Hopkins Ecology

Site:	**Land off High Road, Roydon, South Norfolk**
Work Item:	**Strategic Ecological Assessment**
Client:	**GN Rackham & Sons Ltd**

Author: Dr GW Hopkins CEnv MCIEEM
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Hopkins Ecology Ltd, St George's Works, 51 Colegate, Norwich NR3 1DD
T. 01603 435598 **M:** 07481 477103 **E:** graham@hopkinsecology.co.uk **W:** www.hopkinsecology.co.uk

Contents

Summary

Hopkins Ecology Ltd was appointed by Bidwells on behalf GN Rackham & Sons Ltd to prepare a strategic ecological assessment of Land of High Road, Roydon, with a view to identifying constraints and opportunities in the context of its promotion for development.

The Site is on the southern fringe of Roydon and comprises an arable field with partial boundary hedgerows and a small block of woodland and scrub, ~3.3ha in area. An additional area is also considered within an adjacent arable, as a possible access route.

The arable field comprises the majority of the Site, under winter cereals and with narrow and weed-free margins. The grass margins alongside the boundaries are similar throughout, comprising a permanent grass sward of mainly false oat grass with other widespread grasses and widespread tall ruderal and low growing herbs typical of rank grassland.

A single hedgerow is present, along the east boundary of the main field, and this is species-poor but qualifies as a Habitat of Principal Importance. Along the south boundary is sparse scrub. The access route is likely to breach the hedgerow, and a roadside verge and narrow verge on High Road with young planted lime trees.

At the western end of the Site is a small parcel of woodland, mainly young sycamores and willow but also with mature oak trees of small stature. This woodland includes a portion derived from a hedgerow but the remainder is largely post-1980s in origin, having developed over former sand workings. It is considered to qualify as a Habitat of Principal Importance but is a poor example of the habitat.

Off-Site, adjacent to the south boundary is a narrow belt of woodland, principally sycamore with limited ground flora and shrub layer. Based on historic maps and aerial photographs it is believed to be post-1880 in origin. It is considered to qualify as a Habitat of Principal Importance but is a poor example of the habitat.

Most species of conservation concern are scoped-out, but widespread declining species including Species of Principal Importance maybe present as components of larger local populations. Such species include birds such as dunnock, hedgehogs, foraging bats and widespread moths, and they would be present as components of larger local populations.

Two trees are rated as having low but not negligible potential suitability for roosting bats. One may require removal, as it is dead and possibly hazardous. Surveys for roosting bats are recommended if this is to be removed, and mitigation for any impacts on roosts is realistic. No other surveys are considered necessary to inform the assessment.

The loss of semi-habitat resulting from any scheme will likely be low, and mitigation via soft landscaping is appropriate. At a strategic level such landscape would offer new habitat area potentially relevant to local landscape-scale conservation projects: a sub-regional green infrastructure corridor; the Claylands Living Landscape and the Waveney B-Line (‘bee-line’) for pollinating insects.

Impacts on Roydon Fen LNR and CWS are thought likely to be negligible: the potential increase in the numbers of users will be mitigated by virtue of an existing circular walking route; the promotion of local walking routes results in the general area being already popular with walkers; and the Fen has existing infrastructure to manage visitors and impacts.

In conclusion, it is considered likely that the impacts on the majority of species can be mitigated, and appropriate landscaping and scheme design with have the potential to deliver net ecological enhancement.

1. Introduction

BACKGROUND

1.1 Hopkins Ecology Ltd was appointed by Bidwells on behalf of GN Rackham and Sons Ltd to prepare a strategic ecological assessment of the Land off High Road, Roydon with a view to identifying constraints and opportunities in the context of its promotion for residential development.

SITE CONTEXT AND STATUS

1.1 The Site is on the southern fringe of Roydon and comprises an arable field with partial boundary hedgerows and a small block of woodland and scrub, totaling ~3.3ha in area. An additional area is also considered within an adjacent arable, as a possible access route.

1.2 The Site is in an elevated position above the Waveney Valley and it is within the *South Norfolk and High Suffolk Claylands Natural Character Area*[1], which is characterised as an agricultural landscape *"incised by numerous small-scale wooded river valleys with complex slopes"*.

LEGISLATION AND PLANNING POLICY

1.3 The following key pieces of nature conservation legislation are relevant to legally protected species (with a more detailed description in Appendix 5):

- The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations); and
- The Wildlife and Countryside Act, 1981 (as amended).

1.4 Also, the National Planning Policy Framework (DfCLG, 2012[2]) requires local authorities to avoid and minimise impacts on biodiversity and, where possible, to provide net gains in biodiversity when making planning decisions. A substantial number of species are of conservation concern in the UK. A small number of these species are fully protected under the legislation listed above, but others in England are recognised as Species of Principal Importance under the Natural Environment and Rural Communities Act 2006 and reinforced by the National Planning Policy Framework. For these species local planning authorities are required to promote the "*protection and recovery"* via planning and development control. Examples include the widespread reptiles, skylarks and soprano pipistrelle and, brown long-eared bats.

1.5 Although the NPPF has an overarching aim of minimise impacts to biodiversity, the majority of species of conservation concern are not specifically recognised by legislation or planning policy. The level of protection afforded to these is undefined and should be considered within the overall aim of minimising impacts on biodiversity.

[1] Natural England (2014) *NCA Profile 83: South Norfolk and High Suffolk Claylands.* Available from: http://publications.naturalengland.org.uk/publication/6106120561098752

[2] DCLG (2010) *A National Planning Policy Framework for England*. Department for Communities and Local Government, London.

2. Methods

DESK STUDY

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

Table 1. Overview of desk study data sources.

Source	Information
Norfolk Biodiversity Information Service (with cross-border search into Suffolk)	Designated sites, species of conservation concern; 5km search radius
MAGIC (www.magic.gov.uk)	Additional information on statutory sites, habitats of principal importance and wider countryside information
Great Norwich Area and South Norfolk DC planning policy documents	Information regarding local planning policies, in particular green infrastructure and site impacts
Local planning applications, manual map-based searching of the South Norfolk DC website	Recent survey data for protected species locally, including negative data
Various literature and web-based searches	Information on local projects and initiatives of potential relevance as well as some species-level data
Historic maps Norfolk (http://www.historic-maps.norfolk.gov.uk/)	Aerial photographs from 1988 and 1946; OS maps from 1880s and earlier

FIELD SURVEY

2.2 A Site walkover was undertaken 20 February 2018, when habitats were described according to the methods of JNCC (2010)[3] and hedgerows (following DEFRA, 2007[4]), albeit with herbs and possibly some woody species probably overlooked due to the time of year; the assessment of trees against the Hedgerow Regulations was therefore not undertaken. Trees were surveyed from ground level for their potential suitability for roosting bats, looking for gaps, cracks and other potential roost features (Collins, 2016[5]); searches were also made for signs of badgers.

