WILD FRONTIER ECOLOGY

# Honingham Thorpe Proposal, Norfolk

# Preliminary Ecological Appraisal Report

December 2018

| Wild Frontier Ecology Ltd | Client details |
|---|---|
| Report produced by:<br>William Riddett BA ACIEEM | Brown and Co.<br>Norwich Office<br>The Atrium<br>St George's Street<br>Norwich<br>NR3 1AB<br><br>Contact: Paul Clarke<br>Tel: 01603 629871 |
| Report checked by:<br>Robert Yaxley BSc CEcol CEnv MCIEEM<br>Authorised by: | |
| Unit 2<br>Cold Blow Farm<br>Great Snoring<br>Fakenham<br>Norfolk<br>NR21 0HF | |
| Tel: 01328 864633<br>will@wildfrontier-ecology.co.uk | |



This report conforms to the British Standard 42020:2013 Biodiversity – Code of practice for planning and development.

The data which we have prepared and provided are accurate, and have been prepared and provided in accordance with the CIEEM's Code of Professional Conduct. We confirm that any opinions expressed are our best and professional bona fide opinions.

Wild Frontier Ecology is ISO14001 accredited

Company Registered in England and Wales No: 4942219.
Registered Office: Saxon House, Hellesdon Park Road, Drayton High Road, Norwich NR6 5DR
Director: Robert Yaxley BSc (Hons) CEcol CEnv MCIEEM
VAT Reg No: 887 4692 54

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# 1. Non-Technical Summary

Wild Frontier Ecology Ltd. (WFE) was commissioned to complete a Preliminary Ecological Appraisal for a site which is to be considered for inclusion within the Greater Norwich Development Plan as an Allocated Site. The site, referred to as Honingham Thorpe, is located to the south of the A47 near Honingham, and covers approximately 336 hectares around the village of Colton. Development proposals for the site are in very early stages but are likely to include residential and employment development in the north and centre of the site, and a Country Park and Nature Reserve in the south.

A desk study and Extended Phase 1 Habitat Survey were completed in November 2018.

The desk study found that there are no statutory designated sites within or close to the site. There are, however, three County Wildlife Sites (CWS) wholly or partly within the site (all located in the far south) and a large number of CWSs in the surrounding area. There is also a Geodiversity Site (Marlingford Quarry) in the south of the site. Biological records returned in the desk study included numerous records of birds and small numbers of records of terrestrial and riparian mammals, reptiles, amphibians and fish.

The Extended Phase 1 Habitat Survey found that the vast majority of the site is dominated by arable fields which are bounded by hedgerows, most of which have multiple mature oak trees. Plantation woodlands are also fairly common, particularly in the north-west and the south of the site. There are also some significant areas of grassland along the River Yare in the south of the site. Also located in the south of the site is Colton Wood, an ancient replanted mixed woodland. There are small areas of other habitats, such as ponds, buildings/hard-standing (i.e. farm-yards) and tracks across the site.

The proposal would focus development within those parts of the site with relatively low ecological value. The areas proposed to become Country Park and Nature Reserve cover the more ecologically valued habitats at the site, including those designated as CWSs.

Further surveys will be required for various protected species and valued habitats, to further inform understanding of ecological constraints at the site and to support any future planning applications for development. Survey results will then feed into the future design of the proposal. Overall, based on current information, there are no known ecological constraints across the whole site which would prohibit or form significant/insurmountable constraints to the proposal becoming an Allocated Site for development within the Greater Norwich Local Plan.

Ecological constraints and opportunities are noted and mapped. Constraints relate mainly to existing habitats and features of relative ecological value, such as woodlands, hedgerows and grasslands. Retaining these features will improve the prospect of successfully creating a green network throughout the developed site, using the existing features as the foundation for such a network. There are also substantial opportunities for ecological enhancement at the site, associated with a development here. Enhancement would focus on increasing the quantity, improving the quality and enhancing the connectivity of habitats and features at the site.

# 2. Background

Wild Frontier Ecology Ltd. (WFE) was commissioned by Brown and Co. to conduct a Preliminary Ecological Appraisal (PEA) of a potential development site referred to as 'Honingham Thorpe', west of Norwich in Norfolk. The PEA was requested to inform and support of the scheme's submission to the Greater Norwich Local Plan's 'Call for Sites'. If the scheme is successfully adopted in response to the Call for Sites, it will be included within the Greater Norwich Local Plan (GNLP) as an Allocated Site, that is, a site which the relevant local authority/authorities consider suitable for future development.

The site is roughly centred on grid reference TG 117 102 and covers an area of approximately 336 hectares (ha) to the north, east and south of the village of Colton. Development proposals for the project have not yet been formalised but it is projected that the site could accommodate approximately residential development and employment employment land in the north, and a Country Park and Nature Reserve in the south. A further 13ha to the north-west is reserved as a possible future residential development opportunity.

The site location is shown in Figure 1, below.

*Figure 1: Site Location (as provided by client)*

# 3. Relevant Legislation

## 3.1. Statutory and Non-statutory Site Designations

### *3.1.1. International (European) Site Designations*

The European Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) as amended directs the designation of important wildlife sites through the European Community as Special Areas of Conservation (SACs), and gives statutory protection to habitats and species listed in the Directive as being threatened or of community interest. Sites identified as candidate SAC (cSAC) are provided with the same level of protection as SAC.

Annex I of 92/43/EEC as amended lists habitat types which are regarded as being of European importance. Included within these are a number of 'priority habitat types' which are habitats regarded as being in danger of disappearance and whose natural range falls broadly within the European Union. This European law had been transposed into UK legislation by The Conservation (Natural Habitats) &c Regulations 1994, now replaced by The Conservation of Habitats and Species Regulations 2017.

Habitats of European-wide importance for birds are listed under the EC Wild Birds Directive (79/409/EEC) as amended. Habitats designated under this Directive are notified as Special Protection Areas (SPAs) and are identified for holding populations > 1% of the reference population as defined in Appendix 4 of the SPA review of bird species listed in Annex 1 of the same Council Directive. Sites identified as potential SPA (pSPA) are provided with the same level of protection as SPA.

Wetlands of International Importance are designated under the Ramsar Convention.

### *3.1.2. National (UK) Site Designations*

National ecological designations, such as Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs) are also afforded statutory protection. SSSIs are notified and protected under the jurisdiction of the Wildlife and Countryside Act 1981 (WCA 1981) as amended. SSSIs are notified based on specific criteria, including the general condition and rarity of the site and of the species or habitats supported by it.

### *3.1.3. Non-Statutory County Site Designations*

At county level, sites may be designated for their nature conservation interest. The criteria for inclusion, and the level of protection provided, if any, may vary between areas. Most individual counties have a similar scheme although they do vary.

In Norfolk such sites are known as County Wildlife Sites (CWS). Recognition as a CWS does not itself confer statutory protection but together with statutory designations, such sites are defined in local and structure plans under the Town and Country Planning system and are a material consideration when planning applications are being determined.

## 3.2 Species Designation and Protection

Species in need of special protection in Britain are listed under the various Schedules of the WCA 1981. Schedule 1 covers birds, while Schedules 5 and 6 cover non-avian vertebrates and invertebrates respectively. Schedule 5 makes it an offence to damage, destroy, or obstruct access to any structure or place which any Schedule 5-listed animal inhabits. It is also an offence to disturb any so listed animal while it is occupying a

structure or place which it uses for shelter/habitation. This legislation has been updated by the Countryside and Rights of Way Act 2000 which includes measures to prevent reckless disturbance. Schedule 8 of the WCA 1981 lists plant species which are afforded special protection.

### *3.2.1. Mammals*

The Protection of Badgers Act 1992 makes it unlawful to knowingly kill, capture, disturb or injure an individual badger *Meles meles*, or intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering by badgers (i.e. a sett).

All bat species are listed under Annex IV (and certain species also under Annex II) of the European Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 92/43/EEC, and are given UK protected status by Schedule 2 of the Conservation of Habitats and Species Regulations 2017. This protection extends to both the species and roost sites. It is an offence to kill, injure, capture, possess or otherwise disturb bats. Bat roosts are protected at all times of the year (making it an offence to damage, destroy or obstruct access to bat roosts), regardless of whether bats are present at the time. Bats and their roosts also receive protection from disturbance from by the WCA 1981.

The water vole *Arvicola amphibius* is protected in accordance with Schedule 5 of the WCA 1981. It is an offence to intentionally damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection, or to disturb water voles whilst they are using such a place. It is also an offence to kill, injure, capture or possess water voles.

Otters *Lutra lutra* are protected in accordance with Schedule 5 of the WCA 1981. The otter is also a protected species included in Annex II of 92/43/EEC, and is protected under Schedule 2 of the Conservation of Habitats and Species Regulations 2017. It is an offence to intentionally kill, injure or take an otter from the wild, or to intentionally or recklessly damage, destroy or obstruct access to any habitat used by otters or to disturb the otters which make use of those habitats.

Shrews (all species) and hedgehog *Erinaceus europaeus* are protected from a variety of deliberate means of killing/taking by Schedule 6 of the WCA 1981.

### *3.2.2. Birds*

All wild birds are protected under the WCA 1981 as amended. This prevents killing or injuring any bird or damaging or destroying nests and eggs. Certain species are also listed under Schedule 1 of the WCA 1981, which prevents disturbance of the species or its nest and/or eggs at any time, with protection by special penalties.

Certain bird species are listed in Annex 1 of the Council Directive 79/409/EEC on the conservation of wild birds. These are species for which Special Protection Areas (SPAs) could be designated if the population exceeds 1% of the reference population, as defined in Appendix 4 of the SPA Review.

The British Trust for Ornithology (BTO) lists Birds of Conservation Concern (BoCC), which fall into three categories: Red-listed - species of high concern; Amber-listed - species of medium concern; and Green-listed - species of lower concern (Eaton et al. 2009). Species are placed on these lists based, among other criteria, on the percentage decline of breeding or wintering populations in recent years. These lists do not indicate rarity for the species concerned, and many listed species are currently common and widespread.

### *3.2.3. Reptiles*

All native reptiles are listed on Schedule 5 of the WCA 1981, though they are not afforded the maximum level of protection (covered by Sections 1 and 9 only). For the four most widespread and commonly occurring reptile species (adder *Vipera berus*, grass snake *Natrix helvetica*, slow-worm *Anguis fragilis* and common lizard *Zootoca vivipara*), the protection extends to prohibit killing and injury but does not include habitat protection. When the presence of reptiles is confirmed the legislative protection obliges that a mitigation programme be undertaken to make 'reasonable effort' to remove or displace animals prior to the commencement of any site preparation or development.

### *3.2.4. Amphibians*

The great crested newt *Triturus cristatus* is protected in accordance with both national and European legislation. The species is listed on Schedule 5 of the WCA 1981, making it an offence to knowingly kill, injure, disturb, handle or sell the animal. The protection is afforded to all life stages and includes both the terrestrial and aquatic components of its habitat. The species is also listed under Annexes II and IV(a) of 92/43/EEC and is protected under Schedule 2 of the Conservation of Habitats and Species Regulations 2017.

The other native amphibians, including common frog *Rana temporaria*, common toad *Bufo bufo*, palmate newt *Lissotriton helveticus*, and smooth newt *Lissotriton vulgaris*, are protected by Section 9(5) of the WCA 1981. Section 9(5) only prohibits the sale, possession or transport for the purpose of sale, and advertising the buying or selling of listed animals.

### *3.2.5. Plants*

Schedule 8 of the WCA 1981 lists plant species which are afforded special protection. It is an offence to pick, uproot or destroy any species listed on Schedule 8 without prior authorisation, and all plants are protected from unauthorised uprooting (i.e. without the landowner's permission) under Schedule 13 of the WCA 1981.

## 3.3. Species and Habitats of Principle Importance

Other priority species and habitats which are a consideration under the National Planning Policy Framework (NPPF) 2018, placing responsibility on Local Planning Authorities to aim to conserve and enhance biodiversity and to encourage biodiversity in and around developments. There is a general biodiversity duty in the Natural Environment and Rural Communities (NERC) Act 2006 (Section 40) which 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.

Section 41 of the NERC Act lists a number of species and habitats as being Species/Habitats of Principal Importance (Priority Species/ Habitats). These are species/habitats in England which had been identified as requiring action under the UK BAP, and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework. The protection of either Species of Principal Importance or Habitats of Principal Importance is not statutory, but "specific consideration" should be afforded by Local Planning Authorities when dealing with them in relation to

planning and development control. Also, there is an expectation that public bodies would refer to the Section 41 list when complying with the Section 40 duty.

## 3.4. Policy

The overarching policy guidance for biodiversity is included within the National Planning Policy Framework (NPPF[1]). Section 15 of this document (Conserving and Enhancing the Natural Environment) outlines the approach that Local Authorities should adopt when considering ecological issues within the planning framework, including the principles of the Mitigation Hierarchy. This espouses that in addressing impacts on valued features, avoidance should be the first option considered, followed by mitigation (minimising negative impacts). Where avoidance and mitigation are not possible, compensation for loss of features can be used as a last resort. Paragraph 170 of the NPPF gives policy support to the provision of **net gains** in biodiversity where possible.

[1] MHCLG (2018). National Planning Policy Framework. UK Government.

# 4. Survey Methods

## 4.1. Desk Study

In November 2018, the Multi Agency Geographic Information for the Countryside (MAGIC) website[2], which is managed by Natural England, was reviewed to identify any internationally or nationally designated nature conservation sites (Special Protection Areas, Special Areas of Conservation, Ramsar sites, National Nature Reserves and Sites of Special Scientific Interest) within 2 kilometres (km) of the proposed development site. Information on any identified sites was obtained from the websites of the Joint Nature Conservation Committee[3] and Natural England[4].

A data search was completed with the Norfolk Biodiversity Information Service (NBIS) in November 2018. NBIS was asked to provide all biological records and information on any designated nature conservation sites for the proposal site and the surrounding 2km area.

## 4.2. Extended Phase 1 Habitat Survey

The proposed development site was subject to an Extended Phase 1 Habitat Survey, in accordance with relevant guidance[5] on 8th - 9th November 2018 by William Riddett BA ACIEEM and Robert Yaxley BSc CEcol CEnv MCIEEM of WFE. The proposed development site was walked over and all habitats present were classified according to prescribed Phase 1 habitat categories. Any features of ecological importance were photographed, noted for approximate location and 'target-noted' for details. The survey was extended to include a search for any signs of protected and valued species, and to appraise the habitat in terms of its suitability for use by such species. The survey focussed, in particular, on any signs of badger, water vole and otter presence on the site.

The areas immediately surrounding the surveyed area were also appraised in terms of potential to support protected species. Ordnance Survey maps and aerial photographs were used to supplement the appraisal of the surrounding area.

### *4.2.1. Habitat Suitability Index for Great Crested Newts*

A review of Ordnance Survey maps indicated that there are a number of ponds within the proposed development site boundary. These ponds were appraised for suitability for great crested newts (GCN) using the Habitat Suitability Index (HSI) per Oldham (2000)[6] and the classification guide defined by the Amphibian and Reptile Groups of the United Kingdom (2010)[7]. The appraisal was completed by W. Riddett (Natural England GCN survey class licence registration number 2015-10975-CLS-CLS) and R. Yaxley (Natural England GCN survey class licence registration number 2016-19382-CLS-CLS) during the Extended Phase 1 Habitat Survey.

[2] www.magic.gov.uk

[3] jncc.defra.gov.uk

[4] www.naturalengland.org.uk

[5] JNCC (2010) Handbook for Phase 1 Habitat Survey - A Technique for Environmental Audit. JNCC

[6] Oldham, R., Keeble, J., Swan, M. and Jeffcote, M. (2000). Evaluating the suitability of Habitat for Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10: 143-155.

[7] ARG UK. (2010). ARG UK Advice Note 5, Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Groups of the United Kingdom

The HSI is an indicative tool used to rate the suitability of water-bodies for GCN, based on ten characteristics and features such as size, water quality, vegetation cover and quality of terrestrial habitat. These features are assessed, classified according to prescribed criteria and assigned a numerical score. These scores allow the HSI to categorise water-bodies into one of five ratings which indicate their suitability for use by GCN. The five categories and the score parameters (between 1 and 0) are as follows:

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

# 5. Results

## 5.1. Desk Study

There are three non-statutory designated nature conservation sites within the site boundary. Within 2km of the site there is one statutory designated nature conservation site and a further 22 non-statutory designated sites. Colton Wood in the south of the site is also noted as an Ancient Replanted Woodland. Details are outlined in Table 1, below, and full information on these designated sites is appended. The citations for the SSSI and SAC are available on the websites of Natural England and the JNCC (referenced above).

