TM

PROVIDING TRUSTED ECOLOGICAL ADVICE

WEST HORNDON, EXTENDED PHASE 1 SURVEY

Project	Prepared By	Approved by	Client	Status	Date
RGA051	A.R. Graves CEcol CEnv FCIEEM	A.R. Graves CEcol CEnv FCIEEM	Countryside Properties (UK) Ltd	DRAFT F/C	JAN 15

Richard Graves Associates Ltd, Company Number: **7931959**
Address: **10B Star Lane, Orpington, Kent, BR5 3LJ**
Tel: **020 32861419** E-mail**: enquiries@richardgravesassociates.com**
www.richardgravesassociates.com

Conditions of Use

This report has been prepared for the exclusive use of Countryside Properties (UK) Ltd and its consultants and contractors by Richard Graves Associates Ltd. The purpose of the report is explicitly stated in the text. It is not to be used for any other purposes unless agreed with Richard Graves Associates. The copyright for the report rests with Richard Graves Associates unless otherwise agreed.

According to the purpose of the report, survey information supplied reflects the findings of the surveyor at the time of the visit. Species and habitats are subject to change over time, some species may not be apparent at certain times (for example subject to seasonal variation) and some species may colonise a site after a survey has been completed. These matters should be considered when using this report. Richard Graves Associates takes no responsibility for ecological features present after the date of the most recent survey. Ecological information over two years old should be updated before use in a decision making process. Ecological desktop information from third parties including local records centres is used in accordance with the appropriate terms and conditions of the suppliers. Ecological information more than five years old should be considered of historic interest only and not be relied on for decision making.

All Richard Graves Associates staff are members of, at the appropriate level of the Chartered Institute of Ecology and Environmental Management (CIEEM) and subscribe to its code of professional conduct in their work. In accordance with the code limitations to the methods, results and conclusions will be accurately stated and any biological records collected as part of the project will be supplied to the appropriate local records centre one year after the date of issue of the report unless otherwise agreed.

Contents

1. Summary 4
2. Introduction 5
3. Methods 6
Extended Phase 1 Survey 6
4. Results and Evaluation 8
Desktop Study 8
Phase 1 Survey 10
Figure 1: Survey Waypoint Locations 11
Protected Species 13
5. Recommendations 16
Sites 16
European Protected Species 16
Other Protected Species and S.41 Species 17
General Provisions 17
6. Conclusion 18
7. References 19
8. Appendices 21
Appendix A - Phase 1 Survey Plan 21
Figure 3 – Phase 1 Survey Plan 21
Appendix C – Desktop Study Results 22

1. Summary

Richard Graves Associates undertook an ecological survey of land to the east of West Horndon, Essex in October 2014.

The survey included:

- Phase 1 Habitat Survey
- Protected Species Walkover
- Water Vole Assessment
- Desktop Study

The site does not include and is not near to any protected or ecologically sensitive habitats and the majority of the site is of low ecological value. A protected species, barn owl was recorded during the survey together with some suitable habitats for bats.

The report concludes that if the recommendations are followed the site can be successfully developed without significant harm to wildlife and that there are opportunities for enhancement.

2. Introduction

Instruction

Richard Graves Associates were instructed by Countryside Properties (UK) Ltd to undertake ecological surveys for land at West Horndon in the district of Brentwood, Essex. It is understood that the development proposals include the construction of approximately 450 new homes and associated infrastructure and landscaping.

Location

The total site area comprises of 148.5 hectares (ha) of primarily agricultural land approximately centred at Ordnance Survey (OS) grid reference: TQ 63172 88506. The site is divided into two sections (north and south) by Station Road and extends to the east with a boundary with Tilbury Road (A128). The southern boundary runs parallel to the mainline Fenchurch Street to Shoeburyness railway line. The western boundary comprises the suburban development of West Horndon and arable land with arable land to the north up to the A127 arterial road.

Assessment

The assessment is an Extended Phase 1 survey which includes an assessment of evidence of and suitable features for protected species and some more detailed protected species survey. Protected Species are those, which are fully or partially protected by legislation. The relevant legislation includes:

- The Conservation of Habitats and Species Regulations 2010 (HMG, 2010)
- The Wildlife and Countryside Act 1981 (as amended) (HMG, 1981)
- The Protection of Badgers Act 1992 (HMG, 1992)

Consideration of species listed in Section 41 of the Natural Environment and Rural Communities Act (HMG, 2006), which are regarded as of principal importance in England is also included, as appropriate.