2.3 The suitability of any ponds would be assessed using the Habitat Suitability Index (ARG, 2010)[6].

GUIDANCE

2.4 The ecological assessment has been prepared with reference to best practice guidance published by the Chartered Institute for Ecology and Environmental Management (CIEEM) and as detailed in British Standard 42020:2013 Biodiversity - Code of Practice for Biodiversity and Development.

CONSTRAINTS

2.5 It should be noted that whilst every effort has been made to provide a comprehensive description of the Site, the time of year limited the botanical survey with many species undoubtedly overlooked. The broad characterisation and assessment of the Site is, however, considered robust.

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

[4] DEFRA (2007) *Hedgerow Survey Manual.* DEFRA, London.

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

[6] ARG (2010) *Great Crested Newt Habitat Suitability Index. May 2010 Advice Note 5.* Available from: http://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file

3. Designated Sites

OVERVIEW

3.1 The 2km radius around the Site includes part of Suffolk and two maps are presented to show designated sites within this radius (Figures 1a and b).

STATUTORY (INTERNATIONAL AND NATIONAL) SITES

3.2 There are is one statutory sites within 2km:

- Wortham Ling Site of Special Scientific Interest (SSSI). This is principally designated for its lowland dry heath and acid grassland communities. It is located on the opposite side of the River Waveney (south bank) and is accessible from the Site only via a road route of ~1.5km.

3.3 The nearest international site is upstream in the catchment, ~3.9km distant (Euclidean):

- Redgrave and Lopham Fen, which has the following designations:
  - Redgrave and South Lopham Fens Ramsar site;
  - Waveney and Little Ouse Valley Fens Special Area of Conservation (SAC); and
  - Redgrave and Lopham Fen SSSI.

Figure 1a. *Norfolk:* Data search results for designated sites within a 2km radius.

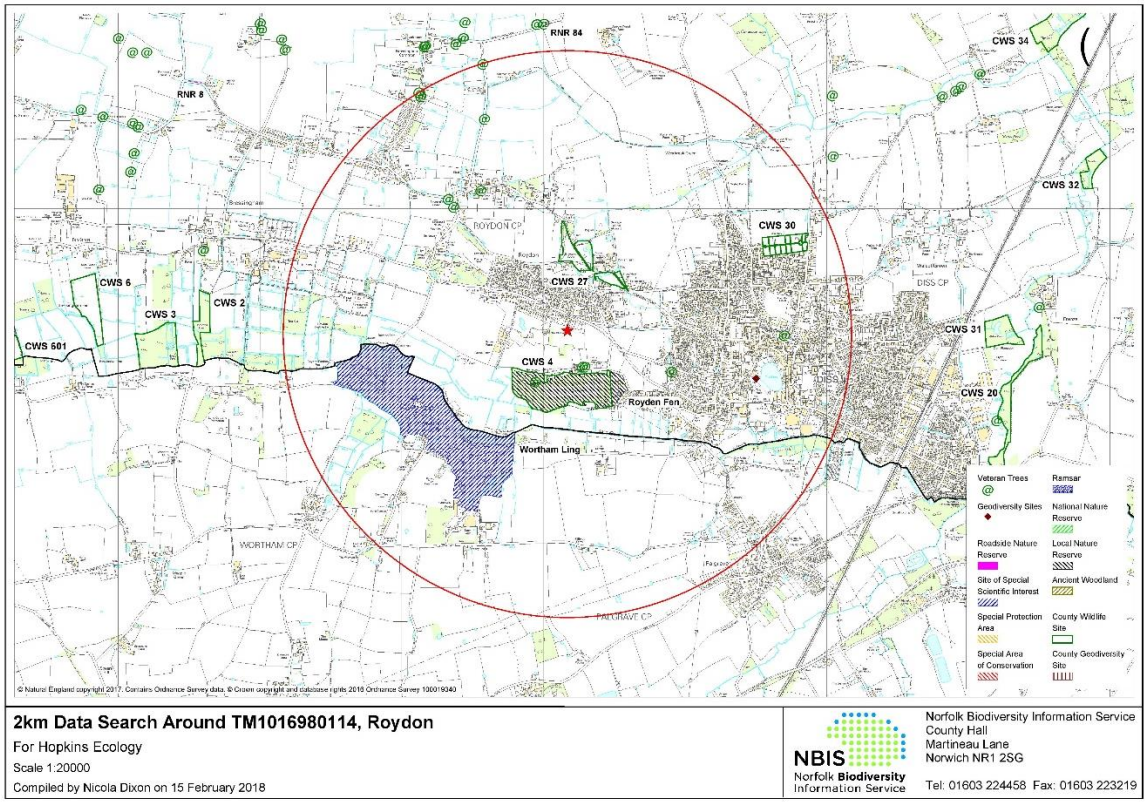
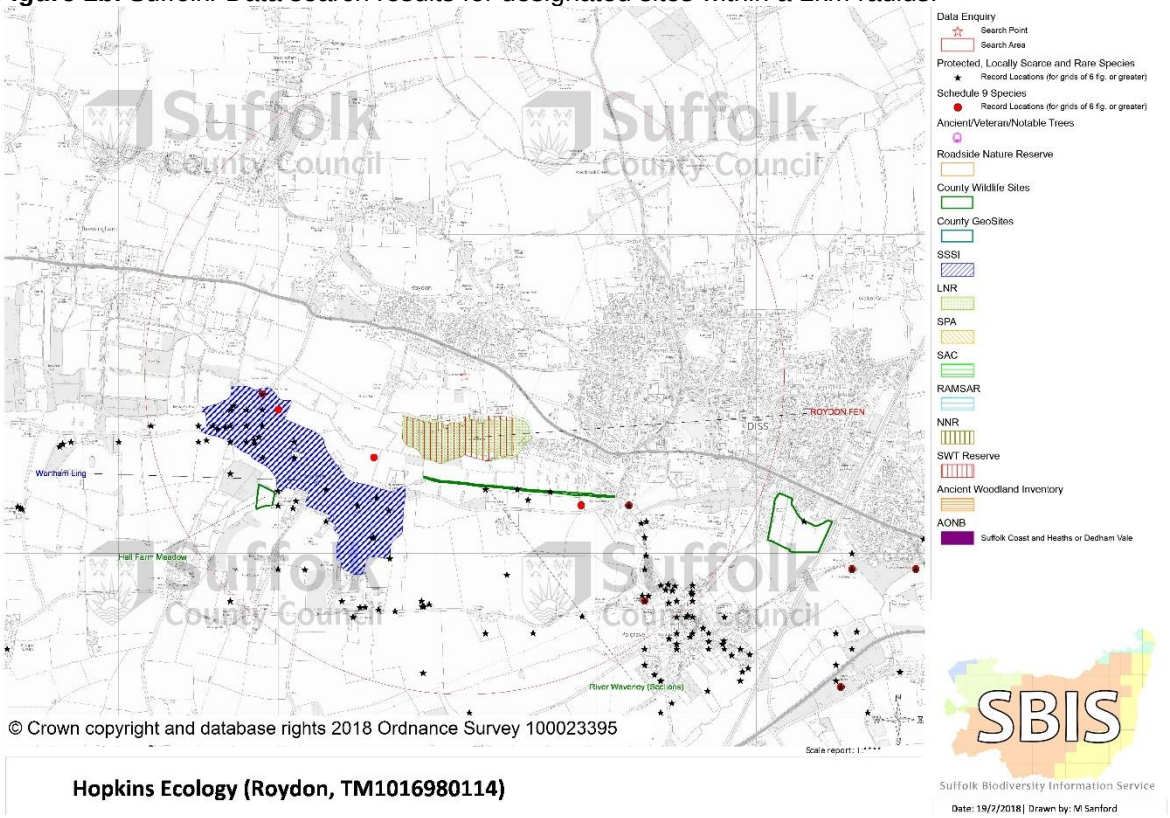