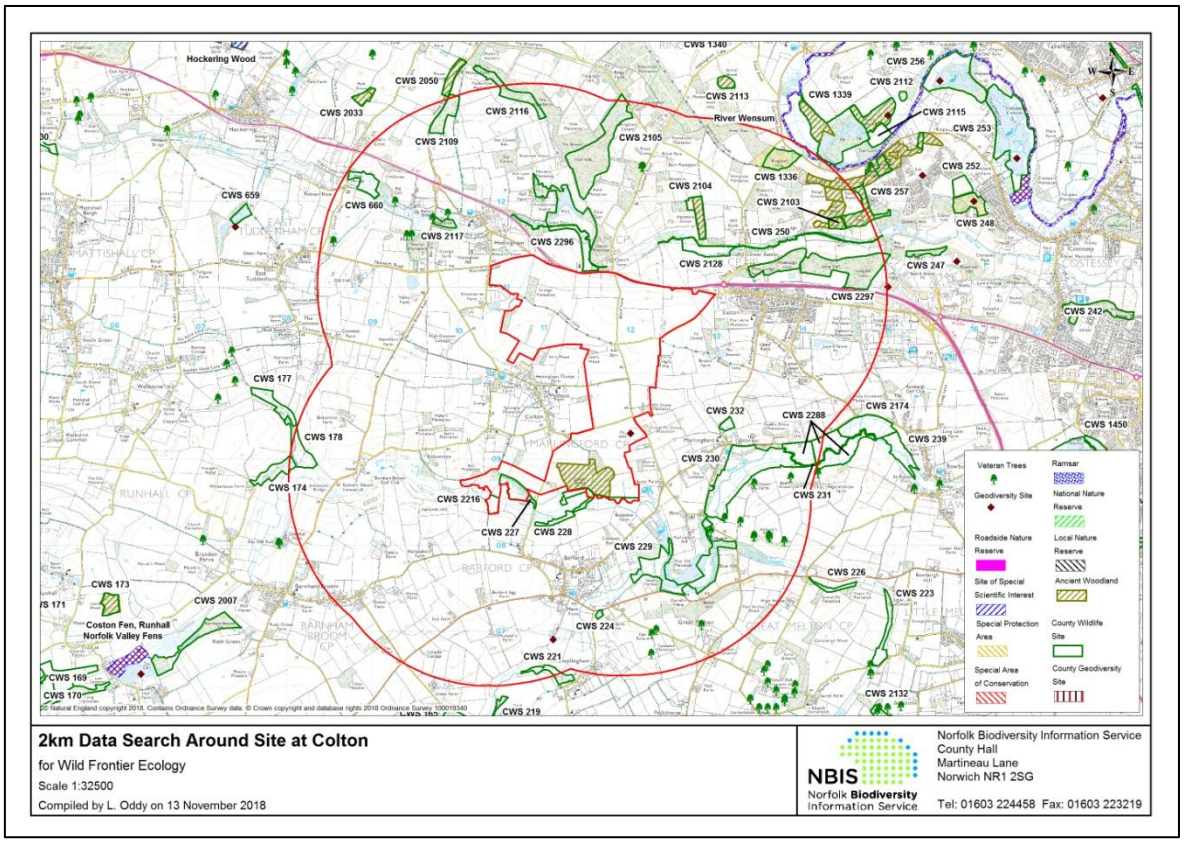
*Table 1: Designated Sites Summary*

| Site Name | Designation | Approximate Distance and Direction from Proposal Site |
|---|---|---|
| Yare Valley (Colton) (no. 227) | County Wildlife Site | Within the site, located in the south-west |
| Yare Valley (Barford) (no. 2216) | County Wildlife Site | Within the site, located in the far south-west corner. |
| Yare Valley (Colton Wood) (no 228) | County Wildlife Site | Within the site, in the south-east. |
| River Wensum | Site of Special Scientific Interest and Special Area of Conservation | 1.9km north-east |
| Church Meadow, Alder Carr, Three Corner Thicket and Nursery Plantation (no. 2296) | County Wildlife Site | 10 metres north (on the north side of the A47) |
| Land adjoining River Tud (no. 2128) | County Wildlife Site | 400 metres north |
| Long Dell and Westlodge Hills (no. 2297) | County Wildlife Site | 450 metres north-east |
| River Tud at Easton and Honingham (no. 250) | County Wildlife Site | 500 metres north |
| Yare Valley (Marlingford Hall) (no. 229) | County Wildlife Site | 500 metres south-east |
| Fen Plantation (no. 2117) | County Wildlife Site | 600 metres north-west |
| Harman's Grove and adj. Grassland (no. 2104) | County Wildlife Site | 600 metres north |
| Old Hall Meadow (no. 232) | County Wildlife Site | 800 metres east |
| Yare Valley (Marlingford) (no. 230) | County Wildlife Site | 800 metres east |
| Hall Hills/ Ringland Covert (no. 2105) | County Wildlife Site | 850 metres north |
| Turnpike Pond (no. 224) | County Wildlife Site | 1.3km south |
| Algarsthorpe Marshes (no. 2288) | County Wildlife Site | 1.5km east |
| Fen West of East Tuddenham (no. 660) | County Wildlife Site | 1.5km north-west |
| Holly Woods (no. 2103) | County Wildlife Site | 1.5km north-east |
| River Yare at Marlingford (no. 231) | County Wildlife Site | 1.5km east |

| Site Name | Designation | Approximate Distance and Direction from Proposal Site |
|---|---|---|
| Land adjoining Foxburrow Plantation (no. 2116) | County Wildlife Site | 1.6km north |
| Old Covert, Wood Lane (no. 2109) | County Wildlife Site | 1.6km north-west |
| Ringland Hills (no. 1336) | County Wildlife Site | 1.6km north-east |
| Lord's Hill & Easton Reeds and Blackhill Wood (no. 257) | County Wildlife Site | 1.7km north-east |
| The Carrs (no. 178) | County Wildlife Site | 1.7km west |
| White House Meadows (no. 174) | County Wildlife Site | 1.9km west |
| Tiffey Woods (no. 221) | County Wildlife Site | 2km south |

There is also a Geodiversity Site bordering the proposal site, at Marlingford Quarry, south of Marlingford Road. The site is noted as having "Former exposure of Pleistocene glacial sands and gravels".

*Figure 2: Designated Sites Map (as provided by NBIS)**




*The red-line boundary in the above figure is a former version of the site boundary.

The biological records search with NBIS returned 194 records relating to 46 species of conservation concern within the proposed development site (as it was in November 2018, as shown in Figure 2, above). Records are summarised in Table 2, below:

*Table 2: Biological Records Search Results Summary for the Proposed Development Site*

| Species Common Name | Species Latin Name | Details |
|---|---|---|
| Sparrowhawk | *Accipiter nisus* | 1 record |
| Kingfisher | *Alcedo atthis* | 6 records |
| Swift | *Apus apus* | 1 record |
| Great white egret | *Ardea alba* | 1 record from Honingham in 2014 |
| Water vole | *Arvicola amphibius* | 1 record from Easton Estate in 2001 |
| Little owl | *Athene noctua* | 6 records |
| Buzzard | *Buteo buteo* | 22 records |
| Cetti's warbler | *Cettia cetti* | 1 record from Colton in 2010 |
| Marsh harrier | *Circus aeruginosus* | 3 records |
| Hawfinch | *Coccothraustes coccothraustes* | 1 record from Honingham in 2007 |
| Stock dove | *Columba oenas* | 2 records |
| Bullhead | *Cottus gobio* | 1 record from River Yare at Barford Bridge |
| Little egret | *Egretta garzetta* | 4 records |
| Hedgehog | *Erinaceus europaeus* | 1 record from Easton Estate in 2001 |
| Hobby | *Falco subbuteo* | 5 records |
| Kestrel | *Falco tinnunculus* | 1 record from Honingham |
| Brambling | *Fringilla montifringilla* | 2 records |
| Crane | *Grus grus* | 3 records |
| Oystercatcher | *Haematopus ostralegus* | 1 record |
| Common gull | *Larus canus* | 1 record |
| Brown hare | *Lepus europaeus* | 5 records |
| Smooth newt | *Lissotriton vulgaris* | 4 records from ponds between Blind Lane and Grange Plantation |
| Crossbill | *Loxia curvirostra* | 2 records |
| Otter | *Lutra lutra* | 1 record from 2009 |
| Badger | *Meles meles* | 5 records |
| Red kite | *Milvus milvus* | 39 records |
| Grey wagtail | *Motacilla cinerea* | 34 records |
| Spotted flycatcher | *Muscicapa striata* | 6 records |
| Polecat | *Mustela putorius* | 2 records from Easton in 2003 |
| Golden oriole | *Oriolus oriolus* | 1 record from Honingham in 2004 |
| House sparrow | *Passer domesticus* | 1 record |
| Grey partridge | *Perdix perdix* | 1 record from Colton |
| Honey buzzard | *Pernis apivorus* | 1 record from Honingham in 2007 |
| Marsh tit | *Poecile palustris* | 2 records |

| | | |
|---|---|---|
| Bullfinch | *Pyrrhula pyrrhula* | 6 records |
| Firecrest | *Regulus ignicapilla* | 1 record |
| Sand martin | *Riparia riparia* | 1 record from Marlingford Mill in 2011 |
| Stonechat | *Saxicola rubicola* | 1 record from Honingham in 2005 |
| Woodcock | *Scolopax rusticola* | 4 records |
| Nuthatch | *Sitta europaea* | 1 record from Honingham in 2011 |
| Tawny owl | *Strix aluco* | 5 records |
| Fieldfare | *Turdus pilaris* | 1 record |
| Barn owl | *Tyto alba* | 3 records |

NBIS also returned records of roosting brown long-eared bats *Plecotus auritus* on the site (at undisclosed locations) in 2011 and 2015.

The data search with NBIS which covered the surrounding 2km area returned 2,877 records relating to 237 species. A summary of records of note is appended.

## 5.2. Extended Phase 1 Habitat Survey Results

Conditions during both the survey days were favourable. On 8th November 2018, air temperature was 12°Celsius, cloud cover was variable from 0% to 50%, wind was estimated to Beaufort scale 2 and there was no precipitation. On 9th November, air temperature was 11°Celsius, cloud cover was approximately 40%, wind was estimated to Beaufort scale 1 and there was no precipitation.

The survey found that the majority of the proposal site is dominated by intensively farmed arable fields which are bounded by hedgerows, most of which have multiple mature oak *Quercus robur* trees. Plantation woodlands (mostly broad-leaved) are also fairly common, particularly in the north-west and the south of the site. There are also some significant areas of grassland along the River Yare in the south of the site, as well as drainage ditches along the river corridor. Colton Wood is an ancient replanted, mixed woodland in the south of the proposal site. There are small areas of other habitats, such as ponds, buildings/hard-standing (i.e. farm-yards) and tracks across the sites. A map showing the extent and distribution of habitats on the proposal site is provided in Figures 3a-3c, below. Target notes are described in Table 3.

The north of the site bordering the A47 is dominated by arable fields, separated by species-rich, intact hedgerows with oak trees (see Photos 1-3 in Appendix 1: Site Photographs). Most field boundary hedgerows are dominated by hawthorn *Crataegus monogyna,* field maple *Acer campestre,* blackthorn *Prunus spinosa,* oak, hazel *Corylus avellana,* bramble *Rubus fruticosus* agg. and ivy *Hedera helix.*

Grange Lane is a green-lane (i.e. a lane with hedgerows on both sides) which connects Colton Road in the west to Blind Lane in the central-eastern part of the site (see Photos 4-7). The lane is bordered by multiple mature oak, field maple and ash trees, including some very large and veteran specimens. Much of the track runs through a slight cutting within the landscape, with the boundary trees and hedgerows on slightly elevated banks. In addition to the trees, the hedgerows on both sides of the lane are species-rich and mostly intact. It is thought to be an ancient lane which has existed for at least 200 years.

To the north side of Grange Lane is Grange Plantation, a broad-leaved plantation woodland on a slight rise in the land, sloping uphill to the north-west, away from Grange Lane (see Photos 8-11). The plantation is thought to be over 100 years old, and

has a canopy layer dominated by sycamore *Acer pseudoplatanus,* sweet chestnut *Castanea sativa* and field maple, with occasional beech *Fagus sylvatica,* ivy *Ilex aquifolium* and conifers (mainly leyland cypress *Cupressus x leylandii*). The under-storey is sparse throughout most of the plantation, and comprises small amounts of hawthorn, hazel, bramble and cherry laurel *Prunus laurocerasus*. There is a fairly large pheasant enclosure within this plantation.

To the west and north of Grange Plantation there are some areas of improved grassland, some of which are grazed by horses (see Photos 12 & 13). The swathe of grassland directly west of Grange Plantation runs alongside a seasonal ditch, which was mostly dry at the time of the survey (see Photo 14).

There is a pond on the south side of Grange Lane, south-west of Grange Plantation. Information on individual ponds on the site is provided in the Habitat Suitability Index results section, below. However, the majority of ponds at the site (including pond basins which were dry at the time of the survey but which may hold water at certain times of year) are man-made pits, most of which have become overgrown with dense scrub.

There are a number of shelter-belt plantations elsewhere on the proposal site (see Photos 15-17), although none in the north of the site (north of Marlingford Road) are as old, established or as large as Grange Plantation. Some of the smaller plantations are estimated to be less than 20 years old. The species planted in these plantations varies, although in general oak, sweet chestnut, ash, bramble, field maple, hawthorn, hazel, poplar *Populus* spp., wild cherry *Pruns avium,* beech, willows *Salix* spp. and Italian alder *Alnus cordata* make up the majorities of these plantations.

Many of the arable fields have field margins and cover crops planted within them or around their peripheries (see Photo 18). These features of not mapped on the Phase 1 Habitat map because they generally occupy small parts of fields and are temporary, dynamic (i.e. changeable) features of arable fields. It is possible that some of the large margins of improved grassland around the edges of arable fields are also temporary and changeable features.

In the north-east of the site is Honingham Thorpe Farm, a collection of modern farm buildings with a surrounding farmyard of hard-standing, bare ground, stored agricultural vehicles, equipment and produce, and areas of tall ruderal vegetation (see Photos 19-21). The only farm building within the site boundary is a large barn constructed of concrete and corrugated metal.

Near the centre of the site, south of Norwich Road and west of Colton Road, is a private landholding which consists of a small group of buildings facing onto Norwich Road and a series of fenced-off horse paddocks to the south (see Photo 22).

There is a broad-leaved plantation woodland in the south-east of the site, planted with field maple, wild cherry, oak and hornbeam *Carpinus betulus* (see Photos 23 & 24).

Colton Wood in the south of the site is an Ancient Replanted Woodland (see Photos 25-27). This means that woodland has existed on this site since at least 1600 (and, therefore, quite possibly for thousands of years), although it has been partly cleared and replanted in recent centuries. The majority of the woodland has been replanted with conifer trees, mostly pines *Pinus* spp., Douglas fir *Pseudotsuga menziesii,* cypress *Cupressus* sp. and noble fir *Abies procera.* However, around the southern and western sides of the woodland, as well as in small areas within the wood, there are areas of semi-natural broad-leaved woodland dominated by oak, field maple, ash, hornbeam, beech, hawthorn, hazel, dog-rose *Rosa canina* and dogwood *Cornus sanguinea*. There are also some areas of broad-leaved plantation dominated by sweet chestnut and

sycamore. There is a large, well established ride which runs north-south roughly through the centre of Colton Wood (see Photo 28). There are large areas where there appears to be little ground flora, although dog's mercury *Mercurialis perennis* was noted in the south of the wood.

The south-west of the site roughly follows the valley of the River Yare. The north side of the river comprises floodplain fen, poor semi-improved grassland, scrub, plantation broad-leaved woodland and ditches (see Photos 29-33). Most of the plantations are dominated by poplar, beech and hazel. The fen and poor semi-improved grassland areas are dominated by stinging nettle *Urtica dioica,* common reed *Phragmites australis,* reed canary grass *Phalaris arundinacea,* reed sweet grass *Glyceria maxima,* hemlock *Conium maculatum,* great horsetail *Equisetum telmateia,* great willowherb *Epilobium hirsutum,* bittersweet *Solanum dulcamara* and crack willow *Salix fragilis.*

In the far south-west, the site extends to the south side of the River Yare and covers a woodland dominated by alder *Alnus glutinosa.* However, the south side of the river was not accessible during the survey.

*Table 3: Phase 1 Habitat Map Target Notes*

| Target Note Reference | Details |
|---|---|
| T1 | Grange Lane: a green lane running east-west through the north-west of the site. The lane is bordered to the north and south by mature, intact hedgerows which are rich in native species and have frequent trees. In the west the lane is wide enough for vehicles, and is used for farm access. In the east the track is too narrow and overgrown for vehicular access but is used as a footpath only. |
| T2 | Grange Plantation: a mature plantation woodland dominated by sweet chestnut, field maple, sycamore, hawthorn, hazel, bramble, cherry laurel and beech. There is a large pheasant enclosure within the woodland. |
| T3 | Area of dense scrub dominated by oak, ivy, blackthorn, elm, field maple, hazel and pines. There are two pond basins here, one of which was dry at the time of the survey and the other (which was covered with dense bulrush) had a very low water level. This type of dry/nearly dry pond basin within an area of scrub is commonplace across the site. |
| T4 | Pond within arable field which was dry at the time of the survey but may hold water at other times of year. |
| T5 | Colton Wood: a mixed plantation woodland with some areas of semi-natural woodland to the south and south-west. Woodland is dominated by pines, Douglas fir, leyland cypress, sycamore, sweet chestnut, field maple, oak, hazel, hawthorn, ash, beech and dog-rose. The woodland is located on undulating ground. There is a large ride running north-south through the centre of the wood. |
| T6 | Area of semi-natural broad-leaved woodland on the north side of the River Nar. Woodland is dominated by oak, alder, white willow, hazel, ash and hornbeam. In low-lying areas the woodland grades in alder-willow carr. |
| T7 | Bank of plantation woodland to the north of the River Yare, dominated by beech, hazel and poplar. The poplar plantations are over-mature. To the south of the plantation is an area of reeds and scrub bordering the river. The area is dominated by reed sweet grass, stinging nettle, hemlock, rosebay willowherb, crack willow, bittersweet nightshade, great horsetail and common reed. |
| T8 | Area of woodland to the south of the River Yare, which was not accessible during the habitat survey. From a remote appraisal, the woodland appeared to be dominated by alder. |

