

ALUCO ECOLOGY LTD

ECOLOGICAL ASSESSMENT

**LAND AT SUMMER LANE,
PAGHAM**

APRIL 2015

Aluco Ecology Ltd Registered in England No. 5598341
info@alucoecology.co.uk www.alucoecology.co.uk

Hampshire

Registered Office: Pencairn, Penmenner Road, The Lizard, Cornwall TR12 7NR

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1.0 INTRODUCTION

1.1 Background

1.1.1 Aluco Ecology Ltd was commissioned to carry out an ecological survey and assessment of land at Summer Lane, Pagham, West Sussex. This is an investigation of the likely ecological and nature conservation issues associated with the site and its potential development.

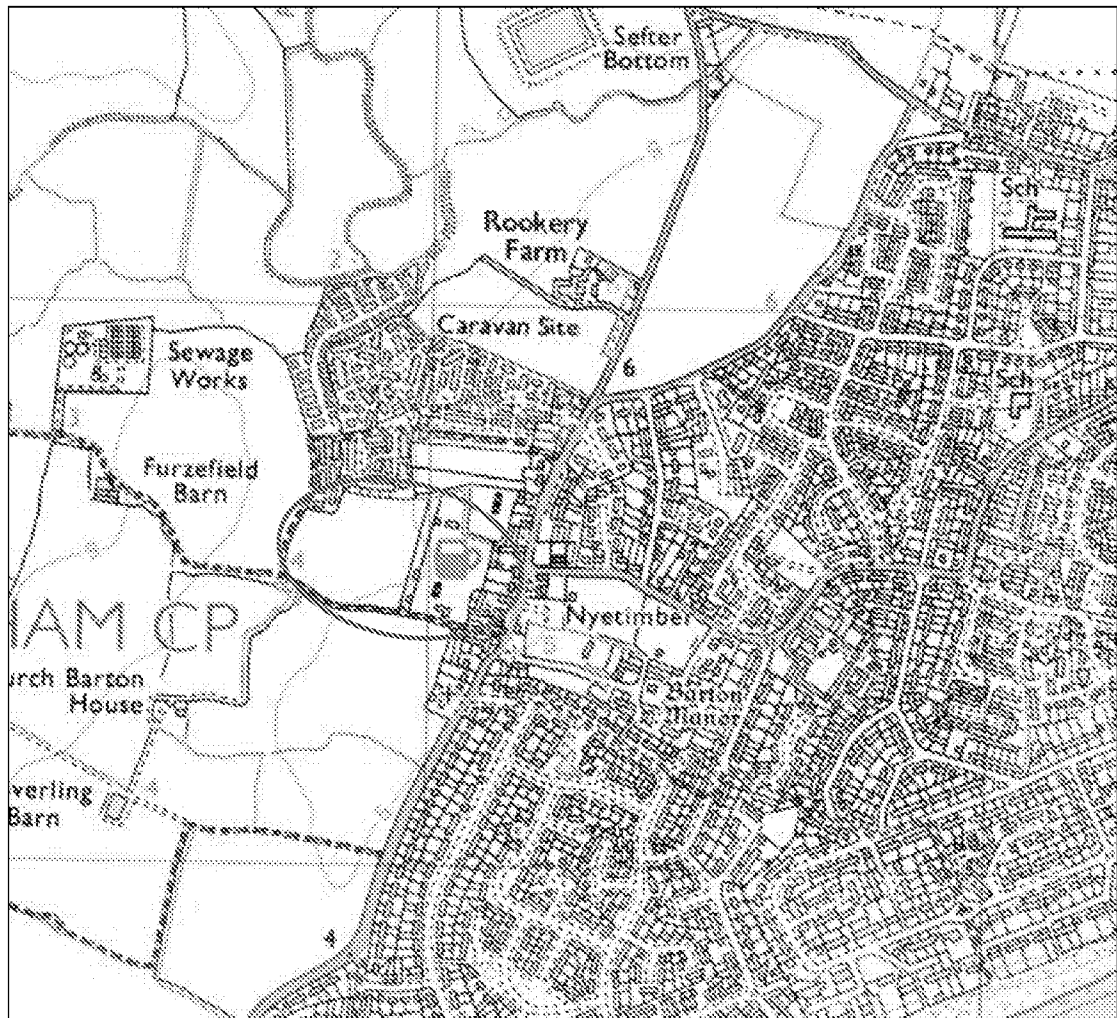
1.1.2 The aim is to survey and document baseline ecology data on the site and study area, and then evaluate and assess the impacts of the proposals for Outline Planning Permission against this baseline. The assessment therefore:

- highlights any features of particular ecological value;
- identifies potential impacts to ecology as a result of the proposed works;
- identifies any ecological issues that may have legal or planning implications such as the presence of protected species; and
- recommends potential for mitigation and/or compensation that can be undertaken to avoid, reduce or offset the potential for impacts.

1.1.3 The results of the assessment are provided below to inform the Outline Planning Application for development on the site.

1.2 Outline of the Scheme and Site Location

1.2.1 The land consists of low intensity use permanent pasture and arable farmland north of Summer Lane at the north west edge of Pagham. The location of the site is shown at **Figure 1** below.



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Figure 1: Location of the Site

2.0 RELEVANT BIODIVERSITY AND NATURE CONSERVATION POLICY

2.1 Summary of Relevant Legislation

UK Legislation

- 2.1.1 The Wildlife & Countryside Act 1981 is the principal mechanism for the legislative protection of wildlife in Great Britain. This legislation deals with both protected species and the designation and protection of Sites of Special Scientific Interest (SSSI). The parts of this Act most relevant to the proposed development are outlined in **Technical Appendix 1**.
- 2.1.2 Environmental Impact Assessment (EIA) is governed by the Environmental Impact Assessment Regulations ‘The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended)’. These Regulations implement the European Council Directive 85 / 337 on the assessment of the effects of certain public and private projects on the environment in so far as it applies to town and country planning. Even though this development is not considered as falling within the Regulations, regard has been had to these Regulations in the ecological assessment undertaken.

European Legislation

- 2.1.3 The Conservation (Natural Habitats &c) Regulations 1994 now replaced by the Conservation of Habitats & Species Regulations 2010 (known as the Habitats Regulations) makes it an offence to deliberately kill, capture, or disturb a European Protected Species (EPS), or to damage or destroy the breeding site or resting place of such an animal. The Habitats Regulations are also concerned with the protection of Special Areas of Conservation (SAC) and Special Protection Areas (SPA), which are designations applied to sites of European Importance for wildlife. See **Technical Appendix 2** for more details.

2.2 Planning Policy

National Planning Policy

- 2.2.1 The National Planning Policy Framework (NPPF) sets out Government guidance on nature conservation, and considers the integration of nature conservation policies and land use planning. It deals with the integration of economic, social and environmental factors into the planning system according to the principles of Sustainable Development. The Government’s objectives for planning and biodiversity state that (at para 118):

“When determining planning applications, local planning authorities should aim to conserve and enhance biodiversity by applying the following principles:

- if significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;*
- proposed development on land within or outside a Site of Special Scientific Interest likely to have an adverse effect on a Site of Special Scientific Interest (either individually or in combination with other developments) should not normally be permitted. Where an adverse effect on the site’s notified special interest features is likely, an exception should only be made where the benefits of the development, at*

this site, clearly outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest;

- *development proposals where the primary objective is to conserve or enhance biodiversity should be permitted;*
- *opportunities to incorporate biodiversity in and around developments should be encouraged;*
- *planning permission should be refused for development resulting in the loss or deterioration of irreplaceable habitats, including ancient woodland and the loss of aged or veteran trees found outside ancient woodland, unless the need for, and benefits of, the development in that location clearly outweigh the loss; and*
- *the following wildlife sites should be given the same protection as European sites:*
 - *potential Special Protection Areas and possible Special Areas of Conservation;*
 - *listed or proposed Ramsar sites;26 and*
 - *sites identified, or required, as compensatory measures for adverse effects on European sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.”*

2.2.2 The National Planning Policy Guidance provides guidance on the Natural Environment, particularly relevant are Paragraphs 007-023. The Guidance sets out information on how biodiversity should be taken into account in planning applications. This includes need for ecology survey and impact assessment needs, consideration of protected species, planning conditions and legal agreements, and that assessments should be proportionate to the nature and scale of development proposed and likely impact on biodiversity. It goes on to outline how the planning system can maintain and enhance biodiversity, and the principals of the mitigation hierarchy in impact assessment.

Local Planning Policy

2.2.3 In addition to the National Planning Policy Framework and the legislation outlined above, the strategic and local planning policies are the principal policies against which the outcomes of this ecological appraisal will be tested; the Arun District Council Local Development Framework contains policies in the pre-submission Core Strategy consultation Draft relating to ecology, these are outlined at **Technical Appendix 3**.