Figure 1b. *Suffolk:* Data search results for designated sites within a 2km radius.



NON-STATUTORY SITES

3.4 Included as a non-statutory site is Roydon Fen Local Nature Reserve (LNR), although the designation is statutory in the sense that it is via national legislation[7]. The protection of such sites is typically via local planning policies.

3.5 A total of five County Wildlife Sites (CWSs) are within 2km, of which two are in Suffolk (Table 2). Roydon Fen LNR is also designated as a CWS.

Table 2. CWSs within 1km.

Proximity		Name (CWS reference)	Description
Location	Distance		
River Waveney valley bottom	0.15km south	Roydon Fen (4)	Roydon Fen is a mosaic of woodland, scrub and fen habitats managed by Suffolk Wildlife Trust. There is a boardwalk open for the public. Fen areas are largely restricted to the centre of the site, the majority dominated by great fen-sedge *Cladium mariscus*
	0.57km south	River Waveney, sections (mid-Suffolk 88)	River with species-rich aquatic flora, also breeding kingfishers
	1.3km south-west	Hall Farm Meadow (mid-Suffolk 138)	Wet meadow
Wider countryside	0.37km north	Brewer's Green (27)	A common, comprising semi-improved neutral grassland
	1.3km north-east	Diss Cemetery (30)	Neutral to basic species-rich grassland, part of which is a wildflower conservation area

[7] The legal instrument being the National Parks and Access to the Countryside Act 1949

4. Strategic Policies and Projects

GREEN INFRASTRUCTURE

4.1 A green infrastructure network has been proposed for the Greater Norwich Area, with the policy requirements originating in the Joint Core Strategy[8]. The spatial vision for these corridors is informed by a Green Infrastructure Strategy (CBA, 2007[9], updated 2011[10]) and associated studies (e.g. Green Networks: Norfolk Wildlife Trust, 2007[11]). The key feature relevant to this Site is:

- A sub-regional green infrastructure corridor running along the Waveney Valley termed the Lowestoft – Beccles – Bungay – Harleston – Diss – Thetford corridor.

COUNTRYSIDE PROJECTS

4.2 Two countryside partnership schemes are of particular relevance:

- Living Landscapes and
- B-Lines

Living Landscapes

4.3 The Norfolk and Suffolk Wildlife Trusts operate a 'Living Landscapes' scheme to promote nature conservation, and habitat management and improvement in high-value landscapes:

- Claylands Living Landscape[12]. The entire South Norfolk DC area is designated as a Living landscape within the South Norfolk area:
    - *"The Claylands Living Landscape project aims to enhance the management of the area's wildlife habitats and expand its area of grassland and woodland – thereby creating a more joined-up ecological network – as well as to encourage the more sensitive management of farmland. To achieve this aim, (Norfolk Wildlife Trust) will be working closely with community groups and landowners in South Norfolk to raise wildlife awareness, as well as encouraging their active participation in conserving and enjoying the area's historic natural environment."*
    - The Valley Fens Living Landscape[13], where the aim is to enhance spring-fed wetlands with particular emphasis on landscape management to *"…. to enlarge and buffer sites …"*

[8] Greater Norwich Development Partnership (2014) *Joint Core Strategy for Broadland, Norwich and South Norfolk.* Available from: http://www.greaternorwichgrowth.org.uk/planning/joint-core-strategy/

[9] CBA (2007) *Greater Norwich Development Partnership. Green Infrastructure Strategy. A Proposed Vision for Connecting People, Places and Nature*. Available from: http://www.greaternorwichgrowth.org.uk/dmsdocument/201

[10] http://www.greaternorwichgrowth.org.uk/dmsdocument/1590

[11] Norfolk Wildlife Trust (2006) *Report of the Ecological Network Mapping Project for Norfolk.* Available from: http://www.norfolkbiodiversity.org/pdf/news/Final_report_of_indicative_map_July%202006.pdf

[12] https://www.norfolkwildlifetrust.org.uk/a-living-landscape/claylands

[13] http://www.suffolkwildlifetrust.org/about-us/what-we-do/living-landscapes/valley-fens

B-Lines

4.4 Buglife – The Invertebrate Conservation Trust runs a countryside project for pollinating insects which they term 'bee-lines' or B-Lines[14]. This landscape scheme fits within the National Pollinator Strategy (DEFRA 2015[15]) and is described as follows:

> *"The B-Lines are a series of 'insect pathways' running through our countryside and towns, along which we are restoring and creating a series of wildflower-rich habitat stepping stones. They link existing wildlife areas together, creating a network, like a railway, that will weave across the British landscape. This will provide large areas of brand new habitat benefiting bees and butterflies– but also a host of other wildlife"*

4.5 The Waveney B-Line runs along the Waveney Valley, connecting to The Brecks in the west and ultimately the coast to the east, with corridors running off the Waveney Valley including one that runs northwards towards Norwich parallel to the A140.