The site has been addressed without reference to any particular development proposal as a number of options are currently under consideration. However it is assumed that impacts will relate to a scale of development of approximately 450 new homes and associated infrastructure and landscaping.

3. Methods

Extended Phase 1 Survey

The Extended Phase 1 Survey is described in *Guidelines for Baseline Ecological Assessment* (Institute of Environmental Assessment, 1995). This approach is based on: *A Handbook for Phase 1 Habitat Survey* (JNCC, 2010 (Revised)), which includes classification of basic habitats and standard mapping, to which are added a desktop survey and a protected species walkover. The standard for Phase 1 plans, which include the use of target notes, is amended as the 'target notes' are also presented as GPS waypoints on a Google Earth-Pro aerial view. This aids accuracy as the observations are geo-referenced to +/- 5 metres and may be easier to interpret for non-specialists.

Desktop Study

Baseline data for protected sites and protected species is held for most parts of the country, some of this, in particular protected sites, is open source (freely available) and some, in particular species information, may be supplied by local records centres for a charge. Given the location of the site in West Horndon (Essex) the following sources have been used:

- Essex Field Club
- Brentwood Strategic Environmental Assessment (Essex County Council, 2007)
- Brentwood LoWS Review (Knowles, 2012)

A desktop study from the local records centre from Essex Field Club was obtained and is supplied in its entirety as a separate report.

Protected Species Walkover and Phase 1 Survey

The site was visited for the Phase 1 by Richard Graves and Phil Bolton on the 27th October 2014. The proposed application (red line) boundary of the site was surveyed but the survey area extended to the existing field boundaries where they extended beyond the red line. Habitats were identified and are plotted on a map (Figure 3, Appendix A); botanical species were recorded and are noted in the text using nomenclature in accordance with (Stace, 2010) and (Veldhuijzen Van Zanten, 2010). Features within the site suitable for, or indicating evidence of protected species and species of nature conservation significance were recorded using a Global Positioning System (GPS) application (Peto, 2010).

Water Vole Survey / Inspection

A more detailed inspection of the ditch / water course was conducted in accordance with survey methods specified in *The Water Vole Conservation Handbook 3rd Edition* (Strachan, 2011) by two experienced surveyors to record features typical for this species including: suitable holes in banks, typical vegetation cropping patterns (lawns) and the distinctive droppings in conjunction with the phase 1.

Surveyor qualifications and experience

Richard Graves
Richard Graves BSc (Hons) MSc PGDip CEcol CEnv FCIEEM has over twenty years' experience as a practising ecologist and has undertaken, commissioned and reviewed several hundred Extended Phase 1 and protected species surveys all over the UK. Richard is a fellow of the Chartered Institute of Ecology and Environmental Management (CIEEM) a chartered ecologist and a chartered environmentalist. Richard is also class licenced for great crested newt surveys, a class licenced bat surveyor and author of current good practice guidelines for bat surveys.

Phil Bolton
Phil Bolton BSc (Hons) ACIEEM MACMA is an experienced ecological consultant with a thirty year background in conservation management and lecturing. He has survey licences for dormice and bats and additional expertise in bird and aquatic invertebrate surveys.

Limitations
The Phase 1 Survey was undertaken just outside of the appropriate time of year for Phase 1 surveys (March – September). Certain species of flora, which flower earlier in the year, may not have been apparent. Given the nature of the habitats present this limitation is not considered to be significant. The survey date was later than ideal for water voles but would have allowed for suitable features to be recorded. The survey was conducted too late in the year to record bird breeding behaviour.

4. Results and Evaluation

Desktop Study

The desktop studies requested from Essex Field Club are supplied in their entirety as Appendix C (Essex Recorders Partnership, 2014). The desktop report provides up to date information with respect to nationally protected sites within 5 km. Additional background information available from Brentwood Borough Council (BBC), which includes: a Strategic Environmental Assessment (SEA) (Essex County Council, 2007) and a Local Wildlife Sites (LoWS) review (Knowles, 2012) have also been assessed.

The following sites, habitats and species information are summarised and evaluated below.

Statutorily Protected Sites

There are no European Protected Special Areas of Conservation (SAC) within the desktop search area. There are no Special Protection Areas (SPA) within the desktop search radius, so no impacts from the development and construction of new housing at this site are anticipated.

