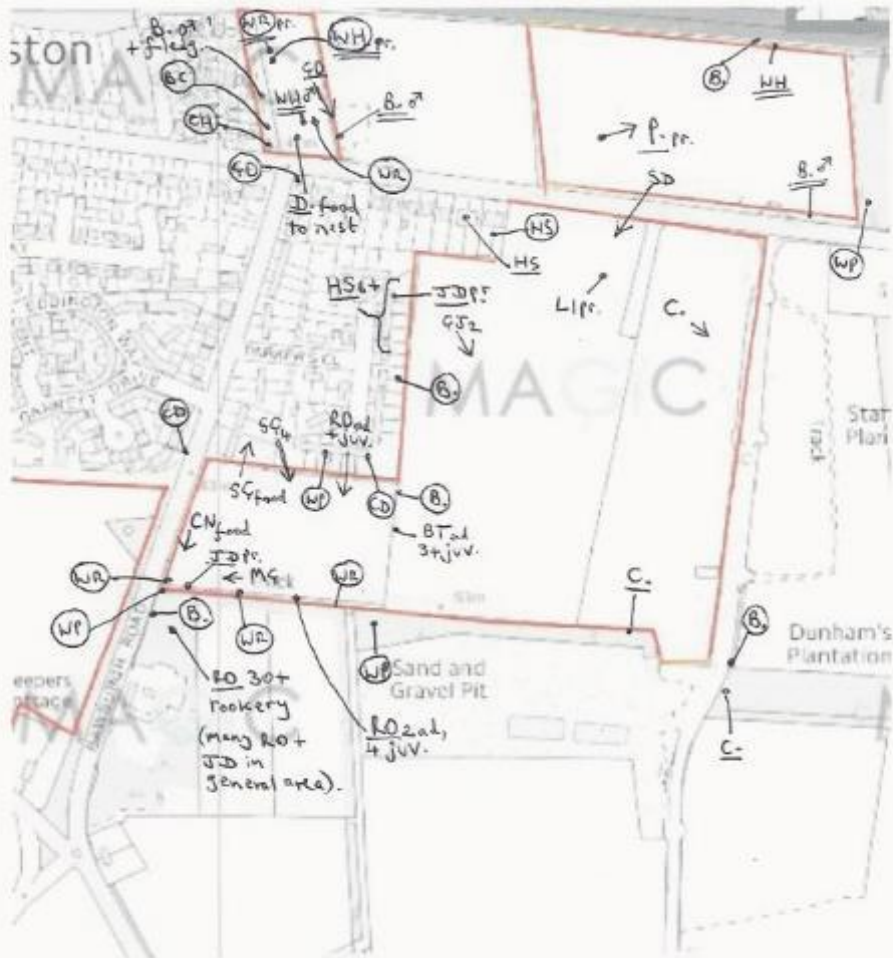
WR_{n?} = probable nest but unconfirmed (e.g. adult taking food into hedge where nest likely located)

APPENDIX B. BIRD SURVEY FIELD MAPS.



Easton (east sections), Norfolk.