[14] https://www.buglife.org.uk/b-lines-hub/east-of-england

[15] DEFRA (2015) *National Pollinator Strategy: Implementation Plan*. Available from; https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/474386/nps-implementation-plan.pdf

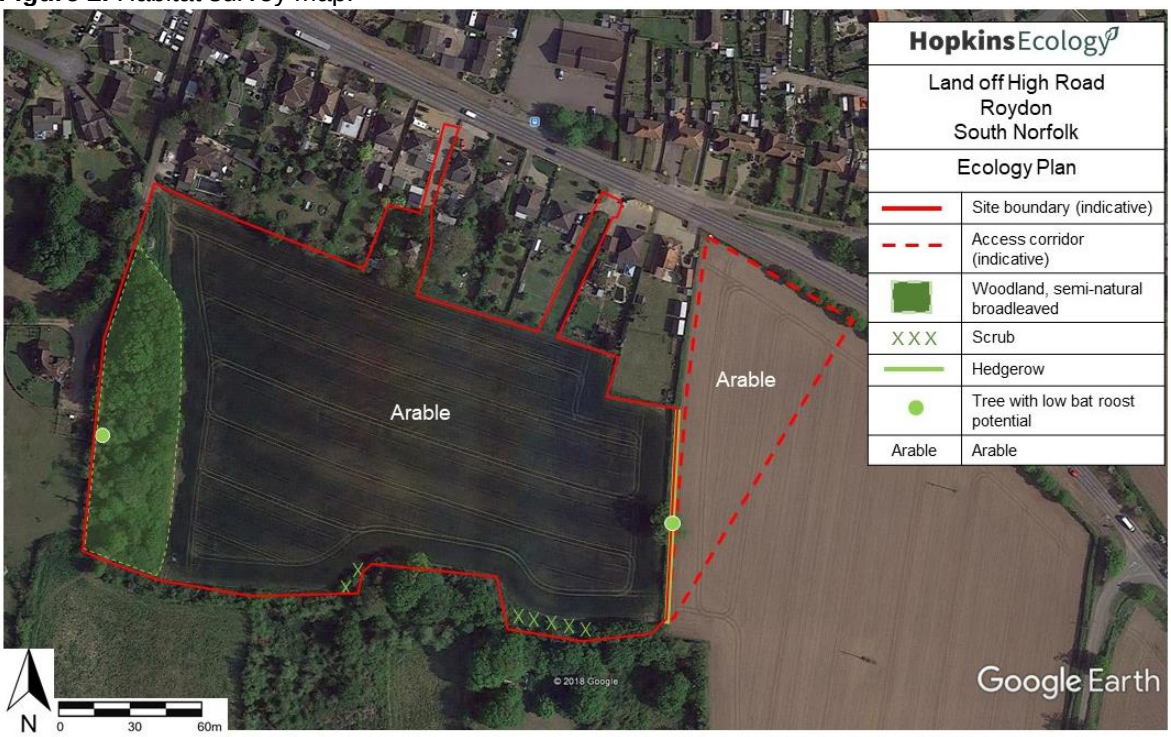
5. Habitats and Botany

OVERVIEW

5.1 The Site comprises a main field with a small block of woodland and some scrub and boundary hedgerows (Figure 2). The soil is classed as a 'freely draining slightly acid sandy soil'. Historically, land to the west was excavated for sand and also along a strip within the Site; it also appears that similar excavations were made adjacent to the south boundary. In summary:

- The 1946 aerial photographs show extensive sand workings to the west of the Site and light tree cover along the south boundary;
- The 1880s OS maps shows limited workings to the west but a steep slope is marked adjacent to the south boundary and woodland is not shown; and
- The Tithe Map does not show woodland nor evidence of workings.

Figure 2. Habitat survey map.



ARABLE FIELD

5.2 The arable fields comprise the majority of the Site. At the time of survey, the field was under winter cereal. The arable margins are narrow and weed-free, with the crop extending to nearly the verges of permanent grass sward.

5.3 The arable field containing the proposed access corridor is likewise under winter cereals and has narrow arable margins.

5.4 The grass verges alongside the boundaries are similar throughout, comprising a permanent grass sward of mainly false oat grass *Arrhenatherum elatius* with red fescue *Festuca rubra*, patches of sterile brome *Anisantha sterilis* with common rough grassland herbs: nettle *Urtica dioica*, white dead nettle *Lamium album*, hedge bedstraw *Galium molle* and cleavers *Galium aparine*, ground ivy *Glechoma hederacea* and mallow *Malva sylvestris*. The only herb characteristic of arable margins was field pansy *Viola arvensis*.

GRASS SWARDS

5.5 Other than the grass field verges described above, the only areas of grass swards are alongside High Road:

- Along two corridors leading between houses from the north boundary of the arable field onto High Road. These comprise short swards of mown sward, mainly comprising rye grass *Lolium* species, false oat grass, and meadow grass with some fescue. The herbs comprise common amenity sward species: daisy *Bellis perennis*, yarrow *Achillea millefolium*, chickweed *Stellaria media* and lanceolate plantain *Plantago lanceolata*.
- Along the verge of High Road adjacent to the possible access corridor. The sward is a mixture of fescue, false oat grass, Yorkshire fog *Holcus lanatus* and rye grass. with common grassland herbs such as yarrow, daisy, dandelion Taraxacum officinale agg, white clover *Trifolium repens*, chickweed, creeping buttercup *Ranunculus repens*, cow parsley *Anthriscus sylvestris*, groundsel Senecio vulgaris, lanceolate plantain, speedwell *Veronica* species, and dove's foot cranesbill *Geranium molle*.

HEDGEROWS

5.6 The only hedgerow runs along the east boundary of the main Site. It is shown on the 1946 aerial photography but in parts there may have been infilling, with some of the woody vegetation appearing to be in staggered, double rows. The main species is hawthorn *Crataegus monogyna* but there is also a length of where elm *Ulmus* species is most frequent. Other woody species include bramble *Rubus fructicosus* agg, elder *Sambucus nigra* and ivy *Hedera helix*. There is a single standard oak *Quercus robur*, ~1m diameter with a sparse ivy covering on the trunk and small dead aerial limbs.

5.7 The north boundary is to garden curtilages and is marked variously by fence panels, wire fences and hedging.

SCRUB

5.8 Along the south boundary there is no hedgerow, rather for most of the boundary there is sparse scrub, 'beyond' which there is sharp drop in the terrain into what appear to be historic sand workings. This drop is not evident on the Tithe Map but is shown by the 1880 OS map, and it certainly appears to be related to sand excavation. Along the boundary therefore is sparse scrub of hawthorn, bramble, hazel *Corylus avellana,* oak, elm suckers including dead stems, and patches of blackthorn *Prunus spinosa*.

PLANTED TREES

5.9 The boundary of the east field for the access corridor includes a row of relatively young (~20 years) lime trees *Tilia* species, planted at roughly 10m intervals. These are absent from the most westerly 30m. The trees are on a low bank with a ground flora of common ruderal herbs and a grass sward similar to the field margins, albeit with celandine *Ranunculus ficaria* as a more typical hedgerow species.

SEMI-NATURAL BROADLEAVED WOODLAND

5.10 At the western end of the Site is a small parcel of woodland. The very western fringe may be derived from a hedgerow (as shown on the 1880s OS maps and 1946 aerial photograph) but the remainder appears to post-date the 1988 aerial photograph. The western boundary is marked by a wire fence and a public footpath runs between this and the woodland parcel.