There are three Sites of Special Scientific Interest (SSSI) within the 5 km desktop search radius:

- Basildon Meadows
- Ingrebourne Marshes
- Thorndon Park

The nearest SSSI and the only one within 2 km is Thorndon Park, which, at its nearest extent is within 500 m of the site. The citation for the SSSI is included in Appendix C. However it is separated from it by the major barrier formed by the Southend Arterial Road (A127), so most direct ecological impact from development are unlikely. The occupation of 450 new homes will result in an increase in population by approximately 1,000 people, which could increase recreational pressure on Thorndon Park. However as the SSSI is part of a larger area managed as a Country Park, with intensive recreational use promoted from a much wider catchment, this impact is unlikely to be significant.

Local Nature Reserves are designated under the National Parks and Access to the Countryside Act (HMG, 1949) and managed for the benefit of nature conservation.

There are 5 Local Nature Reserves (LNRs) within the 5 km search radius:

- Cranham Brickfields
- Cranham Marsh
- Ingrebourne Valley
- Mill Meadow
- The Manor

None of these LNRs are within the 2 km search radius, so impacts as a result of development at West Horndon are unlikely.

Non-statutory Sites

Sites which are not of national significance but may contain features important for wildlife may be designated and given some protection under the planning system. In Essex these are known as Local Wildlife Sites (LoWS). The details for LoWS are provided in the review of Brentwood sites (Knowles, 2012). There is one LoWS recorded within the desktop search area, which is the part of Thorndon Park, not included in the SSSI designation. In addition two areas of woodland included in the Ancient Woodland inventory (P.26 (Essex Recorders Partnership, 2014)) are located immediately to the north and approximately 200 m to the west of the site. Ancient woodlands are those know to have been continuously wooded since at least 1600 and are usually considered to be of high ecological value. Aerial images indicate that these areas are assart hedges, which are the relict remaining as hedges after woodland has been cleared for other land uses. As the immediate surrounding land uses appear to be recreational (school playing fields) and agricultural (arable)

Habitats

Habitats in Essex have not been subject to a detailed programme of habitat surveys. Aerial images indicate that the site is typical of many parts of Essex, comprising a relatively flat agricultural landscape dominated by arable production.

Species

The following protected species were recorded within the 2 kilometre search radius:

Table 1 – Desktop Protected Species Records

Proper Name	Trivial Name	Most Recent Record
Anguis fragilis	Slow worm	2012
Arvicola amphibius	Water vole	2010
Lacerta vivipara	Common lizard	2012
Meles meles	Badger	2013
Myotis daubentonii	Daubenton's bat	1997
Natrix natrix	Grass snake	2012
Nyctalus noctula	Noctule	1999
Pipistrellus pipistrellus	Common pipistrelle	1997
Pipistrellus pygmaeus	Soprano pipistrelle	2010
Triturus cristatus	Great crested newt	2006

Records more than five years old are to be regarded as of historic interest only. None of the species records are from within or adjacent to the application site. The relatively recent record for soprano pipistrelle is from Thorndon Country Park to the north Records for great crested newt, slow worm and grass snake are associated with Thorndon Country Park. The record for common lizard is located more than 1 km to the east of the site at Dunton. There are several recent records for badgers, which suggest an active recording effort in the wider area.

Of potential interest is the relatively recent record of water vole approximately 2 km to the south west of the site. As water voles have undergone a significant decline in population and range over the last two decades and are now extinct in many parts of the country recent records (if correct) are uncommon.

Phase 1 Survey

Site Description

The site is divided by existing boundaries into four main fields. The two western fields (north and south of Station Road) the entire south-eastern field and part of the central north-eastern field are currently under cultivation. Most of the north-eastern and eastern central fields are currently used as improved pasture, while the western section of the north-eastern field currently appears to have been left as 'set-aside' land currently dominated by ruderal species. The site is bisected by a ditch, running north to south, which is culverted under Station Road and continues through a culvert under the railway embankment to the south.

Figure 1 below indicates waypoint locations of habitats and features of interest recorded during the survey.