Biodiversity

2.2.4 Under the Governments duty to conserve Biodiversity, a number of Biodiversity Action Plans have been prepared for habitats and species of conservation concern, including national BAPs and a Biodiversity Action Plan for Sussex, and this is considered in general ecological site assessment. Every public authority has duties under the Natural Environmental & Rural Communities Act 2006 (NERC Act) to have regard to purpose of conserving, restoring or enhancing biodiversity when exercising its functions (at Section 40 onwards).

3.0 ASSESSMENT METHODOLOGY

3.1 Introduction

- 3.1.1 This assessment is undertaken having regard to the Guidelines for Ecological Impact Assessment (EcIA) in the United Kingdom (IEEM 2006) and the Guidelines for Ecological Report Writing (CIEEM, 2015).

3.2 Data Sources

- 3.2.1 The baseline data for this assessment has been obtained from survey work undertaken by Aluco Ecology in Spring-Summer 2014, with an Appraisal of the eastern horse paddock in Summer 2013. The base line survey includes a zone of influence and detailed survey work has been carried out considering the wider zone of influence.
- 3.2.2 The Sussex Biodiversity Records Centre has been consulted. Information returned is provided within the baseline results chapter and relevant technical appendices.

3.3 Methodology Used in this Assessment

- 3.3.1 The methods used in this ecological impact assessment follow guidance in Government Policy, and are based on the recent best practice guidance from the Institute of Ecology and Environmental Management (IEEM, 2006), and Natural England Standing Advice.
- 3.3.2 The methods used are outlined in **Technical Appendix 4**, and involve the concept of a project's zone of influence. Assessment of impacts and species work involves looking at how the project may affect local habitats and species. The method uses concepts such as site and species integrity and conservation status.
- 3.3.3 The following assessment begins by looking at the potential biophysical changes that may occur as a result of the scheme proposed. This is followed by a description and evaluation of the baseline environment (using criteria outlined in **Technical Appendix 4**). Once the features are evaluated, those of local and greater value within the zone of influence are brought into the impact assessment. Impacts are assessed prior any mitigation, and then where significant adverse impacts are predicted, mitigation and compensation is proposed.

3.4 Biophysical Changes And The Zone Of Influence

Introduction

- 3.4.1 In order to be able to target relevant ecological survey work and assess the impacts of a proposed development, it is necessary to identify the activities that may result in biophysical changes from the development and the area these cover (i.e. the zone of influence). There are three stages of this development scheme that include activities that may have an impact on features of ecological value; namely site preparation, construction and operation / use.

- 3.4.2 The Illustrative Masterplan for the development of 90 dwellings with associated open space is shown at **Figure 2** below.

Biophysical Changes associated with the Development Scheme – Determination of the Zone of Influence

- 3.4.3 It is proposed that change of use of the site will result in the physical structure of the present site being altered significantly. The potential zone of influence of the proposal is determined from the predicted biophysical changes brought about by activities associated with construction and post-construction phases. Therefore the zone is predicted to extend across the development footprint and locally along the edge of the site, and immediately adjacent to the site. Consequently, survey work has been carried out within this zone. The main survey area includes the proposed development and adjacent land where impacts have potential occur.

Site Preparation / Construction Activities and Biophysical Changes

- 3.4.4 During the construction phase, it is predicted that site preparation activities will include some earthworks and earth stripping associated with a phased construction. Each phase of the development construction may affect habitat suitable for wildlife. Without appropriate mitigation, site clearance work may result in death or injury to protected species (if they are present), or damage to other features of ecological value. Construction could result in the loss of features of ecological value and/or the loss of habitat of protected species resulting in a net decrease in biodiversity.
- 3.4.5 The construction of the site has the potential to affect adjacent habitats, where present, through noise, air and run off pollution.

Predicted Operational Activities during Use Phase and Biophysical Changes

- 3.4.6 The operational phase will need to consider how protected species and species of conservation concern may use the site and zone of influence, and what effect the proposals may have on their conservation status locally.



Figure 2: Land at Summer Lane (Davis Landscape Architects 2015)

4.0 BASELINE CONDITIONS WITHIN THE ZONE OF INFLUENCE

4.1 Introduction

- 4.1.1 The ecological baseline describes the site in the context of the characteristic habitats of the area, and includes descriptions of designated sites and ecological features present within the potential zone of influence of the proposed development.

4.2 Designated Sites

Statutory Designated Sites

- 4.2.1 There is one biological Site of Special Scientific Interest within 2km of the site, Pagham Harbour SSSI which at its closest point is about 1km from the site to the south west and south. A sheet for the SSSI is provided at **Technical Appendix 5**. A second SSSI, Bognor Reef SSSI, designated for geological reasons, is present along the foreshore south of the site (also a Local Geological Site).
- 4.2.2 The SSSI is also a European and Internationally designated site. This is Pagham Harbour Special Protection Area (SPA); designated under the Wild Birds Directive 79/409/EEC and under the Ramsar Convention 1971. It is designated for its migratory, breeding and non breeding wetland bird species. The SPA citation for this site is reproduced in **Technical Appendix 5**.

Local Nature Reserves

- 4.2.3 Parts of Pagham Harbour are also designated as a Local Nature Reserve. The location is shown at **Technical Appendix 5**.

4.3 Habitats and Vegetation

Methodology

- 4.3.1 All parts of the study area were walked over during a number of dates in between spring and summer 2014, with the eastern pasture also surveyed on a single date in June 2013. Details of vegetation types were recorded, including notes on characteristic and dominant species. The relative frequency and abundance of plant species over the study area was estimated.

Introduction

- 4.3.1 The main site is made up of two fields and a small yard between the two. The eastern field is dominated by permanent pasture with scrubby boundaries dominated by Bramble *Rubus fruticosus* and Thorn scrub. The western field is an arable unit with some hedge boundaries and watercourses around the western and southern boundary along Summer Lane. **Figure 3** below shows the main habitats present on site.

Arable Land

- 4.3.2 Arable land on site is intensively managed with chemical input, and in 2014 the crop was Wheat. The arable flora includes common species of arable land including, Scentless Mayweed *Tripleurospermum inodorum*, Scented Mayweed *Matricaria recutita*, Shepherd's Purse *Capsella bursa-pastoris*, Common Knotweed *Polygonum arenastrum*, Field Bindweed *Convolvulus arvensis*, Scarlet Pimpernel *Anagallis arvensis*, Cut-leaved Cranesbill *Geranium dissectum*, Creeping Buttercup *Ranunculus repens*, Common Poppy *Papaver rhoeas*, Sun Spurge *Euphorbia helioscopia*, Fat Hen *Chenopodium album*, Field Forget-me-not *Myosotis arvensis*, Red Deadnettle *Lamium purpureum*, Common Field Speedwell *Veronica persica*, Groundsel *Senecio vulgaris*, Greater Plantain *Plantago major*, Cleavers *Galium aparine* and small amounts of Sharp-leaved Fluellen *Kickxia elatine*,. Arable grasses were also present including Wild Oat *Avena fatua*, Black Twitch *Alopecurus myosuroides*, Annual Meadow Grass *Poa annua*, and Barren Brome *Bromus sterilis*. An example of the arable land is shown at **Photo 1** below.



Photo 1: Arable Land on site

Arable Margins

- 4.3.3 The majority of boundaries of the arable land on site generally have a c1-2m wide strip of uncultivated land. This is dominated by coarse grasses and tall herbs. False Oat Grass *Arrhenatherum elatius*, is generally dominant, with some occasional to locally frequent Cocks Foot *Dactylis glomerata*, Common Couch *Elytigia repens*, Soft Brome *Bromus hordeaceus*, Rough Meadow Grass *Poa trivialis*, and Common Reed *Phragmites australis* encroaching from the edge of the watercourses where present. Herbs present include common tall herbs of arable edge including Cleavers, Creeping & Spear Thistle *Crisium arvense* & *C. vulgare*, Common Ragwort *Senecio vulgare*, Nettle *Urtica dioica*, Cow Parsley *Anthriscus sylvestris*,

Hogweed *Heracleum sphondylium*, Broad Leaved & Clustered Dock *Rumex obtusifolius* & *R. conglomeratus*, Bristly Oxtongue *Picris echioides*, Sowthistles *Sonchus* sp. and Hedge Woundwort *Stachys sylvatica*. This habitat is shown at **Photo 2** below.