5.11 Within the woodland are shallow excavations and mounds originating from past sand workings. The main features are:

- The woodland is mainly young sycamores *Acer pseudoplatanus* and goat willow *Salix caprea* with the occasional ash *Fraxinus excelsior* and oak, these latter two species including some mature specimens but of small stature. Also present in the understorey are occasional hawthorn and bramble, with ivy on a few stems and also as a ground cover.
- The ground flora includes a few woodland or hedgerow herbs including snowdrop *Galathea* species as a likely garden escape and hedge bedstraw, lords and ladies *Arum maculatum*, cow parsley, white dead nettle, ground ivy and patches of nettle. The bryophytes appeared to be the feather moss *Kindbergia* species throughout.
- The dead wood includes a tall snag (standing dead bole / trunk), probably oak and ~0.8m diameter. Other dead wood items include fallen trunks up to ~30cm diameter and young twigs.
- At the southern end the woodland grades into bramble scrub with some elm suckers, elder and young oak saplings.

OFF-SITE WOODLAND

5.12 Adjacent to the south boundary is a narrow belt of woodland. This is marked on MAGIC as a the Habitat of Principal Importance: Lowland Deciduous Woodland. As interpreted it is post-1880s in origin and is shown as a sparse canopy on the 1946 aerial photograph and much denser by 1988 and onwards to the present day. The main species is sycamore, growing as closed canopy specimens, and with a sparse shrub layer of occasional hawthorn bushes and then the ground flora not visible other than for nettles.

6. Scoping for Species of Conservation Concern

PLANTS

6.1 The broader landscape is considered to have a moderate diversity of arable margin species (Walker et al. 2012[16]). The data search returned records for few plants of conservation concern, the majority associated with the acid grassland and heath of Wortham Ling and the others are wetland species.

6.2 The extent and quality of habitat for arable species on the Site is, however, likely to be very low, with cropping close to the grassy field verges and only limited areas of 'field corners' with a reduced intensity of cultivation. The assemblage of arable flora is likely to be small.

BATS

6.3 Records for eight species of bat were returned by the data search: barbastelle, Daubenton's, Natterer's, serotine, noctule, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle, and brown long-eared. The majority of these records were obtained during field surveys for the Norfolk Bat Survey[17]; the only roost records are for two separate brown long-eared roosts, both >1.5km distant.

- Foraging. Much of the Site is an open arable field with foraging habitat restricted to the boundary hedgerows, scrub and woodland. High quality foraging habitat, such as extensive wetlands, wet humus-rich soil, herb-rich grassland or extensive woodland are absent. The overall quality of the Site for foraging bats is therefore low and the numbers of bats regularly foraging are likely to be low and the overall assemblage comprising a small number of species.

- Trees. Two trees within the Site or on its boundaries are rated as having low but not negligible bat roost potential (see Figure 3: Habitat Plan). One is a snag (western tree) with vertical slits in the trunk and the other (eastern tree) is a standard oak with a moderate ivy covering and some dead aerial limbs albeit of relatively narrow diameter.

6.4 In summary, extensive tracts of the Site are of very low suitability for foraging with the boundary hedgerows and woodland being the main potential areas of habitat likely to be used by bats, albeit by low numbers. Two trees (one dead, one living) have low but not negligible potential suitability for roosting.

GREAT CRESTED NEWTS

6.5 The only records of great crested newts are from Wortham Ling SSSI, close to the 2km search radius limit and on the south side of the River Waveney.

6.6 As viewed on OS maps, Google Earth and the site walkover, it is not through that there are any ponds within 250m, which is considered an appropriate search radius given the size of

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

[17] http://www.batsurvey.org/

the Site (following English Nature, 2001[18]). Roydon Fen will support open water, even though no ponds are marked. However:

- The nearest open water at the time of survey was at least 225m distant from the Site (rather than the shorter distance between boundaries);
- Houses and gardens alongside the small Roydon Fen track will offer partial barriers to dispersal of great crested newts (if indeed present on Roydon Fen).

6.7 It is considered that great crested newts can be scoped-out by virtue of the distance between the nearest waterbodies being at least 225m, coupled with the partial barriers to dispersal created by dwellings alongside the Roydon Fen track.

BIRDS

6.8 The data search returned a diverse range of species records, including a number unlikely to be relevant, such as great white egret and species with strong association with wetland areas. Included on the search are species potentially likely to overwinter on arable farmland and utilise open fields, verges, hedgerows, scrub and woodland for nesting:

- Nesting in open fields: skylarks;
- Nesting in scrub and hedgerows: turtle dove, linnet, spotted flycatcher, reed bunting, dunnock, and song thrush;
- Field margins: grey partridge; and
- Woodland: marsh tit.

6.9 During the Site visit no wintering birds of note were recorded. The quality of the Site for wintering small (passerine) farmland species is generally low, lacking seed-rich margins or cereal stubbles. For species of open fields, such as lapwing, the Site is probably overly disturbed from nearby gardens and the footpath.

6.10 For nesting birds:

- The field margins are generally narrow and grassy rather than weed- and herb-rich, thus they are probably of lower value for species that nest or feed in such areas, e.g. grey partridge and yellowhammer.
- The hedgerows and scrub probably not dense enough for some species such as turtle dove, but would likely to be used by widespread but declining species such as dunnock, bullfinch and others.
- The open field habitat is of potential value to skylark, but possibly too small to support a territory based on average territory size in winter cereals of 4.5ha[19].
- The woodland is probably too small and young to support woodland specialists such as marsh tit.

6.11 In summary, for most typical farmland species the Site is probably of lower value based on the lower quality of wintering habitat and the general absence of weed- and herb-rich field

[18] English Nature (2001) *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

[19] Based on territory sizes of 4.5ha in winter cereals and 2.5ha in other arable types, taken from: Poulsen, J.G., Sotherton, N.W., & Aebischer, N.J. (1998) Comparative nesting and feeding ecology of skylarks *Alauda arvensis* on arable farmland in southern England with special reference to set-aside. *Journal of Applied Ecology*,*35*(1), 131-147.

margins. The hedgerows, scrub and woodland are likely to support a small assemblage of widespread, declining species.

REPTILES

6.12 The only reptile records returned from north of the River Waveney are for common lizards from Roydon Fen, within ~300m.

6.13 Arable landscapes typically support few if any reptiles and the verges on the site lack cover and shelter and are small in area. It is considered that reptiles can be scoped-out from being present.

SMALL MAMMALS

6.14 Small mammals are assessed as follows:

- Badgers, no records locally and no evidence on-Site. They are considered absent.
- Brown hares as a single record from almost 2km distant. The Site is probably too small and not within more extensive tracts of arable fields for brown hares to be present. They are scoped-out from being present.
- Hedgehogs are known widely locally. The hedgerows and woodland block offer shelter and foraging habitat and they are probably present in low numbers.