Figure 1: Survey Waypoint Locations

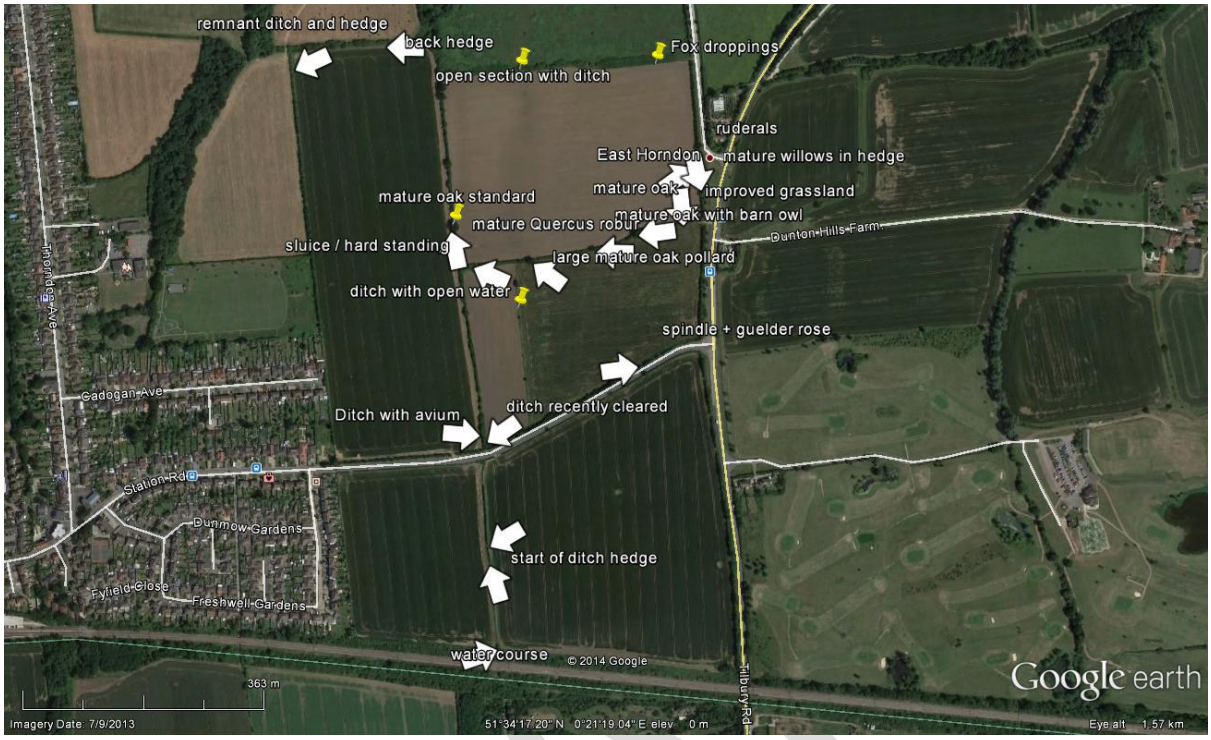

Image © Google Earth Pro (Base Image 2013)

Habitats

The habitats recorded on site included: hedges and tree, improved grassland, ruderal habitats and cultivated land, running / open water

Agricultural / Cultivated Land

The largest area of habitat (about two thirds of the total) within the site comprises cultivated land, which at the time of the survey had been recently ploughed and harrowed. This bare ground / arable habitat is of low ecological value.

Hedges and Boundaries

The site retains some original field boundaries including hedges, particularly north of Station Road. The retained hedge types include species rich hedges with trees, species poor hedges with trees and defunct and intact species poor hedges. The hedges forming the western boundary is defunct and species poor to the south of Station Road, comprising mainly of occasional *Crataegus monogyna* hawthorns, defunct and species poor where it is adjacent to housing to the west and mostly intact and dominated by hawthorn and *Prunus spinosa* blackthorn for the rest of its length. The hedge forming the northern boundary of the western field is of the same character and species mix.

The eastern boundary of the western field, north of station road comprises of a gappy / defunct hedge with several mature *Quercus robur* pedunculate oak and *Salix* sp. willow

trees and hawthorn with a ditch. The boundary of the south western field south of Station Road comprises of a ditch with a defunct hedge comprising occasional hawthorn and willow.

The northern boundary of the eastern field comprises a hedge of dense hawthorn and blackthorn scrub.

The eastern boundary of the site comprises of an intact species poor hedge of hawthorn with occasional mature oaks to the north of Station Road and an intact species poor hedge comprising mostly hawthorn and blackthorn along the eastern boundary of the field south of Station Road.