Photo 2: Arable Margin, here the northern edge of Summer Lane

Permanent Pasture

- 4.3.4 The majority of the eastern field on site is made up of farmland that has been agriculturally improved and is currently grazed by horses. The main pasture is improved reverting to semi-improved pasture with abundant Yorkshire Fog *Holcus lanatus*, and occasional to frequent Bent Grasses *Agrostis* sp, False Oat Grass *Arrhenatherum elatius*, Meadow Grasses *Poa trivialis*, Meadow Foxtail *Allopecurus pratensis* and Soft Brome *Bromus hordeaceus*. Herbs are moderately distributed through the sward, but with low species diversity. Species noted include frequent to locally abundant White Clover *Trifolium repens* and Creeping Buttercup *Ranunculus repens*, and occasional Red Clover *T. pratense*, Lesser Stitchwort *Stellaria graminea*, Thistles *Cirsium vulgare* and Common Ragwort *Senecio jacobaea*. Common Centaury *Centaureum erythraea* is also present. At the edges of the sward patches of Common Fleabane *Pulicaria dysenterica* are present and merging into Bramble *Rubus fruticosus* scrub with abundant to dominant Nettles *Urtica dioica* in places. The main grasslands are shown at **Photos 3 & 4**.
- 4.3.5 In more open and trampled areas an open ground community is present with Annual Meadow Grass *Poa annua*, Greater Plantain *Plantago major*, Marsh Cudweed *Gnaphalium uliginosum*, Toad Rush *Juncus bufonius* agg, Lesser Swinecress *Coronopus didymum* and Lesser Trefoil *Trifolium dubium*.

- 4.3.6 An area of hardstanding is present along the northern boundary, representing the base of former agricultural buildings. This area has been enclosed mostly by Bramble and nettle scrub and is now closing off the northern corner of the pasture from the main field. Some Bee Hives are present in this area. A small wooden shed on the southern boundary is used as a Horse Stable.
- 4.3.7 Other areas of Bramble scrub are present within the pasture indicating a current low grazing regime, and a feel of semi abandonment of the agricultural unit. See **Figure 3** and eg **Photo 4** for extent of scrub on site. At the northern end of the site part of the grassland has become heavily invaded by scrub, mostly dominated by Blackthorn *Prunus spinosa*, but with some Hawthorn *Crataegus monogyna*, Elder *Sambucus nigra*, Willow *Salix sp.* and Oak.

Amenity Grassland

- 4.3.8 The site access off Summer Lane is a regularly mown strip of amenity grassland (**Photo 5**) with a few herbs noted as above. A single patch of Birds Foot Trefoil *Lotus corniculatus* was noted by the road edge. A small spur along the eastern boundary is also amenity grassland lawn of a dwelling in Sylvia Close separated from the main field by a fence line and was only viewed from the main field.



Photo 3: Horse Paddock, currently grazed by two Horses & Rabbits



Photo 4: semi-isolated patch of grassland being encroached by Blackthorn dominated scrub at the northern end of the site



Photo 5: Mown Grassland entrance to Site

Horticultural

- 4.3.9 Along the southern edge of the eastern field is an area of relatively recently created allotments backing onto the dwellings on Summer Lane. These allotments are in partial cultivation

(**Photo 6**) with non-cultivated areas dominated by stands of Nettles, ruderals and annual weeds. No scarcer arable weeds were noted from the allotments.



Photo 6: *Small Area of Allotments along Southern edge of the site*

Builder's Yard & Hardstanding

- 4.3.10 A small yard is present between the eastern Horse paddock and the western arable field. This comprises hardstanding with a number of common ruderal weeds associated with disturbance, and encroaching Blackthorn dominated scrub with Elder, Hawthorn and young Oak *Quercus sp.* at its northern end. There is also much Bramble and Nettle and some Fleabane and Docks around the boundaries. This area is shown at **Photo 7** below.

Scrub

- 4.3.11 Parts of the boundaries on the northern edge of the Horse paddock and in the builders yard are unmanaged and have developed mature Blackthorn scrub, with some Hawthorn, Elder, rarely young Oak, and extensive Bramble domes and Nettles.



Photo 7: Yard showing ruderals vegetation and Nettle banks along boundaries

Site Boundaries (including Ruderal and Scrub)

4.3.12 The boundaries are numbered on **Figure 4** and described below.

Boundary 1

4.3.13 The northern boundary of the site is a ‘dog leg’ made up of a ditch line that was dry in the areas that could be examined during the majority of the survey, mostly scrubbed up and lacking aquatic vegetation. During early spring 2014 and late winter 2015 there was c20cm of standing water after the wet late winter period in ponds along the eastern end of the ditch. The ditch line appears to be unconnected to any watercourses in the surrounding landscape. This boundary dominated by Bramble scrub scrambling over an outgrown thorn hedge dominated in parts by Blackthorn *Prunus spinosa*, but with frequent Hawthorn and Elder *Sambucus nigra* also present. A few non-native and/or planted woody species are present along the northern edge of the ditch line (including mature Oak and Conifers) and a patch of Goat Willow *Salix capraea* along its eastern end. The Bramble edge includes frequent Nettles, Ragwort and Broad Leaved Dock *Rumex obtusifolius*. **Photos 8 & 9** shows the northern boundary.



Photo 8: Ditch along northern boundary looking west. Ditch was dry during summer but contained c20cm of standing water at its eastern end during early spring 2014, but again dry by Summer 2014. It has no aquatic vegetation and very dense shading and scrub encroachment over much of its length.



Photo 9: Northern Boundary showing extensive Bramble scrub encroaching into the pasture with the ditch line marked by the line of trees on its northern boundary.

Boundaries 2,3 & 4

- 4.3.14 The eastern, southern and western boundaries of the Horse paddock are all fenced. Along the western boundary are patches of Hawthorn with dominant Bramble and Nettle scrub and some abundant patches of Fleabane (see **Photo 10**). At its northern end it is lost into an area of Blackthorn dominated scrub that takes up parts of the Horse paddock and builders yard to the west. The southern and eastern boundaries of the paddock comprise fences with back gardens of dwellings off site. Again there are some extensive areas of Bramble, Nettle and occasional Hawthorn, Blackthorn and Elder scrub. The entrance to the field contains a garden hedge maintained along its eastern length. Here a small and isolated ditch line also scrubbed up and dry in areas inspected is present.



Photo 10: The western boundary of the Horse paddock looking south with extensive Bramble, Nettle scrub encroaching onto the pasture, and abundant Fleabane in the foreground.

Boundary 5

- 4.3.15 The eastern boundary of the arable field. This has a young planted hedge along its southern half with Hawthorn, Elder and Field Maple *Acer campestre*, gaps with Nettles and Brambles along a fence line, and then the edge of the Blackthorn dominated scrub at the northern third of the builders yard. The boundary is shown at **Photo 11**. There are only limited grassy margins along this boundary, mostly towards its southern end.

Boundary 6

- 4.3.16 This boundary comprises a dog leg around the southern edge of Mill Farm Park Home estate. At its eastern end is a small length of Blackthorn dominated scrub edge, with some Bramble

and Elder. The remainder of the boundary is a strip of uncultivated coarse grasslands as described above, dominated by False Oat Grass, with Nettles in places (See **Photo 12**).



Photo 11: Boundary 5 at its mid-point looking south, with a gap in the woody vegetation dominated by Nettles and Brambles.



Photo 12: Boundary 6 with Blackthorn scrub edge from scrub off site to the north, with rough grassland, and in the distance open rough grassland edge.

Boundary 7

- 4.3.17 The western boundary of the arable land comprises a small watercourse that is c2-3m wide by 1.5m deep engineered ditch, that contained water through to summer 2014, although only upto 30cm along most of its length. At the northern end a concrete sluice traps a deeper section of water, especially during the early spring. The ditch comprises coarse grasses on its bank as described above, with dominant Common Reed and Hemlock Water Dropwort *Oenanthe crocata* in the channel (see **Photo 13**).

Boundary 8

- 4.3.18 This represents a continuation of the watercourse along boundary 7, although generally drier along its length. It was only damp during late summer 2014, but contained c20cm of water during early spring along its length. The ditch is again engineered and c2-3m x 1.5m deep. It is dominated by Hemlock Water Dropwort in places, but with abundant tall herbs including Nettles, Hogweed, Cleavers and some Large Willowherb *Epilobium hirsutum*. Water Figwort *Scrophularia auriculata* and Common Watercress *Nasturtium officinale* are rare along the ditch (see **Photo 14**).

Summer Lane

- 4.3.19 Summer Lane comprises Boundary 8 along the northern stretch of its western end, and a number of dwellings along the western end. The south verge of summer Lane rises on a small bank and is again dominated by a strip of uncultivated coarse grasses and tall herbs as described above. The boundary is fenced.