INVERTEBRATES

6.15 Records for a suite of species were returned from Wortham Ling including heathland specialists, and smaller numbers from fen habitats. Also recorded from Wortham Lin is a suite of widespread but declining moths with the status of Species of Principal Importance (Butterfly Conservation, 2007[20]). A number of these are likely to be present widely in the wider landscape, their caterpillars feeding on a range of host plants in a range of habitats.

6.16 The site offers little specialist habitat and resources for invertebrates, largely lacking high quality features typically associated with species of conservation concern in the respective habitats:

- The arable margins are narrow and weed-free, thus not offering seed-rich periodically disturbed conditions;
- The woodland is young and small in area, the ground flora species-poor, and the dead wood comprises small amounts of commoner types, rather than rot holes, larger timbers or heartwood decay; and
- The hedgerows and scrub are small in area, lacking dead wood and without association with transition habitats such as grassland-scrub matrix or flower-rich areas.

6.17 The Site is likely to be of low value for invertebrates, and at most it may support a small assemblage of generalist moths that includes a number of Species of Principal Importance that have undergone national declines while remaining widespread.

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

7. Evaluation

HABITATS OF PRINCIPAL IMPORTANCE

7.1 Two on-Site habitats are considered to qualify as Habitats of Principal Importance (Maddock, 2011[21]):

- Hedgerows. The only hedgerow is along the east boundary of the main arable field and qualifies due to its woody composition being >80% native species. It is thought unlikely to qualify as an Important Hedgerow under the Hedgerow Regulations.
- Lowland Mixed Deciduous Woodland. The block of woodland qualifies as a Habitat of Principal Importance, but it is also appreciated that it is a relatively low quality example, being young (largely post-1980s) and without higher quality features such as over-mature trees or well developed ground flora.

7.2 The off-Site woodland to the south also qualifies as the Lowland Mixed Deciduous Woodland Habitat of Principal Importance, while recognising that it is relatively young (no older than the 1880s, developed over former sand workings). It is mainly tall sycamore woodland, with a poorly developed shrub and ground flora.

SCOPING FOR SPECIES OF CONSERVATION CONCERN

7.3 The Site appears to be 'typical' of farmland habitat, with a limited length of boundary hedgerows and other habitats. The assemblages of species of conservation concern are likely to be relatively species-poor and with low numbers. Notwithstanding any legal protection to individual species, it is likely that the Site is of relatively low ecological value and with the species present likely to be present in low numbers and as part(s) of larger local population(s). The protected species scoping is summarised below (Table 8).

Table 8. Summary of ecology assessment.

Feature	Description	Assessment
Bats	Two trees with low bat roost potential Habitat for foraging limited to boundary hedgerow, scrub and woodland block	Likely of low importance for foraging, with roosts in two trees not discounted. One of the trees will likely be retained but the other is dead and may be removed for safety
Great crested newts	None to the north of the River Waveney within 2km Nearest water >225m distant on Roydon Fen and with low connectivity due to dwellings	Scoped-out and considered absent
Birds	Hedgerows and verges relatively sparse and not suitable for some species Arable verge habitat of low quality, lacking weed- and herb-rich margins	Nesting likely in hedgerows and verges, scrub dawn woodland and also open fields. Assemblage likely to be restricted to common and also widespread, declining species. The assemblage is likely to be small and with low densities
Reptiles	Common lizard recorded from Roydon Fen On-Site habitat restricted to verges and of low area and extent	Scoped-out and considered absent

[21] Maddock, A. (2011) *UK BAP Priority Habitat Descriptions*. Available from: http://jncc.defra.gov.uk/PDF/UKBAP_PriorityHabitatDesc-Rev2010.pdf

Feature	Description	Assessment
Badgers	No records from within 2km No evidence on-Site	Considered absent
Brown hare	Single record from within 2km On-Site habitat suitable but small in area and isolated from larger tracts of arable farmland open fields	Scoped-out and considered absent
Hedgehogs	Known to be present locally and hedgerows and woodland offer shelter and foraging habitat	Potentially present
Invertebrates	Records of widespread but declining moths, as well as specialists of fen and heath Specialist microhabitats generally absent	Only widespread species likely to be present but including declining moths. Assemblage small and in low numbers

RECOMMENDATIONS FOR ADDITIONAL SURVEYS

7.4 The baseline description here is considered to provide a robust baseline for the Site. However, the presence of roosts in the two trees cannot be discounted and it is likely that although one will be retained the other may be removed for safety, and as such activity surveys for roosts are recommended on this tree.

8. Impacts, Mitigation and Enhancements

IMPACTS

International Sites

8.1 Redgrave and Lopham Fen has international, European and national designations, as:

- Redgrave and South Lopham Fens Ramsar site;
- Waveney and Little Ouse Valley Fens Special Area of Conservation; and
- Redgrave and Lopham Fen SSSI.

8.2 It is located upstream, ~3.9km distant (Euclidean). It is thought very unlikely that a scheme on this Site would impact its site integrity, by virtue of:

- The downstream location of the Site in the catchment, such that any surface run-off or water borne contaminants would flow away; and
- Recreational impacts are unlikely due to distance, the small size of the scheme and the substantial visitor infrastructure at Redgrave and Lopham Fen, such as boardwalks and its management by Suffolk Wildlife Trust[22]. This was also the conclusion of the *Habitats Regulations Assessment for the Site Specific Allocations and Policies Document* (South Norfolk DC, 2013[23]).

National Sites

8.3 The assessment of impacts on Redgrave and Lopham Fen SSSI is the same as described for the site in terms of its international and European designations.

8.4 Wortham Ling SSSI is designated for heathland vegetation and also a strong population of a widespread but declining butterfly. It is located on the other side of the River Waveney (south bank) and is accessible from the site only via a road route of ~1.5km. Impacts on this site from recreational pressure are thought to be unlikely by virtue of:

- The distance from the Site and the need for road access rather than via a walking route; and
- The small size of the site in relation to the other conurbations within similar travel distances to Wortham Ling SSSI, i.e. Diss.

Roydon Fen and Non-Statutory Sites

8.5 Roydon Fen LNR and CWS is located 0.15km south of the site and potential pathways of impact are:

- Surface water drainage; and
- Recreational impacts from an increased local population.

8.6 Surface water drainage from the Site will likely be managed via a sustainable drainage system and it is likely that an appropriation mitigation train can be included to mitigate run-off impacts

[22] http://www.suffolkwildlifetrust.org/redgrave

[23] South Norfolk DC (2013) *Habitats Regulations Assessment of the Site Specific Allocations and Policies Document, Wymondham Area Action Plan, Long Stratton Area Action Plan and Cringleford Neighbourhood Development Plan, Undertaken for South Norfolk District Council. October 2013.* Available from: https://www.south-norfolk.gov.uk/sites/default/files/Habitat%20Regulations%20Assessment.pdf

following standard guidance (CIRIA, 2015[24]). As such this pathway is not considered likely to impact the site.

