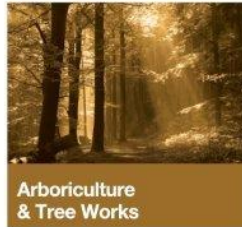




Landscape
Architecture



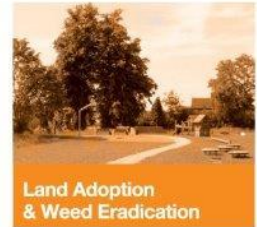
Landscape
Planning



Arboriculture
& Tree Works



Ecology
& Habitat Management



Land Adoption
& Weed Eradication

James Blake Associates Ltd

Updated Phase 1 Habitat Survey

of

Land at Town House Road, Costessey, Norfolk

on behalf of

Taylor Wimpey Strategic Land

November 2017

© James Blake Associates Ltd 2017

Over 30 Years of Service, Value and Innovation

The Black Barn, Hall Road, Lavenham, Suffolk CO10 9QX
tel: **01787 248216** fax: **01787 247264** email: jamesblake@jba-landmarc.com

Chairman: James Blake BA (Hons) Dip LA (Hons) CMLI


Company Secretary: Louise Blake BSc PGCE

Directors: Elzbieta Zebrowska MSc Eng LArch MScEnvSc CMLI : John Wainwright BA (Hons) Dip LA CMLI
Kevin Slezacek DipArb MArborA

Associate Directors: Mary Power BSc MSc MCIEEM : Vivienne Jackson : Jenny Beck BA (Hons)

www.jba-landmarc.com

Registration no. 8169866 VAT no. 512.4127.91

Revision	Purpose	Originated	Checked	Authorised	Date
		EB	HW	JBA	November 2017
Job Number: JBA 16/141		 <p>JAMES BLAKE A S S O C I A T E S</p> <p>Title: Updated Phase 1 Habitat Survey of Land at Town House Road, Costessey, Norfolk</p>			

Disclaimer

James Blake Associates Ltd have made every effort to meet the client's brief. However, no survey ensures complete and absolute assessment of the changeable natural environment. The findings in this report were based on evidence from thorough survey: It is important to remember that evidence can be limited, hard to detect or concealed by site use and disturbance. When it is stated that no evidence was found or was evident at that point in time, it does not mean that species are not present or could not be present at a later date: The survey was required because habitats are suitable for a given protected species, and such species could colonise areas following completion of the survey.

This report was instructed by Taylor Wimpey Strategic Land. Neither James Blake Associates Ltd nor any associated company, nor any of their employees, nor any of their contractors, subcontractors or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use of the report.

© James Blake Associates Ltd 2017 (Copyright of this report remains with James Blake Associates Ltd: Content must not be reproduced, in whole or part, without formal written consent).

CONTENTS

1	INTRODUCTION	5
2	METHODS	8
	Desk study.....	8
	Phase 1 Habitat Survey	8
3	RESULTS	11
4	PROTECTED SPECIES – RESULTS AND EVALUATION	25
5	KEY RECOMMENDATIONS: LEGAL REQUIREMENTS	31
6	ADDITIONAL AND ENHANCEMENT RECOMMENDATIONS	33
8	REFERENCES	35
	Appendix A: Plant species list	37
	Appendix B: Relevant protected species legislation	39

Non-technical Summary

Site:	Town House Road, Costessey, Norfolk
Grid Reference (from the centre of the site)	TG 17320 11447
Report Commissioned by:	Taylor Wimpey Strategic Land
Date of Survey:	15 th May 2017

Considerations	Description	Timings and potential impacts
Statutory and non-statutory sites within 2km:	Fourteen County Wildlife Sites	No impacts to any statutory or non-statutory sites are predicted
SPA, SAC and Ramsar sites within 7km:	The River Wensum SAC	
Phase 2 surveys:	Reptiles survey Bat activity survey	Mid-March to September May to September
Phase 2 surveys depending on final layout	Climb and inspect on trees with bat roost potential Bat emergence surveys on trees to be removed	All year round May to September
Precautionary Measures:	Removal of scrub, trees and hedgerows	Outside of the nesting bird season (March to September) or following a nesting bird survey.
Habitat types:	Semi-improved grassland, scrub, hedgerows, ruderal vegetation, mature trees	

1 Introduction

Background

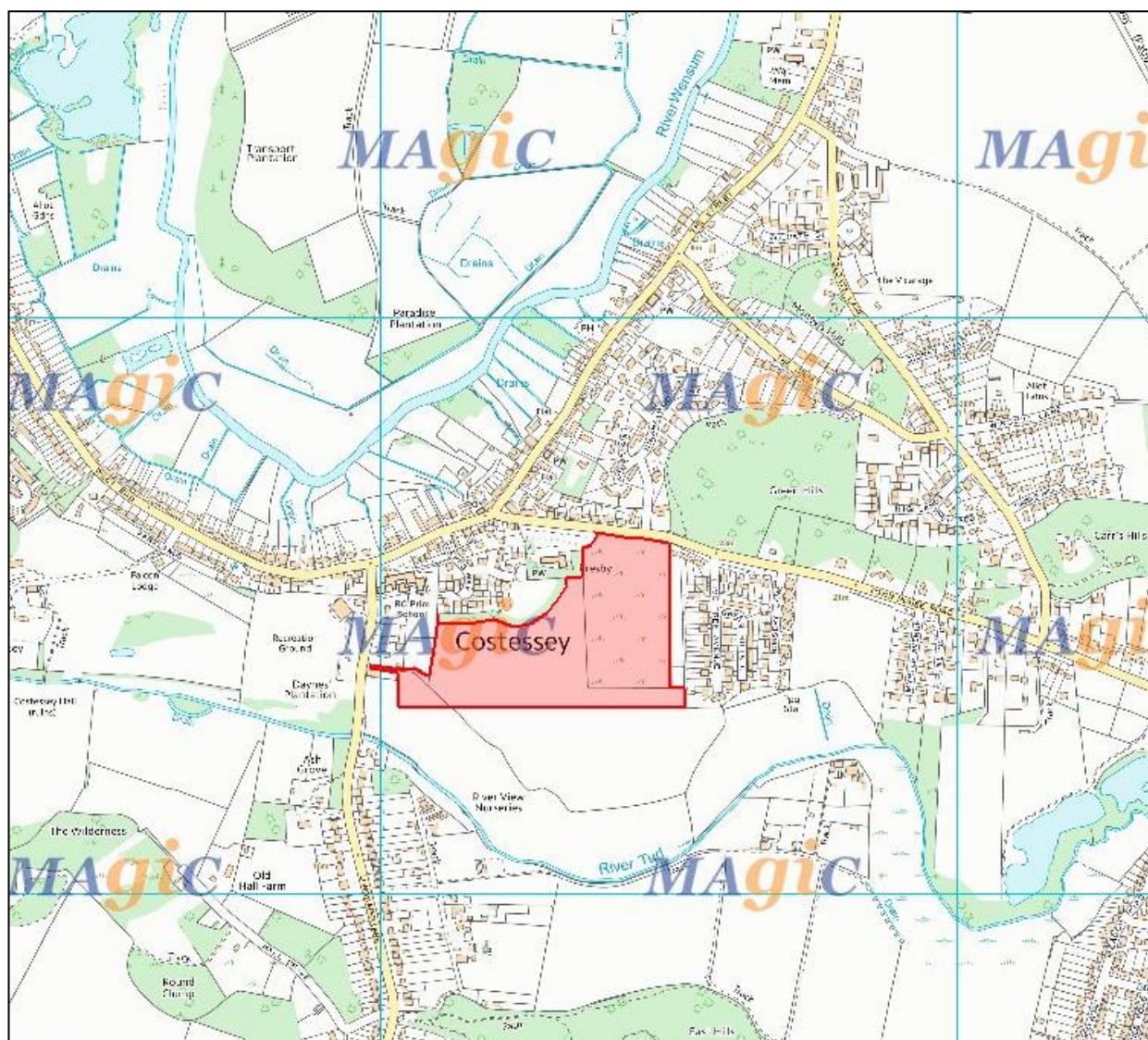
- 1.1 James Blake Associates Ltd was commissioned by Taylor Wimpey Strategic Land to undertake an updated Phase 1 Habitat Survey and Protected Species Scoping Survey of land at Town House Road, Costessey, Norfolk (grid ref TG 17320 11447, taken from the centre of the site).
- 1.2 The survey was required to update a previous Phase 1 Habitat Survey, which was undertaken in July 2016, due to a site boundary alteration. The potential impacts of the proposed allocation of the site on any protected or notable species and/or habitats present including nature conservation sites on, or adjacent to, the site.
- 1.3 For the purposes of this report, protected species are taken to be those which are protected under European Legislation (Conservation of Habitats and Species Regulations 2010, as amended) and UK legislation (Wildlife and Countryside Act 1981; Protection of Badgers Act 1992); and species and habitats of principal importance which are listed in Section 41 of the NERC Act (2006).
- 1.4 There is a general biodiversity duty in the National Planning Policy Framework (NPPF) 2012, placing responsibility on Local Planning Authorities to aim to conserve, enhance and encourage biodiversity in and around developments. Section 40 of the NERC Act requires every public body in the exercising of its functions to 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Biodiversity, as covered by the Section 40 duty, includes all biodiversity, not just the habitats and species of principal importance. However, there is an expectation that public bodies would refer to the S41 list when complying with the Section 40 duty.