Photo 13: Boundary 7 with banks of ditch dominated by a strip of coarse grassland, and the ditch shown with the darker green broader leaves of Common Reed. The Hemlock Water Dropwort has died back by this time of the year and the watercourse is heavily choked by reed and with low water depth.



Photo14: Boundary 8 showing edge of Summer Lane and ditch that was mostly dry during summer 2014, but with some very shallow water in early spring. A small amount of dying back Hemlock Water Dropwort is shown along with non-aquatic species choking the ditch.

Flora

- 4.3.20 No rare or scarce species were recorded on site. Off site along the curb of Summer Lane a single plant of the local Knotted Hedge Parsley *Torilis nodosa* was noted growing on the roadside.

Evaluation of Vegetation and Habitats

- 4.3.21 Habitats over the site are considered to generally be of **value within the zone of influence** being relatively species poor but semi natural habitats with currently low intensity use. The ditch line along Boundary 1 and watercourse within Boundaries 7 & 8 are of **value within the zone of influence to local value**. Although heavily neglected and with little diversity of species, Boundary 1 represents a semi-natural boundary feature surviving in the landscape. The ditch along Boundaries 7 & 8 is engineered and of low diversity, but again represent a linear wildlife feature within the local landscape.

5.0 BIRDS

5.1 Introduction

- 5.1.1 The area was surveyed for birds during spring and early summer 2014, including a breeding bird survey. This included dedicated post dawn surveys, as well as surveys during times of the day other survey work was undertaken, including dusk surveys during bat survey work.

5.2 Methodology

- 5.2.1 The breeding bird survey methods used were similar to the standard Common Bird Census (CBC) techniques adopted by the British Trust for Ornithology (BTO) and set out in Marchant (1983), Marchant *et al.* (1990), and Bibby *et al.* (2000).
- 5.2.2 Time is spent on recording species present and identifying territory centres, territory range and size. This is done by noting what activity the birds recorded are undertaking. Sightings are noted on individual survey maps using standard codes for behaviour and species. Over a number of visits these maps can be collated and territories of species determined to a relative degree of accuracy. Further advice is also obtained from the methodology used by the BTO for their Breeding Bird Survey (BBS). More information on survey work is provided at **Technical Appendix 6**.
- 5.2.3 The survey dates are provided below in **Table 1**.

Table 1: Bird Survey Dates

Date	Time	Conditions
07/04/14	pm	Breeding Bird Survey
14/04/14	pm	Breeding Bird Survey
24/04/14	am	Breeding Bird Survey
29/04/14	am	Breeding Bird Survey
20/05/14	am	Breeding Bird Survey
05/06/14	am	Breeding Bird Survey

5.3 Results

Species

- 5.3.1 The total number of species recorded during survey work was 40 species (see **Technical Appendix 6**). Only a proportion of these species are breeding or likely to be breeding within the study area, with others recorded as flying over or only recorded during the non-breeding period or as a passage migrant.
- 5.3.2 **Figure 5** shows notable breeding species or likely breeding species recorded during the survey work. **Table 2** below shows the species of Conservation Concern recorded during the survey effort. The Birds of Conservation Concern (See Eaton *et al* 2009) are Red Listed species (generally because of >50% population declines over 25 years - BDP) or Amber Listed species (generally because of a 25-50% decline in populations over the last 25 years - BDMP). Some species are recognised on account of European importance and some on range contractions within the UK (SPEC).

Table 2: Species of Conservation Concern & Other Species with Notes

Species	Status	Comments
Common Buzzard <i>Buteo buteo</i>	Not listed	A pair occasionally recorded in the local area
Sparrowhawk <i>Accipiter nisus</i>	Not listed	Recorded, including carrying food early one morning to the north west
Common Kestrel <i>Falco tinnunculus</i>	Amber (SPEC)	Recorded on one occasion flying over.
Tawny Owl <i>Strix aluco</i>	Not listed	Heard during Bat survey work from north of the site.
Common Swift <i>Apus apus</i>	Amber (BDMP)	Regularly recorded during summer survey work foraging over study area.
Green Woodpecker <i>Picus viridis</i>	Amber (SPEC)	A single territory within study area, with foraging noted on site in the horse paddock. With nesting considered likely locally.
Barn Swallow <i>Hirundo rustica</i>	Amber (SPEC)	Regularly recorded during survey work foraging over the arable land and around Summer Lane.
House Martin <i>Delichon urbica</i>	Amber (BDMP)	Occasionally recorded during survey work foraging around the eastern end of the site.
Hedge Accentor (Dunnock) <i>Prunella modularis</i>	Amber (BDMP)	Common breeding species on site, see Figure 5 .
Song Thrush <i>Turdus philomelos</i>	BAP, Red (BDP)	Territories around the site are shown at Figure 5 .
Common Starling <i>Sturnus vulgaris</i>	Red (BDP, SPEC)	Not breeding, but present along the existing dwellings at the edge and using the habitats on site. Only a low population considered present locally
House Sparrow <i>Passer domesticus</i>	Red (BDP)	Not breeding but numerous pairs located in housing along east boundary, and along Summer Lane
Whitethroat <i>Sylvia communis</i>	Amber (BDMP)	A couple of territories during 2014, see Figure 5
Linnet <i>Carduelis cannabina</i>	BAP Red (BDP)	Recorded flying over but no breeding confirmed.

Key

Sch1 = Listed under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended)

Annex 1 = Listed under Annex 1 of the Wild Birds Directive 79/409/EEC

BAP = Listed as a local or national Biodiversity Action Plan species

Red = Red Listed bird of Conservation Concern

Amber = Amber listed bird of Conservation Concern

(nb details of these category listings is provided in **Technical Appendix 6**)

Bird Habitats

- 5.3.3 There are three main bird habitats within the study area; Hedgerow and scrub, some with ditches; open agricultural (arable) and permanent pasture.
- 5.3.4 The hedgerow and scrub edge habitats are present along some site boundaries of the study area. Typical species using this habitat included the BAP species Song Thrush as well as Dunnock, House Sparrow (with nesting in buildings off site), Linnet (although no breeding confirmed in 2014) and warblers including Whitethroat, Chiffchaff and Blackcap.
- 5.3.5 The pasture provides some foraging resource for thrushes, Starling and Green Woodpecker. These species breed either on the boundaries of the site or off site.

- 5.3.6 The use of arable farmland by farmland bird species was low during the current survey, with only a low diversity recorded, and no confirmed breeding of typical farmland species of conservation concern that are present in the wider landscape (eg Skylark, Yellowhammer, Linnet, Reed Bunting, Grey Partridge). These species are known in the wider landscape around Pagham Harbour and may use arable habitats on site on occasion. Whitethroat have been recorded around the boundaries of the arable land in low density (see **Figure 5**).
- 5.3.7 A number of species were recorded over the site and are likely to be breeding in the wider local countryside, including Kestrel, Sparrowhawk and Common Buzzard, Tawny Owl, Swallow, House Martin & Swift, as well as gulls including high flying Mediterranean Gulls on one date, and Little Egret (which are frequent in Pagham Harbour to the south west). Barn Owl *Tyto alba* were noted as having been recorded on farmland at the northern end of Pagham village during Newt survey work in the spring. It is likely that they occasionally hunt along the wider countryside including edges of the site, but were not recorded during evening survey work for other protected species groups on site in 2014. The habitats on the site for this species are mainly limited to the coarse grassland edges of the arable land.
- 5.3.8 The data search has returned records for waterfowl including Brent Geese *Branta bernicula* within 2km of the site, and the wider arable field network and local landscape may occasionally provide winter loafing/feeding opportunities, but are further away than more local sources for foraging and loafing around the harbour. The arable field on site north of Summer Lane is smaller and more enclosed than those south of Summer Lane, and therefore less likely to be of potential. The horse paddock is considered too enclosed to be used by waterfowl or Geese. The principal foraging for Brent Geese in the local area is in the pasture and arable farmland directly adjacent to Pagham Harbour SSSI/SPA/Ramsar and the populations in the harbour are one of the reasons for the site's designation.
- 5.3.9 The data search has also returned records of a number of Sussex notable species within 2km of the site. These are mostly associated with Pagham Harbour, and consideration was given to potential presence during survey work on site (eg Grey Partridge *Perdix perdix*).

5.4 Evaluation

- 5.4.1 The assemblage of bird species recorded is typical of a suburban edge site, within a farmed landscape. No rare or scarce species were recorded, but the study area does provide nesting habitat around its boundaries for species of conservation concern including Song Thrush, Green Woodpecker, Dunnock, and Whitethroat.
- 5.4.2 The scrub and grassland features within the study area are considered to be of **Local Value** for bird populations. The remaining arable land is considered to be of **value within the zone of influence to local value**.