8.7 In terms of residents' potential access:

- Roydon Fen LNR and CWS can be accessed from the Site via a public footpath that runs along the western boundary of the Site, joining the Angles Way for a short distance and then with access via a small car park at the north-east corner of the Roydon Fen.

8.8 Further, as shown on Figure 3, Roydon Fen lies alongside promoted walking route and public footpaths:

- The Angles Way is a well-promoted[25] [26] [27] long distance route along the Waveney Valley and runs along the track that would be used for access from the Site;
- Walking routes using the Angles Way and the footpath alongside the site are promoted locally as a Health Walk[28] and for local recreation[29]; and
- Roydon Fen is also promoted informally for recreational walking[30].

8.9 In terms of dog walkers (which are among the group of most frequent users to many areas of greenspace[31]) the Site and vicinity includes features that may reduce pressure on Roydon Fen:

- A circular walking route is available via the public footpaths, a quiet track and then limited lengths on pavements;
- Access to Roydon Fen is only via a boardwalk and walking off the boardwalk within the fen is likely to be hazardous; and
- Dogs are not allowed off their leads within Roydon Fen.

8.10 In terms of potential impacts on Roydon Fen it is thought that recreational impacts in particular will be negligible:

- The increase in numbers of visitors from the scheme will likely be low in absolute terms due to the availability of the existing circular route;
- Any increase will be relatively low due to its location adjacent to the Angles Way and other promoted routes; and also
- Roydon Fen LNR has existing infrastructure to manage visitors and to limit recreational impacts, such as the boardwalk and signage.

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[24] CIRIA C753 (2015) *The SuDS Manual*. Available from:
http://www.ciria.org/Resources/Free_publications/SuDS_manual_C753.aspx

[25] https://www.norfolk.gov.uk/out-and-about-in-norfolk/norfolk-trails/long-distance-trails/angles-way

[26] http://www.discoversuffolk.org.uk/assets/Walks/Long-distance-walks/Angles-Way-Ramblers-guide.pdf

[27] https://www.ldwa.org.uk/ldp/members/show_path.php?path_name=Angles+Way

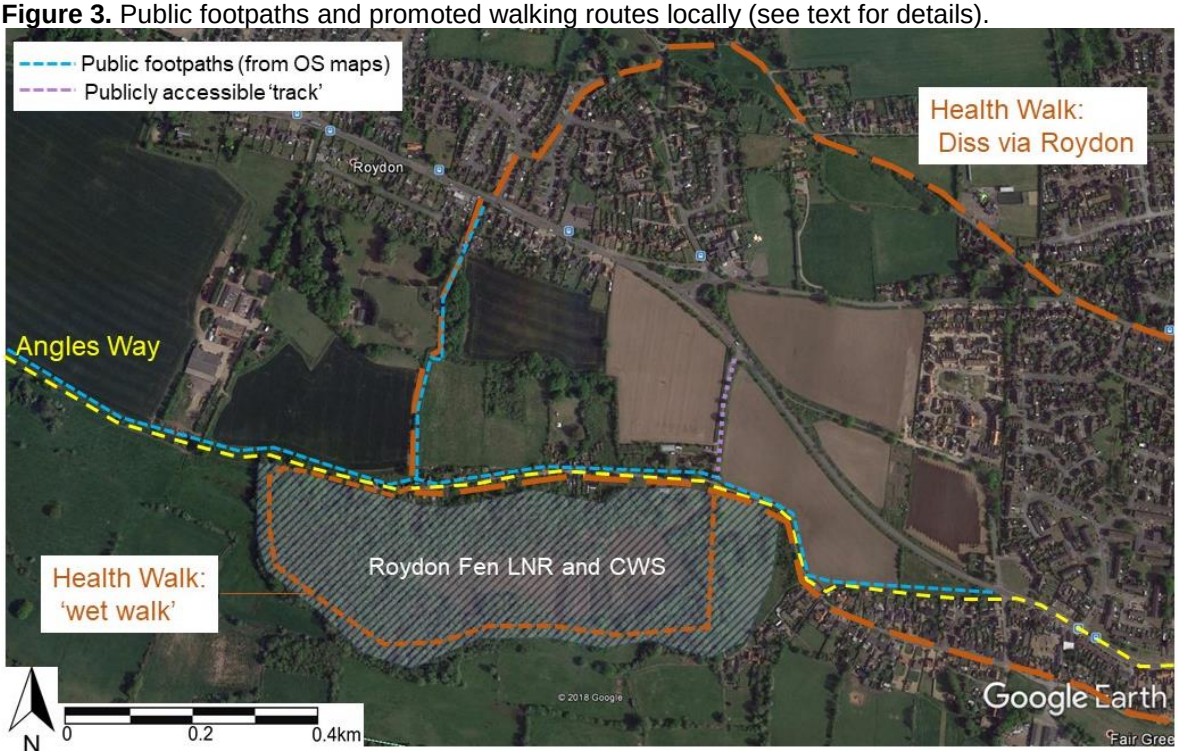
[28] https://www.walkingforhealth.org.uk/content/diss-d17-roydon-fen-summer

[29] http://www.diss.gov.uk/visiting-diss/places-to-eat-2-2-3/

[30] https://www.walkhighlands.co.uk/Forum/viewtopic.php?f=25&t=78403

[31] Hampshire CC (2013) *Planning for Dog Ownership in New Developments: Reducing Conflict – Adding Value*. Available from:
http://documents.hants.gov.uk/ccbs/countryside/planningfordogownership.pdf

Figure 3. Public footpaths and promoted walking routes locally (see text for details).



MITIGATION OF CONSTRUCTION IMPACTS

8.11 Generic guidance to mitigate construction impacts at this stage are:

- General site clearance works should avoid the nesting bird season; and
- The likely requirement to fell the tree with low potential suitability for roosting bats on the western boundary should be informed by direct activity surveys for roosting bats (following Collins, loc. cit., pp48). If present, then the removal of this tree will require European Protected Species Licensing.

ENHANCEMENTS AND OPPORTUNITIES

Strategic Context

8.12 As noted, the Site is within or close to:

- A sub-regional green infrastructure corridor;
- Claylands Living Landscape (Norfolk Wildlife Trust), and
- The Waveney B-Line (Buglife).

8.13 The site is located above the Waveney Valley and is unlikely to be relevant in terms of wetland and fen habitats *per se*. It is not thought to occupy a location that is particularly significant in terms of its wider landscape role linking habitats. As such it is thought that at a strategic level appropriate enhancement should comprises:

- Increasing the strength of woodland planting along the south boundary, thus offering a corridor for movements east-west and linking the on-Site woodland to the woodland adjacent to the south boundary.
- Offering flower-rich habitats and vegetation, contributing to the B-Line aspirations of providing habitat for pollinators.