*Figure 3a: Phase 1 Habitat Map*

*Figure 3b: Phase 1 Habitat Map (north)*

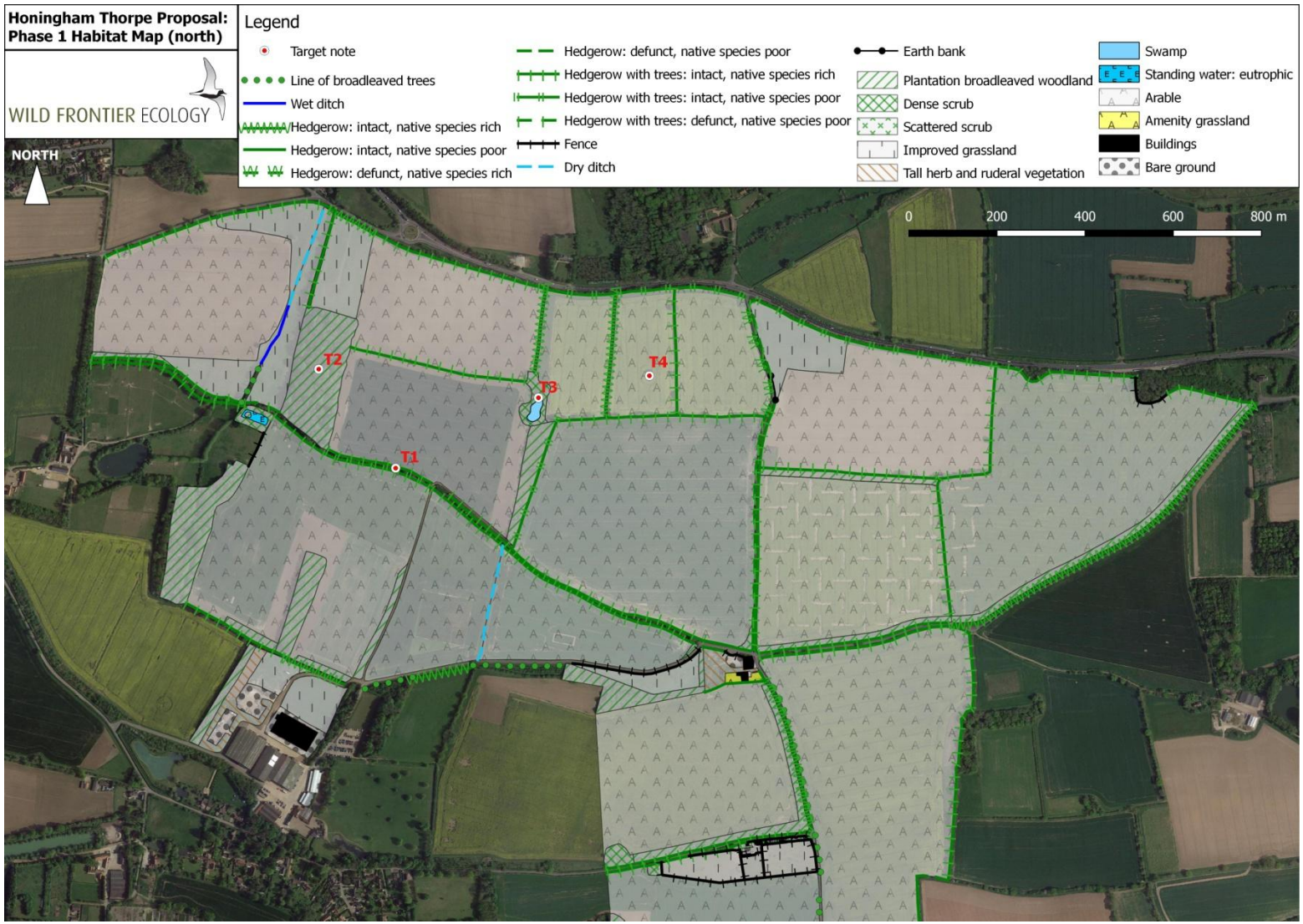
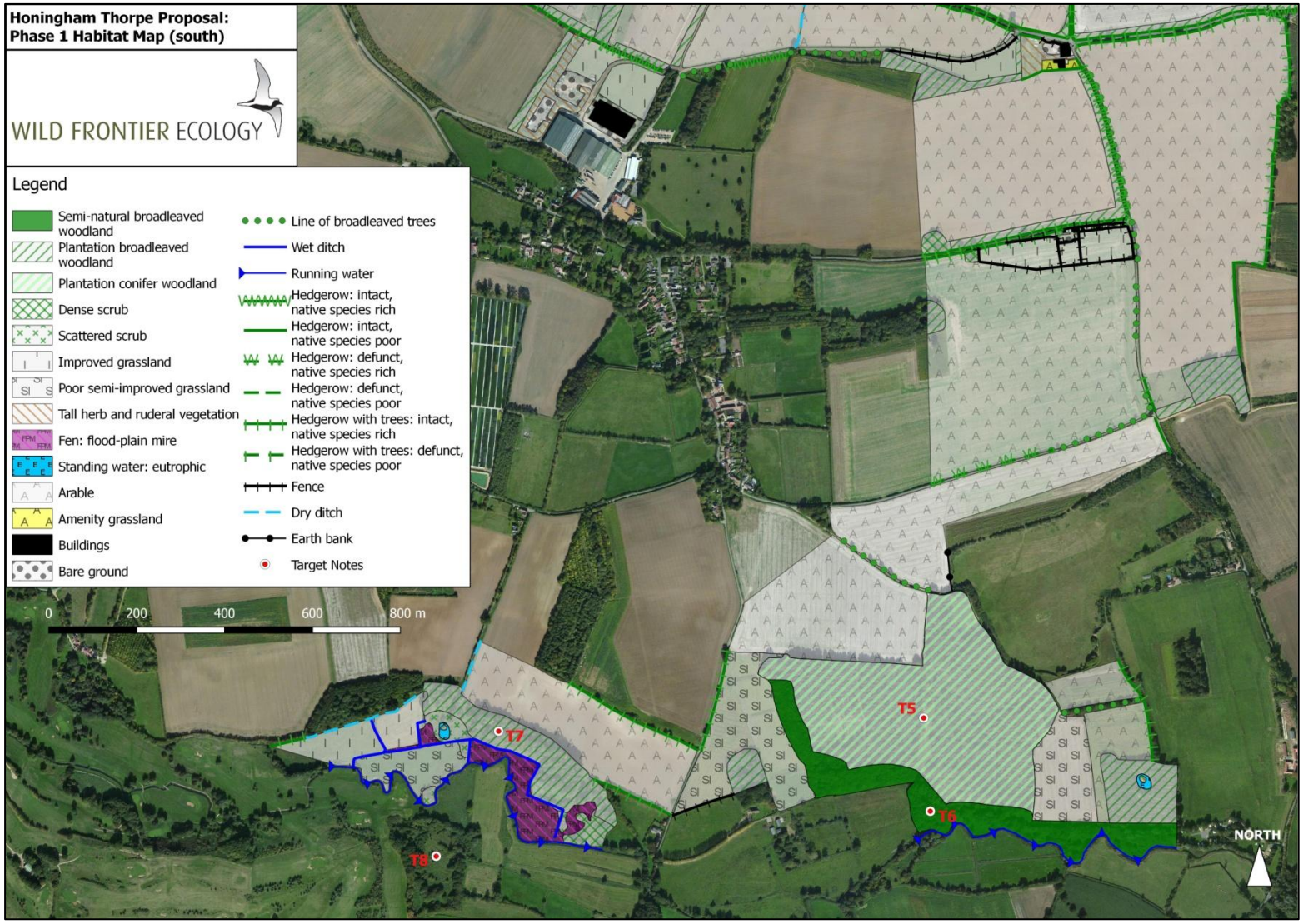


*Figure 3c: Phase 1 Habitat Map (south)*



### *5.2.1. Habitat Suitability Index*

A review of Ordnance Survey (OS) maps revealed that there are 19 ponds within or directly bordering the proposal site. All ponds were visited and appraised for suitability for great crested newts during the Extended Phase 1 Habitat Survey. Results are summarised in Tables 4a and 4b, below. For all ponds, the geographical area of the UK (in terms of regional suitability for great crested newts) is A. Photographs of the ponds are provided in Appendix 1: Site Photographs (see Photos 34-52). A map showing the locations of the ponds is provided in Figure 4, below.

*Table 4a: Habitat Suitability Index Calculations*

| Pond ref. | HSI Assessed Criteria | | | | | | | | | HSI Score |
|---|---|---|---|---|---|---|---|---|---|---|
| | Size (square metres) | Estimated rate of desiccation | Water quality | Percentage of shoreline shaded | Waterfowl presence | Fish presence | Ponds within surrounding 1km | Quality of terrestrial habitat | Percentage of pond with Macrophyte coverage | |
| 1 | 650 | Never | Moderate | 95 | Minor | Possible | 15 | Moderate | 5 | **0.67** |
| 2 | Dry | | | | | | | | | N/A |
| 3 | 690 | Annually | Moderate | 90 | Minor | Absent | 7 | Moderate | 50 | **0.62** |
| 4 | Dry | | | | | | | | | N/A |
| 5 | Dry | | | | | | | | | N/A |
| 6 | 130 | Rarely | Poor | 90 | Major | Absent | 6 | Moderate | 0 | **0.38** |
| 7 | Dry | | | | | | | | | N/A |
| 8 | 236 | Rarely | Poor | 100 | Major | Absent | 6 | Moderate | 0 | **0.37** |
| 9 | Dry | | | | | | | | | N/A |
| 10 | 47 | Annually | Moderate | 95 | Absent | Absent | 17 | Moderate | 0 | **0.46** |
| 11 | 176 | Sometimes | Moderate | 90 | Absent | Absent | 16 | Moderate | 0 | **0.63** |
| 12 | Dry | | | | | | | | | N/A |
| 13 | Dry | | | | | | | | | N/A |
| 14 | Dry | | | | | | | | | N/A |
| 15 | Dry | | | | | | | | | N/A |
| 16 | Dry | | | | | | | | | N/A |
| 17 | Dry | | | | | | | | | N/A |
| 18 | 180 | Sometimes | Moderate | 85 | Absent | Absent | 13 | Good | 25 | **0.71** |
| 19 | 236 | Never | Moderate | 95 | Absent | Absent | 9 | Good | 10 | **0.68** |

*Table 4b: Habitat Suitability Index Summary*

| Pond reference | HSI Score | HSI Classification | Notes |
|---|---|---|---|
| 1 | 0.67 | Average | Pond with island, located south-east of Grange Plantation. Heavily shaded by scrub and steep-sided. |
| 2 | Dry | N/A | Deep, dry pit with dense scrub. Appears to have been dry for a number of years. |
| 3 | 0.62 | Average | Large pond basin surrounded by scrub, with dense reedmace *Typha latifolia* and some water mint *Mentha aquatica* in centre of the pond. Water level was very low at the time of the survey. |
| 4 | Dry | N/A | Open, shallow pond basin within the centre of an arable field south of the A47. Appears likely to hold water, at least seasonally, most years. |
| 5 | Dry | N/A | Large, deep, dry pit with dense scrub directly south of the A47. Appears to have been dry for a number of years. Scrub has encroached into the pond basin. |
| 6 | 0.38 | Poor | Duck pond at Hag's Pits – an area of dense scrub which has developed over and around a series of disused pits. Mallards *Anas platyrhynchos* are abundant at the pond. The peripheries of the pond are heavily shaded. |
| 7 | Dry | N/A | Dry pit with surrounding dense scrub at Hag's Pits. Scrub has encroached into the pond basin. |
| 8 | 0.37 | Poor | Duck pond at Hag's Pits, with surrounding dense scrub. Mallards are abundant at the pond. The peripheries of the pond are heavily shaded. |
| 9 | Dry | N/A | Dry pit with surrounding dense scrub at Hag's Pits. Scrub has encroached into the pond basin. |
| 10 | 0.46 | Poor | Nearly-dry pond to the north-west of Honingham Thorpe Farm. Pond is located along a plantation shelter-belt. |
| 11 | 0.63 | Average | Pond to the north-east of Honingham Thorpe Farm. Partially shaded and may dry out at certain times of year. |
| 12 | Dry | N/A | Large, deep, dry pit with surrounding dense to the north-east of Honingham Thorpe Farm. |
| 13 | Dry | N/A | Large, deep, dry pit to the north of Norwich Road, with surrounding scrub. |
| 14 | Dry | N/A | Large, deep, dry pit to the south of Norwich Road, with surrounding scrub. Scrub has encroached into the pond basin. |
| 15 | Dry | N/A | Very large, deep, dry pit in plantation woodland to the south of Norwich Road, with dense surrounding scrub and woodland. Scrub has encroached into the pond basin. |
| 16 | Dry | N/A | Large, deep, dry pit in plantation woodland to the south of Norwich Road, with surrounding scrub and woodland. Scrub has encroached into the pond basin. |
| 17 | Dry | N/A | Dry pond basin overgrown with willows. |

| | | | |
|---|---|---|---|
| 18 | 0.71 | Good | Woodland pond located in plantation woodland in the south-east of the site, north of the River Yare. Water level was low at the time of the survey but larger basin around it appeared to have been inundated earlier in the year. Some aquatic vegetation present. |
| 19 | 0.68 | Average | Pond near the floodplain of the River Yare, with surrounding trees and scrub encroaching into the pond. |

*Figure 4: Map of Ponds on-site**

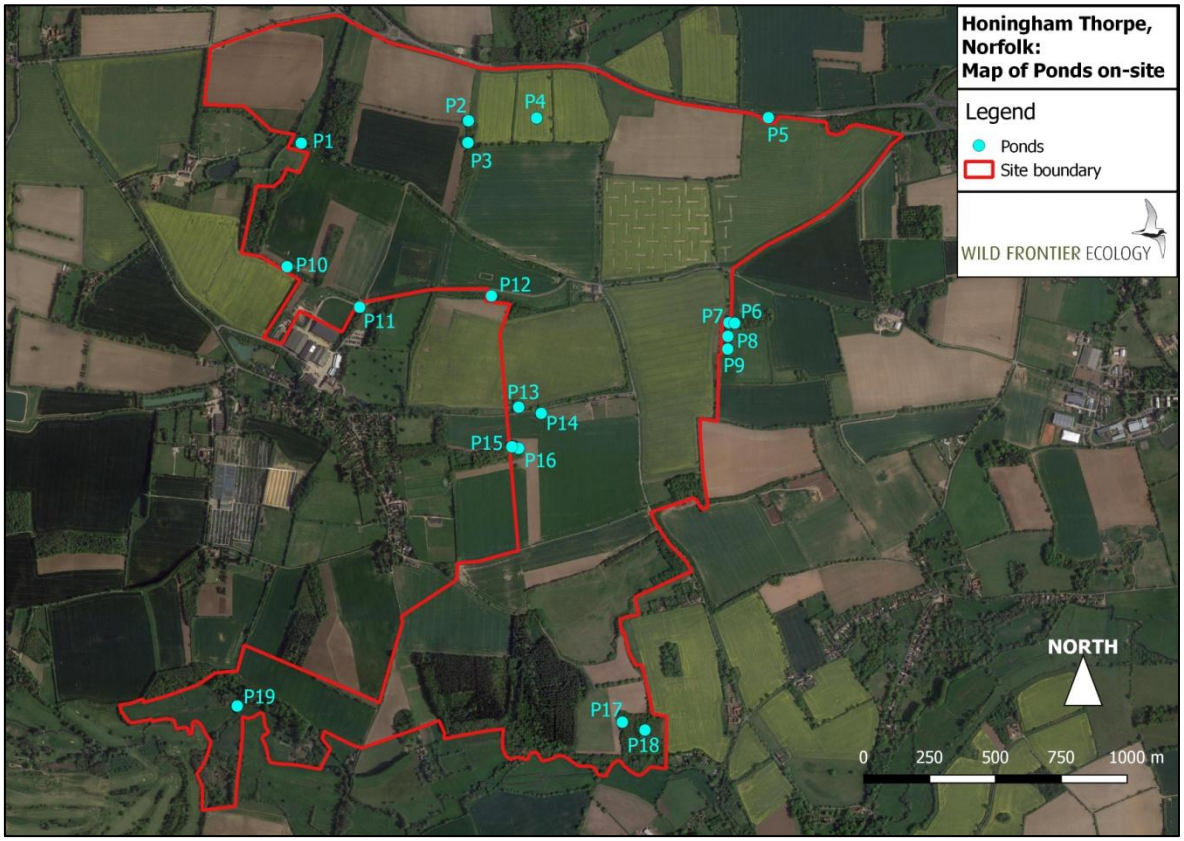



*Figure 4 is based on a former development layout but all ponds are still inside the current redline site boundary.

OS maps show approximately 19 further ponds within 250 metres of the proposal site boundary, 17 of which are located to the north-west and west of the site, mainly within and around the village of Colton. Between 250 and 500 metres of the site boundary, OS maps show that there are an additional 25 ponds. These numbers exclude those ponds located to the north of the A47 and south of the River Yare; as these features are considered to present significant barriers to movements of small animals such as great crested newts, ponds on the far side of them do not need to be considered.

## 5.3. Constraints

The desk study experienced no notable constraints.

The Extended Phase 1 Habitat Survey was completed outside of the optimum survey season (May to September). However, the survey was still able to confidently classify all habitats on the site. Further botanical surveys are also scheduled for habitats of interest such as semi-natural woodlands and grasslands, to ensure a comprehensive species list is compiled for these areas. Overall the seasonal constraint on the habitat survey is considered to have had a negligible bearing on the survey results.

The HSI appraisal of most of the ponds was constrained because so many ponds were dry at the time of the appraisal. Re-appraisal of the ponds will be necessary in early spring and any ponds holding water will be surveyed for great crested newts.

# 6. Preliminary Ecological Appraisal

## 6.1. Valued Ecological Receptors Confirmed at the Site

### *6.1.1. Designated Sites*

There are three CWSs within the site boundary and multiple other designated nature conservations sites in the surrounding area.

The closest statutory designated sites are considered to be sufficiently well separated from the site by distance and intervening barriers (roads, human development and farmland) for direct impacts to be extremely unlikely. The closest SSSI is the River Wensum, which has minimal recreational facilities so is unlikely to experience secondary impacts from eventual residents of the proposed development. The potential for a Likely Significant Effect (LSE) on other statutory designated sites in the wider area (i.e. elsewhere in Norfolk) will need to be considered further; European designated sites such as Broadland and the North Norfolk Coast, for example, are more vulnerable to recreational impacts from regional population growth.

The CWSs within the site boundary are located within the area targeted for future use as a Country Park and Nature Reserve. It is anticipated that these CWSs can be ecologically enhanced through implementing improved management plans. Enhanced management may involve, for example, altered grazing regimes, a revised woodland management programme, and, crucially, enhancement of the areas bordering these CWSs, to improve the quantity and connectivity of valued habitats at the site.

### *6.1.2. Habitats*

The majority of the site which is targeted for development (i.e. excluding the parts outlined to become Country Park and Nature Reserve) comprises arable fields. There are some sections of improved and poor semi-improved grassland, plantation woodland, hedgerows, green lanes and mature trees within the proposed development area which are of varying ecological value. The green lanes, some of the plantation woodlands (namely Grange Plantation), some of the hedgerows and most of the mature oak trees are all valued habitats and features. These features should, therefore, be retained and used as the foundation for a green network to be created through the site and connecting it to the surrounding landscape. The arable habitat is of low ecological value so development impacts should be focused on this habitat as much as possible, at the benefit of other relatively more valuable habitats.

The habitats in the south-west of the site, along the River Yare, are also valued habitats and should be retained and enhanced. The proposal involves retention of this habitat within a planned Country Park and Nature Reserve. There are, therefore, opportunities for ecological enhancement in this part of the site.

There is significant scope for enhancement of habitats across the proposed development parts of the site. Ponds, for example, can be cleared of scrub to improve sunlight exposure, which will increase biodiversity within the pond. Some of the plantation woodlands can be ‘thinned’ to improve light exposure and encourage the development of more diverse ground flora and understorey vegetation.

### *6.1.3. Protected Species*

Given the habitats present and based on the results of the habitat survey, it is certain that the site supports the following protected species:

- Badgers (2 setts confirmed present)
- Bats (foraging)
- Breeding birds

Further surveys will be necessary to clarify the extent to which these protected species use the site.