Site Description

- 1.5 The site was located to the south of Town House Road in the town of Costessey in Norfolk. Residential housing and gardens bordered the eastern boundary, with arable land to the south. To the north-west was a small wooded area surrounding a church. The wider landscape included agricultural land, woodland, the town of Costessey and riparian habitats associated with the rivers Tud and Wensum (see Figure 1).

- 1.6 The site itself was comprised of a horse grazed field with areas of longer semi-improved grassland in the north east, and a portion of an arable field in the west and south. Hedgerows and scattered mature trees were present along the eastern, southern and western boundaries of the grazed field, separating it from the arable field. A hedgerow and field margin ran along the north of the arable field. A man-made trench ran along the northern boundary and areas of dense scrub were recorded at the northern and eastern boundaries of the site.

Figure 1: Site location



Reproduced from Ordnance Survey map data by permission of Ordnance Survey,
© Crown copyright.

Aims and objectives

1.7 The aim of the survey was to:

- Identify the presence or likely absence of any protected or notable species or habitats on, or adjacent to, the site.
- Assess the potential impact of the proposed development of the site on any protected or notable species and/or habitats present including nature conservation sites on, or adjacent to, the site.
- To provide suggestions and constraints to inform layout design and enhance the wildlife value of the site post-development.

2 Methods

Desk study

- 2.1 A 2km radius search for statutory designated sites, excluding Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites, either on the proposed development site or in the surrounding area, was conducted using “MAGIC”, the Multi-Agency Geographic Information system for the Countryside.
- 2.2 A 7km search for SACs, SPAs and Ramsar sites was also conducted using MAGIC.
- 2.3 The Norfolk Biodiversity Information Service (NBIS) was consulted for records of non-statutory sites and protected and rare species within a 2km search radius (data provided on the 24th May 2017).
- 2.4 The site is covered by the Local Biodiversity Action Plan (LBAP) for Norfolk (www.norfolkbiodiversity.org/actionplans/).

Phase 1 Habitat Survey

- 2.5 The survey was undertaken by Emma Bruce BSc (Hons) MSc and Hetty Wakeford (great crested newt class licence WML-CL08, bat class licence WML-CL18) on the 15th of May 2017. During the survey, the temperature was 15°C, there was a light breeze (Beaufort scale 1), 10% cloud cover and good visibility.
- 2.6 The survey methodology followed JNCC (Joint Nature Conservation Committee) Guidelines (JNCC, 2010) and included mapping habitat types and identifying all plant species observed on the site, including Wildlife and Countryside Act Schedule 9 invasive plant species such as Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*).
- 2.7 The site was also assessed for signs and evidence of protected, principally important and rare species in accordance with approved guidelines, as follows:
- 2.8 **Amphibians:** There were no ponds within 500m of the site.
- 2.9 **Bats:** Mature trees within the site boundary, and adjacent to the site boundary, were surveyed externally, from the ground, for their potential to support roosting bats, under the following criteria, taken from recommendations made by the Bat Conservation Trust in the ‘Bat Surveys for Professional Ecologists Good Practice Guidelines’ (BCT, 2016).

Table 1: Bat survey protocol for trees (potential bat roosting features were identified in order to categorise trees, as below):

Bat Roost Potential	Field signs
Roost Confirmed	Confirmed bat roost in tree: field evidence of the past or current presence of bats, e.g. droppings, staining.
High roost potential	Splits or cracks in major limbs which develop upwards, smooth surface or flies around entry point, medium to dense ivy-covering particularly on mature trees, woodpecker/rot holes, hollow stem or limb, significant lifting bark, snagged branches, artificial bird or bat boxes, tightly forked branch unions, hole between roots leading into a hollow stem, dense epicormic growth, deadwood in canopy or stem, Ancient or over mature trees where the canopy cannot be fully inspected from the ground.
Medium roost potential	Splits in branches, low - medium ivy-covering on trees in healthy condition, small cavities and small areas of deadwood in canopy or stem.
Low roost potential	Splits in minor branches, sparse ivy, and limited loose bark.
No roost potential	Trees with good visibility to the top of the canopy (particularly young and semi-mature trees) not supporting any of the above features or trees with a negligible potential to support bat roosts (may display minor features but considered highly unlikely to be suitable for bats).

- 2.10 **Dormice:** A visual survey for the presence of suitable habitat (woodland/suitable hedges with good under-storey/shrub layer and a range of food plant species, such as hazel, bramble and honeysuckle) was carried out, to assess if dormice were likely to be present.
- 2.11 **Reptiles:** A visual survey for the presence of suitable habitat was carried out according to the criteria given in the Herpetofauna Workers' Manual (Gent and Gibson 1998).
- 2.12 **Otters and water voles:** There were no water bodies within the site or within 50m that provided suitable habitat for otters or water voles.
- 2.13 **Invertebrates:** The site was scoped for significant rotting deadwood, and high quality aquatic or other habitats, which could be used by significant assemblages of invertebrates, or by any of the invertebrates highlighted in the data search.
- 2.14 **Flora and habitats:** All habitats and plant species that were identifiable at the time of the survey were recorded.

- 2.15 **Badgers:** A visual survey for setts, hair, latrines, prints, snuffle marks or other signs of badgers was undertaken within the site boundary, following guidelines set out by the Mammal Society (1989).
- 2.16 **Birds:** A visual survey of bird activity and suitable nesting habitat was carried out, to determine if any areas would be suitable for WCA Schedule 1 birds, Birds of Conservation Concern or other common and widespread nesting birds.
- 2.17 **Adjacent Habitat:** Habitats close to the site were identified, using aerial maps and field observation, so that the ecological impact of the proposed works on the wider landscape could be assessed.

3 Results

Desk Study

Statutory Nature Conservation Sites and Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites within 2km of the site

- 3.1 There was one European/statutory designated site within 2km of the site: The River Wensum Site of Special Scientific Interest (SSSI) and SAC. This is detailed in Table 2 and shown in Figure 2.