6.0 MAMMALS

6.1 Bats

Introduction

- 6.1.1 A bat survey of the study area was undertaken between April 2014 – September 2014 looking at foraging, commuting and roosting potential. All bats and their roosts are protected under law (see **Technical Appendix 1 & 2**). The data search returned records for six species of Bat; Pipistrelle *Pipistrellus sp.* & *Pipistrellus pygmaeus*, Brown & Grey Long-eared Bat *Plecotus auritus* & *P. austriacus*, Daubenton's Bat *Myotis daubentoni*, Noctule *Nyctalus noctula* and Serotine *Eptesicus serotinus* within 2km of the site. Grey Long-eared Bat is a nationally rare species restricted to the south coast of England, but with known populations on the Manhood peninsular and Pagham area.

Survey Methodology

- 6.1.2 Bat survey work has been undertaken to the methods outlined in **Technical Appendix 7**. This survey considered potential roosting structures within the study area, and also the potential foraging resource for populations of bats within the zone of influence and commuting through the study area. The survey work comprised dusk and dawn surveying with a number of survey points around the site. Each part of the study area was surveyed a minimum of three times during the period, with longer term monitoring using remote detectors along identified areas of foraging and commuting. Survey work was spread out to cover a wide survey period during the early spring to late summer/autumn. Where necessary recordings were made of bat passes using Peterson, Anabat, Duet and SM2 recorders. The results of the bat surveys are provided in **Table 3** below and at **Figure 6**.
- 6.1.3 Given the temporary (though often seasonally repeated) occupancy of many bat roosts, and the crevice dwelling nature of many species, it is not always possible to definitively say if a site is used by bats or not. For this reason a bat survey searches for signs of bats and in their absence make judgements about the potential and likelihood of a site being used by bats.

Survey Results – Building Roost Assessment

- 6.1.4 A single open fronted horse shed/field shelter is present on site. This is of wooden construction (5mx4mx2m), has a single layer with no cavities in the roof space and a wooden roof with shed felt lining. It is of negligible potential for roosting bats, and no bats were recorded using the building during survey work.

Survey Results – Tree Roost Potential

- 6.1.5 Trees were surveyed for their potential to provide roosting structures for bats using the methods outlined in **Technical Appendix 7**. This classifies tree potential according to categories. The trees on site are generally of low potential being young and free of features that could support roosting bats (eg as described in the survey methodology in **Technical Appendix 7**). On Boundary 1 a dead tree represents the only potential tree roost feature within the site. An evening emergence position was located in this area and surveyed on three occasions. No evidence of roosting bats was noted along this boundary.

Survey Results - Off Site

- 6.1.6 Single roosts of Soprano and Common Pipistrelle were recorded from dwelling houses off site to the south of boundary 3 and east of boundary 2. These roosts were recorded during early spring survey effort, and only individual bats were recorded on each occasion (see **Table 3** for details).

Survey Results – Foraging and Commuting Habitats

- 6.1.6 The site is relatively open, with some boundary features, although within the arable land these are limited in places to ditches with coarse grassland banks and no woody features. A series of transect monitoring points were set up in the site and remote monitoring points also set up in two places along the more woody boundaries of each main field (Boundary 1 & Boundary 6)
- 6.1.7 The surveys confirmed that bats utilise the boundaries within the study area, with greater use of the more sheltered edge depending upon wind direction, and the more wooded boundaries with greater shelter and protection, in combination with increased food availability with diverse mixed woodland areas. **Table 3** provides a Summary of bat survey. **Figure 5** provides a summary of the main foraging and commuting areas.

(a) Commuting Routes

- 6.1.8 During the surveys, commuting and foraging bats were recorded using the range of local landscape features. All wooded boundary features were used by bats for moving around the landscape. A number of areas were identified as areas of higher bat activity associated with non-feeding commuting combined with casual feeding on route. These are illustrated in **Figure 5**. These mainly included the fence lines around the back gardens of properties off site.

(b) Foraging Sites

- 6.1.9 The surveys confirmed the presence of six - seven species; Noctule, Serotine, Nathusius's, Common and Soprano Pipistrelle, and Myotis including a Whiskered type Bat. All species recorded utilise the hedgerow/boundaries, rough grassland edges and linear features such as Summer Lane, with greater use of the more mature sheltered boundaries with favoured feeding areas depending upon wind direction and invertebrate accumulations. These areas are shown on **Figure 6**. The more open arable land was in lower use by bats, owing to its open nature, and this is also shown in the transect data points in these locations (see **Table 3**).
- 6.1.10 Of the species recorded two species, Common & Soprano Pipistrelle were present on all survey work, and represent over 90% of records and bat passes on site. There are small numbers of regular foraging Pipistrelles around parts of the site, and favoured feeding areas are shown in **Figure 6**. All other species were recorded much more infrequently and generally with only a single or a small number of passes through the site during a survey. These bats are likely to use the site as a part of the wider countryside. The presence of Nathusius's Bat on two evening monitoring periods is not unusual along the West Sussex coast, and they appear to be widespread around the Manhood peninsular to Bognor area.

- 6.1.11 Analysis of overnight monitoring shows generally low totals of up to 121 (Boundary 1) and an average of 72 passes per night being recorded. In comparison with other woodland edge and hedgerows which can often record 200 - 1000 passes per night, the level of bat use on the site is considered to be relatively low. Given the size of the site and habitats present, and geographic area, use by bats is thought to be fairly typical, with any similar-studied local area expected to have similar use.

Evaluation

- 6.1.12 The habitats on site along the more wooded boundaries (Boundary 1, parts of 4 and 5 where they intersect) are considered to be of **Local Value** to bat populations. The wider arable land is considered to be of **value within the zone of influence** for bats. Foraging and commuting is recorded around all boundary features, with details of main foraging locations recorded. A total of seven species of bat have been recorded. The assemblage of bats is considered to be of **Local Value**.