## 6.2. Valued Ecological Receptors Possible at the Site

Further surveys will also be required to establish whether the following protected species are present. Surveys for these species are necessary because suitable habitat for them exists at the site:

- Bats (roosting in trees)
- Great crested newts in ponds
- Otters in the River Yare
- Reptiles in areas of scrub, grassland, ponds, ditches, the River Yare and along boundaries such as woodland edges
- Water voles in the River Yare and ditches.

Surveys are also required to determine the impact that the development would have on wintering birds; although wintering birds are not legally protected in the same way as the above species, they are still a valued ecological feature which warrants consideration.

Further surveys of certain parts of the site will also be necessary to compile a comprehensive plant species list, so as to allow any areas of particular botanical importance to be factored into the development plans.

## 6.3. Summary

The preliminary ecological appraisal based on initial investigations has found that further ecological surveys are necessary to determine, in detail, the potential impacts that a development at this site would have on valued ecological receptors. However, the initial development proposal appears to avoid the most ecologically valued parts and features of the site, thereby allowing these areas to be retained and possibly enhanced. Most protected species are expected to be concentrated within these more valued habitats and features, meaning most impacts on protected species should be minimal and/or largely avoidable. Impacts on some protected species will likely be inevitable, but these are not anticipated to present insurmountable obstacles to a development proposal at this site. The scale of the proposed Country Park and Nature Reserve present substantial opportunities for ecological enhancement which could, if enhanced and managed appropriately, result in net positive ecological impacts for a wide range of valued ecological receptors in the long-term. However, in order to achieve net positive impacts, it will be crucial to incorporate green network throughout the development site, drawing on and integrating existing habitats and features.

# 7. Further Ecological Survey Requirements

Further surveys will be necessary to inform a detailed Ecological Impact Assessment. The following surveys are advised:

- Bat activity surveys using deployed static bat detectors (to record throughout the night) and walked transect surveys at dusk and possibly at dawn. These surveys should provide an indication as to which bat species use the site, the approximate level of bat activity and any concentrations of activity or areas of importance to bats. Surveys would be completed from April to October inclusive.

- Bat roost surveys, likely focussing on mature trees. A large number of trees at the site were noted during the Extended Phase 1 Habitat Survey as having notable Bat Roost Potential (BRP), although specific inspections of trees was not completed as part of this survey. Any trees likely to be felled, subject to tree surgery and be located close to certain types of development (for example, new roads) will be surveyed further. Trees would first be subject to an initial inspection by a Natural England licensed ecologist, and any which are confirmed as having BRP will then be subject to further surveys from May to August. These further surveys would determine whether roosting bats are present, and if so, the species, approximate number of bats and the nature of the roost/s. Surveys will need to be targeted to specific trees because there are currently hundreds of trees at the site with notable BRP, so covering all trees would involve excessive survey effort.

- Breeding bird surveys comprising walked transects across the site to record species breeding at the site, the number of breeding territories and their distributions. Surveys will run from late March/early April to late June/early July.

- Great crested newt (GCN) surveys of all ponds which are holding water in spring. Surveys will aim to determine the presence of GCN in ponds using either four presence/absence surveys or environmental DNA sampling of the pond-water. Any ponds with confirmed GCN presence should be subject to a total of six surveys to establish the population size and confirm whether the pond supports a breeding population. Surveys will take place between mid-March and mid-June.

- Otter survey of the River Yare and any suitable surrounding ditches and streams. The survey will be completed between March and May and will focus on confirming the presence of otters in the river. If possible, the surveys will also aim to establish the territorial ranges of individual otters, any holts, couches and other areas of importance for otters. If appropriate, the survey may use motion-activated trail cameras to record animal activity within and around the River Yare.

- Reptile surveys of areas of suitable habitat, which are largely confined to the areas around Colton Wood and the River Yare. The surveys would use artificial refuges deployed amongst areas of suitable reptile habitat, to attempt to determine whether reptiles are present, and if so, the species and size/nature of any population. Surveys are possible between March and October but would aim to be completed in the optimal months of April and May.

- Water vole survey of the River Yare and any suitable surrounding ditches and streams. The survey will be completed between May and August, and will focus on confirming the presence of water voles in water courses on and bordering the

site. The surveys will aim to establish the approximate ranges of water voles and likely population sizes.

- Wintering bird surveys to establish which species use the site over winter, the approximate numbers of birds present, and any areas of the site of particular importance to wintering birds. Surveys are underway (having commenced in early November) and are due to run until March 2019.

# 8. Ecological Constraints and Opportunities

The habitat survey has identified a number of ecological constraints and opportunities at the site which will be factored into the design of the development as the scheme evolves.

## 8.1. Ecological Constraints

The majority of the site which is targeted for development (i.e. excluding the parts outlined to become Country Park and Nature Reserve) comprises arable fields. There are some sections of improved grassland and poor semi-improved grassland, plantation woodland, hedgerows, green lanes and mature trees within the proposed development area, which are of varying ecological value. The green lanes, some of the plantation woodlands (namely Grange Plantation), some of the hedgerows and most of the mature oak trees are all valued habitats and features. These features should, therefore, be retained and used as the foundation for a green network to be created throughout the site and connecting it to the surrounding landscape. The arable habitat is of minimal ecological value so development impacts should be focused on this habitat as much as possible, thereby allowing the retention of other relatively more valuable habitats.

The habitats along the River Yare in the south-west of the site are also valued habitats and should be retained and enhanced. The proposal would allow for retention of this habitat within a planned Country Park and Nature Reserve. There are, therefore, opportunities for ecological enhancement in this part of the site.

A map showing the distribution of features according to their ecological value (based on the Phase 1 Habitat Survey alone) is provided in Figures 5a-5c, below. This map uses a traffic-light system of red, amber and green to reflect the features' ecological value; this equates to the level of importance that should be assigned to these features when determining which are to be retained and which are to be removed.

Red marked habitats and features are of those of the highest ecological value (within the context of the site), meaning there should be an aspiration to retain as many of these features as possible. These features would then form the basis of the integrated green network to be created throughout the developed site. Any losses or negative impacts to these habitats and features may be difficult to adequately mitigate, or would require extensive mitigation.

Amber marked habitats and features are of intermediate ecological value meaning that they should be retained if possible, although some focussed losses may be acceptable if they cannot be practically avoided. Mitigation is likely to be achievable for most losses of amber marked habitats and features.

Green marked habitats and features are those of lower ecological value although they still have some value relative to other (non-marked) areas. Some green marked features will have scope for enhancement, so although their current ecological value is low, there is potential for enhancement in the medium and long-terms. Some features have also been assigned this level of ecological value because of their context, such as located in close proximity to areas of higher ecological value or providing connections between such features. Losses of green marked habitats and features would likely be acceptable although some standard mitigation will be required in most cases.

Areas and features which are expected to be of negligible ecological value are not highlighted. Development works to and losses of these habitats would likely be acceptable and would probably not require mitigation, although this would be clarified by the forthcoming ecological surveys. It is anticipated that the development will

incorporate extensive ecological enhancements, meaning the minor ecological impacts of losses of the habitats and features of negligible ecological value will still be offset in the medium and long-terms.

As the development proposal evolves, the principal ecological protection objective will be to avoid red marked habitats and features, and focus development impacts (i.e. land-take) on areas which are not highlighted on the constraints maps. The secondary objective will be to avoid amber marked habitats and features, and the tertiary objective will be to avoid green marked habitats and features.

*Figure 5a: Ecological Constraints Map*

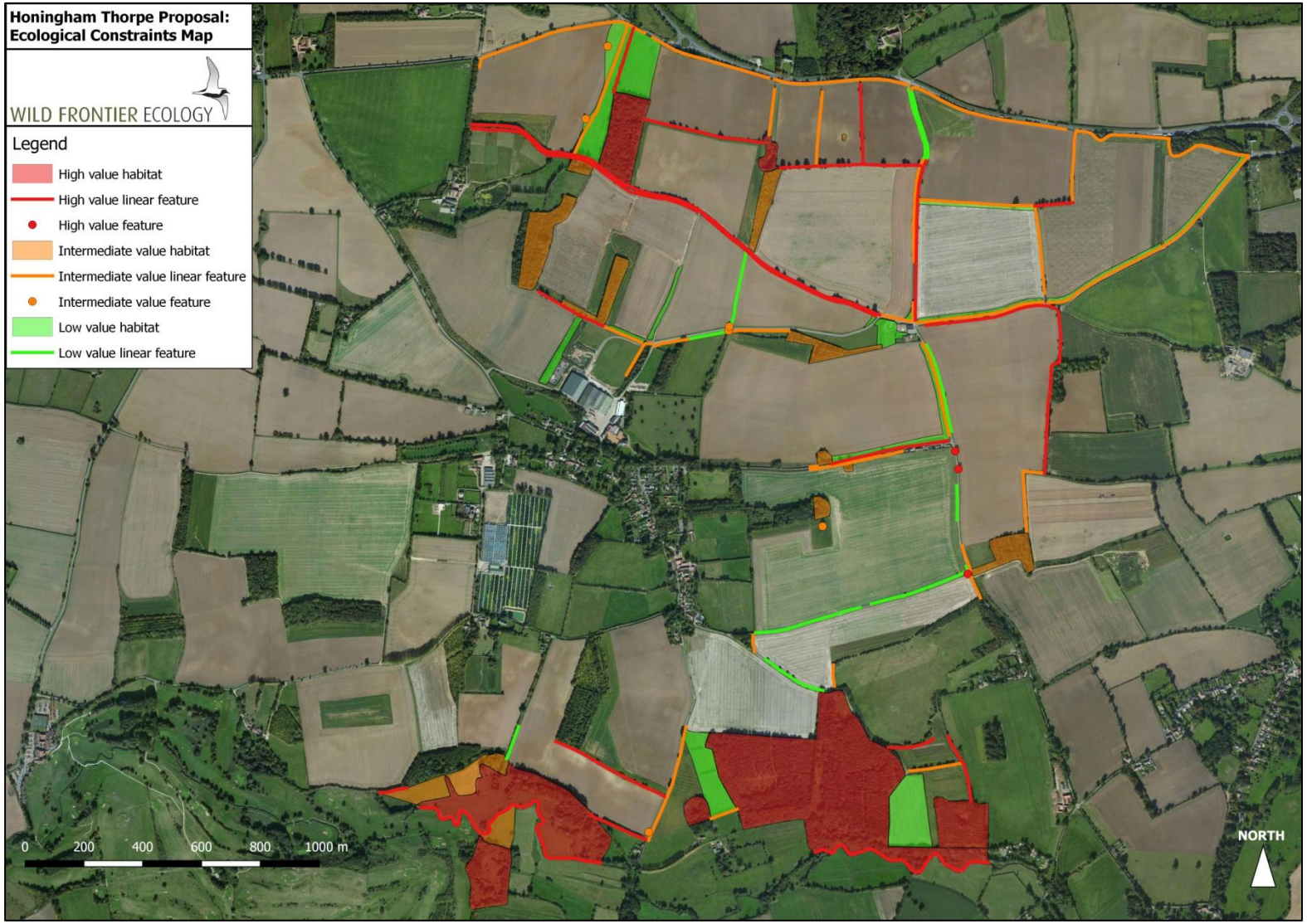


*Figure 5b: Ecological Constraints Map (north)*

*Figure 5c: Ecological Constraints Map (south)*

*Figure 6: Indicative Ecological Opportunities Map*

## 8.2. Ecological Opportunities

There is significant scope for enhancement of habitats across the proposed development parts of the site. The basic principle of enhancement will be to increase the quantity, enhance the quality and improve the connectivity of habitats and features at the site. Detailed enhancement plans cannot be provided at this stage because development plans are not yet finalised. However, basic opportunities for enhancement which will be appropriate for the site are outlined below and indicative locations are mapped in Figure 6, above.

- Ponds can be cleared of scrub, particularly where it shaded the south, east and west sides of ponds, to improve sunlight exposure. This will increase plant life within the pond, which in turn will encourage invertebrates and amphibians. Removal of some scrub may also improve access to the ponds for other wildlife such as birds, bats and reptiles.

- Some of the plantation woodlands can be 'thinned' to improve light exposure and encourage the development of more diverse ground flora and understorey vegetation. In addition to increasing floral and structural diversity, this will provide superior quality habitat for woodland animals including invertebrates, birds and terrestrial mammals such as hedgehog and badger.

- Colton Wood and the other woodlands across the site are to be subject to a Woodland Management Plan, to be produced in conjunction with the arboricultural consultants. The ecological objectives of the management plan will be to increase the amount and diversity of native woodland species in the canopy, understorey and ground layers. This will require gradual removal of conifers and replanting at low-densities (or natural regeneration) of native woodland species such as oak, hornbeam, field maple, holly, wild cherry, crab apple, cherry plum, rowan, wild service tree, hawthorn, dogwood, guelder rose, elder and hazel. If possible, ecological connections between woodlands will be enhanced. The number of extent of woodland rides will be increased so as to encourage structural diversity and improve opportunities for invertebrates such as butterflies and moths. The woodlands bordering the River Yare in the south of the site will need to be managed so as to control the prevalence of fast-growing species such as willows, birch, poplar and alder.

- Hedgerows which are defunct (with gaps) can be infilled to increase the quantity of hedgerow habitat and improve connectivity of habitats throughout the site. Infilling will use a range of native hedgerow species to enhance the structure and floral diversity of existing hedgerows. Trees will also be planted along selected hedgerows to ensure new standard trees become established and replace those existing hedgerow trees which will begin to deteriorate in the medium and long-terms. It is not known which hedgerows will be removed as part of the development, so the mapped enhancement opportunities do not specify which hedgerows could be enhanced via infilling. The Phase 1 Habitat Map shows which hedgerows are defunct.

- New ecological connections can be established between features of ecological value on the site. Connections such as green lanes, hedgerows, tree-lines, footpaths, ditches, grassland swathes and woodland belts can be created at strategic points throughout the site to enhance connectivity. Some of these new connections can follow and enhance existing linear features (such as hedgerows), but in other areas, entirely new linear connections could be created. Within residential development areas, boundaries between gardens and along linear

features such as roads can be planted with hedgerows. If fences or walls are required for security reasons, hedgerows can be planted alongside. These hedgerows would create a micro-network running throughout the residential blocks of the site, linking to the larger network of green lanes, woodlands and mature hedgerows/trees which run throughout the entire site and connect to the surrounding landscape.

- The area targeted to become a Country Park should form the main focus for recreational activity by new residents. A network of footpaths and other features to facilitate recreational activity should be installed here, including, for example, benches, dog-waste bins, footpath signage and information boards. The network of footpaths, cycle paths etc. throughout the wider site will be designed so as to allow easy access from areas of housing to the Country Park area. Areas of the Country Park which are particularly ecologically sensitive will have restricted/prohibited public access.

- Flood management infrastructure (swales, lagoon, ditches etc.) can be designed so as to encourage aquatic biodiversity. Incorporating features such as wide 'draw-down zones' in ponds, lagoons and swales, will encourage plant life and aquatic animals such as invertebrates and amphibians. The draw-down zones are the shallow margins of a water-body which become gradually inundated or exposed as the water level rises and falls respectively; a wide draw-down zone means having very shallow sloping margins so as to increase the area of this biodiverse semi-aquatic zone.

- Bird nest boxes and bat roost boxes can be integrated within the new buildings at the site. It is advised that at least 50% of the new residential buildings have at least one integrated nest box or roost box installed. Buildings located in close proximity to features such as woodlands, hedgerows and ponds, for example, will be more suited to bird and bat box installations than houses surrounded by roads and built development, for example. Using integrated boxes will mean that their inclusion will have to be factored into the building designs at an early stage. In general, exterior-mounted boxes (which can be installed after a building has been erected) do not provide the same quality of nesting and roosting opportunities as integrated boxes. Some of the larger and commercial buildings (such as employment units, schools, village halls etc.) may also provide opportunities for installation of bird and bat boxes, although this will be considered once the design and locations of such buildings has been determined.

- Some of the larger, non-residential buildings (such as schools and employment units) may be suitable for incorporating ecological enhancements on the buildings themselves, such as green roofs, green walls and/or brown roofs.

- New field margins and nest plots for ground-nesting birds such as skylark *Alauda arvensis* will need to be created off-site. The level and type of off-site enhancement will depend entirely on the results of the forthcoming ornithological surveys.

# Appendix 1: Site Photographs


Photo 1: The northern boundary of the proposed development site, with the hedgerow bordering the A47 to the north, as viewed looking west.


Photo 2: Arable field in the north of the site, with large, species-rich, intact hedgerow with trees to the east of the field, as viewed looking north-east.


Photo 3: An example of a fairly typical hedgerow at the site, with multiple mature oak trees, as viewed looking west.


Photo 4: The western end of Grange Lane, as viewed from near the entrance on Colton Road, looking east.


Photo 5: Mature oak tree (centre) on north side of Grange Lane (left), as viewed looking west.


Photo 6: Grange Lane near the south of Grange Plantation, as viewed looking west.


Photo 7: Grange Lane near the entrace onto Blind Lane, as viewed looking east.


Photo 8: The west side of Grange Plantation as viewed looking east.


Photo 9: The eastern side of Grange Plantation (in the distance), as viewed looking west)


Photo 10: Interior of Grange Plantation.


Photo 11: Pheasant enclosure within Grange Plantation.


Photo 12: Area of improved grassland to the north of Grange Plantation.


Photo 13: Horse paddocks to the north of Grange Lane, west of Grange Plantation, as viewed looking west.


Photo 14: Seasonal ditch to the west of Grange Plantation, as viewed looking south towards Grange Lane.


Photo 15: Broad-leaved plantation woodland to the north of Grange Lane, east of Grange Plantation, as viewed looking south.


Photo 16: Interior of a broad-leaved plantation woodland in the east of the site, south of Grange Lane.


Photo 17: Interior of a broad-leaved plantation woodland in the north-east of the site.


Photo 18: An example of a cover crop (right) within an arable field to the north of Marlingford Road, as viewed looking north.


Photo 19: Cover crop and area of improved grassland to the north side of Honingham Thorpe Farm, as viewed looking south-east.


Photo 20: Stored agricultural vehicles, equipment and waste within Honingham Thorpe Farm farmyard, as viewed looking east.


Photo 21: Honingham Thorpe Farm, as viewed looking north-east.


Photo 22: Horse paddocks and buildings within a private landholding to the west of Colton Road.

Photo 23: Broad-leaved plantation woodland in the south-east of the site.

Photo 24: Western side of the plantation woodland in the south-east of the site, as viewed looking south.