Table 2: Conservation sites within 2km

Site Name	Designation	Distance from Site	Description
River Wensum	SAC and SSSI	350m north west	A calcareous lowland river flowing from north west Norfolk through to Norwich, forming a tributary to the River Yare. Land surrounding the Wensum supports a range of habitats including unimproved grassland, fens, marshes and broad-leaved woodlands. A variety of <i>Ranunculus</i> vegetation occurs sporadically throughout much of the river's length, white-clawed crayfish populations are also present within this river system.

Non-Statutory Nature Conservation Sites

- 3.2 There were fourteen non-statutory conservation sites within 2km of the site: all of which were County Wildlife Sites (CWS). These are listed in Table 3 and shown in Figure 2.

Table 3: Non-statutory conservation sites within 2km of the site

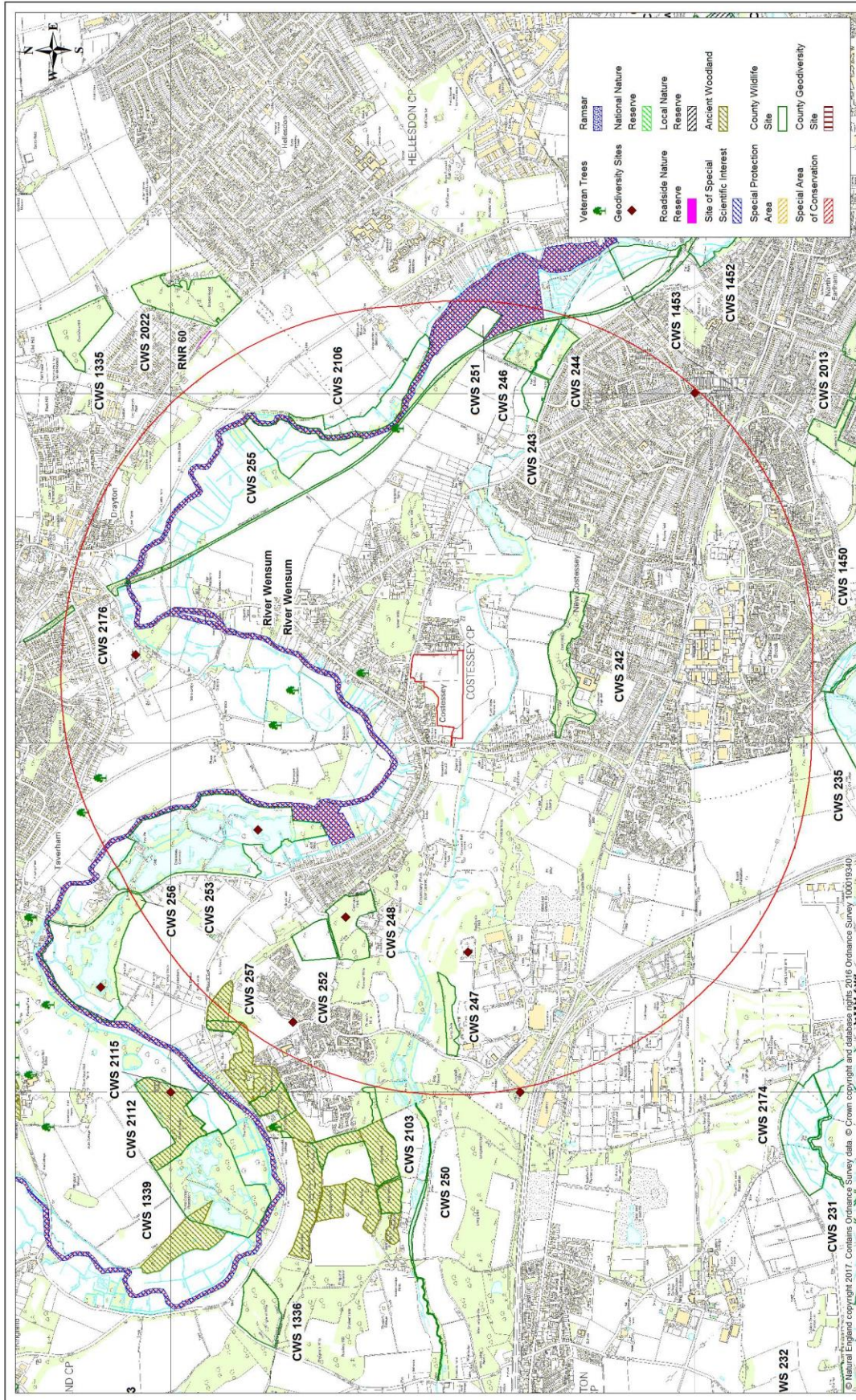
Site Name	Designation	Distance from Site	Description
Land South of River Tud	CWS (244)	1.7km south east	Land sloping away from the River Tud consisting of deciduous woodland and semi-improved grassland. The canopy is dominated by alder however species such as oak, willow and hawthorn are also present.
East Hills	CWS (242)	500m south	An area of deciduous woodland sloping adjacent to the valley of the River Tud. The woodland canopy has frequent small clearings and features such species as sycamore, sweet chestnut, beech, oak, ash, and hornbeam.
Land South of River Tud	CWS (243)	1.4km north east	Area of semi-improved damp grassland adjacent to the river Tud, the north of the site contains several damp hollows.
Red Bridge	CWS (246)	1.7km east	Situated north of the River Tud. The site consists of a variety of habitats including fen, deciduous woodland, scrub and several ponds. The woodland consists mostly of birch, rowan and oak.
Wensum Meadow	CWS (251)	1.9km east	A paddock of species rich semi-improved grassland surrounded by the River Wensum SSSI. The site is bordered with hedgerows of oak, and hawthorn.
Low Road Meadow	CWS (255)	1.4km north east	Species-rich semi-improved grassland crossed by several deep dykes. Uneven ground gives rise to both wet and dry areas.
Snakes Hill	CWS (248)	1.3km west	An area of deciduous woodland with a well-developed shrub layer lining a deep sandy ridge. The woodland canopy contains mature beech, hornbeam, oak, birch, rowan and sycamore.
Brickfield Farm	CWS (252)	1.4km north west	An area of acidic grassland with an abundance of herb species lying on gently sloping ground.
Costessey Pits (East)	CWS (253)	1km north west	A complex mosaic of grassland and woodland surrounding a number of lakes used for angling and water sports. The woodland consists predominantly of alder and birch, an abundance of deadwood provides habitat for a wide variety of fauna.
Taverham Mill	CWS (256)	2km north west	This site is situated to the south of the River Wensum and consists of a fishing lake surrounded by grassland and a mixture of planted and semi-natural woodland over an acid soil. The lake supports good aquatic

			vegetation with abundant fringed water-lily (<i>Nymphoides peltata</i>) which is scarce in Norfolk.
Lord's Hill & Easton Reeds and Blackhill Wood	CWS (257)	1.96km north west	The woodland is dominated by oak with patches of Lombardy poplar, beech, hornbeam and hazel, both mature and recently coppiced. Ancient coppice stools of oak, sweet chestnut and field maple occur inside the south-east boundary. Blackhill Wood is located to the north east, and lies along the Wensum escarpment.
Wensum Mount Farm	CWS (2106)	1.3km east	Low-lying river valley floodplain, wet grassland and fen, adjacent to the River Wensum SSSI and SAC. The site is predominantly species-rich to moderately species-rich marshy grassland with impeded drainage over peaty soils, with two small patches of alder woodland adjacent to the river and scattered alder, white willow, grey willow and hybrid black-poplars.
Long Dale	CWS (247)	1.8km west	A site of old gravel pits with areas of deciduous woodland, south of Costessey park golf course. The canopy of the woodland is dominated by birch and downy birch with mature sycamore, oak, and hornbeam occurring less frequently.
Marriott's Way	CWS (2176)	1.2km north east	This sit follows a disused railway line that has been laid with a firm track. Although the area around the track is largely un-vegetated, some stretches contain various tree species and scrubland. Badger setts have been recorded along this stretch and bats have been recorded roosting under bridges and commuting along the track itself.