Table 3: Bat Survey Results

Date	Survey	Conditions	Results																																																																		
07/04/2014	Dusk Emergence in paddock on southern and eastern housing boundaries and dead tree.	Pre-survey heavy shower but dry during survey, no wind part cloud 11c	PS emergence off site along Summer Lane buildings. Dusk 19:47 First PS at 20:00 from bungalow along Summer Lane, considered likely to have emerged from dwelling off site. PP & PS foraging along eastern boundary of site occasional during survey.																																																																		
29/04/2014	Dusk Emergence in paddock on southern and eastern housing boundaries and dead tree.	11c clear, no wind	20:53 PP from houses to east (off site), 20:55 PP as 1st PP same direction, probably from similar roost site to east. (not adjacent houses) 20:56 PP as before then foraging 1-3 PP along road and house garden south of paddock.																																																																		
20/05/2014 - 23/05/2014	Remote Detector Northern boundary	low southerlies with some showers, lows to 12c	<table><tr><th>Date</th><th>Passes</th><th>PP</th><th>PS</th><th>PN</th><th>My</th><th>NN</th><th>NN</th><th>ES</th><th>1st</th><th>Lst</th></tr><tr><td>20/05/2014</td><td>75</td><td>29</td><td>44</td><td></td><td></td><td></td><td></td><td>2</td><td>21:11</td><td>04:05</td></tr><tr><td>21/05/2014</td><td>121</td><td>91</td><td>28</td><td></td><td></td><td>2</td><td></td><td></td><td>21:07</td><td>04:12</td></tr><tr><td>22/05/2014</td><td>21</td><td>8</td><td>12</td><td></td><td></td><td>1</td><td></td><td></td><td>20:57</td><td>04:04</td></tr><tr><td>Avg</td><td>72</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Date	Passes	PP	PS	PN	My	NN	NN	ES	1st	Lst	20/05/2014	75	29	44					2	21:11	04:05	21/05/2014	121	91	28			2			21:07	04:12	22/05/2014	21	8	12			1			20:57	04:04	Avg	72																				
Date	Passes	PP	PS	PN	My	NN	NN	ES	1st	Lst																																																											
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21/05/2014	121	91	28			2			21:07	04:12																																																											
22/05/2014	21	8	12			1			20:57	04:04																																																											
Avg	72																																																																				
20/06/2014	Dusk Emergence in paddock on southern and eastern housing boundaries and dead tree.	Sunny and warm, start at 21c finish at 15c. No wind, no cloud	Nil emergence noted. First bat PP from south at 21:55, foraging at SE boundary of paddock. First PS from NE commuting south along eastern boundary at 21:58. Along southern boundary of paddock first bat PS at 22:02. Foraging along lane by 3xPS and 2xPP regularly during survey time. My recorded along lane at west end 22:35 <i>Transect data: T1= 2PS, 3PP; T2=22PS, 4PP; T3= 0; T4= 0; T5 = 0; T6= 0; T7= 3PS, 5PP; T8 = 5PP; T9= 5PP, 7PS; T10= 2PP; T11= 0.</i>																																																																		
20/06/2014 - 24/06/2014	Remote Detector Arable field boundary	Hot days, cloudless nights with lows to 13c. Mostly Light winds	<table><tr><th>Date</th><th>Passes</th><th>PP</th><th>PS</th><th>PN</th><th>My</th><th>NN</th><th>NN</th><th>ES</th><th>1st</th><th>Lst</th></tr><tr><td>20/06/2014</td><td>58</td><td>37</td><td>17</td><td></td><td></td><td>1</td><td>1</td><td></td><td>21:35</td><td>04:07</td></tr><tr><td>21/06/2014</td><td>78</td><td>28</td><td>42</td><td>2</td><td>1</td><td>2</td><td>3</td><td></td><td>21:40</td><td>04:09</td></tr><tr><td>22/06/2014</td><td>58</td><td>23</td><td>29</td><td>1</td><td></td><td>2</td><td></td><td>1</td><td>21:41</td><td>03:56</td></tr><tr><td>23/06/2014</td><td>87</td><td>40</td><td>44</td><td></td><td></td><td>1</td><td></td><td>2</td><td>21:39</td><td>04:11</td></tr><tr><td>Avg</td><td>69</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>	Date	Passes	PP	PS	PN	My	NN	NN	ES	1st	Lst	20/06/2014	58	37	17			1	1		21:35	04:07	21/06/2014	78	28	42	2	1	2	3		21:40	04:09	22/06/2014	58	23	29	1		2		1	21:41	03:56	23/06/2014	87	40	44			1		2	21:39	04:11	Avg	69									
Date	Passes	PP	PS	PN	My	NN	NN	ES	1st	Lst																																																											
20/06/2014	58	37	17			1	1		21:35	04:07																																																											
21/06/2014	78	28	42	2	1	2	3		21:40	04:09																																																											
22/06/2014	58	23	29	1		2		1	21:41	03:56																																																											
23/06/2014	87	40	44			1		2	21:39	04:11																																																											
Avg	69																																																																				
17/07/14	Dawn Bat Survey, transect around site	No cloud, low to 14c, no wind	Last bat at 05:05 PS along Summer Lane. No re-entry noted. Serotine recorded south of Summer lane at 03:47. My recorded Boundary 6 at 04:14. Regular foraging of 1-2 PP and PS along Summer Lane, and along back gardens adjacent to horse paddock at Boundaries 2 & 3, as well as foraging along boundary 1. <i>Transect data: T1= 1PP; T2=4PP; T3= 2PS; T4= 1PS; T5 = 4PP; T6= 0; T7= 3PS; T8 = 5PP; T9= 1PP, 1ES; T10= 0; T11= 0.</i>																																																																		

21/08/14	Dusk Bat Survey, transect	Part cloud, no rain, low to 12c	Nil emergence. First bat PP along Summer Lane at 20:35. First PP on eastern boundary at 20:39. PS along eastern boundary at 20:41 from east. Occ PP & PS foraging during fixed point survey. My sp. noted along northern boundary of arable field at 21:07 <i>Transect data: T1= 4PP; T2=2PP; T3= 5PS; T4= 1PS; T5 = 4PP; T6= 0; T7= 0; T8 = 5PP, 2PS; T9= 1PP; T10= 0; T11= 0.</i>
12/09/14	Dawn Bat Survey, transect	Part cloud, low to 13c, light SE wind	Generally low activity around the site. PP & PS recorded in horse paddock during survey on and off, and less so along northern boundary of arable field and Summer Lane. Late foraging by PS in NE corner of horse paddock and off site to north. Last bats PS 06:07 headed NE, PP 06:08 headed east. Social calling by PS during foraging. <i>Transect data: T1= 1PP; T2=4PS; T3= 12PS; T4= 0PS; T5 = 0PP; T6= 0; T7= 1PS, !NN; T8 =0; T9= 1PP, 1ES; T10= 0; T11= 0.</i>
Key: PP = Common Pipistrelle, PS = Soprano Pipistrelle, NN = Noctule, ES = Serotine, PN = Nathusis's Pipistrelle, My = Myotis sp., MyM = Whiskered Bat			

6.2 Badgers

- 6.2.1 The site was assessed for potential Badger *Meles meles* presence using the methodology outlined in **Technical Appendix 4**. Habitats on site are suitable for foraging Badgers and there is potential along the dense scrub boundaries for Setts creation. Parts of the site could not be fully examined due to the impenetrable nature of the Thorn, Bramble and Nettle scrub. However no evidence of Badgers was noted during survey work. Evidence of Fox *Vulpes vulpes* was noted from the western boundary area, with breeding confirmed in the Blackthorn scrub at the northern end of the builder's yard.

6.3 Water Vole & Otter

Introduction

- 6.3.1 Water Vole have been recorded locally around the grazing marshes at Pagham Harbour west and south of the site, with a number of records from the data search in ditches and Rifes in the wider local area. A survey of the ditches and watercourses around the site has been undertaken during spring/summer 2014. The survey was undertaken to the methodology outlined in **Technical Appendix 8**. This involves searching the watercourses, ditches and their banks for signs of use by Water Vole and Otter.

Results

- 6.3.2 Three of the boundaries within the proposed development area have ditches/watercourses with potential for Water Vole presence. These are assessed below.

Boundary 1 Ditch

- 6.3.3 This ditch currently contain very limited suitable habitat for Water Vole with low potential. This is due to its relatively isolated nature, reduced feeding opportunities because of the likely mostly dry nature of the ditch for the majority of the year, but after the very wet winter of early 2014 contained some standing water in early spring, and very limited ponding of water along its eastern end in late winter 2015. It has dense scrub dominance, and a lack of aquatic vegetation. There may be slightly higher potential if the farmland was in flood and the ditch became wetter, and/or was managed to be open and with higher water levels, however the ditch is isolated from the surrounding landscape and does not appear to be connected.

Boundary 7 Watercourse

- 6.3.4 This ditch contained some water throughout the spring and summer, and a sluice at its northern end provides a small area with deeper water (to 0.5m in early spring). There is aquatic vegetation dominated by Reed and Hemlock Water Dropwort. Signs of Water Vole presence including burrows, feeding lawns, latrines and chewed vegetation were noted along the northern section of this ditch in the early spring survey. Two Water Vole were also observed at the mid point of the boundary ditch.

Boundary 8 Watercourse

- 6.3.5 This boundary ditch is a continuation of that at Boundary 7. It is generally drier than at Boundary 7, but contains aquatic vegetation, with stretches of coarse grasses and tall herbs. It had mostly dried by summer 2014. It is generally more suboptimal habitat for Water Vole. Signs of Water Vole use were noted where it joins the ditch at Boundary 7, and the ditch is likely to be at least used during periods of high winter water levels in winter and early spring (as was the case in late winter 2014), until the channel dries out.

Evaluation

- 6.3.6 Boundaries 7 & 8 are considered to be of **local value** for Water Vole on account of their confirmed presence in both ditches. Boundary 1 ditch is considered to be of **value within the zone of influence**.

6.4 Dormouse**Introduction**

- 6.4.1 The potential for the European protected species Dormouse *Muscardinus avellanarius* to be present was also considered (See **Technical Appendix 1 & 2** for legal status). The habitat is assessed as generally too isolated, recently established and species poor for it to be of suitability for Dormice and the data search has not returned any records from within 2km of the site. The nearest known populations are along the southern edges of the South Downs. A Dormouse nest tube survey was undertaken during April – September 2014 with tubes checked monthly.

Methodology

- 6.4.2 A total of 50 nest tubes were located between c10m intervals along suitable locations on all wooded boundaries within the site. This density of tubes is considered an adequate survey according to the Dormouse Mitigation Handbook (Bright et al 2006). Further details are provided in **Technical Appendix 9**.

Results

- 6.4.3 The habitat within the study area was assessed for potential use by Dormouse. The habitat is assessed as generally too isolated, recently established and species poor for it to be of suitability for Dormice. The majority of woody habitat is present along Boundaries 1, 4 & 5, and around the Blackthorn dominated scrub at the northern end of the horse paddock and builder's yard.
- 6.4.4 The survey work recorded use of the tubes and boxes by Wood Mice *Apodemus sylvaticus*, as well as roosting birds. No evidence of Dormouse using the tubes or boxes was noted. Details of the use of the tubes/boxes is provided at **Technical Appendix 9**.

Evaluation

- 6.4.5 No evidence of Dormouse has been recorded on site.