The hedge forming the boundary between the two fields forming the north-western section of the site is defunct and species poor, but does include one larger mature oak with a hollow bole.

The hedge which forms the boundary to the north of station road is intact and species rich, comprising of oak, hawthorn and blackthorn and appears to have been reinforced with planting of additional species including: *Fraxinus excelsior* ash, *Carpinus betulus* hornbeam, *Euonymus europaeus* spindle, *Viburnum opulus* guilder rose and *Cornus sanguinea*.

The hedges within the site are not of high intrinsic ecological value, although the do form important corridors for foraging and commuting wildlife, shelter for roosting and nesting and include some mature oak trees

The southern boundary of the site with the rail corridor is a chain link fence.

Grassland

The majority of the north-eastern section of the site comprised of improved grassland, apparently managed as hay crop. This grassland was of very low diversity; dominated by *Lolium perenne* perennial rye-grass with very occasional *Trifolium repens* white clover, *Bellis perennis* daisy and *Taraxacum officinale* agg. dandelion. This habitat is of low ecological value but does provide some cover and foraging for small mammals and birds.

Ruderal

A small section of the north-western field had been left uncultivated and comprised bare earth and ruderal species including: *Cirsium vulgare* creeping thistle, *Cirsium arvense* field thistle, *Rumex* sp. dock and *Senecio vulgaris* groundsel. This habitat is of low ecological value, but if left for a few years could develop additional ecological interest.

Water

The dich north of Station Road was mostly dry with occasional pools of open water and little in the way of aquatic vegetation. It appeared, from the presence of relatively fresh spoil to have been cleared recently (within the last two years).
The ditch south of Station Road contained continuous open water with aquatic vegetation including reeds: *Phalaris arundinacea* reed canary grass and *Phragmites australis* common read and other aquatic vegetation including *Sparganium erectum* branched bur-reed and *Apium nodiflorum* fools watercress.

Protected Species
The survey recorded features suitable for the following protected species:

- Breeding birds

Further species were recorded in the desktop study area (Essex Recorders Partnership, 2014), so their potential presence is addressed.

European Protected Species
European Protected Species (EPS) are those listed on Schedule 2 of the Conservation of Habitats and Species Regulations (HMG, 2010). The species and their habitats are fully protected and any activity likely to have an impact on them may require an EPS mitigation licence in order to proceed legally. Only those EPS which are terrestrial and known to be present in Essex are considered in this assessment.

Bats
The site includes features suitable for commuting and foraging bats (hedges and watercourses) and a limited number of potential roosting features (larger mature trees). The desktop records do not provide much in the way of useful information about the species and populations which may be present and using the site. As the site is currently rural in character and connected to some areas of suitable habitat with roosting opportunities in the wider area a typical assemblage of bat species (for south Essex) could be anticipated.

Great Crested Newts
The desktop study included records of great crested newt at Childerditch Pond (Essex Recorders Partnership, 2014) approximately 1 km to the north. However Childerditch pond is separated from the site by the major barrier of the A127 and there is no suitable breeding habitat on site or within 500 m of the site further consideration of this species is not required.

Dormice
Muscardinus avellenarius hazel dormouse has been recorded in Essex but is not recorded in the desktop report. The hedges within the site to not appear to be particularly suitable to support these species so further consideration of this species is not required.

Other Protected Species

Badgers

Badgers are protected under their own act: The Protection of Badgers Act (HMG, 1992), which is deals with welfare issues rather than nature conservation (as the species is relatively common and widely distributed). However the presence of badgers is regarded as a material consideration for planners.

No definitive evidence of badger activity was recorded within the site. However it was not possible to penetrate areas of dense scrub. There are several mammal paths around and leading beyond the site and it is likely that the site forms part of the local foraging range for badger clans. There are several badger records for the surrounding area which indicate a probable active local recording effort.

Water Voles

Water vole is listed on Schedule 5 of the Wildlife and Countryside Act (HMG, 1981) and is fully protected. This reflects the decline of populations and extinction throughout most of its range, though to result from predation by *Neovison vison* American mink and loss of habitat.

No field sign for or evidence of water voles was observed during the survey. While the banks of the ditch / water course appeared to have been relatively recently cleared (within the last two years), enough time should have elapsed for a rapidly breeding species to have re-established themselves if present. The section of water course north of Station Road is unlikely to be suitable for water vole due to a lack of open water and significant over-shading. The section south of Station Road includes open water and is not over-shaded but is also relatively limited in extent and cover. As the area is outside of the American mink control zones established in Essex, presence and therefore predation is likely. Therefore it is assumed that they are currently not present at the site.