Habitat Types within 2km


3.3 Habitat types within 2km of the development site included ancient woodland, deciduous woodland, traditional orchards, lowland fens, floodplain grazing marsh, good quality semi-improved grassland and lowland meadows (see Figure 3). The nearest woodland lay approximately 25m north-west of the site, with ancient woodland 2km north-west. The lowland fens associated with the river Wensum were 1.2km north east of the site and the nearest area of floodplain grazing marsh was 100m south, adjacent the River Tud. The lowland meadows, adjacent Marriott's Way, were approximately 1.8km east of the site and the good quality semi-improved grassland was approximately 900m north-west of the site. Two traditional orchards were located both approximately 1.3km north-west of the site.

Figure 2: Statutory and non-statutory sites within 2km



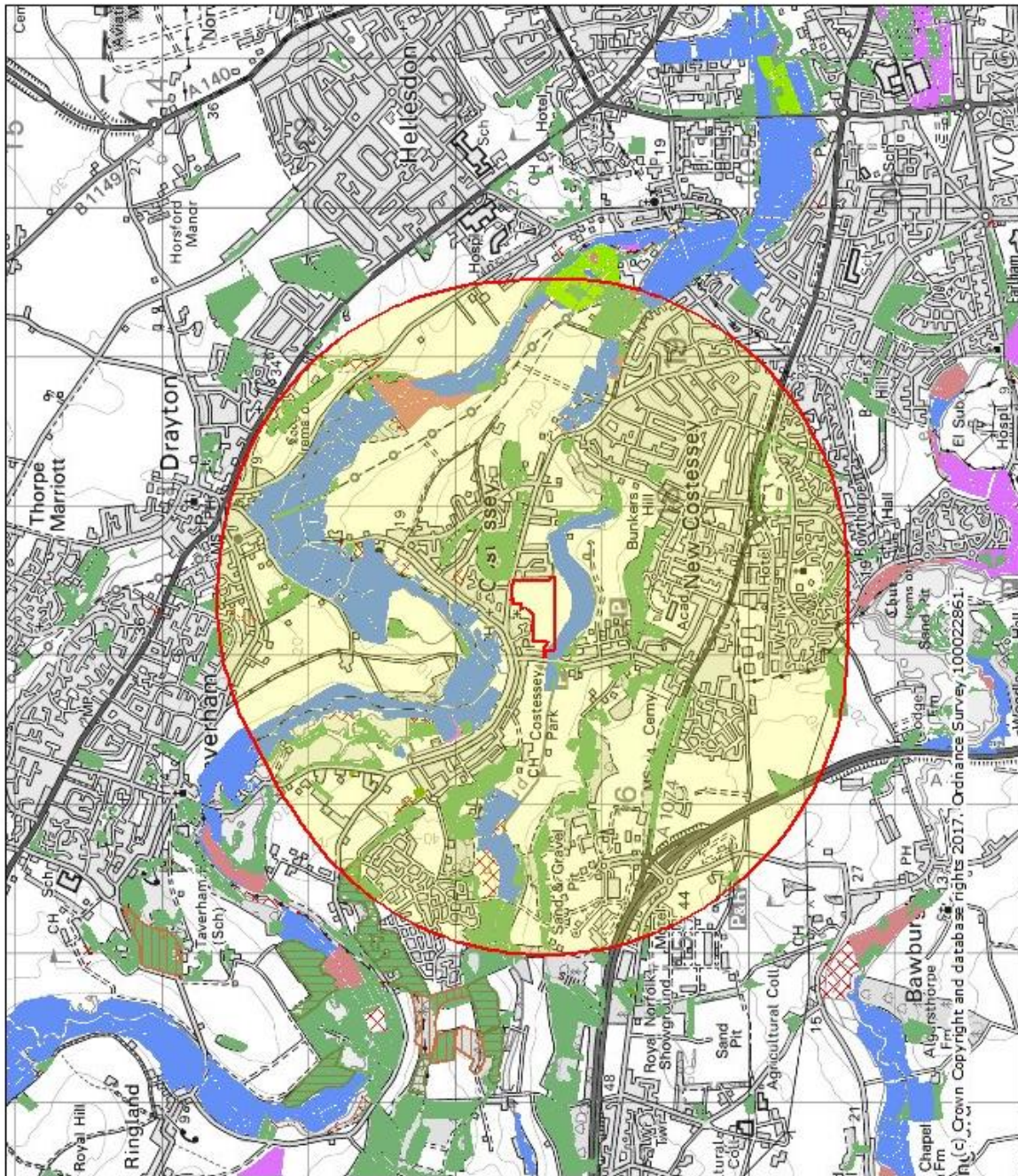
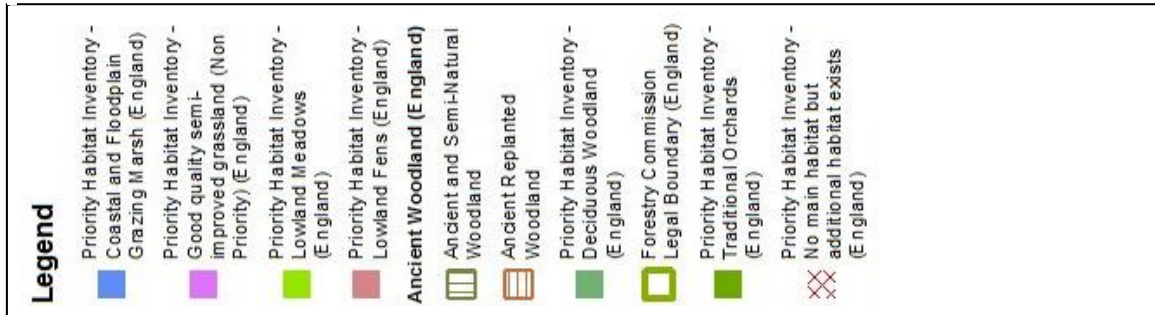
2km Data Search Around TG173114, Costessey
 For James Blake Associates
 Scale 1:20000
 Compiled by Nicola Dixon on 23 May 2017

Norfolk Biodiversity Information Service
 County Hall
 Martineau Lane
 Norwich NR1 2SG
 Tel: 01603 224458 Fax: 01603 223219



NBIS
 Norfolk Biodiversity
 Information Service

Figure 3: Habitat types within 2km



Protected, priority and rare species

- 3.4 The Birds of Conservation Concern (BoCC) are split into three criteria. The red list is the highest conservation priority (species needing urgent action). The amber list is the next most critical group, followed by green. Red listed species are those that are globally threatened according to IUCN criteria, species with populations or ranges that have declined rapidly in recent years, and those that have declined historically and have not shown a substantial recent recovery.
- 3.5 Full lists of UK principally important and protected amphibians, reptiles and mammals are shown below. A reduced list of UK principally important and protected birds and invertebrates is shown; these have been selected based on their likelihood of being recorded at the site given the habitats types present.