Date: 12/6/19

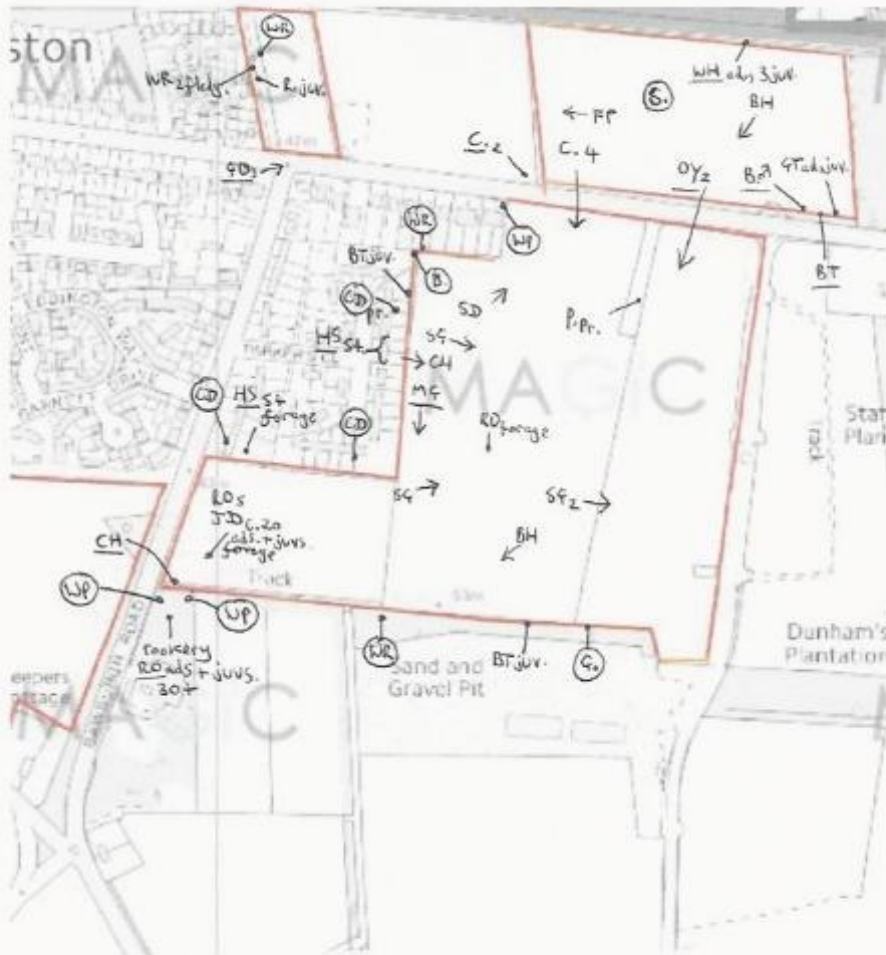


Date: 18/6/19



Easton (east sections), Norfolk.

Date: 18/6/19



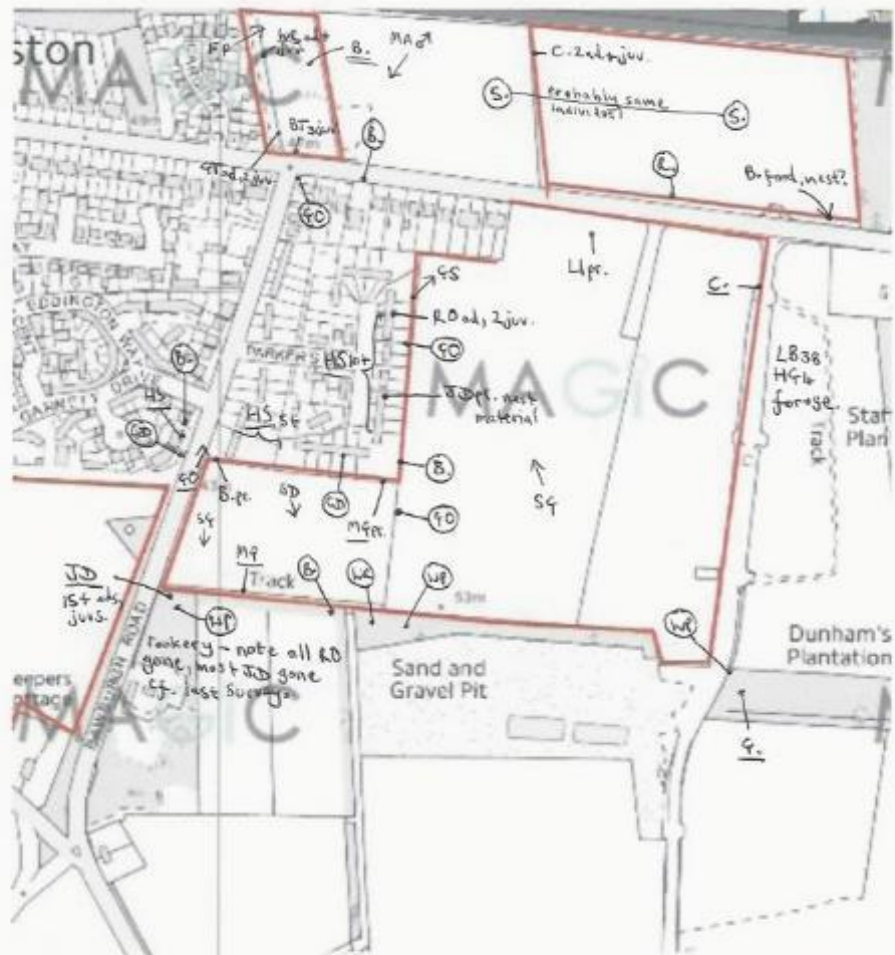
Date: 21/6/19



Date: 23/6/19



Date: 23/6/19



16. APPENDIX 6: REPTILES

METHODS

Reptile surveys were undertaken using direct survey methods on the Site, intended to identify the presence / absence of reptiles and the species present. These surveys were carried out following best practice guidance recommended by the JNCC *Herpetofauna Workers' Manual* (Gent and Gibson, 2003³⁴) and Froglife (loc. cit.).

The reptile survey involved the placement and checking of artificial refugia, together with general observations during visits. The refugia were made from heavy grade bitumen felt, cut to a size of approximately 50cm x 50cm. A total of 65 refugia were deployed. Surveys were undertaken during optimal weather conditions whenever possible: temperatures between 10°C and 18°C with intermittent or hazy sunshine and little or no wind (as described by Beebee and Griffiths, 2000³⁵) (Table 30).