Common Reptiles

There is little suitable habitat for common reptiles within the site other than some limited potential for slow worm around the margins and grass snake in the ditches. This will remain the case while mowing and / or grazing are maintained. The nearest known records of common reptiles are separated from the site by significant barriers.

Fully Protected Bird Species

A *Tyto alba* barn owl was recorded roosting in a tree during the survey during the survey which was apparently not pleased to be discovered. Barn owl is a fully protected bird listed on Schedule 1 of the Wildlife and Countryside Act (HMG, 1981). It will be necessary to establish whether this bird also nests on the site. Barn owls require significant open spaces with grassland and scrub as well as suitable nesting and roosting habitat (The Barn Owl Trust, 2012) and are particularly vulnerable to (literal) traffic impacts (The Barn Owl Trust, 2012). The development of new house may have a significant impact on the potential use of the landscape by barn owls.

Nesting Birds

All nesting birds are protected from disturbance under the Wildlife and Countryside Act. The nesting season is considered to be between March and August, although birds nesting at other times are also protected. The hedgerows within the site are the most significant foraging and nesting sites with some foraging provided by cultivated land and improved grassland (during re-seeding). Impacts on breeding birds are likely to be significant at the local level only.

Other Species

No other evidence of protected species was recorded during the survey and there are no relevant records of any other species included in the desktop records.

Species of Principal Importance

No evidence of habitat or field signs for species of principal importance in England was recorded during the survey.

5. Recommendations

The following section includes recommendations for further survey work and for the protection of wildlife and biodiversity prior to, and during, construction works, recommendations for minimising and mitigating impacts and includes potential mitigation and enhancement opportunities for the site.

Sites

Habitats

Ditches and Hedgerows

Although not of high intrinsic ecological value the hedgerows and main (running north to south) ditch are the most important features of the site. These may support several species and should be retained wherever possible. The retained hedges should be considered for restoration of traditional management including: laying and coppicing and pollarding for larger trees.

Ditches will need to be maintained and cleared occasionally to maintain their drainage and wildlife function. This should be accomplished with sensitivity to wildlife with respect to timing and in sections on a rotational basis (so that not all habitat is disrupted at the same time.

Large Mature Tree

The site contains a number of larger trees, including oak, mostly associated with the defunct hedge forming the eastern boundary of the north western field and the hedge running west to east across the north eastern fields. These larger trees provide habitat for barn owls and have bat potential and should be retained whenever possible. Consideration should be given to new / re-established pollarding, which may prolong the lifespan of the trees if undertaken sensitively.

Other Habitats

The cultivated, improved grassland and ruderal habitats are not of ecological value. Hence areas which are not developed for housing can be used to achieve ecological enhancement through planting and management of more diverse species mixes and the establishment of new water features with suitable aquatic planting.

Consideration of Lighting

In accordance with good practice and planning guidance (DCLG, 2012) lighting impacts during construction and operation of development should be considered. Lighting if used should be directed away from vegetation, trees and wildlife corridors. Advice on suitable lighting design can be obtained from guidance produced by the bat conservation trust / Institute of Lighting Engineers (The Bat Conservation Trust and Institute of Lighting Engineers, 2009).

European Protected Species

Bats

As bats appear to be under recorded in the area (Essex Recorders Partnership, 2014), there are suitable features for foraging and roosting and the project falls within the scope of chapter 9 (Graves, 2012) of *Bat Surveys Good Practice Guidelines* (Hundt, 2012) further surveys are required to establish the species and populations present and any roosting locations. The surveys should be undertaken during the active season for bat recording (March to October).

Other Protected Species and S.41 Species

Badgers

Protected features associated with badgers are mostly likely to be confined to the boundaries of the site. If development is proposed within 30 m of these boundaries a pre-construction badger survey should be undertaken immediately prior to the start of works.

Barn Owl

It will be necessary to assess all of the roosting location within the site and whether barn owl is nesting. Appropriate surveys should be undertaken during the early part of the nesting season (March – June). Retention / creation of open grassland habitats and speed restrictions to road within the development and haul roads during construction to below 30 mph should be considered to minimise and mitigate for potential impacts.