Birds	Protection	Approximate distance from site	Recent year within 2km
Barn owl	Schedule 1 species	Within a 2km square 1.2km south west	2015
Corn bunting	BoCC red list, SPI	820m south east	2010
Cuckoo	BoCC red list; SPI	Within the same 2km square as the site	2014
Dunnock	BoCC amber list, SPI	1.4km south	2013
Fieldfare	BoCC red list; Schedule 1 species	Within a 2km square 1.2km south west	2013
Grey partridge	BoCC red list; SPI; LBAP	1.5km north east	2007
Hawfinch	BoCC red list; SPI	Within a 2km square 1.2km south west	2014
Hobby	Schedule 1 species	Within a 2km square 1.2km south west	2014
House martin	BoCC amber list	2km west	2014
House sparrow	BoCC red list; SPI	Within the same 2km square as the site	2014
Lapwing	BoCC red list; SPI	1.4km south west	2013

Lesser spotted woodpecker	BoCC red list; SPI	Within a 2km square 1.2km south west	2007
Linnet	BoCC red list; SPI	Within the same 2km square as the site	2014
Marsh tit	BoCC red list; SPI	Within a 2km square 1.2km south west	2014
Merlin	BoCC red list; Schedule 1 species	Within a 2km square 1.2km south west	2010
Quail	BoCC amber list; Schedule 1 species	1.4km west	2011
Redwing	BoCC red list; Schedule 1 species	Within a 2km square 1.2km south west	2014
Reed bunting	BoCC amber list; SPI; LBAP	1.4km south west	2014
Skylark	BoCC red list; SPI; LBAP	Within the same 2km square as the site	2014
Song thrush	BoCC red list; SPI	Within the same 2km square as the site	2014
Spotted flycatcher	BoCC red list; SPI; LBAP	1.4km south west	2007
Starling	BoCC red list; SPI	Within a 2km square 1.2km south west	2014
Swift	BoCC amber list	1.12km south east	2014
Turtle dove	BoCC red list; SPI	Within a 2km square 1.2km south west	2014
Yellow wagtail	BoCC red list; SPI	Within a 2km square 1km south west	2013
Yellowhammer	BoCC red list; SPI	Within the same 2km square as the site	2014

Mammals	Protection	Approximate distance from site	Year of Record
Badger	Protection of Badgers Act 1992	1.8km north west	2015
Harvest mouse	SPI; LBAP	500m south west	2000
Hedgehog	SPI; LBAP	1.38km south west	2015
Otter	European protected SPI; LBAP	Within the same 2km square as the site	2013
Water vole	WCA5; SPI; LBAP	330m south west	2007
		Within the same 2km square as the site	2007
Brown hare	SPI; LBAP	520m north west	2015
Serotine bat	European protected	120m north east	2011
		Within same 2km square as site	2015
Daubenton's bat	European protected	100m north east	2011
		Within same 2km square as site	2015
Natterer's bat	European protected	600m south east	2012
		Within same 2km square as site	2015
Western barbastelle	European protected; SPI LBAP	300m south west	2013
		Within same 2km square as site	2015
Whiskered bat	European protected	3.14km west	2008
Brown long-eared bat	European protected; SPI; LBAP	130m north east	2011
		Within same 2km square as site	2015
Noctule bat	European protected; SPI; LBAP	100m north east	2011
		Within same 2km square as site	2015
Common pipistrelle bat	European protected	Within same 2km square as site	2015
Soprano pipistrelle bat	European protected; SPI; LBAP	Within same 2km square as site	2015
Nathusius' pipistrelle bat	European protected	Within same 2km square as site	2013

Invertebrates	Protection	Approximate distance from site	Year of Record
White-clawed Freshwater	WCA5; SPI; LBAP	Within same 2km square as site	2012

Crayfish			
Desmoulin's Whorl Snail	SPI; LBAP	1.7km north east	2001
34 Moth species were identified within 2km of the site all of which were SPI and LBAP			

Plants	IUCN Red Data list	Approximate distance from site	Year of Record
Basil thyme (<i>Clinopodium acinos</i>)	<i>Vulnerable</i>	1.2km north east	2000

Amphibians	Protection	Approximate distance from site	Year of Record
Toad	SPI; LBAP	2km west	2014
Great crested newt	European protected, SPI; LBAP	1.7km north west	2013
		Within same 2km square as site	2010

Reptiles	Protection	Approximate distance from site	Year of Record
Common lizard	Partially protected under the WCA Schedule 5; LBAP; SPI	1.8km north west	2011
Grass snake		1.5km north west	2011
		1.9km north west	2015
Slow worm	Within same 2km square as site	2015	

WCA = Wildlife and Countryside Act 1981 as amended; SPI = Species of Principle Importance; LBAP = Local Biodiversity Action Plan; BoCC = Birds of Conservation Concern 4

Updated Phase 1 Habitat Survey

- 3.6 Figure 4 shows a Phase 1 habitat map of the site, with Target Notes. A list of plant species identified on the site is included in Appendix A.

Limitations and Assumptions

- 3.7 The baseline conditions reported and assessed in this document represent those identified at the time of the survey on the 15th May 2017. Although a reasonable assessment of habitats present can be made during a single walkover survey, seasonal variations are not observed. The full plant species list (Appendix A) was based on the current site visit. The survey was conducted in May, which is in the



optimal season for Phase 1 habitat surveys. All areas of the site were accessible on the day of the survey.


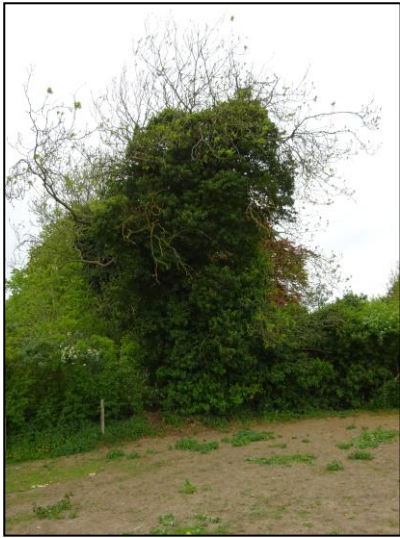


- 3.8 The desk study used available records and historical data from the local area. However, this does not provide a reliable indication of species present since records depend entirely on survey effort in the area, which is highly variable. The data are useful as a general guide to supplement the site visit, but absence of records does not reflect absence of species.





Figure 4: Updated Phase 1 Habitat Map



Target Notes

Target Note	Habitat description	Photo
1	<p>A large (approximately 4ha) semi-improved grassland field that is horse grazed. The sward height ranged from <5cm (in grazed areas) to 20cm (in ungrazed areas) and was dominated by Yorkshire fog (<i>Holcus lanatus</i>) and false oat grass (<i>Arrhenatherum elatius</i>) with frequent forbs throughout.</p>	
2	<p>Tall ruderal was recorded along a bank and next to a dry ditch. Scattered scrub was also present including elm (<i>Ulmus minor</i>), hawthorn (<i>Crataegus monogyna</i>), sycamore (<i>Acer pseudoplatanus</i>), and honeysuckle (<i>Lonicera periclymenum</i>).</p>	

<p>3</p>	<p>A species-rich hedgerow, measuring 3m wide by 10m tall, was recorded along the western field boundary. Species included sycamore (<i>Acer pseudoplatanus</i>), ash (<i>Fraxinus excelsior</i>), hawthorn (<i>Crataegus monogyna</i>), elder (<i>Sambucus nigra</i>) blackthorn (<i>Prunus spinosa</i>) and oak (<i>Quercus robur</i>). A tall ruderal understorey layer was also present.</p> <p>Three mature ash trees within the hedgerow covered extensively in ivy provided moderate bat roost potential.</p>	 
<p>4</p>	<p>Two small connected wooden buildings with a corrugated onduline covered roof were recorded on the western boundary of the site. The building interiors were intact and unlined with no gaps or crevices for bats.</p> <p>Overall, the building provided negligible potential for roosting bats.</p>	 