6.5 Other Protected Mammals

- 6.5.1 There is habitat for the BAP species Brown Hare *Lepus europaeus*, however none were recorded during survey work on site, and some suitable habitat for Hedgehog *Erinaceus europaeus*. The BAP species Harvest Mouse is recorded from within 2km of the site, and is a widespread species in coastal West Sussex.

7.0 REPTILES, AMPHIBIANS & INVERTEBRATES

7.1 Reptiles

Introduction

- 7.1.1 The habitats on site are considered to be suitable for common species of reptile, which are protected from harm under UK legislation (See **Technical Appendix 2**). A survey of reptiles and reptile habitat was undertaken during April-July 2014.

Methodology

- 7.1.2 A dedicated reptile survey was undertaken during seven dates to determine the likely level of use of the study area by reptiles. This involved survey to the methodology outlined in **Technical Appendix 10**, by laying down reptile refugia in suitable locations around the study area. A total of c50 refugia were placed around the study area margins and most suitable potential reptile habitat. The dates of the survey are provided in **Table 4** below.

Results

- 7.1.4 The desktop and records centre search has provided records for all four commoner reptile species, Slow Worm *Anguis fragilis*, Grass Snake *Natrix natrix*, Adder *Viper beris* and Common Lizard *Zootoca vivipara* within 2km of the site.
- 7.1.5 The habitats are restricted to the field boundaries in arable, rough grassland and woodland edge.
- 7.1.6 Three species of reptile were recorded during the survey, Common Lizard, Grass Snake and Slow Worm. The numbers recorded on individual survey dates are shown in **Table 4** below.
- 7.1.7 The distribution of reptiles is shown on **Figure 7**. Reptiles are concentrated around the horse paddock and builder's yard, with much lower numbers around the edges of the arable field where rough grassland strip is present.

Table 4: Reptile Survey

Date	Time	results
07/04/2014	pm	Reptile Set Up (AF= 1Sub 5Juv)
14/04/2014	pm	AF= 2M, 3F, 2sub
20/05/2014	am	AF = 1M, 5F, 3Sub, 1Juv; ZV = 2Ad
05/06/2014	am	AF= 1M, 8F, 2sub, 2juv; ZV = 4Ad; NN= 1 Ad
20/06/2014	pm	AF = 1M, 3F, 6Sub, 2Juv; ZV = 4Ad
24/06/2014	am	AF = 4F, 5sub, 1juv; ZV = 3Ad, 1sub
27/06/2014	am	AF = 3F, 6sub, 3juv; ZV = 2Ad, 2sub, NN = 1 Ad
17/07/2014	am	AF = 1F, 4sub, 2juv; ZV = 2Ad, 1sub

Key: NN = Grass Snake; AF = Slow Worm, ZV = Common Lizard

M=Male, F=Female, sub= Sub Adult, Juv = Juvenile

Evaluation

- 7.1.8 Three species of reptile have been recorded, Slow Worm, Common Lizard and Grass Snake. The records are distributed around the boundaries of the horse paddock, and less so around the arable field boundaries. These areas are considered to be of **Local Value** to populations of reptiles. The likely size of the populations of reptiles within the study area is however considered to be moderate for Slow Worm and Common Lizard, based on numbers recorded, and possibly low for Grass Snake based on the survey data and habitats present. The arable fields are of **negligible value** for reptiles at present.

7.2 Amphibians

Introduction

- 7.2.1 A survey for the legally protected Great Crested Newt *Triturus cristatus* (See **Technical Appendix 1 & 2** for legal status) was undertaken in April – May 2014. A single record of Great Crested Newt from a ‘SARG 2002 leaflet’ is noted from North Mundham about 2km from the site, although the Manhood peninsular and local area is not known as a Great Crested Newt area (with the exception of a single population north of Medmerry) generally and there are no records from the area in the National Biodiversity Network database.

Methodology

- 7.2.2 A dedicated Great Crested Newt assessment was undertaken on waterbodies within 500m of the site that were highlighted as having potential for containing breeding populations of Great Crested Newt that may potentially use habitats on site. The survey was undertaken by experienced and licensed Great Crested Newt surveyors. The survey was undertaken on four separate occasions to the standard methodology outlined and presented in **Technical Appendix 11**, which involved the use of a number of survey techniques to determine the level of use of the waterbodies by amphibians and particularly Great Crested Newt. Methods are selected depending upon pond conditions such as weed growth and water clarity. The results of the survey are provided below, and in more detail in the Table in **Technical Appendix 11**.

Results – On Site Waterbodies

- 7.2.3 The majority of the arable areas are likely to provide limited suitable terrestrial habitat for populations of amphibians in the local area. Terrestrial habitats are generally restricted to the boundaries where there is ditches and watercourses, rough grassland and hedgerows. During the reptile survey no Great Crested Newts were recorded terrestrially or under refugia.
- 7.2.4 On site there are three ditches/waterbodies that held water during early spring 2014. These ditches contained shallow water, with the deepest section of Boundary 7 containing c50cm of water by an artificial sluice at its northern end. The habitats provide ephemeral standing water for amphibians, but are of low value for Great Crested Newt as potential breeding ponds. During the survey Palmate Newt was recorded in the watercourse in Boundary 7, no other amphibians were recorded on site.

Results - Waterbodies Within 500m of the Site

- 7.2.5 Four ponds are present within 500m of the site, and further ditches to the western end of Summer Lane were examined during survey work on site. The ponds are described below.
- 7.2.6 **Pond 1**, which is shown at **Photo 15** is about 250m from the closest point of the site. It is situated in a housing estate and is c50m x 15m and upto 1m deep. It is on private land, but permission was given to survey. It is Willow dominated on its northern boundary with native and non-native aquatic marginal vegetation including Hemlock Water Dropwort *Oenanthe crocata*, Common Reed *Phragmites australis*, and Yellow Flag *Iris pseudochorus*. A heavily shaded nearby ditch was also examined. The survey worked noted the presence of fish and Smooth & Palmate Newt *Triturus vulgaris* & *Lissotriton helveticus* from the main pond area.
- 7.2.7 **Pond 2**, which is shown at **Photo 16** is about 300m from the site to the south east. It is 50m x 25m, but only 0.3-0.5m deep and kidney shaped. Again it is located within a housing estate and is relatively formal. It contains some native and non-native aquatic vegetation around parts of the margin, and other parts are open. Its shallow nature suggests it may dry out in some years and no fish were noted. Smooth & Palmate Newt and Common Frog *Rana temporaria* were recorded from this pond.
- 7.2.8 **Pond 3**, is a garden pond situated in the Rookery Farmhouse. The pond was on private land, but permission was given to survey. It is an old pond and is about 10m x 10m and upto c1m deep with a spur at one end. The pond has good clarity and contains a number of native and some non-native species, including Curled Pondweed, Greater Spearwort, Bogbean, Yellow Flag Iris, Celery-leaved Buttercup, and some Willows around the edges, but not shading the whole pond. The pond is shown at **Photo 17**. Again Smooth & Palmate Newts & Common Frog were recorded from this pond.
- 7.2.9 **Pond 4** is a farm pond on private land connected to watercourses and is located about c450m from the site to the north. Access was not granted to this pond. Given the distance to the site and habitats in-between it is unlikely that any newts from this pond would regularly use the habitats on site.
- 7.2.10 The off-site ditches south west of the site contained pools of ephemeral water of lower potential value for breeding ponds for Great Crested Newt, similar to those on site. These waterbodies contained small populations of Palmate Newt.