Nesting Birds

Any clearance of hedges scrub and trees within the site should be timed to avoid the bird nesting season (March to August). Where it is not possible to do so, vegetation should be inspected in advance by a suitably qualified ecologist to confirm that nesting birds are not affected, or comply with their further advice if they are.

General Provisions

A pre-construction survey should be completed immediately prior to the start of development works on the site to confirm that the situation on site is as reported here.

In accordance with good practice, retained habitat should be appropriately delineated and protected from construction activity. Compounds and stockpiles should be securely fenced to prevent wildlife accessing them. Materials should not be stored on or near the root protection area of trees as soil compaction can damage tree health. Excavations should be left covered overnight or provided with a means of escape for wildlife. Water butts should be left covered over night to prevent wildlife drowning while attempting to drink.

Prior to the start of works on site the contractor should receive a 'toolbox' talk to describe the ecological features and species present, their legal protection and responsibilities towards them and what to do if wildlife is encountered. Relevant material should be included in the induction material for new site personnel.

6. Conclusion

The proposed development site comprising four / five large fields to the east of West Horndon was surveyed and assessed for ecological interest in 2014. The desktop assessment identified that the site does not include and is not close to any nearby protected or sensitive sites and that it does not have any previous protected species records.

The survey identified that the majority of the site (cultivated land, improved grassland and ruderal habitats) is of low ecological value but contains ditches, hedgerows and mature trees which are of greater potential value. One protected species, barn owl was recorded together with some potential bat habitat.

Further surveys are recommended for bats and barn owls, with precautionary measures for the prevention and avoidance of harm to other wildlife are described. Recommendations are also made for the retention, management and enhancement of habitats.

As the majority of the site is of low ecological value, there should be no reason (with respect to ecological issues), once a reasonable and proportionate further survey effort is completed and details of appropriate mitigation provided, that a local planning authority should not grant planning permission for a proposed development of new houses and associated infrastructure.

7. References

Adobe. (2012). *Adobe Reader.* Adobe Incorporated.

Essex County Council. (2007). *Strategic Environmental Assessment Baseline Information Profile 2006 - 2007.* Chelmsford: Essex County Council.

Essex Recorders Partnership. (2014). *Biodiversity Data Regarding West Horndon.* Pitsea: Essex Field Club.

Graves, A. R. (2012). Bat Surveys for Major Infrstructure Projects. In L. Hundt, *Bat Surveys Good Practice Guidelines 2nd Edition* (pp. 65 - 68). London: The Bat Conservation Trust.

HMG. (1949). The National Parks and Access to the Countryside Act 1949. HMSO.

HMG. (1981). The Wildlife and Countryside Act 1981. UK: HMSO.

HMG. (1992). The Protection of Badgers Act.

HMG. (2006). *The Natural Environment and Rural Communities Act.* London: HMSO.

HMG. (2010). The Conservation of Habitats and Species Regulations. London: HMSO.

Hundt, L. (2012). *Bat Surveys Good Practice Guidelines 2nd Edition.* London: Bat Conservation Trust.

Institute of Environmental Assessment. (1995). *Guidelines for Baseline Ecological Assessment.* London: E & F.N. Spon.

Knowles, A. (2012). *Brentwood Borough Local Wildlife Sites Review 2012.* Great Wigborough: Essex Ecology Services.

Petosoft. (2010). *GPS Version 1.3.* Petosoft.

Stace, C. (2010). *New Flora of the British Isles 3rd Edition.* Cambridge: Cambridge University Press.

Strachan, R. M. (2011). *Water Vole Conservation Handbook Third Edition.* Oxford: Wildlife Conservation Research Unit.

The Barn Owl Trust. (2012). *Barn Owl Conservation Handbook.* Exeter: Pelagic Publishing.

The Bat Conservation Trust and Institute of Lighting Engineers. (2009, May). *Bats and Lighting in the UK Version 3.* Retrieved September 18, 2013, from The Bat Conservation Trust: http://www.bats.org.uk/data/files/bats_and_lighting_in_the_uk__final_version_version_3_may_09.pdf

The Hedgerow Regulations 1997. (n.d.).

Veldhuijzen Van Zanten, H. v. (2010). Mobile Interactive Flora of the British Isles - A Digital Encyclopedia. Netherlands.

8. Appendices

Appendix A - Phase 1 Survey Plan

Figure 3 – Phase 1 Survey Plan

Appendix C – Desktop Study Results

Essex Field Club Report