<p>5</p>	<p>A mature hawthorn (<i>Crataegus monogyna</i>) hedgerow, measuring 3m wide by 10m tall, with occasional oak standards along its length. Understorey species included nettle (<i>Urtica dioica</i>), cleavers (<i>Galium aparine</i>), cow parsley (<i>Anthriscus sylvestris</i>), white dead-nettle (<i>Lamium album</i>) and woodland forget-me-not (<i>Myosotis sylvatica</i>).</p>	
<p>6</p>	<p>Mammal pathways were recorded going through the hedgerow along the southern field boundary.</p>	
<p>7</p>	<p>Two mature oak (<i>Quercus robur</i>) trees within the hedgerow along the southern field boundary. As with TN2 the trees along this boundary had ivy covering on the main stem.</p> <p>Both oak trees provided moderate potential for roosting bats.</p>	
<p>8</p>	<p>A species-rich hedgerow, measuring 2m wide by 3m tall, was recorded north of the arable field. Species included rowan (<i>Sorbus aucuparia</i>), blackthorn (<i>Prunus spinosa</i>), hawthorn (<i>Crataegus monogyna</i>), horse chestnut (<i>Aesculus hippocastanum</i>), elm (<i>Ulmus minor</i>), hazel (<i>Corylus avellana</i>) and sycamore (<i>Acer pseudoplatanus</i>).</p>	

4 Protected Species – Results and Evaluation

Flora and habitats

- 4.1 **Semi-improved grassland** - The eastern part of the site was a semi-improved grassland field which was grazed by horses. The western side of the field was heavily grazed and the eastern side was only grazed in small patches. The sward height ranged from 5cm to 20cm tall in grazed and ungrazed areas respectively. Grass species included Yorkshire fog, false oat and perennial rye (*Lolium perenne*) and there was a good diversity of forbs across much of the field. The field margins along the boundaries of the arable field also consisted of semi-improved grassland with some tall ruderal species.
- 4.2 **Hedgerows** - A wide, mature hawthorn hedgerow formed the western boundary of the grassland field. The ground flora was limited and predominantly consisted of ivy, and in places manure piles had been created beneath the canopy. In addition, large patches of bare earth were noted along the hedgerow, likely as a result of horse/grazing activity. The hedgerow to the east was species-poor and formed a garden boundary to the adjacent property. The southern hedgerow was species poor; however it contained some mature scattered trees. A species-rich hedgerow was recorded along the northern boundary of the adjacent arable field and this was connected to the mature hawthorn hedgerow in the horse grazed field.
- 4.3 None of the hedgerows on site were considered likely to be classified as ‘important’ under the Hedgerow Regulations 1997 due to a lack of associated features. However, they did provide suitable commuting and foraging corridors which could be retained and enhanced.
- 4.4 **Trees** - There were a number of trees along the southern and western horse grazed field boundaries which, along with the hedgerows and scrub, had the potential to support a range of species, such as bats and nesting birds. This is discussed in more detail below.
- 4.5 Although no rare, principally important, local BAP or protected plant species were recorded during the survey, the site did support a good diversity of forbs. However, as the site is regularly grazed by horses, further botanical survey is considered unnecessary.

Bats

- 4.6 There were two connected buildings on the site, which were used as a horse shed and for storage. These were constructed of weather-boarding with no gaps, and a corrugated iron flat roof. Both buildings were open and subjected to high light levels and draughty making them unsuitable for roosting bats. In addition, there were no suitable crevices internally. Therefore, both buildings were considered to have a negligible bat roost potential.
- 4.7 Mature trees along the site boundaries and within the hedgerows were considered to have a moderate bat roost potential. This was based on the presence of dense ivy cover on the main stems. If the trees would need to be removed, or any work undertaken on the trees, further surveys would be required.
- 4.8 The site also provided suitable foraging habitat for bats with hedgerows, scrub and trees providing potential commuting routes between woodland and riparian areas to the north (associated with the River Wensum) and riparian habitats associated with the River Tud to the south.
- 4.9 There are records of nine bat species within the same 2km square as the site, the majority of which are from 2015. These records include Barbastelle, which is a rare bat species, is an Annex II species and a Species of Principal Importance. The nearest record of this species was 300m south-west of the proposed development.
- 4.10 Retention and creation of new hedgerows at the site boundaries, along with appropriate lighting restrictions, would preserve such corridors through a change in site use/development.
- 4.11 Further bat surveys would be required if the development would have a negative impact on trees with moderate bat roost potential.

Reptiles

- 4.12 The site provided suitable habitat for reptiles. The longer areas of grassland provided potential foraging habitat and the brash, debris and log piles, hedgerows and scrub provided hibernation and shelter opportunities.
- 4.13 There are records of grass snake, common lizard and slow worm within 2km of the site.
- 4.14 Further reptile surveys are required.

Birds

- 4.15 Trees, scrub and hedgerows surrounding the site provided potential nesting and foraging opportunities for birds, with the horse shed providing additional potential nesting opportunities. The grassland was considered sub-optimal for ground nesting birds, due to disturbance by horses and structure of the vegetation, but it was considered likely to be used by foraging birds. However, the arable field adjacent to the horse grazed field provided suitable nesting habitat for ground nesting birds such as skylarks.
- 4.16 Bird species observed during the field survey included goldfinch, blackcap, blackbird, blue tit, jackdaw, robin, house sparrow, chaffinch and bullfinch. Skylarks have been recorded on a separate site visit. House sparrows and skylarks are BoCC red listed and NERC Section 41 species. Bullfinches are BoCC amber listed and also a NERC Section 41 species.
- 4.17 There are records of eleven BoCC red listed species and four amber listed species within 2km of the site that are likely to use the habitats provided on site for nesting and foraging. There are also records of three BOCC red listed wintering bird species: lapwing, redwing and fieldfare, that are very likely to use the grassland and arable fields on site for foraging. Redwing and fieldfare are also WCA Schedule 1 species.
- 4.18 Trees and hedgerows should be suitably protected from harm during the construction works following British Standard: BS5837 (2012).
- 4.19 Should any site clearance or works to trees or hedges should be required then this should be conducted outside the main bird breeding season (which is March until September). If vegetation removal is unavoidable between these dates, an ecologist should survey the site for active bird nests immediately prior to works. If active nests are found or identified, a radius of 5m of vegetation should be left around the nest until the young have fledged.
- 4.20 As there is suitable habitat, such as grazed pastures, hedgerows and arable fields, for breeding and wintering birds in the surrounding area, it is considered unlikely that the development will have a significant effect on local bird populations. Therefore, no further bird surveys are recommended.

Great Crested Newts

- 4.21 The hedgerows, ungrazed areas of grassland and field margins on site provided suitable foraging habitat for great crested newt during their terrestrial phase. Additionally, the debris, brash and log piles provided suitable shelter and hibernation opportunities.
- 4.22 There are records of great crested newts within 2km of the site from 2013.
- 4.23 Despite the suitable terrestrial habitats on the site, there were no ponds or waterbodies on site, or within 500m of the site boundary. Therefore it was considered unlikely that great crested newts would be present on the site.
- 4.24 Large rivers (the Tud and Wensum), main roads and residential areas also acted as significant barriers to dispersal, further reducing the likelihood that any great crested newts would migrate to the site.
- 4.25 No further great crested newt survey is necessary.

Invertebrates

- 4.26 The site was considered suitable to support a number of invertebrates due to the plant diversity available in ungrazed areas. The scrub across the site and hedgerow, along the western boundary of the horse grazed field, provided potential habitat for other common invertebrates. These habitats were abundant and therefore could support a significant assemblage of invertebrate species.
- 4.27 The data search highlighted records of thirty-four moth species within 2km of the site, all of which were NERC Section 41 Species of Principle Importance in England and listed on the local biodiversity action plan.
- 4.28 It is recommended that habitats suitable for invertebrates are retained within the site and any developments include the creation of insect houses/hibernacula in retained /created wildflower areas.

Hedgehogs and badgers

- 4.29 The site, particularly the mature hedgerow along the western boundary provided moderate quality habitat for badgers and hedgehogs, however all evidence recorded during the site visit was attributed to either foxes or rabbits due to size and/or form. This included mammal push-throughs and scrapes to the south of the site, which were not considered large enough to have been created by badgers.