Photo 25: Colton Wood in the south of the site, as viewed looking west.

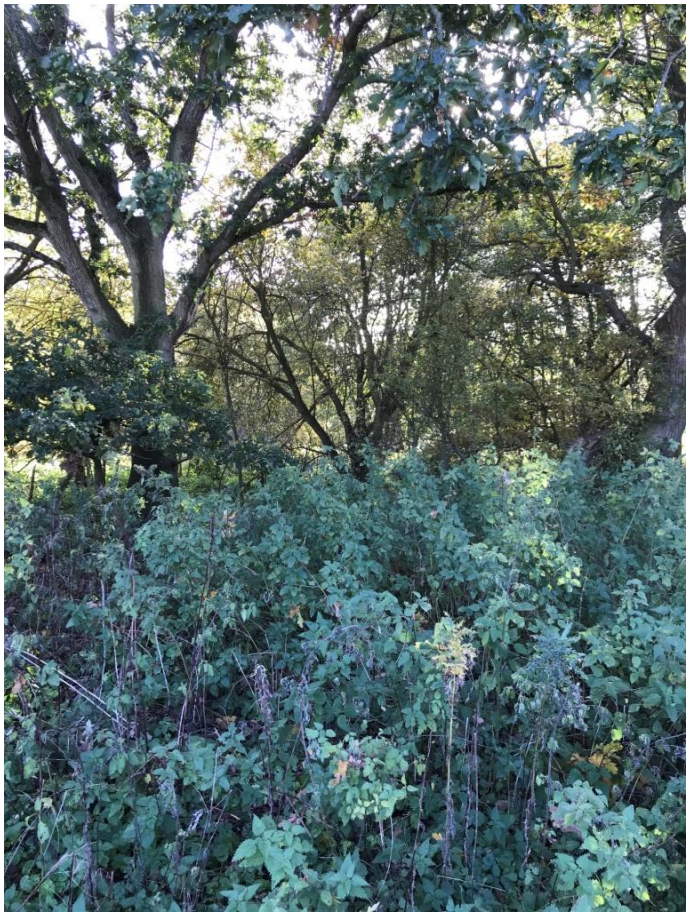


Photo 26: Colton Wood in the south of the site.

Photo 27: Interior of a broad-leaved plantation section of Colton Wood.

Photo 28: Woodland ride which runs north-south through the centre of Colton Wood, as viewed looking north.

Photo 28: Floodplain fen in the south-west of the site, as viewed looking south.

Photo 30: Plantation broad-leaved woodland and fen in the south-west of the site, as viewed looking north.

Photo 31: Wet ditch with surrounding valley mire fen in the south-west of the site, as viewed looking west.

Photo 32: River Yare in the south of the site.

Photo 33: Poor semi-improved grassland in the south-west of the site, as viewed looking west.


Photo 34: Pond 1, as viewed looking east.


Photo 35: Pond 2 (dry), as viewed looking north-east.


Photo 36: Pond 3, as viewed looking west.


Photo 37: Pond 4 (dry), as viewed looking south.


Photo 38: Pond 5 (dry) as viewed looking north.


Photo 39: Pond 6, as viewed looking east.


Photo 40: pond 7 (dry), as viewed looking south.


Photo 41: Pond 8, as viewed looking north-east.


Photo 42: Pond 9: as viewed looking south-west.


Photo 43: Pond 10, as viewed looking south-east.


Photo 44: Pond 11, as viewed looking south.


Photo 45: Pond 12 (dry), as viewed looking south-east.


Photo 46: Pond 13 (dry), as viewed looking north.


Photo 47: Pond 14 (dry), as viewed looking south.


Photo 48: Pond 15 (dry), as viewed looking south-west.


Photo 49: Pond 16 (dry), as viewed looking south-west.

Photo 50: Pond 17 (dry).

Photo 51: Pond 18, as viewed looking east.

Photo 52: Pond 19, as viewed looking south-west.

# Appendix 2: Designated Sites Information

| Site Name and Designation | Approximate Distance and Direction from Proposal Site | Reasons for Designation (CWS information copied from NBIS data search results) |
|---|---|---|
| Yare Valley (Colton) CWS no. 227 | Within the site, located in the south-west | This site lies to the north of the River Yare and consists largely of wet plantation woodland with an area of fen and marshy grassland towards the east. A sizeable area adjacent the river has been planted with game crops. Most of the woodland has a canopy of mature poplar *Populus* sp. although to the west there is abundant Scots pine *Pinus sylvestris*. Moving eastwards the woodland grades into an area of scrub with mature oak *Quercus robur* and crack willow *Salix fragilis* over dense blackthorn *Prunus spinosa*. The ground flora is similar throughout with patches of dog's mercury *Mercurialis perennis* and herb-robert *Geranium robertianum* where dry and reed *Phragmites australis* and great horsetail *Equisetum telmateia*. The fen has tall growth of reed, meadowsweet *Filipendula ulmaria* and nettle *Urtica dioica* with scattered angelica *Angelica sylvestris* and great horsetail. This grades into grassland dominated by rye-grass *Lolium perenne* and Yorkshire fog *Holcus lanatus* but few other herbs except square-stalked St. John's-wort *Hypericum tetrapterum*, carnation sedge *Carex panicea* and jointed rush *Juncus articulatus*. |
| Yare Valley (Barford) CWS no. 2216 | Within the site, located in the far south-west corner. | This site lies to the south of the River Yare and consists of a mosaic of scrub, fen and wet neutral grassland. Areas of scrub have mature oak *Quercus robur* and crack willow *Salix fragilis* over dense blackthorn *Prunus spinosa*. The ground flora includes patches of dog's mercury *Mercurialis perennis* and herb-robert *Geranium robertianum* where dry and reed *Phragmites australis* and great horsetail *Equisetum telmateia*. The fen has tall growth of reed, meadowsweet *Filipendula ulmaria* and nettle *Urtica dioica* with scattered angelica *Angelica sylvestris* and great horsetail. This grades into grassland dominated by rye-grass *Lolium perenne* and Yorkshire fog *Holcus lanatus* but few other herbs except bristle club-rush *Isolepsis setacea*. |
| Yare Valley (Colton Wood) CWS no 228 | Within the site, in the south-east. | This is an area of low-lying marshy grassland and tall fen situated on either side of the River Yare. The site also includes areas of wet semi-natural woodland and scrub. The grassland areas are grazed by horses under the Countryside Stewardship Scheme and there is public access to the northern side. The species-diversity of the grassland areas varies greatly. Generally the sward is dominated by rye-grass *Lolium perenne* and creeping bent *Agrostis stolonifera* with frequent reed sweet-grass *Glyceria maxima* and reed canary-grass *Phalaris arundinacea*. The richest area contains a low growth of jointed rush *Juncus articulatus*, carnation sedge *Carex panicea* and blunt-flowered rush *Juncus subnodulosus*. Square-stalked St. |

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|---|---|---|
| | | John's-wort *Hypericum tetrapterum* is common here whilst bristle club-rush *Isolepsis setacea* and long-stalked yellow-sedge *Carex lepidocarpa* occur occasionally. Ungrazed fen areas have a tall vegetation consisting of reed sweet-grass *Glyceria maxima*, meadowsweet *Filipendula ulmaria*, great willowherb *Epilobium hirsutum* and more locally reed *Phragmites australis*. Nettle *Urtica dioica* and purple-loosestrife *Lythrum salicaria* are scattered but common. Ditches crossing the fen support bulrush *Typha latifolia* and greater pond-sedge *Carex riparia*). Scrub is scattered throughout the site but in places forms large blocks. Sallow *Salix cinerea*, elder *Sambucus nigra* and alder *Alnus glutinosa* are the most frequent components. To the north of the site this has developed into an area of woodland with a canopy of alder and ash *Fraxinus excelsior*. |
| River Wensum SSSI and SAC | 1.9km north-east | The site is designated because it is an example of an enriched calcareous lowland river. It supports a high diversity of plants, a rich invertebrate fauna and has a relatively natural corridor.<br>The river is also designated as a SAC. The primary reasons for selection of the site as a SAC are the presence of the Annex I habitat: 3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation and the Annex II species: 1092 white-clawed crayfish *Austropotamobius pallipes*. Three Annex II species (1016 Desmoulin's whorl snail *Vertigo moulinsiana,* 1096 brook lamprey *Lampetra planeri* and 1163 bullhead *Cottus gobio*) are also present as qualifying features, but they are not primary reasons for the selection of the site. |
| Church Meadow, Alder Carr, Three Corner Thicket and Nursery Plantation CWS no. 2296 | 10 metres north (on the north side of the A47) | The site comprises mainly cattle grazed, unimproved wet pasture, bisected by spring-fed ditches (Church Marsh), with areas of wet and dry woodland (Alder Carr, Nursery Plantation and 3-Corner Thicket), some of which appears to be of ancient origin. To the north, there is an area of former lake, which has reverted to wetland, including a large reedbed. The River Tud flows west to east through the middle of the site. Church Marsh is old and unimproved wet, neutral grassland, supporting cuckooflower *Cardamine pratensis*, common sorrel *Rumex acetosella*, smooth tare *Vicia tetrasperma*, meadow buttercup *Ranunculus acris*, marsh thistle *Cirsium palustre*, brooklime *Veronica beccabunga*, watermint *Mentha aquatica*, clustered dock *Rumex conglomeratus*, square-stemmed St John's-wort *Hypericum tetrapterum*, meadow vetchling *Lathyrus pratensis*, greater birds-foot trefoil *Lotus pedunculatus*, ragged robin *Lychnis flos-cuculi*, glaucous sedge *Carex flacca*, lesser pond sedge *Carex acutiformis*, sharp-flowered rush *Juncus acutiflorus*, jointed rush *Juncus articulatus*. The marshy grassland also has locally abundant creeping thistle *Cirsium* |

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|---|---|---|
| | | *arvense* and dominating soft rush *Juncus effusus*. On drier ground notable species include crested dog's-tail *Cynosurus cristatus* and yellow oat grass *Trisetum flavescens*. The spring-fed ditch system feature dense beds of stonewort *Chara vulgaris*, water crowfoots *Ranunculus aquatilis* and *Ranunculus trichophyllus*, water plantain *Alisma plantago-aquatica*, water horsetail *Equisetum fluviatile*, opposite leaved pondweed *Groenlandia densa*, floating pondweed *Potamogeton natans*, and fen rush *Juncus subnodulosus*. Small teasel *Dipsacus pilosus* and great bittercress *Cardamine amara* grow in shady spots alongside the River Tud. There are stands of low lying, carr woodland and scrub beside the water, dominated by alder *Alnus glutinosa* and willow *Salix* sp., with marsh marigold *Caltha palustris*, town hall clock *Adoxa moschatellina*, flag iris *Iris pseudacorus*, lady fern *Aythrium filix-foemina* and pond sedge *Carex riparia*. Drier stands of woodland support primrose *Primula vulgaris*, sanicle *Sanicla europaea*, wood speedwell *Veronica montana*, wood sorrel *Oxalis acetosella*, climbing corydalis *Ceratocapnos claviculata*, native bluebell *Hyacinthoides non-scripta*, pignut *Conopodium majus*, perennial mercury *Mercurialis perennis*, wood sedge *Carex sylvatica*, enchanters nightshade *Circaea lutetiana*, wood false-brome *Brachythecium sylvaticum*, wood anemone *Anemone nemorosa*, bugle *Ajuga reptans*, 3-nerved sandwort *Moehringia trinerva*, greater chickweed *Stellaria neglecta* and ramsons *Allium ursinum*. Honingham Old Lake supports stands of reed *Phragmites australis* and reed sweet grass *Glyceria maxima*, with water mint, pond sedge, reed canary grass *Phalaris arundinacea*, hemp agrimony *Eupatorium cannabinum*, common fleabane *Pulicaria dysenterica*, wild angelica *Angelica sylvestris*, marsh thistle, brooklime and fen rush. |
| Land adjoining River Tud CWS no. 2128 | 400 metres north | The site lies directly south of the River Tud at Lower Easton, and consists of rough pasture, and a large area of wet meadow overgrown with greater pond sedge. Several drainage ditches traverse the site, and these hold the main botanical interest. The rough pasture lies mainly to the south of the main ditch and at the west end of the site. It consists mostly of dry, species-poor grassland, dominated by Yorkshire fog *Holcus lanatus*, with frequent rough meadow-grass *Poa trivialis*, cock's-foot *Dactylis glomerata*, stinging nettle *Urtica dioica*, creeping buttercup *Ranunculus repens* and broad-leaved dock *Rumex obtusifolius*. The wetter areas north of the main drain include frequent hard rush *Juncus inflexus*. At the east end of the site and to the north of the main ditch, the ground is damp and marshy, and the vegetation is dominated by very large stands of greater pond sedge, to the exclusion of almost all other vegetation. Some lengths of ditch have become |

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|---|---|---|
| | | overgrown and are dominated by greater and lesser pond sedge, reed canary-grass and reed sweet-grass, but elsewhere the vegetation in the ditches and along the banks is generally species-rich. Herb species in damp ground along the edges of the ditches include occasional lady's smock *Cardamine pratensis*, fen bedstraw *Galium uliginosum*, greater bird's-foot trefoil *Lotus pedunculatus*, water figwort *Scrophularia auriculata*, perforate St John's wort *Hypericum perforatum*, ragged robin *Lychnis flos-cuculi* and southern marsh orchid *Dactylorhiza praetermissa*. Finer grasses include occasional yellow oat-grass *Trisetum flavescens*, crested dog's-tail *Cynosurus cristatus*, meadow foxtail *Alopecurus pratensis*, sweet vernal grass *Anthoxanthum odoratum* and smaller cat's-tail *Phleum pratense* ssp *bertolonii*. Sedges and rushes include frequent hard rush, with occasional pendulous sedge *Carex pendula*, glaucous sedge *Carex flacca*, hairy sedge *Carex hirta*, false-fox sedge *Carex otrubae*, jointed rush *Carex articulatus* and common spike rush *Eleocharis palustris*. The ditches contain occasional water-cress *Rorippa nasturtium-aquaticum*, celery-leaved crowfoot *Ranunculus sceleratus*, spiked water-milfoil *Myriophyllum spicatum*, water plantain *Alisma plantago-aquatica*, water forget-me-not *Myosotis scorpioides* and brooklime *Veronica beccabunga*. Trees and shrubs along the ditch edges include very occasional goat willow *Salix caprea*, alder *Alnus glutinosa* and blackthorn *Prunus spinosa*. |
| Long Dell and Westlodge Hills CWS no. 2297 | 450 metres north-east | This site comprises a semi-natural woodland of mainly oak *Quercus robur*, beech *Fagus sylvatica* and ash *Fraxinus excelsior*, with holly *Ilex aquifolium* and rowan *Sorbus aucaparia*. The woodland has a varied age structure and includes areas of plantation, with some areas supporting pine *Pinus* sp. The canopy is largely closed, while some areas have a more open structure, supporting a more varied woodland ground flora. The site lies on an east-west ridge of higher ground on light sandy soils with both south and north facing aspects. Clearings in the western part of the site feature acid grassland and gorse scrub. Throughout the wood, where soils are drier and more acidic, the ground flora includes climbing corydalis *Ceratocapnos claviculata*, wood sedge *Carex sylvatica*, enchanter's nightshade *Circaea lutetiana*, wood false-brome *Brachythecium sylvaticum*, wood sorrel *Oxalis acetosella* and broad buckler fern *Dryopteris dilatata*. Where the ground is slightly damper, particularly on the north-facing slopes, species include male fern *Dryopteris filix-mas*, wood melick *Melica uniflora*, bluebell *Hyacinthoides non-scripta*, ramsons *Allium ursinum*, common figwort *Scrophularia nodosa* and wood anemone *Anemone nemorosa*. Other flora present in the wood includes wood sage *Teucrium scorodonium*, perennial |

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|---|---|---|
| | | mercury *Mercurialis perennis* and red campion *Silene dioica*. Clearings in the western part of the site support areas of acid grassland, which is dominated by common bent *Agrostis capillaris*, with gorse *Ulex europaeus* scrub. Associated species in these areas include wood sage and sheep's sorrel *Rumex acetosella* with common cudweed *Filago vulgaris* and hoary mullein *Verbascum pulverulentum* occurring locally on more disturbed ground. |
| River Tud at Easton and Honingham CWS no. 250 | 500 metres north | Length 4.6km This site meets the following CWS criteria: Species-rich aquatic, marginal and emergent riverine flora; Otter and water vole recorded; Presence of natural physical features. This site originally extended from Ringland Road in the west to the parish boundary in Bog wood in the east; in 2017, the section west of Church Farm to the A47 at Honingham was added, along with a section from the district boundary in the west to Bog Wood in the east; there is a small break at the location of privately owned property on Ringland Road. It runs through agricultural land in a corridor which is dominated by grassland and wet woodland. A weir and sluice near Easton Lodge creates a barrier to fish and a ponded section to the eastern sections of the watercourse. It runs through agricultural land in a predominantly grassland corridor. The channel is narrow at Ringland Road bridge at only 3m wide but quickly widens to an average of 5-6m. By the house the channel is artificially widened to 10m. There is some variation in depth from 25cm to 1.3m at the weir. Natural features include submerged berms of sand and silt just east of the Ringland Road bridge. Emergent vegetation is abundant on the edges of the channel providing some more quiet areas of water. There are variable light levels with frequent trees along the western half of the stretch and fewer towards the east. The wooded west end of the stretch has an abundance of coarse woody debris, mainly composed of fallen branches but also including an old ligger. The eastern half has almost no coarse woody debris. The banks are densely wooded at the western end with abundant overhanging trees including alder *Alnus glutinosa*, white willow *Salix alba* and crack willow *Salix fragilis* with planted poplars *Populus* x *canadensis* along the southern bank. Between the woods and the bridge to the east trees grow along much of the river side. East of the Easton Lodge farm bridge, a large house and garden occupy the northern bank as far east as the weir and sluice with some overhanging weeping willow *Salix* x *sepulcralis*. Aquatic species include lesser water parsnip *Berula erecta* and unbranched bur-reed *Sparganium emersum*. The wooded western end also has some stream water crowfoot *Ranunculus pencillatus* with lesser duckweed *Lemna minor* and blanket weed abundant near the |