Table 30. Reptile survey dates and weather conditions.

Visit Number	Date	Start Time	Temp. °C	Weather
Felts out	17 June 2019	n/a	n/a	n/a
1	05 September 2019	07.00	13	Light wind, 20% cloud
2	09 September 2019	07.00	13	Light wind, 30% cloud
3	10 September 2019	09.30	14	Light wind, 40% cloud
4	12 September 2019	09.30	16	Light wind, 40% cloud
5	16 September 2019	08.00	14	Light wind, 30% cloud
6	20 September 2019	07.30	14	Light wind, 40% cloud
7	27 September 2019	16.30	16	Light wind, 40% cloud
8	30 September 2019	15.30	17	Light wind, 40% cloud
9	02 October 2019	09.30	14	Light wind, 30% cloud
10	04 October 2019	09.30	14	Light wind, 40% cloud
11	06 October 2019	10.00	14	Light wind, 40% cloud
12	11 October 2019	10.00	15	Light wind, 4% cloud
13	16 October 2019	17.00	14	Light wind, 60% cloud
14	19 October 2019	15.00	15	Light wind, 50% cloud

RESULTS

A low population was recorded, but only in the west parcel north of Dereham Road (Table 31).

Table 31. Summary of slow worm counts.

Date	Refuge number (see main Results)											
	1	2	3	4	5	6	9	13	18	19	20	
05 September 2019	1	1		1	1							
09 September 2019		1	1					2				
10 September 2019			1	1	2					1		
12 September 2019			1			2						
16 September 2019			1		1							
20 September 2019					1		1					
27 September 2019			1		1						1	
30 September 2019	1		1									
02 October 2019	1											
04 October 2019			1		1							
06 October 2019			1						1			

³⁴ Gent, T. and Gibson, S. (2003) *Herpetofauna Workers Manual*. Joint Nature Conservancy Council, Peterborough UK.

³⁵ Beebee, T. and Griffiths, R. (2000) *Amphibians and Reptiles – A Natural History of the British Herpetofauna*. HarperCollins, London.

Date	Refuge number (see main Results)										
	1	2	3	4	5	6	9	13	18	19	20
11 October 2019			1								
16 October 2019					1				1		
19 October 2019			1								

17. APPENDIX 7: LEGISLATION SUMMARY

Non-technical account of relevant legislation and policies.

Species	Legislation	Offence	Licensing
Bats: European protected species	Conservation of Habitats and Species Regulations 2017 (as amended) Reg 41.	Deliberately capture, injure or kill a bat; deliberate disturbance of bats; or damage or destroy a breeding site or resting place used by a bat. [The protection of bat roosts is considered to apply regardless of whether bats are present.]	A Natural England (NE) licence in respect of development is required.
Bats: National protection	Wildlife and Countryside Act 1981 (as amended) S.9.	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb a bat in such a place.	Licence from NE is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site.
Birds	Wildlife and Countryside Act 1981 (as amended) S.1.	Intentionally kill, injure or take any wild bird; intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built. Intentionally or recklessly disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young; intentionally or recklessly disturb dependent young of such a species [e.g. kingfisher].	No licences are available to disturb any birds in regard to development.
Great crested newt: European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41.	Deliberately capture, injure or kill a great crested newt; deliberate disturbance of a great crested newt; deliberately take or destroy its eggs; or damage or destroy a breeding site or resting place used by a great crested newt.	Licences issued for development by Natural England.
Great crested newt: National protection	Wildlife and Countryside Act 1981 (as amended) S.9.	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb it in such a place.	A licence is required from Natural England for surveying and handling.
Adder, common lizard, grass snake slow worm	Wildlife and Countryside Act 1981 S.9(1) and S.9(5).	Intentionally kill or injure any common reptile species.	No licence is required. However, an assessment for the potential of a site to support reptiles should be undertaken.

Species	Legislation	Offence	Licensing
Scientific Interest (SSSI)	Wildlife and Countryside Act 1981 (as amended).	To carry out or permit to be carried out any potentially damaging operation. SSSIs are given protection through policies in the Local Development Plan.	Owners, occupiers, public bodies and statutory undertakers must give notice and obtain the appropriate consent under S.28 before undertaking operations likely to damage a SSSI. All public bodies to further the conservation and enhancement of SSSIs.
County Wildlife Sites	There is no statutory designation for local sites.	Local sites are given protection through policies in the Local Development Plan.	Development proposals that would potentially affect a local site would need to provide a detailed justification for the work, an assessment of likely impacts, together with proposals for mitigation and restoration of habitats lost or damaged.