- 4.30 The site was considered suitable for sett creation with cover provided by hedgerows and dense scrub. The arable and grassland fields provided suitable foraging habitat for badgers. The availability of deciduous trees, brash, scrub and hedgerows also provided opportunity for nesting and hibernating hedgehogs.
- 4.31 There are records of badgers and hedgehogs within 2km of the site, both from 2015.
- 4.32 Although no evidence of badgers or hedgehogs was recorded during the site visit, the site remains suitable for these species and could be colonised in the future. Therefore, it is recommended that a precautionary check for these species is carried out prior to development. This should be undertaken 6 months prior to works commencing.

Dormice

- 4.33 The site was sub-optimal for dormice; hedgerows were dominated by a single species, with infrequent mature trees and an open understorey. Scrub within the site was of limited extent and isolated within both the local and wider landscape. Furthermore, the site did not link to wider areas of woodland suitable for dormice.
- 4.34 The desk study did not find any records of dormice within 2km of the site. In addition, dormice are known to be absent from Norfolk. Therefore, no further survey would be required.

Other Protected, BAP or Rare Species

- 4.35 There were no water courses within the site or within 50m of the site boundary. It was considered unlikely that species such as otter and/or water vole would be impacted by the proposed development.
- 4.36 The proposed development was considered unlikely to impact on any other protected, BAP or rare species.

Potential Impacts to Conservation Sites

- 4.37 There was one European protected site within 7km of the potential development area, the River Wensum SSSI and SAC (detailed in Table 2).
- 4.38 The site falls within the Impact Risk Zone of the SSSI. This relates to any residential development of 50 or more houses outside existing settlements and urban areas (*source: Magic Map*).
- 4.39 According to Magic Maps, the River Wensum is in an unfavourable status, and was considered to be in a decline in 2002 and an unfavourable status in 2010 (NE). The reason for the decline and unfavourable status assessment by Natural England is due to invasive freshwater species, freshwater siltation, water abstraction, pollution, agricultural run-off. In addition, there is no public access from the proposed development site to the SSSI. Therefore, it was considered that the impacts from the proposed development would be negligible.

5 Key Recommendations: Legal Requirements

- 5.1. Further surveys for bats and reptiles are recommended. These species are protected under EU and/or UK law and loss of habitat or disturbance to these species should be adequately mitigated.

Bats

- 5.2. All bat species are European protected and are listed in the European Commission Habitats and Species Directive. They are also protected by the Wildlife and Countryside Act 1981 (as amended). The legislation means that all bat roosts are protected from destruction, damage or modification, even if the bats are not present at the time of any proposed works. The legislation also protects bats from disturbance, killing and injury.
- 5.3. If any of the mature trees or moderate bat roost potential trees were to be removed as part of the proposed development, the trees will need to be climbed and inspected survey to determine if any bat roosts are present. The climb and inspect survey should be undertaken by a licensed bat ecologist.
- 5.4. A sensitive lighting scheme should be adhered to in order to prevent disturbance to potentially nearby roosting, foraging or commuting bats:
- No works on site should be conducted after sunset and if security lighting is required then this should be kept to the minimal level (as necessary for safety and security).
 - Post development lighting should be directed away from boundary trees and hedgerows.
 - Installation of lighting columns at the lowest practical height level with box shield fittings will minimise glare and light spillage
 - Lux level of lamps should be as low possible and be high pressure sodium (rather than metal halide, or other) with covers made from glass rather than plastic as this minimises the amount of UV light, reducing the attraction effects of lights on insects
 - Security lights should be set on short timers, and be sensitive to large moving objects only

- 5.5. If any of the hedgerows would be removed as part of the proposed development, or new access entrances would create large gaps in the hedgerows, bat activity surveys would be required to observe how bats are using the site as any work to the hedgerows could result in the loss or fragmentation of foraging routes, particularly for those species which hug the treeline, eg brown long-eared bat and serotine.
- 5.6. The desk study showed that there were nine bat species within 2km of the proposed development, including some species which have been recorded within 300m of the site (Barbastelle bat). The horse paddock field was noted to be 3.8ha which contained suitable foraging habitat. The proposed development would result in the loss of 3.8ha of suitable foraging habitat. The loss of suitable foraging habitat for bat species such as Barbastelle bat could have a significant impact on populations or result in the fragmentation of foraging areas. Therefore, bat activity surveys are recommended.
- 5.7. Bat activity surveys require one survey per month throughout the bat surveying season (May to September). The surveys require ecologists to walk pre-determined transects around the site recording any bat activity observed. At least one of these visits is required to be a back-to-back dusk and dawn survey.

Reptiles

- 5.8. Widespread reptiles are partially protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Reptile surveys require seven site visits to survey previously placed artificial refugia such as roofing felt. Surveys should follow current best practice guidelines (Froglife, 1999) and be undertaken between April and September.
- 5.9. Hedgehogs are species of principle importance (SPI) under the NERC Act 2006 and are protected by the Wild Mammal Protection Act 1996. Where suitable hedgehog habitat must be removed, it should be done by hand held mechanical tools under ecological supervision to avoid killing or injury. Where this is necessary, the vegetation should be cut to no less than 20cm and searched by an experienced ecologist before any further vegetation removal can be completed.
- 5.10. Precautionary clearance of the site, buildings and trees will be necessary, as detailed in Section 4, to avoid infringing legislation which protects all nesting birds.

6 Additional and Enhancement Recommendations

- 6.1 Where possible, hedgerows at the boundaries of the site should be retained and enhanced to create corridors and shelter/foraging areas for wildlife including birds, bats, badgers and hedgehogs. Planting of native hedgerow species in gaps, for example along the southern and eastern boundaries will provide further opportunities for these species and enhance their value as ecological corridors.
- 6.2 The addition of bat boxes to any new buildings or retained trees within the site would provide additional roosting opportunities. Schwegler bat boxes are recognised as being suitable for roosting bats and long lasting. Bat boxes should ideally be located south facing (between south-east and south-west) and above 5m. Boxes such as Schwegler 2F or integral bat tubes Schwegler 1FR suitable for pipistrelles would be suitable for this site.
- 6.3 Landscaping could incorporate native or wildlife attracting trees, shrubs, and wildflower areas as these would likely be of benefit to a variety of wildlife including, birds, bats and invertebrates. Such landscaping could also act as a receptor area should reptiles be recorded using the site and require translocation.
- 6.4 The incorporation of a reptile hibernaculum into the landscape design (preferably within any wildflower grassland) will enhance the area for reptiles in the future. Hibernacula can be created by partially burying piles of wood/rubble and covering with earth. Hibernacula in the form of log piles could also benefit hedgehogs.
- 6.5 The addition of a range of bird boxes would provide additional nesting opportunities. This could include house sparrow terraces on any new buildings on site providing additional nesting opportunities for this BoCC red listed species recorded on/over site. Further standard bird boxes sited on mature trees will help attract a greater diversity of birds to nest. Boxes should be located out of direct sunlight and close to, but not restricted by, vegetation. A suitably qualified ecologist should be consulted to determine the exact location and position of the bird boxes.
- 6.6 The addition of insect houses/hibernacula within retained or created wildflower grassland would retain shelter and hibernation opportunities for invertebrates using the grassland or boundary habitats.