Generic Soft Landscaping

8.14 Soft landscaping is the most appropriate Site-wide enhancement, using appropriate native species and species of known wildlife value. Key points for many species groups is the need for insect prey, for bats and also for the chicks and fledgling of many birds. Thus, a range of native plant types should be planted to provide a range of resources across the seasons from spring to autumn (insects and their predators), and also fruit and berry producing species in autumn and winter (birds).

8.15 For woody species appropriate for structural planting, those typical of local hedgerows (Norfolk County Council, undated[32]) are:

- Hawthorn, blackthorn, ash, maple, dogwood *Cornus sanguinea*, elm and hazel, with lesser amounts of crab apple *Malus sylvestris*, hornbeam and holly *Ilex aquifolium*, and scattered examples of privet *Ligustrum vulgare*, oak, spindle *Euonymus europaeus*, wild cherry *Prunus avium* and guelder rose *Viburnum opulus*.

8.16 Shrubs suitable for planting within the scheme include most of the species listed for hedgerows. Suitable small trees include silver birch *Betula pendula*, rowan *Sorbus aucuparia*, whitebeams *Sorbus* species, and fastigiate forms of hornbeam *Carpinus betulus*. Within open green space trees that are allowed to develop open growth forms typical of parkland trees would be of particular value in the medium- and long-term, with oak and beech *Fagus sylvatica* of very high value in such contexts.

8.17 Within areas of grassland and SUDS features a number of wildflower seed mixes are available from commercial suppliers, including wetland and pond planting (e.g. Emorsgate EM8 meadow mixture for wetlands), wildflower swards on heavy soils (e.g. EM4 meadow mixture for clay soils and EM10 tussock mixture) and flowering lawns for areas with more intensive use and management (e.g. EL1 flowering lawn mixture).

Additional Measures

8.18 Additional measures could include:

- Bat boxes to be erected on buildings, either as integral ‘bat tubes’ embedded within walls or as external boxes, and also within the on-Site block of woodland. A wide range of types are suitable[33].
- Bird boxes should be erected for locally relevant species, including swifts and house sparrows.
- The scheme should allow for the continued movements of hedgehogs, with garden gates raised to allow them to pass under and holes within gravel boards to allow them to pass through[34].

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[32] Norfolk County Council (undated) *Planting Hedges in Norfolk – Maintaining Regional Character*. Available from: http://www.norfolkbiodiversity.org/pdf/reportsandpublications/HedgeBookletPROOF4.pdf

[33] http://www.wildlifeservices.co.uk/batboxes.html

[34] https://www.jacksons-fencing.co.uk/News/outdoor-living/new-hedgehog-friendly-gravel-boards-winter-news-topical-treats-and-more-6511.aspx

9. Conclusion

9.1 The main part of the Site is considered to be typical of an intensive arable field, with a small block of woodland, boundary scrub and a hedgerow. The species of conservation concern likely or potentially present mostly comprise widespread but declining species, and as components of larger local populations. Further surveys are recommended to establish the status of any bat roosts within an on-Site tree that will likely require removal for safety reasons.

9.2 Other than the tree with low bat roost potential it is not thought mitigation for impacts on protected species will be required, other than timing of clearance works to avoid the nesting bird season.

9.3 The loss of semi-habitat will likely be low and mitigation via soft landscaping is appropriate. At a strategic level, such landscaping would offer new habitat area potentially relevant to three local landscape conservation projects: a sub-regional green infrastructure corridor; the Claylands Living Landscape; and the Waveney B-Line for pollinating insects.

9.4 Impacts on Roydon Fen LNR and CWS are thought likely to be negligible: the potential increase in the numbers of users will be mitigated by virtue of an existing circular walking route; the promotion of local walking routes results in the general area being already popular with walkers; and the Fen has existing infrastructure to manage visitors and impacts.

9.5 In conclusion, it is considered likely that the impacts on the majority of species can be mitigated, and appropriate landscaping and scheme design with have the potential to deliver net ecological enhancement.

10. Appendix 1: Photographs

Figure 4.
View of the main apart of the Site from the north-west.

Figure 5.
The verge along High Road, through which the access may pass.

Figure 6.
West boundary of main field, looking south. The breach for the access corridor would likely be along here.

Figure 7.
View of woodland from north.

Figure 8.
Woodland floor.

Figure 9.
Tree with low bat roost potential on west boundary.

11. Appendix 2: Legislation

Non-technical account of relevant legislation and policies.

Species	Legislation	Offence	Licensing
Bats: European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately capture, injure or kill a bat; deliberate disturbance of bats; or damage or destroy a breeding site or resting place used by a bat. [The protection of bat roosts is considered to apply regardless of whether bats are present.]	A Natural England (NE) licence in respect of development is required.
Bats: National protection	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb a bat in such a place.	Licence from NE is required for surveys (scientific purposes) that would involve disturbance of bats or entering a known or suspected roost site.
Birds	Wildlife and Countryside Act 1981 (as amended) S.1	Intentionally kill, injure or take any wild bird; intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built. Intentionally or recklessly disturb a Schedule 1 species while it is building a nest or is in, on or near a nest containing eggs or young; intentionally or recklessly disturb dependent young of such a species [e.g. kingfisher].	No licences are available to disturb any birds in regard to development.
Great crested newt: European protected species	Conservation of Habitats and Species Regulations 2010 (as amended) Reg 41	Deliberately capture, injure or kill a great crested newt; deliberate disturbance of a great crested newt; deliberately take or destroy its eggs; or damage or destroy a breeding site or resting place used by a great crested newt.	Licences issued for development by Natural England.
Great crested newt: National protection	Wildlife and Countryside Act 1981 (as amended) S.9	Intentionally or recklessly obstruct access to any structure or place used for shelter or protection or disturb it in such a place.	A licence is required from Natural England for surveying and handling.
Adder, common lizard, grass snake slow worm	Wildlife and Countryside Act 1981 S.9(1) and S.9(5)	Intentionally kill or injure any common reptile species.	No licence is required. However, an assessment for the potential of a site to support reptiles should be undertaken.
Scientific Interest (SSSI) It is an offence	Wildlife and Countryside Act 1981 (as amended)	To carry out or permit to be carried out any potentially damaging operation. SSSIs are given protection through policies in the Local Development Plan.	Owners, occupiers, public bodies and statutory undertakers must give notice and obtain the appropriate consent under S.28 before undertaking operations likely to damage a SSSI. All public bodies to further the conservation and enhancement of SSSIs.

Species	Legislation	Offence	Licensing
County Wildlife Sites	There is no statutory designation for local sites.	Local sites are given protection through policies in the Local Development Plan.	Development proposals that would potentially affect a local site would need to provide a detailed justification for the work, an assessment of likely impacts, together with proposals for mitigation and restoration of habitats lost or damaged.