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|---|---|---|
| | | weir. East of the weir stream water crowfoot is frequent. The western end of the river has only occasional emergent branched bur-reed *Sparganium erectum* whereas the eastern half has a more open channel supporting a range of emergents. Large banks of watercress *Nasturtium officinale* grow across the river and branched bur-reed and reed sweet grass *Glyceria maxima* grow on the edges or as stands in the river. Lesser pond sedge *Carex acutiformis* becomes dominant in places. Marginal species west of Lodge Farm bridge include dogs mercury *Mercuralis perennis*, hemp agrimony *Eupatorium cannabinum*, small teasel *Dipsacus pilosus*, rough chervil *Chaerophyllum temulentum*, herb robert *Geranium robertianum* and wild angelica *Angelica sylvestris* on the southern bank. Butterbur *Petasites hybridus* is found on the northern wooded bank. East of the bridge similar marginal species occur. Purple loosestrife *Lythrum salicaria* is notable on the southern bank with locally frequent great willowherb *Epilobium hirsutum*. East of the weirs a 20m wide grassland margin gradually gets wider, dominated by nettle *Urtica diocia* but also supporting grassland species such as wild carrot *Daucus carota*, greater birds-foot trefoil *Lotus pedunculatus* and common fleabane *Pulicaria dysenterica*. West of Church Farm, the river comprises a naturally functioning chalk stream watercourse with a sand and gravel bottom, broadly similar to the eastern section. The channel is narrow, varying from 2-3m with some variation in depth from shallow 'rapids' to slightly ponded sections close to the alder carr. Natural features include submerged berms of sand and silt and dense rafts of emergent vegetation include brooklime *Veronica beccabunga*, and watercress *Nasturtium officinale* agg. Faster-flowing sections are scoured by periodic spate flows to leave bare earth 'cliffs'. The section adjacent to and upstream of Alder Carr features plant species associated with shadier conditions, including large bittercress *Cardamine amara* and small teasel *Dipsacus pilosus*. Further east, in the section which flows through cattle-grazed meadows, the channel features bulrush *Schoenoplectus lacustris*, water plantain *Alisma plantago-aquatica* and branched bur-reed *Sparganium erectum*. Beds of submerged stream water crowfoot *Ranunculus pencillatus*, water starwort *Callitriche* spp. and river water dropwort *Oenanthe fluviatile* are frequent. Fish records include trout, bullhead, dace, eel, gudgeon and stone loach. |
| Yare Valley (Marlingford Hall) CWS no. 229 | 500 metres south-east | This site comprises woodland, marshy grassland and fen either side of the River Yare as it forms a large meander to the south of Marlingford Hall. The marshy grassland is largely neutral with either impeded drainage or is subject to flooding. Much of the grassland contains rushes *Juncus* spp., sedges, reed |

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| | | sweetgrass *Glyceria maxima* and meadowsweet *Filipendia ulmaria*. The wettest areas may be spring-fed with a possibly more basic influence. In these damper parts the flora is more diverse and include quaking grass *Brizia media*, marsh arrow grass *Triglochin palustre*, marsh marigold *Caltha palustris* and glaucous sedge *Carex flacca*. The fen area lies adjacent to the river and grassland and is dominated by reed sweetgrass and meadowsweet. The woodland on the site comprises some areas of planted poplar *Populus* sp. In the western blocks the trees are over tall fen vegetation, whilst to the east, following Melton Beck, there is a shrub layer which includes willow *Salix* sp., alder *Alnus glutinosa* and hazel *Corylus avellana*. The herb layer here includes dog's mercury *Mercurialis perennis* and great willow herb *Epilobium hirsutum*. The areas known as The Carrs and River Plantation have been left largely undisturbed. Ash *Fraxinus excelsior* and willow *Salix* sp. dominate although there is a considerable amount of oak *Quercus robur* and some sweet chestnut *Castanea sativa*. The shrub layer is varied but most common are willow and dogwood *Cornus sanguinea*. The ground flora is largely nettles *Urtica dioica* with dogs mercury and ground ivy *Glechoma hederacea*. There are, however, some species- rich patches which include enchanters nightshade *Circaea lutetiana*, violets *Viola* sp. and wood avens *Geum rivale*. Many of the dykes leading to the river contain a variety of aquatic flora which include arrowhead *Sagittaria sagittifolia*, water plantain *Alisma plantago-aquatica*, flowering rush *Butomus umbellatus* and frogbit *Hydrocharis morsus-ranae*. The dyke sides are dominated by sedges *Carex* spp. and reedmace *Typha latifolia* together with herbs such as fleabane *Pulicaria dysenterica*. |
| Fen Plantation CWS no. 2117 | 600 metres north-west | This site is situated on the south bank of the River Tud, and consists of dry to damp semi-natural woodland in the west, becoming increasingly wet towards the eastern end. There are a number of ditches draining the site, the majority of which is second generation poplar plantation. The western end of the site has a diverse canopy, with a mixture of sycamore *Acer pseudoplatanus*, ash *Fraxinus excelsior* and alder *Alnus glutinosa*. The shrub layer consists mainly of hazel *Corylus avellana* and holly *Ilex aquifolium*, with frequent elder *Sambucus nigra*. The ground layer consists of a mixture of fen and woodland species, including dog's mercury *Mercurialis perennis*, ramsons *Allium ursinum*, nettle *Urtica dioica*, great horsetail *Equisetum telmateia* and meadowsweet *Filipendula ulmaria*. The major part of the site is poplar plantation, with a dense shrub layer consisting mainly of guelder rose *Viburnum opulus*, grey willow *Salix cinerea*, rowan *Sorbus aucuparia* and alder *Alnus glutinosa*. The ground flora is dominated by purple |

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|---|---|---|
| | | small-reed *Calamagrostis canescens* and dense patches of lesser pond sedge *Carex acutiformis*. Herb Paris *Paris quadrifolia* also occurs in places. |
| Harman's Grove and adj. Grassland CWS no. 2104 | 600 metres north | A semi-natural ancient woodland, plus an area of species-rich acid grassland. The woodland is managed as coppice with standards and for pheasant shooting. A large pheasant release pen is present in the centre of the woodland. The standards are dominated by oak *Quercus robur* and sweet chestnut *Castanea sativa*. Ash *Fraxinus excelsior*, field maple *Acer campestre*, beech *Fagus sylvatica*, holly *Ilex aquifolium* and silver birch *Betula pendula* are occasional, as are standards of English elm *Ulmus procera*. To the south the canopy is closed, but it is more open to the north. The understorey is composed largely of hazel *Corylus avellana*, with some stools notable for their size and age. Sweet chestnut coppice is occasional in the understorey, as are hawthorn *Crataegus monogyna*, dog rose *Rosa canina*, blackthorn *Prunus spinosa* and elder *Sambucus nigra*. European larch *Larix decidua* has been planted in some areas of the wood. Where the canopy is open, in the north of the site, the ground flora is dominated by dense stands of bramble *Rubus fruticosus* agg. and bracken *Pteridium aquilinum*. Bluebell *Hyacinthoides non-scripta* is frequent throughout the site, covering much of the woodland floor early in the year. In the southern part of the wood and most notably on the woodland edge, the ground flora includes red campion *Silene dioica*, herb Robert *Geranium robertianum* and lesser stitchwort *Stellaria graminea*. Field bindweed *Convolvulus arvensis* and black bryony *Tamus communis* occur as climbers in the field layer. Ground ivy *Glechoma hederacea* is abundant in the southern part of the wood Some areas of the woodland floor appear to have been disturbed and in these areas the ground flora includes creeping thistle *Cirsium arvense*, creeping buttercup *Ranunculus repens*, common chickweed *Stellaria media*, silverweed *Potentilla anserina*, scentless mayweed *Tripleurospermum maritimum*, hoary plantain *Plantago media*, cleavers *Galium aparine* and nettles *Urtica dioica*. Grasses common throughout the site include cocksfoot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus*, false oat grass *Arrhenatherum elatius* and occasional perennial rye grass *Lolium perenne*. The extension comprises a low, rabbit-grazed acid grassland sward between Harman's Grove and a nearby plantation woodland. The grassland features a number of uncommon or declining plant species, including several which are more typically found on sites in the Norfolk/Suffolk Breckland, supporting *Cladonia* lichens, common cudweed *Filago vulgaris*, bird's-foot *Ornithopus perpusillus*, least medick *Medicago minima* and thyme-leaved sandwort *Arenaria* |

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| | | *serpyllifolia*. |
| Old Hall Meadow CWS no. 232 | 800 metres east | This site consists of a series of small semi-improved fields with associated ponds and small blocks of scrub and trees. The site is well sheep-grazed and contains orchids *Dactylorhiza*. The sward is a mixture of common bent *Agrostis capillaris*, red fescue *Festuca rubra*, rye-grass *Lolium perenne* and Yorkshire fog *Holcus lanatus*. Where grazing is light the sward becomes tussocky with sheep's fescue *Festuca ovina* and tufted hair-grass *Deschampsia cespitosa* along with false oat-grass *Arrhenatherum elatius*. Forbs include white clover *Trifolium repens*, common sorrel *Rumex acetosa*, yarrow *Achillea millefolium* and cat's-ear *Hypochoeris radicata*. Heath bedstraw *Galium saxatile* and field scabious *Knautia arvensis* are common and burnet-saxifrage *Pimpinella saxifraga* occurs occasionally. The ponds all have quite distinct vegetation. The pond near to the centre of the site is largely silted-up and overgrown by scrub although bulrush *Typha latifolia* forms dense stands and there is marginal vegetation of ragged-robin *Lychnis flos-cuculi* and toad rush *Juncus bufonius*. The pond to the north-west has open water with branched bur-reed *Sparganium erectum*, pond-weed *Potamogeton natans* and amphibious bistort *Polygonum amphibium*. Scrub consists of hawthorn *Crataegus monogyna* with frequent oak *Quercus robur*. |
| Yare Valley (Marlingford) CWS no. 230 | 800 metres east | This site consists of a diversity of habitats situated on flat land either side of the River Yare. Much of the grassland within the site is grazed but the woodland areas, marsh and tall fen are all apparently unmanaged. Areas of marshy grassland are generally found close to the river. The sward has a mixture of grasses such as reed sweet-grass *Glyceria maxima*, Yorkshire fog *Holcus lanatus*, creeping bent *Agrostis stolonifera* and red fescue *Festuca rubra* together with hairy sedge *Carex hirta* and jointed rush *Juncus articulatus*. Typical forb species include fen bedstraw *Galium uliginosum*, greater bird's-foot trefoil *Lotus uliginosus*, meadowsweet *Filipendula ulmaria*, marsh horsetail *Equisetum palustre*, amphibious bistort *Polygonum amphibium*, marsh arrowgrass *Triglochin palustris* and ragged-robin *Lychnis flos-cuculi*. Several drains cross through the grassland and these support blunt-flowered rush *Juncus subnodulosus*, hard rush *Juncus inflexus* and water mint *Mentha aquatica* as well as the scarce opposite-leaved pondweed *Groenlandia densa*. Where these grassland areas are grazed a more varied flora has developed, particularly close to the drains. Here reed sweet-grass and branched bur-reed *Sparganium erectum* are abundant with frequent water forget-me-not *Myosotis scorpioides*, marsh bedstraw *Galium palustre*, brooklime *Veronica beccabunga*, water plantain |

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| | | *Alisma plantago-aquatica*. More notable are water violet *Hottonia palustris*, opposite-leaved pondweed *Groenlandia densa* and frogbit *Hydrocharis morsus-ranae*. Further from the river are areas of grassland which have been improved and are dominated by grasses such as rye-grass *Lolium perenne* and Yorkshire fog. Fen vegetation is found to the north of the site and is dominated by reed *Phragmites australis*, great willowherb *Epilobium hirsutum*, lesser pond-sedge *Carex acutiformis* and reed sweet-grass. Nettle *Urtica dioica*, cleavers *Galium aparine* and creeping thistle *Cirsium arvense* are all frequent. Woodland areas generally have a canopy of ash *Fraxinus excelsior* with oak *Quercus robur* and alder *Alnus glutinosa*. The shrub layer has abundant hawthorn *Crataegus monogyna* and elder *Sambucus nigra* over a ground flora of nettle, dog's mercury *Mercurialis perennis*, ground-ivy *Glechoma hederacea* and ivy *Hedera helix*. Also present is the scarce small teasel *Dipsacus pilosus*. |
| Hall Hills/ Ringland Covert CWS no. 2105 | 850 metres north | A large woodland, listed as ancient woodland and lying between the river valleys of the Tud and the Wensum. The woodland is composed largely of standards, with small areas of coppice. The site is bisected by a track, running south-east to north west, that divides the site into Hall Hills to the south and Ringland Covert to the north. The Hall Hills area is mainly high forest, dominated by sycamore *Acer pseudoplatanus* in the west, with occasional oak *Quercus robur*, beech *Fagus sylvatica*, Scots pine *Pinus sylvestris* and sweet chestnut *Castanea sativa*. The canopy is almost closed and the understorey dominated by sycamore seedlings. Holly *Ilex aquifolium*, elm *Ulmus procera* and hazel *Corylus avellana* are occasional in the understorey. To the south, exotic species, such as cotoneaster *Cotoneaster* spp. and red oak *Quercus rubra*, have been planted around a pheasant release pen. Scots pines dominate the central section of the wood, with occasional oak, sycamore and sweet chestnut. To the north-east, Hall Hills is dominated by oak standards, with frequent standards of sweet chestnut, sycamore and pine. Stored hazel coppice dominates the understorey here, with occasional holly and birch *Betula pendula*. The herb layer throughout Hall Hills is sparse, but is dominated by bluebell *Hyacinthoides non-scripta* early in the year, with frequent bramble *Rubus fruticosus* agg., bracken *Pteridium aquilinum* and nettle *Urtica dioica*. Male fern *Dryopteris filix-mas*, Lady Fern Athyrium filix-femina and Broad Buckler fern *Dryopteris dilatata* dominate the herb layer in the central section of Hall Hills. Several abandoned mineral workings are present in the south-east of the wood and have been planted with small leafed lime *Tilia europaea*. The Ringland Covert area is primarily coppice |

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| | | with standards; oak standards dominate, with occasional sweet chestnut, sycamore and Scot's pine. Stored hazel coppice is interspersed with occasional holly and birch, but is threatened by sycamore. Other mature trees planted throughout the site include horse chestnut *Aesculus hippocastanum*, Leyland *Cupressocyparis leylandii*, larch *Larix decidua*, rowan *Sorbus aucuparia*, aspen *Populus tremula* and Sitka spruce *Picea sitchensis*. Rhododendron *Rhododendron ponticum* occurs rarely in the understorey. The herb layer is dominated by bluebells early in the year, with bracken, bramble, nettle and ferns frequent throughout. An open area, adjoining the ride that bisects the site, is dominated by soft rush *Juncus effusus* and Yorkshire fog *Holcus lanatus*, with occasional rosebay willowherb *Chamaenerion angustifolium* and wild raspberry *Rubus idaeus*. Species frequent along the rides include ground ivy *Glechoma hederacea*, wood avens *Geum urbanum*, cow parsley *Anthriscus sylvestris* and lesser burdock *Arctium minus*. Red campion *Silene dioica*, creeping buttercup *Ranunculus repens* and meadow buttercup *Ranunculus acris* are common, with hoary plantain *Plantago media* present on disturbed areas. Grasses present in open areas across the site include smooth meadow grass *Poa pratensis*, common bent *Agrostis capillaris*, annual meadow grass *Poa annua*, creeping bent *Agrostis stolonifera*, common cat's ear *Hypochoeris radicata* and barren brome *Bromus sterilis*. |
| Turnpike Pond CWS no. 224 | 1.3km south | This site comprises a sizeable fenced-off pond surrounded by species-poor grassland. The pond has undergone restoration work with the removal of sediment and planting of marginal vegetation. The surface of the pond is partly covered by white water-lily *Nymphaea alba*, broad-leaved pondweed *Potamogeton natans*, common duckweed *Lemna minor*, ivy-leaved duckweed *Lemna trisulca* and rigid hornwort *Ceratophyllum demersum*. The pond is fed by run-off from the adjacent land and is susceptible to eutrophication; small patches of algae are present. The western edge of the pond is partially shaded by young trees, mostly crack willow *Salix fragilis* and alder *Alnus glutinosa*. In the shade a marginal vegetation of reed sweet-grass *Glyceria maxima*, great willowherb *Epilobium hirsutum*, water mint *Mentha aquatica* and amphibious bistort *Polygonum amphibium* has developed. Amongst this are patches of creeping bent *Agrostis capillaris*, hard rush *Juncus inflexus*, common spike-rush *Eleocharis palustris* and marsh horsetail *Equisetum palustre*. To the east there is less shade and species such as bogbean *Menyanthes trifoliata*, water plantain *Alisma plantago-aquatica*, amphibious bistort, bittersweet *Solanum dulcamara* and pink water-speedwell *Veronica catenata* occur. Lesser pond-sedge |

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| | | *Carex acutiformis* and yellow flag *Iris pseudacorus* are also frequent. The locally scarce great marsh-bedstraw *Galium elongatum* is also found. The pond is surrounded by neutral grassland which is damp and generally improved. The sward contains creeping bent, rye-grass *Lolium perenne*, Yorkshire fog *Holcus lanatus* and white clover *Trifolium repens*. In marshy places species such as meadowsweet *Filipendula ulmaria* occur. |
| Algarsthorpe Marshes CWS no. 2288 | 1.5km east | The site consists of three separate parcels of grassland which lie adjacent to the River Yare and either side of a central track. West of the track one parcel lies north of the river and east of the track a further two parcels lie both north and south of the river. North of the river a central ditch runs east – west. The grassland comprises grazing marsh and semi-improved neutral grassland and includes ditches, some of which are permanently wet and spring fed. North of the central ditch the land steadily rises up to the road and here the grassland is semi-improved and relatively species poor with sandy soils. Yorkshire fog *Holcus lanatus* is abundant, ragwort Senecio jacobae and perennial rye-grass *Lolium perenne* are locally abundant, common mouse-ear *Cerastium fontanum* is frequent, and creeping thistle *Cirsium arvense* and red clover *Trifolium pratense* locally frequent. Dandelion *Taraxicum officinale* agg., creeping buttercup *Ranunculus repens* and hogweed *Heracleum sphondylium* are occasional, redshanks is locally frequent, and meadow buttercup *Ranunculus acris* is rare. South of the central ditch are areas of grazing marsh with damp peaty soils and within which ditches and scrapes are present. Adjacent to these features areas of more diverse flora occur including species which are not seen elsewhere such as purple loosestrife *Lythrum salicaria*, water mint *Mentha aquatica*, fleabane *Pulicaria dysenterica*, water figwort *Scrophularia auriculata*, common valerian *Valeriana officinalis* and square stalked St John's wort *Hypericum tetrapterum*. West of the track the most dominant grass species is perennial rye-grass which is abundant and creeping buttercup, Yorkshire fog, tufted hair-grass *Deschampsia cespitosa*, red fescue *Festuca rubra*, timothy *Phleum pratense*, white clover *Trifolium repens*, and field horsetail *Equisetum arvense* are all frequent. Other species include jointed rush *Juncus articulatus*, common sorrel *Rumex acetosa*, hairy sedge *Carex hirta*, meadow buttercup *Ranunculus acris* and dandelion and which are locally frequent. Meadowsweet *Filipendula ulmaria* is occasional, cuckoo flower *Cardamine pratensis* and silverweed *Potentilla anserina* rare and reed sweet-grass Glyceria maxima is locally frequent. East of the track and north and south of the river is moderately more diverse than |