7 Conclusion

- 7.1 The site was a grazed semi-improved grassland field with an outgrown native hedgerow at the western boundary, garden hedgerows to the east and a defunct hedgerow to the north. Dense scrub and garden fences formed the other boundaries and scrub was also encroaching into the field at the southern, western and northern boundaries. Adjacent to the grassland field was an arable field bordered by hedgerows and field margins.
- 7.2 A reptile survey is recommended to determine the presence/likely absence of reptile species such as slow worm, common lizard and grass snake. This has been based on the suitability of habitats present and the number of reptile records within 2km of the development site.
- 7.3 If the mature trees, or those with a moderate bat roost potential, would need to be removed, further survey work would be required.
- 7.4 If the hedgerows would need to be removed, or the development would create large significant gaps in the hedgerows, further bat activity surveys should be undertaken. These are undertaken between May and September inclusive.
- 7.4.1 The desk study showed that there were 9 bat species within 2km, including a rare species, Barbastelle. The development would result in the loss of suitable foraging habitat (approximately 3.8ha). Therefore, bat activity surveys are recommended.
- 7.5 If any mitigation or compensation recommended following these further surveys is carried out, and if the precautionary measures for birds detailed in this report are followed, it was considered that any development could proceed with minimal impact on the local conservation status of any protected, principally important or rare species within the area.
- 7.6 It is also considered that with a sensitive landscape scheme, and by including some, or all, of the additional recommendations, the value of the site for local wildlife could be retained or enhanced post development.

8 References

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines, third edition*. The Bat Conservation Trust, London.

Froglife (1999) *Reptile Survey An Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation*. Froglife Advice Sheet 10.

Gent, A.H. and Gibson, S.D., eds. (1998) *Herpetofauna Workers' Manual*. Peterborough, Joint Nature Conservation Committee.

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

JNCC (2010) *Handbook for Phase 1 habitat survey: a technique for environmental audit (revised reprint)* JNCC: Peterborough.

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

English Nature (2004) *Guidelines for Developers*. English Nature, Peterborough

Strachan, R., Moorhouse, T. & Gelling, M. (2011) *Water vole Conservation Handbook* (3rd edition). WildCRu: Oxford.

Eaton, M. Aebischer, N. Brown, A. Hearn, R. Lock, L. Musgrove, A. Noble, D. Stroud, D. & Gregory, R. (2015) *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*. British Birds **108**: 708-746.

Web references

MAGIC: Designated area data downloaded from URL <http://www.magic.gov.uk/html>

Norfolk Local Biodiversity Action Plan from www.norfolkbiodiversity.org/actionplans/

9 Bibliography

Environmental Protection Act (Duty of Care) Regulations 1991.

EU, Habitats Directive, ec.europa.eu/environment

HMSO (1981) Wildlife and Countryside Act. HMSO, London.

HMSO (2010) Conservation of Habitats and Species Regulations 2010 (as amended)
HMSO, London.

HMSO (2006) Natural Environment and Rural Communities Act HMSO London.

National Planning Policy Framework (2012) ISBN: 9781409834137.

HMSO (2000) Countryside and Rights of Way (CRoW) Act. HMSO, London.

HMSO (1992) Protection of Badgers Act, HMSO London.

Stace, C (2005) *Field Flora of the British Isles*. Cambridge University Press.

Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. & Taylor, I. (2014) *A Vascular Plant Red List for England*. Botanical Society of Britain and Ireland, Bristol.

W.J. Cresswell, J.D.S. Birks, M. Dean, M. Pacheco, W.J. Trehwella, D. Wells and S. Wray (2012) UK BAP Mammals Interim Guidance for Survey Methodologies, Impacts and Mitigation. Eds. The Mammal Society, Southampton.

10 Appendices

Appendix A: Plant species list

Common Name	Scientific Name	Grassland	Hedgerow	Scrub
Sycamore	<i>Acer pseudoplatanus</i>		x	x
Yarrow	<i>Achillea millefolium</i>	x		
Horse chestnut	<i>Aesculus hippocastanum</i>		x	
Cow parsley	<i>Anthriscus sylvestris</i>		x	
False oat grass	<i>Arrhenatherum elatius</i>	x		
Daisy	<i>Bellis perennis</i>	x		
Hedge bindweed	<i>Calystigia sepium</i>		x	
Common mouse-ear	<i>Cerastium fontanum</i>	x		
Creeping thistle	<i>Cirsium arvense</i>	x	x	
Field bindweed	<i>Convolvulus arvensis</i>	x		
Hazel	<i>Corylus avellana</i>		x	
Hawthorn	<i>Crataegus monogyna</i>		x	x
Leyland cypress	<i>X Cupressocyparis leylandii</i>		x	
Cock's-foot	<i>Dactylis glomerata</i>	x		
Ash	<i>Fraxinus excelsior</i>		x	
Cleavers	<i>Galium aparine</i>		x	
Herb-Robert	<i>Geranium robertianum</i>	x	x	
Ivy	<i>Hedera helix</i>		x	
Yorkshire fog	<i>Holcus lanatus</i>	x		
Wall barley	<i>Hordeum murinum</i>		x	
Perforate St John's wort	<i>Hypericum perforatum</i>	x		
White dead nettle	<i>Lamium album</i>		x	
Oxeye daisy	<i>Leucanthemum vulgare</i>	x		
Perennial rye grass	<i>Lolium perenne</i>	x	x	
Honeysuckle	<i>Lonicera periclymenum</i>			x
Pineapple weed	<i>Matricaria disciodes</i>	x		
Black medick	<i>Medicago lupulina</i>	x		
Woodland forget-me-not	<i>Myosotis sylvatica</i>		x	
Ribwort plantain	<i>Plantago lanceolata</i>	x		
Broadleaved plantain	<i>Plantago major</i>	x		
Self-heal	<i>Prunella vulgaris</i>	x		
Blackthorn	<i>Prunus spinosa</i>		x	
Oak	<i>Quercus robur</i>		x	
Creeping buttercup	<i>Ranunculus repens</i>	x		
Bramble	<i>Rubus fruticosus agg.</i>			x
Broad leaved dock	<i>Rumex obtusifolius</i>			x
Elder	<i>Sambucus nigra</i>		x	
Common ragwort	<i>Senecio jacobaea</i>	x		
Prickly sow-thistle	<i>Sonchus asper</i>			x
Rowan	<i>Sorbus aucuparia</i>		x	

Red clover	<i>Trifolium pratense</i>	x		
White clover	<i>Trifolium repens</i>	x		
Elm	<i>Ulmus sp.</i>			x
Nettle	<i>Urtica dioica</i>		x	

Appendix B: Relevant protected species legislation

Species	Relevant Legislation	Level of Protection
Bats	<ul style="list-style-type: none"> ○ Full protection under the Wildlife and Countryside Act (WCA) (1981) (Listed on Schedule 5) - as amended ○ Classified as European protected species under Conservation of Habitats and Species Regulations 2010, as amended ○ Also protected by the Wild Mammals (Protection) Act 1996 	<p>Under the WCA (1981), it is an offence to:</p> <ul style="list-style-type: none"> • intentionally kill, injure, or take any species of bat • intentionally or recklessly disturb bats • intentionally or recklessly damage destroy or obstruct access to bat roosts
Birds	<ul style="list-style-type: none"> ○ Protection under the Wildlife and Countryside Act (1981) as amended 	<p>Under the WCA (1981), it is an offence to: (with exceptions for certain species):</p> <ul style="list-style-type: none"> • Intentionally kill, injure or take any wild bird • Intentionally take, damage or destroy nests in use or being built (including ground nesting birds) • Intentionally take, damage or destroy eggs <p>Species listed on Schedule 1 of the WCA or their dependant young are afforded additional protection from disturbance whilst nesting</p>
Widespread reptiles	<ul style="list-style-type: none"> ○ Partially protected under Schedule 5 of the Wildlife and Countryside Act (1981) as amended. 	<p>Under the WCA (1981), it is an offence to:</p> <ul style="list-style-type: none"> • intentionally kill or injure these animals • sell, offer for sale, advertise for sale, possess or transport for the purposes of selling any live or dead animals or part of these animals