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| | | west of track and has damper soils. Creeping bent *Agrostis stolonifera*, tufted hair-grass, reed sweet-grass and red fescue are locally abundant, meadowsweet locally abundant, and fen bedstraw *Galium uliginosum*, meadow buttercup, greater pond sedge *Carex riparia*, greater bird's-foot trefoil *Lotus pedunculatus*, silverweed and cuckoo flower are locally frequent. Species which are rare include meadow vetchling *Lathyrus pratensis*, celery-leaved buttercup *Ranunculus sceleratus*, marsh thistle *Cirsium palustre*, and marsh horsetail. The ditches east of the track are the most notable, being permanently wet and spring fed. Floating aquatic plant species include rigid hornwort *Ceratophyllum demersum*, frogbit *Hydrocharis morsus-ranae*, Canadian pondweed *Elodea canadensis* and water starwort sp. *Callitriche* sp. and which are locally abundant, and stonewort *Chara* sp., and water violet *Hottonia palustris* are rare. A small pond is present east of the track and is linked to the wet ditches and which has banks dominated by reed canary-grass *Phalaris arundinacea* with reedmace sp. *Typha* sp. abundant. Rigid hornwort and frogbit are frequent and water horsetail *Equisetum fluviatile* is locally frequent. Stretches of hedgerows occur either side of the central track, along the northern boundary adjacent to the road and along the southern boundary east of the track. Species include elm *Ulmus* sp., hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, crab apple *Malus sylvestris*, ash *Fraxinus excelsior*, oak *Quercus robur*, wild privet *Lugustrum vulgare* , rose sp. *Rosa arvensis*, elder *Sambuscus nigra*, field maple *Acer campestris*, and bramble *Rubus fruticosus*. The occasional mature tree occurs adjacent to the central ditch and river and mainly consisting of alder *Alnus glutinosa*, white willow Salix alba and oak. The River Yare flows east – west through the site and in general its bed is silty sandy although gravel sections occur frequently along its length. Branched bur-reed *Sparganium erectum* is locally dominant forming extensive areas. Arrowhead *Sagittaria latifolia*, water starwort sp., water plantain *Alisma plantago-aquatica* and floating sweet-grass *Glyceria maxima* are rare to locally frequent, yellow water lily *Nuphar lutea* and watercress *Nasturtium officinale* occasional and water forget me-not *Myosotis scorpioides* locally abundant. |
| Fen West of East Tuddenham CWS no. 660 | 1.5km north-west | This site comprises low lying marshy grasslands, exhibiting various degrees of management and species diversity. A stream flows through the middle of the site and there is a small man-made pond. The majority of the site is tall dense vegetation which is mostly dominated by meadowsweet *Filipendula ulmaria* with frequent great willowherb *Epilobium hirsutum*. Nettle *Urtica dioica* and wild angelica *Angelica sylvestris* are |

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| | | also present. To the northern edge is a dense stand of common reed *Phragmites australis*. To the south-west lies an area of species-rich, marshy grassland which is co-dominated by Yorkshire fog *Holcus lanatus* and soft rush *Juncus effusus* with frequent meadowsweet. Other species present includes creeping thistle *Cirsium arvense*, creeping buttercup *Ranunculus repens*, hedge bindweed *Calystegia sepium*, hogweed *Heracleum sphondylium*, Timothy *Phleum pratense pratense*, false oat-grass *Arrhenatherum elatius*, meadow vetchling *Lathyrus pratensis*, fleabane *Pulicaria dysenterica* and bush vetch *Vicia sepium*. The south-east is an area of dense reed canary-grass with frequent false oat-grass, meadowsweet and soft rush. Other species present include Yorkshire fog, marsh thistle *Cirsium palustre*, purple-loosestrife *Lythrum salicaria*, perennial rye-grass *Lolium perenne perenne* and angelica. To the north broad-leaved dock *Rumex obtusifolius* is frequent. There are drier strips of false oat-grass dominated grassland which are moderately species-rich. Perennial rye-grass, hogweed and creeping thistle are frequent and fleabane, hedge bindweed and bush vetch also occur. The stream is mesotrophic (bordering on eutrophic) in character and is fairly impeded by vegetation. Bulrush *Typha latifolia*, water forget-me-not *Myosotis scorpioides*, branched bur-reed *Sparganium erectum* and water starwort *Callitriche stagnalis* are common. Other species include Canadian waterweed *Elodea canadensis*, greater pond-sedge *Carex riparia,* reed canary-grass *Phalaris arundinacea* and water-cress *Nasturtium officinale*. The man-made pond is surrounded by dense bulrush and greater pond-sedge with a central island covered by dense reed canary-grass. |
| Holly Woods CWS no. 2103 | 1.5km north-east | Two areas of semi-natural, broad-leaved woodland, separated by a third area of semi-mature conifer plantation with occasional broad-leaved species in the canopy. Holly Wood is situated to the south of the site, and is largely composed of hazel coppice with standards, dominated by oak *Quercus robur* and sweet chestnut *Castanea sativa*, with infrequent ash *Fraxinus excelsior*, beech *Fagus sylvatica* and sycamore *Acer pseudoplatanus*. There are occasional European larch *Larix deciduas*, Douglas fir *Pseudostuga menziesii* and Scot's pine *Pinus sylvestris* specimens, and a number of veteran oak pollards occur in the south-west. The understorey consists of stored hazel *Corylus avellana* coppice, with occasional holly, field maple *Acer campestre* and silver birch *Betula pendula*. Along the western edge of the woodland, rhododendron *Rhododendron ponticum* and cotoneaster *Cotoneaster* spp. have been planted as game cover, and honeysuckle *Lonicera periclymenum* and ivy *Hedera helix* are common throughout. |

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| | | The herb layer is dominated by bluebells *Hyacinthoides non-scripta*, with broad-buckler fern *Dryopteris dilatata* and male fern *Dryopteris filix-mas* also present. Bramble *Rubus fruticosus* agg., nettle *Urtica dioica* and cleavers *Galium aparine* are abundant in the north, while bracken *Pteridium aquilinum* is common to the west and wild raspberry *Rubus idaeus* and soft rush *Juncus effusus* to the south. The greatest diversity in the herb layer is found along the rides and on the woodland edge. Dominant grasses here include false oat grass *Arrhenatherum elatius*, cock's-foot *Dactylis glomerata*, rough and smooth meadow-grass *Poa trivialis*, *Poa pratensis*, Yorkshire fog *Holcus lanatus*, wood false-brome *Brachypodium sylvatica* and red fescue *Festuca rubra*. Forbs include marsh thistle *Cirsium palustre*, hoary and ribwort plantain *Plantago media*, *Plantago lanceolata* herb robert *Geranium robertianum*, black medick *Medicago lupulina*, agrimony *Agrimonia eupatoria* and foxglove *Digitalis purpurea*. Rough Ground forms the northern end of the site. Conifer clearance has resulted in a more open canopy, where spindly silver birch is abundant, with frequent mature hornbeam, occasional sweet chestnut, Norway maple *Acer platanoides*, sycamore, rowan *Sorbus aucuparia*, field maple, horse chestnut *Aesculus hippocastanum*, oak, ash and wild cherry *Prunus avium*. Large areas of bare ground in the south-west have been colonised by seedlings of canopy species, while herb species are dominated by foxglove *Digitalis purpurea*, red campion *Silene dioica*, bluebell, climbing corydalis *Corydalis claviculata*, and occasional wood anemone *Anemone nemorosa* and wood sorrel *Oxalis acetosella*. Large stands of bracken are present in the north-west. Old Wood, which connects the other two areas of wood, is dominated by exotic coniferous species, including Lawson's cypress *Chamaecyparis lawsoniana*, Douglas fir, European larch, Scots pine, giant fir *Abies grandis*, Western hemlock *Tsuga heterophylla* and Western red cedar *Thuja plicata*. Broad-leaved species include occasional beech, rowan, silver birch, sycamore and holly. Young self-seeded holly and rowan form the sparse understorey, while herb species include occasional wood sage *Teucrium scorodonia*, climbing corydalis, wood dock *Rumex sanguineus*, honeysuckle, bluebell, foxglove, wood sorrel, yellow pimpernel *Lysimachia nemorum*, with broad-buckler fern, toad rush *Juncus bufonius* and soft rush. |
| River Yare at Marlingford CWS no. 231 | 1.5km east | This site extends from just west of Bawburgh Road to the Bawburgh parish boundary. It is listed for its species-rich marginal and riverine flora, presence of 10 species of fish, including eel and relatively natural physical features. Two County Wildlife Sites are found adjacent to the river; CWS 2174 Easton College Water meadows stands on the north bank at the |

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| | | eastern end and CWS 239 Yare valley (Bawburgh) is to the east of that. The river has a fairly natural appearance, meandering through grazing marshes. Trees and scrub stand in the eastern third and at the western end. The flow is generally steady, but speeds up occasionally where stones break the surface and divert the water around them. The depth varies across the channel and also along its length. Several berms/beaches occur, some are small and sandy while others are wider and more muddy, the result of cattle accessing the river. Bankside trees overhang the river to the east creating a shadier section of the site. Aquatic vegetation includes yellow water-lily *Nuphar lutea* which occurs throughout the stretch except in the shallow areas, becoming frequent and covering the river in places. Unbranched bur-reed *Sparganium emersum* is locally frequent and starwort *Callitriche* agg. occasional. White water-lily *Nymphaea alba* grows just west of the trees at the eastern end. Lesser water-parsnip *Berula erecta* and branched bur-reed *Sparganium erectum* occur occasionally on the edges of the river in the western third of the site; grey bulrush *Schoenoplectus tabernaemontanii* has a large stand in the middle of the channel both west and east of the bridge. Further east, reed sweet-grass *Glyceria maxima* and reed canarygrass *Phalaris arundinacea* establish on the edges wherever there is silty deposition, making a 3m wide area of vegetation in one or two places. Blue water-speedwell *Veronica anagallis-aquatica* seeds abundantly in the muddy beach on the northern side of the river at the top of the first meander. Other plants grow by the river where open areas allow: blue water-speedwell, celery-leaved buttercup *Ranunculus sceleratus*, water mint *Mentha aquatica*, bittersweet *Solanum dulcamara* and brooklime *Veronica beccabunga* grow locally in the west. Further east, the larger emergents tend to dominate, with common nettle *Urtica dioica* also frequent. Trees edge the river in the eastern third of the site: crack willow *Salix fragilis* and alder *Alnus glutinosa* grow as shrubs but then further east both grow as tall trees, along with goat willow *Salix caprea* and osier *Salix viminalis* which also grow by the water, making a dense area of woodland to the north. The southern bank has a narrow belt of smaller trees and shrubs. Mature white willow *Salix alba* grow at the extreme eastern end and also west of the bridge here, alder, ash *Fraxinus excelsior* and hawthorn *Crataegus monogyna* also stand by the river. Small teasel *Dipsacus pilosus* grows in the woodland at the western end. |
| Land adjoining Foxburrow | 1.6km north | This site forms part of a larger area known collectively as Foxburrow Plantation and The Waterfence. It consists of an extensive area of wet, species-rich grassland situated in the |

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| Plantation CWS no. 2116 | | bottom of a spring-fed valley. The stream itself is mostly overgrown with fool's watercress *Apium nodiflorum*. The site was at one time planted with poplars which have been felled, and the stumps can be found among the vegetation. In the wetter areas of the meadow, soft rush *Juncus effusus* dominates, particularly on the south side. The grassland contains a wide range of herbs, including lady's smock *Cardamine pratensis*, great willowherb *Epilobium hirsutum*, brooklime *Veronica beccabunga*, marsh thistle *Cirsium palustre*, lesser spearwort *Ranunculus flammula* and water chickweed *Myosoton aquaticum*, with frequent water-mint *Mentha aquatica* and greater bird's-foot trefoil *Lotus uliginosus*. Marsh fern *Thelypteris palustris* and ragged robin *Lychnis flos-cuculi* are occasional. In the drier areas, tufted vetch *Vicia cracca*, meadow vetchling *Lathyrus pratensis*, bluebell *Hyacinthoides non-scripta*, red campion *Silene dioica* and germander speedwell *Veronica chamaedrys* are present. Grasses include false oat-grass *Arrhenatherum elatius* and Yorkshire fog *Holcus lanatus*, while other coarse species include creeping thistle *Cirsium arvense* and bracken *Pteridium aquilinum* which grow amongst other vegetation rather than in dense stands. The wet meadow is bounded to the south-west by a low, dry bank on which grows frequent western gorse *Ulex gallii*, bracken and goat willow *Salix caprea*. |
| Old Covert, Wood Lane CWS no. 2109 | 1.6km north-west | A coppice with standards woodland that is not listed on the Ancient Woodland Inventory, although it may have once been part of a larger, ancient woodland. The wood is managed as active coppice and for shooting. The standards are mostly sweet chestnut *Castanea sativa*, with frequent sycamore *Acer pseudoplanatus*. Oak *Quercus robur* and ash *Fraxinus excelsior* are occasional, but more abundant in the north of the woodland. Field maple *Acer campestre* is rare to occasional throughout the site, as is holly *Ilex aquifolium*. European larch *Larix decidua* has been planted in some areas and both silver birch *Betula pendula* and downy birch *Betula pubescens* occur rarely. The understorey is composed largely of hazel *Corylus avellana*, especially in the north of the woodland. Other species found in the understorey, frequently as coppice stools, include hawthorn *Crataegus monogyna*, elder *Sambucus nigra* and ash. Recent coppicing has largely taken place in the north of the wood, creating a more open canopy. The herb layer in this part of the wood is dominated by dog's mercury *Mercurialis perennis*, with occasional wood avens *Geum urbanum*, red campion *Silene dioica*, lords and ladies *Arum maculatum* and herb robert *Geranium robertianum*. Ground ivy *Glechoma hederacea* is also frequent. Early in the year bluebells *Hyacinthoides non-scripta* dominate the ground flora |

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| | | throughout the wood. Lady fern *Athyrium filix-femina* is occasional throughout the wood and male fern *Dryopteris filix-mas* is frequent. Both honeysuckle *Lonicera periclymenum* and ivy *Hedera helix* occur as climbers in the field layer. To the south of the wood, the canopy is more closed and the understorey dense. The herb layer here is dominated by bramble *Rubus fruticosa* agg., nettle and rosebay willowherb *Chamaenerion angustifolium*. Herb robert is occasional, as are both marsh thistle *Cirsium palustre* and creeping thistle *Cirsium arvense*. The most frequent grasses found in open areas of the woodland are annual meadow grass *Poa annua*, creeping bent *Agrostis stolonifera*, red fescue *Festuca rubra* and false oat grass *Arrhenatherum elatius*. Yorkshire fog *Holcus lanatus* and common bent *Agrostis capillaris* also occur, as does soft rush. Herbs common in the more open areas of the wood and on the edges include hedge woundwort *Stachys sylvatica*, lesser stitchwort *Stellaria graminea*, black knapweed *Centaurea nigra* and creeping buttercup *Ranunculus repens*. |
| Ringland Hills CWS no. 1336 | 1.6km north-east | The CWS is a representative part of a narrow ridge of low hills to the south of a large meander in the River Wensum Valley. Steep northern slopes indented with narrow gullies drop away from a fairly level area at the top of the ridge. Historically open, and at least partly grazed, the hills are now almost entirely semi-natural, predominantly oak-birch woodland. There is evidence of significant use and surface disturbance (including military), from pre-history (flint mining) right through to the present day (dog walking cycling etc). Situated beside a busy minor road crossing the hills, a small car-park leads to a public footpath following the south and east boundaries of the site, provided easy recreational access. The majority of the site is covered by fairly mature woodland, dominated by pedunculate oak *Quercus robur* and silver birch *Betula pendula*, with locally frequent rowan *Sorbus aucuparia*, occasional beech *Fagus sylvatica*, sycamore *Acer pseudoplatanus* and rare sweet chestnut *Castanea sativa*. In the northern part of the site ash *Fraxinus excelsior* is occasional, mainly as mature boundary trees. The understorey is mainly of young rowan and holly *Ilex aquifolium*, but also hazel *Corylus avellana*, blackthorn *Prunus spinosa* and rare hawthorn *Crataegus monogyna* at the bottom of the slope. The ground-layer is predominantly bramble *Rubus fruticosus* agg. and bracken *Pteridium aquilinum* with honeysuckle *Lonicera periclymenum* widespread. An extensive area in the northern part of the site is dominated by the invasive variegated yellow archangel Lamiastrum galeobdolon subsp. *Argentatum*. There are patches of raspberry *Rubus idaeus* along the slope. Woodland herbs are generally occasional or rare, and include |

| Site Name and Designation | Approximate Distance and Direction from Proposal Site | Reasons for Designation (CWS information copied from NBIS data search results) |
|---|---|---|
| | | climbing corydalis *Corydalis claviculata*, herb-robert *Geranium robertianum*, wood-avens *Geum urbanum*, wood sage *Teucrium scorodonia*, wood-sorrel *Oxalis acetosella*, hedge woundwort *Stachys sylatica*, enchanter's nightshade *Circaea lutetiana*, greater stitchwort *Stellaria holostea*, foxglove *Digitalis purpurea* and red campion *Silene dioica*. False brome *Brachypodium sylvaticum* is widespread and remote sedge *Carex remota* rare. The highest, central part of the site is maintained as a small area of acid grassland. The sward is relatively species-poor and mainly composed of Yorkshire-fog *Holcus lanatus*, common bent *Agrostis capillaris*, cock's-foot *Dactylis glomerata* and perennial ryegrass *Lolium perenne*. More characteristically, sheep's-fescue *Festuca ovina* and wavy hair-grass *Deschampsia flexuosa* are present on the sandy edge of the slope. Herbs include frequent sheep's sorrel *Rumex acetosella*, common mouse-ear *Cerastium fontanum*, white clover *Trifolium repens* and cat's-ear *Hypochoeris* sp. Common gorse *Ulex europaeus* is present in part of the sward, being kept in check by mowing. An area of steep slope immediately below the open grassland has been cleared of woodland in the recent past, and is now developing as dense scrub with silver birch, rowan, common gorse, broom, bramble and bracken. |
| Lord's Hill & Easton Reeds and Blackhill Wood CWS no. 257 | 1.7km north-east | This is a diverse area in three parts, principally woodland, situated on light acid soil. There has been some localised planting of broad-leaved and coniferous trees. The woodland to the south-west is dominated by oak *Quercus robur* with patches of birch *Betula pendula*, rowan *Sorbus aucuparia*, sycamore *Acer pseudoplatanus* and, towards the southern boundary, lombardy poplar *Populus nigra 'italica'* and beech *Fagus sylvatica*. The shrub layer is almost absent, consisting of young canopy species with a small amount of holly *Ilex aquifolium*. Bracken *Pteridium aquilinum*, bramble *Rubus fruticosus* agg. and climbing corydalis *Corydalis claviculata* constitute much of the ground flora although bluebell *Hyacinthoides non-scriptus* dominates in shaded areas. Lily-of-the-valley *Convalleria majalis* is abundant in places. The northern block consists of old and widely spaced oak and hornbeam *Carpinus betulus* with some field maple *Acer campestre* coppice. The understorey is similar to that in the south-west as is the ground flora, with bluebell dominating in shade and bracken in more open areas. Wood millet Milium effusum, wood-sorrel *Oxalis acetosella* and climbing corydalis are all frequent whilst male-fern *Dryopteris filix-mas* is scattered throughout. Wood-rush *Luzula* spp. and wood melick *Melica uniflora* are infrequent. The eastern block (Easton Reeds) is similar to that in the north but with abundant mature hazel *Corylus avellana* coppice and several huge old coppice |

| Site Name and Designation | Approximate Distance and Direction from Proposal Site | Reasons for Designation (CWS information copied from NBIS data search results) |
|---|---|---|
| | | stools of sweet chestnut *Castanea sativa*, hornbeam and beech. Blackhill Wood is located to the north east, and lies along the Wensum escarpment. The wood is divided into eight plots, of which five are residential. While only parts of the wood are notified as County Wildlife Site, due to restrictions of access, all areas of the wood are believed to be of similar quality. High canopy trees consist mainly of oak, sycamore and sweet chestnut, with occasional stands of ash, silver birch, hornbeam, elm *Ulmus minor*, beech and wild cherry *Prunus padus*. There are extensive areas of mature and recent hazel coppice. Ancient coppice stools of oak, sweet chestnut and field maple occur inside the south-east boundary. The shrub layer is generally sparse, and consists mainly of canopy species, although there are occasional dense stands of cherry laurel *Prunus laurocerasus*. Spindle *Euonymus europaeus*, bramble, elder *Sambucus nigra*, honeysuckle *Lonicera periclymenum* and holly occur in places, and climbing ivy *Hedera helix* is locally frequent. The ground flora is dominated throughout much of the woodland by bracken and bluebell, but other species include wood anemone *Anemone nemorosa*, dog's mercury *Mercurialis perennis*, climbing corydalis, common dog violet *Viola riviniana*, wood sorrel, enchanter's nightshade *Circea lutetiana*, yellow *pimpernel Lysimachia nemorum*, yellow archangel *Galeobdolon luteum* and ramsons *Allium ursinum*. Spruce *Picea* sp., larch *Larix* sp., Douglas fir *Pseudotsuga menziesii*, Scot's pine *Pinus sylvestris* and sweet chestnut have all been planted in various places within the site. |
| The Carrs CWS no. 178 | 1.7km west | This site is situated to the north of the River Yare and is criss-crossed by numerous drains. The soils are wet and neutral to alkaline and support a mosaic of tall herb, fen and marsh vegetation. A strip of woodland runs along the west of the site. The area is ungrazed and unmanaged and consequently some areas of fen are drying out. Much of the grassland has a basic influence and supports species such as meadowsweet *Filipendula ulmaria* and blunt-flowered rush *Juncus subnodulosus*. Other frequent species include angelica *Angelica sylvestris*, marsh horsetail *Equisetum palustre*, red fescue *Festuca rubra*, marsh thistle *Cirsium palustre*, brown sedge *Carex disticha*, common spotted-orchid *Dactylorhiza fuchsii* and ragged-robin *Lychnis flos-cuculi*. In more neutral areas are found false oat-grass *Arrhenatherum elatius*, Yorkshire fog *Holcus lanatus*, red fescue and black knapweed *Centaurea nigra*. Fen areas are dominated by reed *Phragmites australis* with large stands of lesser pond-sedge *Carex acutiformis* and reed canary-grass *Phalaris arundinacea*. Taller fen and grassland species mix with coarse grasses and more ruderal |

| Site Name and Designation | Approximate Distance and Direction from Proposal Site | Reasons for Designation (CWS information copied from NBIS data search results) |
|---|---|---|
| | | species to form large expanses of tall herb vegetation. Here are found nettle *Urtica dioica*, cleavers *Galium aparine*, hemlock *Conium maculatum*, white dead-nettle *Lamium album* and red campion under scattered alder *Alnus glutinosa*. The woodland canopy includes some old coppice trees and is comprised of beech *Fagus sylvatica*, ash *Fraxinus excelsior*, sycamore *Acer pseudoplatanus* and alder. The shrub layer consists of coppiced hazel *Corylus avellana* and hawthorn *Crataegus monogyna* over a ground flora dominated by dog's mercury *Mercurialis perennis*. |
| White House Meadows CWS no. 174 | 1.9km west | This is a complex, rich site with a diversity of species-rich habitats on wet neutral to alkaline soils. The woodland is unmanaged and surrounded by deep drains. The west of the site is largely semi-improved grassland. Where this is not grazed it boasts abundant rough meadow-grass *Poa trivialis*, rye-grass *Lolium perenne* and Yorkshire fog *Holcus lanatus* but few forbs. In sheep-grazed areas the sward is more diverse with smooth meadow-grass *Poa pratensis*, creeping bent *Agrostis stolonifera*, blunt-flowered rush *Juncus subnodulosus*, hard rush *Juncus inflexus*, floating sweet-grass *Glyceria fluitans*, meadowsweet *Filipendula ulmaria*, marsh thistle *Cirsium palustre*, water mint *Mentha aquatica* and great horsetail *Equisetum telmeteia*. Moving eastwards this grades into unimproved grassland with red fescue *Festuca rubra*, crested dog's-tail *Cynosurus cristatus* and sweet vernal-grass *Anthoxanthum odoratum*. Other species include yarrow *Achillea millefolium*, field wood-rush *Luzula campestris* and daisy *Bellis perennis*. The east of the site is tall fen vegetation dominated by reed *Phragmites australis* with lesser pond-sedge *Carex acutiformis*, reed canary-grass *Phalaris arundinacea*, reed sweet-grass *Glyceria maxima* and many of the species found in the grassland to the west. The woodland in the centre of the site has a canopy of alder *Alnus glutinosa*, ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus* over scattered saplings, guelder-rose *Viburnum opulus*, elder *Sambucus nigra*, field maple *Acer campestre* and coppiced hazel *Corylus avellana*. In the open area of the woodland grows the rare monk's hood *Aconitum napellus*. |
| Tiffey Woods CWS no. 221 | 2km south | This area of woodland lies either side of the River Tiffey. To the north-west there is a small area of fen which grades into wet neutral grassland. The woodland canopy to the north of the river is largely dominated by ash *Fraxinus excelsior*, alder *Alnus glutinosa* and willow *Salix* spp. over a shrub layer of guelder-rose *Viburnum opulus*. To the south of the river the woodland is dense willow with no shrub layer. In both areas the ground flora is of tall herb and fen vegetation with species such as reed canary-grass *Phalaris arundinacea*. The fen lies to |

| Site Name and Designation | Approximate Distance and Direction from Proposal Site | Reasons for Designation (CWS information copied from NBIS data search results) |
|---|---|---|
| | | the north of the river and extends along the river banks. Reed canary-grass is dominant and mint *Mentha aquatica*, hemp agrimony *Eupatorium cannabinum*, purple-loosestrife *Lythrum salicaria*, angelica *Angelica sylvestris* and nettle *Urtica dioica* are abundant. The marshy grassland has an abundance of fen species in a sward otherwise dominated by false oat-grass *Arrhenatherum elatius*. |

# Appendix 3: Biological Records for Surrounding 2km Area

| Species Common Name | Species Latin Name | Details |
|---|---|---|
| Lesser redpoll | *Acanthis cabaret* | 7 records |
| Common (Mealy) redpoll | *Acanthis flammea* | 1 record |
| Goshawk | *Accipiter gentilis* | 1 record |
| Sparrowhawk | *Accipiter nisus* | 7 records |
| Common sandpiper | *Actitis hypoleucos* | 11 records |
| Mandarin duck | *Aix galericulata* | 5 records |
| Skylark | *Alauda arvensis* | 8 records |
| Kingfisher | *Alcedo atthis* | 32 records |
| Pintail | *Anas acuta* | 1 record |
| Shoveler | *Anas clypeata* | 6 records |
| Teal | *Anas crecca* | 60 records |
| Wigeon | *Anas penelope* | 50 records |
| Mallard | *Anas platyrhynchos* | 86 records |
| Garganey | *Anas querquedula* | 2 records |
| Gadwall | *Anas strepera* | 23 records |
| Slow worm | *Anguis fragilis* | 7 records |
| White-fronted goose | *Anser albifrons* | 3 records |
| Greylag goose | *Anser anser* | 69 records |
| Pink-footed goose | *Anser brachyrhynchus* | 9 records |
| Snow goose | *Anser caerulescens* | 4 records |
| Tundra Bean goose | *Anser fabalis* subsp. *rossicus* | 1 record |
| Meadow pipit | *Anthus pratensis* | 2 records |
| Water pipit | *Anthus spinoletta* | 1 records |
| Swift | *Apus apus* | 14 records |
| Great white egret | *Ardea alba* | 7 records |
| Grey heron | *Ardea cinerea* | 1 record |
| Water vole | *Arvicola amphibius* | 20 records |
| Long-eared owl | *Asio otus* | 1 record |
| Little owl | *Athene noctua* | 42 records |
| White-clawed crayfish | *Austropotamobius pallipes* | 1 record from the River Tud in 2000 |
| Pochard | *Aythya ferina* | 9 records |
| Tufted duck | *Aythya fuligula* | 58 records |
| Barbastelle | *Barbastella barbastellus* | 15 records |
| Waxwing | *Bombycilla garrulus* | 7 records |
| Bittern | *Botaurus stellaris* | 1 record |

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|---|---|---|
| Canada goose | *Branta canadensis* | 32 records |
| Barnacle goose | *Branta leucopsis* | 12 records |
| Goldeneye | *Bucephala clangula* | 9 records |
| Common toad | *Bufo bufo* | 5 records |
| Buzzard | *Buteo buteo* | 68 records |
| Nightjar | *Caprimulgus europaeus* | 1 record |
| Goldfinch | *Carduelis carduelis* | 4 records |
| Treecreeper | *Certhia familiaris* | 2 records |
| Cetti's warbler | *Cettia cetti* | 3 records |
| Little ringed plover | *Charadrius dubius* | 28 records |
| Bats | *Chiroptera* | 2 records |
| Black tern | *Chlidonias niger* | 2 records |
| Greenfinch | *Chloris chloris* | 2 records |
| Black-headed gull | *Chroicocephalus ridibundus* | 11 records |
| White stork | *Ciconia ciconia* | 1 record |
| Marsh harrier | *Circus aeruginosus* | 1 records |
| Hawfinch | *Coccothraustes coccothraustes* | 1 records |
| Stock dove | *Columba oenas* | 2 records |
| Quail | *Coturnix coturnix* | 2 records |
| Cuckoo | *Cuculus canorus* | 9 records |
| Blue tit | *Cyanistes caeruleus* | 3 records |
| Bewick's swan | *Cygnus columbianus* | 10 records |
| Whooper wwan | *Cygnus cygnus* | 1 record |
| Mute swan | *Cygnus olor* | 20 records |
| House martin | *Delichon urbicum* | 4 records |
| Great spotted woodpecker | *Dendrocopos major* | 2 records |
| Lesser spotted woodpecker | *Dendrocopos minor* | 5 records |
| Little egret | *Egretta garzetta* | 73 records |
| Yellowhammer | *Emberiza citrinella* | 8 records |
| Reed bunting | *Emberiza schoeniclus* | 3 records |
| Serotine | *Eptesicus serotinus* | 4 records |
| Hedgehog | *Erinaceus europaeus* | 58 records |
| Robin | *Erithacus rubecula* | 2 records |
| Peregrine | *Falco peregrinus* | 9 records |
| Hobby | *Falco subbuteo* | 23 records |
| Kestrel | *Falco tinnunculus* | 4 records |
| Pied flycatcher | *Ficedula hypoleuca* | 1 record |
| Brambling | *Fringilla montifringilla* | 7 records |

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|---|---|---|
| Coot | *Fulica atra* | 50 records |
| Snipe | *Gallinago gallinago* | 16 records |
| Moorhen | *Gallinula chloropus* | 26 records |
| Crane | *Grus grus* | 1 records |
| Oystercatcher | *Haematopus ostralegus* | 26 records |
| Swallow | *Hirundo rustica* | 9 records |
| Little gull | *Hydrocoloeus minutus* | 2 records |
| Herring gull | *Larus argentatus* | 2 records |
| Common gull | *Larus canus* | 5 records |
| Lesser black-backed gull | *Larus fuscus* | 9 records |
| Great black-backed gull | *Larus marinus* | 2 records |
| Mediterranean gull | *Larus melanocephalus* | 1 record |
| Yellow-legged gull | *Larus michahellis* | 1 record |
| Brown hare | *Lepus europaeus* | 26 records |
| Linnet | *Linaria cannabina* | 4 records |
| Crossbill | *Loxia curvirostra* | 1 record |
| Nightingale | *Luscinia megarhynchos* | 18 records |
| Otter | *Lutra lutra* | 7 records |
| Jack snipe | *Lymnocryptes minimus* | 11 records |
| Badger | *Meles meles* | 30 records |
| Smew | *Mergellus albellus* | 2 records |
| Goosander | *Mergus merganser* | 2 records |
| Harvest mouse | *Micromys minutus* | 4 records |
| Red kite | *Milvus milvus* | 67 records |
| Pied wagtail | *Motacilla alba* | 3 records |
| Grey wagtail | *Motacilla cinerea* | 29 records |
| Spotted flycatcher | *Muscicapa striata* | 15 records |
| Unidentified bat | *Myotis* | 11 records |
| Daubenton's bat | *Myotis daubentonii* | 18 records |
| Whiskered bat | *Myotis mystacinus* | 1 record |
| Natterer's bat | *Myotis nattereri* | 21 records |
| Grass snake | *Natrix helvetica* | 4 records |
| Curlew | *Numenius arquata* | 2 records |
| Lesser noctule | *Nyctalus leisleri* | 1 record |
| Noctule bat | *Nyctalus noctula* | 31 records |
| Wheatear | *Oenanthe oenanthe* | 4 records |
| Osprey | *Pandion haliaetus* | 1 record |
| Great tit | *Parus major* | 1 record |
| House sparrow | *Passer domesticus* | 4 records |

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|---|---|---|
| Tree sparrow | *Passer montanus* | 3 records |
| Grey partridge | *Perdix perdix* | 3 records |
| Coal tit | *Periparus ater* | 1 record |
| Cormorant | *Phalacrocorax carbo* | 33 records |
| Black redstart | *Phoenicurus ochruros* | 1 record |
| Redstart | *Phoenicurus phoenicurus* | 1 record |
| Willow warbler | *Phylloscopus trochilus* | 7 records |
| Green woodpecker | *Picus viridis* | 16 records |
| Pipistrelle bat species | *Pipistrellus* | 45 records |
| Nathusius's pipistrelle | *Pipistrellus nathusii* | 1 record |
| Pipistrelle | *Pipistrellus pipistrellus sensu lato* | 62 records |
| Common pipistrelle | *Pipistrellus pipistrellus sensu stricto* | 67 records |
| Soprano pipistrelle | *Pipistrellus pygmaeus* | 96 records |
| Brown long-eared bat | *Plecotus auritus* | 24 records |
| Glossy ibis | *Plegadis falcinellus* | 1 record |
| Golden plover | *Pluvialis apricaria* | 17 records |
| Great crested grebe | *Podiceps cristatus* | 4 records |
| Red-necked grebe | *Podiceps grisegena* | 1 record |
| Marsh tit | *Poecile palustris* | 17 records |
| Dunnock | *Prunella modularis* | 1 record |
| Bullfinch | *Pyrrhula pyrrhula* | 24 records |
| Water rail | *Rallus aquaticus* | 2 records |
| Firecrest | *Regulus ignicapilla* | 1 record |
| Goldcrest | *Regulus regulus* | 1 record |
| Stonechat | *Saxicola rubicola* | 1 record |
| Woodcock | *Scolopax rusticola* | 11 records |
| Nuthatch | *Sitta europaea* | 13 records |
| Siskin | *Spinus spinus* | 2 records |
| Common tern | *Sterna hirundo* | 21 records |
| Arctic tern | *Sterna paradisaea* | 3 records |
| Sandwich tern | *Sterna sandvicensis* | 1 record |
| Turtle dove | *Streptopelia turtur* | 9 records |
| Tawny owl | *Strix aluco* | 12 records |
| Starling | *Sturnus vulgaris* | 2 records |
| Little grebe | *Tachybaptus ruficollis* | 1 record |
| Shelduck | *Tadorna tadorna* | 1 record |
| Green sandpiper | *Tringa ochropus* | 12 records |
| Redshank | *Tringa totanus* | 3 records |

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|---|---|---|
| Wren | *Troglodytes troglodytes* | 2 records |
| Redwing | *Turdus iliacus* | 11 records |
| Song thrush | *Turdus philomelos* | 2 records |
| Fieldfare | *Turdus pilaris* | 11 records |
| Mistle thrush | *Turdus viscivorus* | 3 records |
| Barn owl | *Tyto alba* | 51 records |
| Lapwing | *Vanellus vanellus* | 41 records |
| Common lizard | *Zootoca vivipara* | 9 records |