Photo 15: Pond 1 Barton Close



Photo 16: Pond 2 Lake Way



Photo 17: Pond 3 Rookery Farmhouse

Evaluation

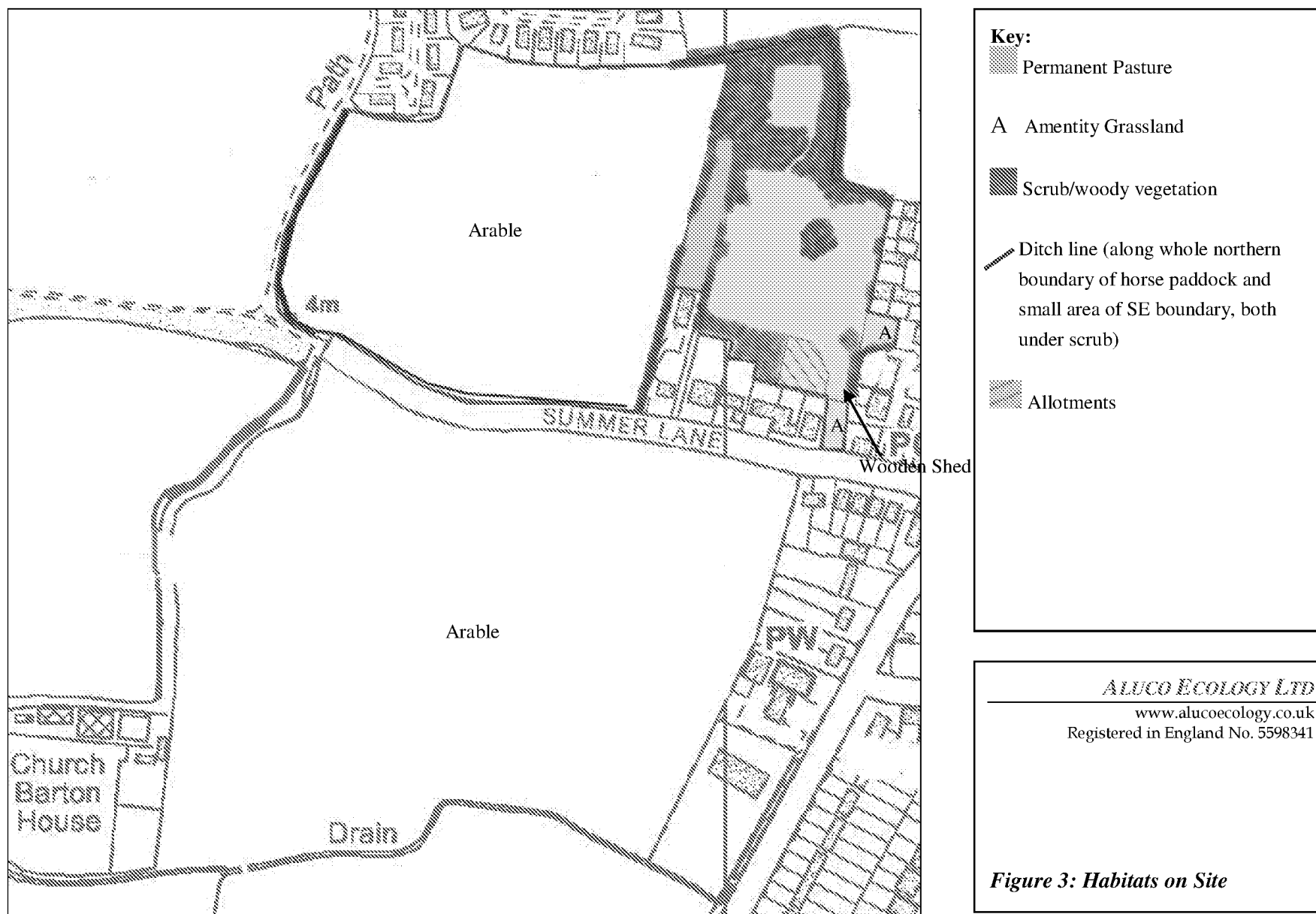
- 7.2.12 The survey results show the habitats on site are considered to be of **value within the Zone of Influence** for populations of Amphibians. Survey work has not resulted in any evidence of the presence of Great Crested Newt. The local populations of Smooth & Palmate Newts and Common Frog within the ponds off site suggests that these waterbodies are considered to be of **local value** to these amphibian populations.

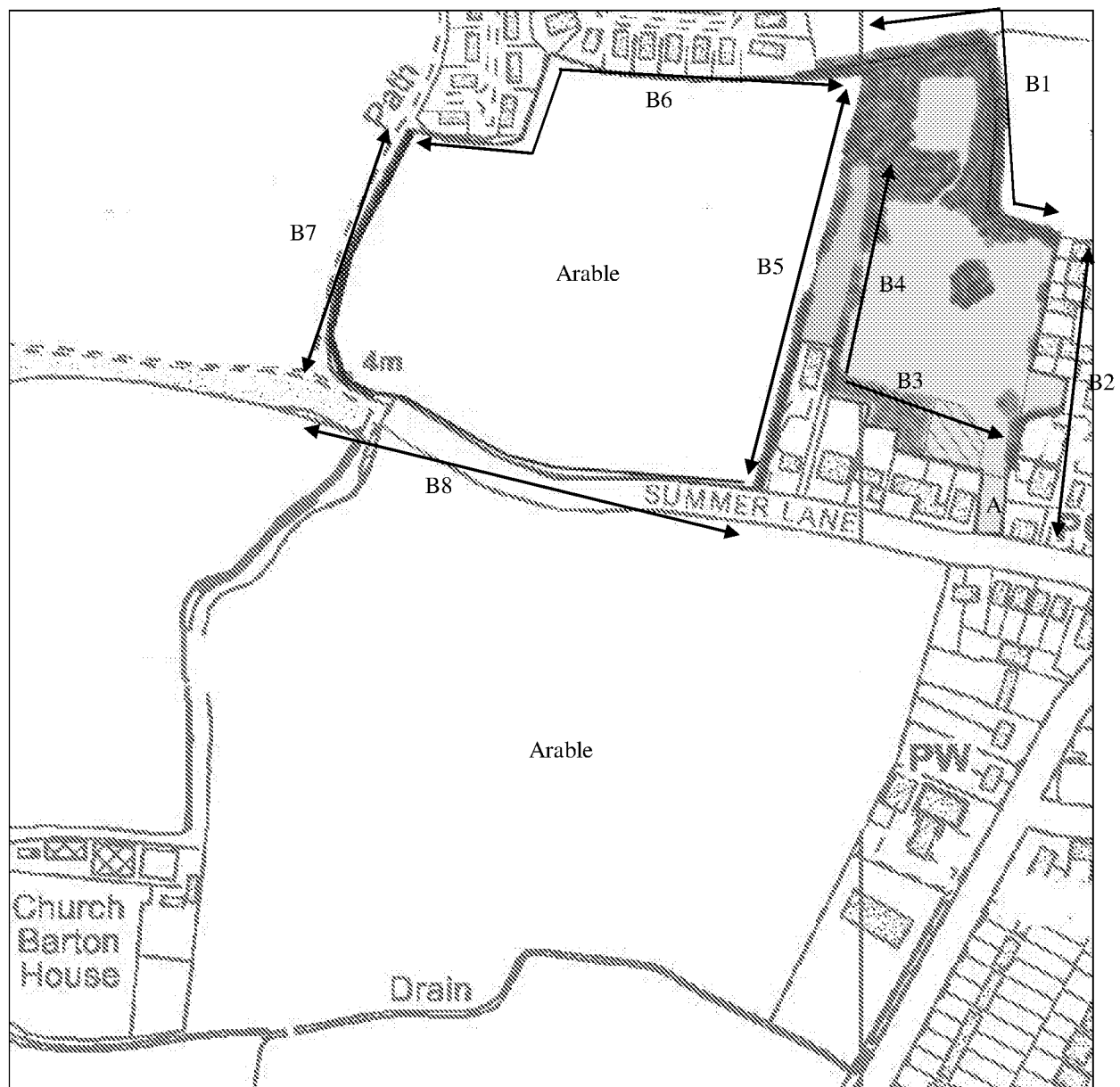
7.3 Invertebrates

- 7.3.1 Invertebrates and habitats were assessed during survey work on site in spring to summer 2014. The habitats on site are generally of intensive agricultural use in the arable areas, and of low intensity in the Horse paddock. The lower intensity use areas contained no habitats with high diversity of potential food sources or scarce local habitats, being generally species poor scrub edge and scrub, and species poor rough grassland dominated by False Oat Grass. Some nectar sources are present around the boundaries, including Bramble, Fleabane, and Thistles.
- 7.3.2 The survey effort recorded a number of commoner invertebrates including a number of butterflies such as Large, Small & Green Veined White *Pieris brassicae*, *P. rapae* & *P. napi*, Large Skipper *Ochlodes sylvanus*, Speckled Wood *Pararge aegeria*, Meadow Brown *Maniola jurtina*, Gatekeeper *Pyronia tithonus*, Small Tortoiseshell *Aglais urticae*, Peacock *Inachis io*, & Red Admiral *Vanessa atalanta*. The formally scarce but now widespread Long-winged Conehead *Gomphocerippus rufus* and Roesel's Bush Cricket *Metrioptera roeseli* were present in rough grassland, and Speckled and Dark Bush Crickets in scrub edge. The now BAP listed

(for research purposes) Cinnabar Moth *Tyria jacobaeae* was recorded on Ragwort in the boundaries. There is limited dead wood habitat for the protected Stag Beetle *Lucanus cervus*, but the species is present in the wider local area.

- 7.3.3 The habitats on site are considered of **value within the zone of influence** for invertebrate species of conservation concern on account of their generally agriculturally improved nature.





Key:

Boundary numbers refers to boundaries within the text

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Figure 4: Boundaries

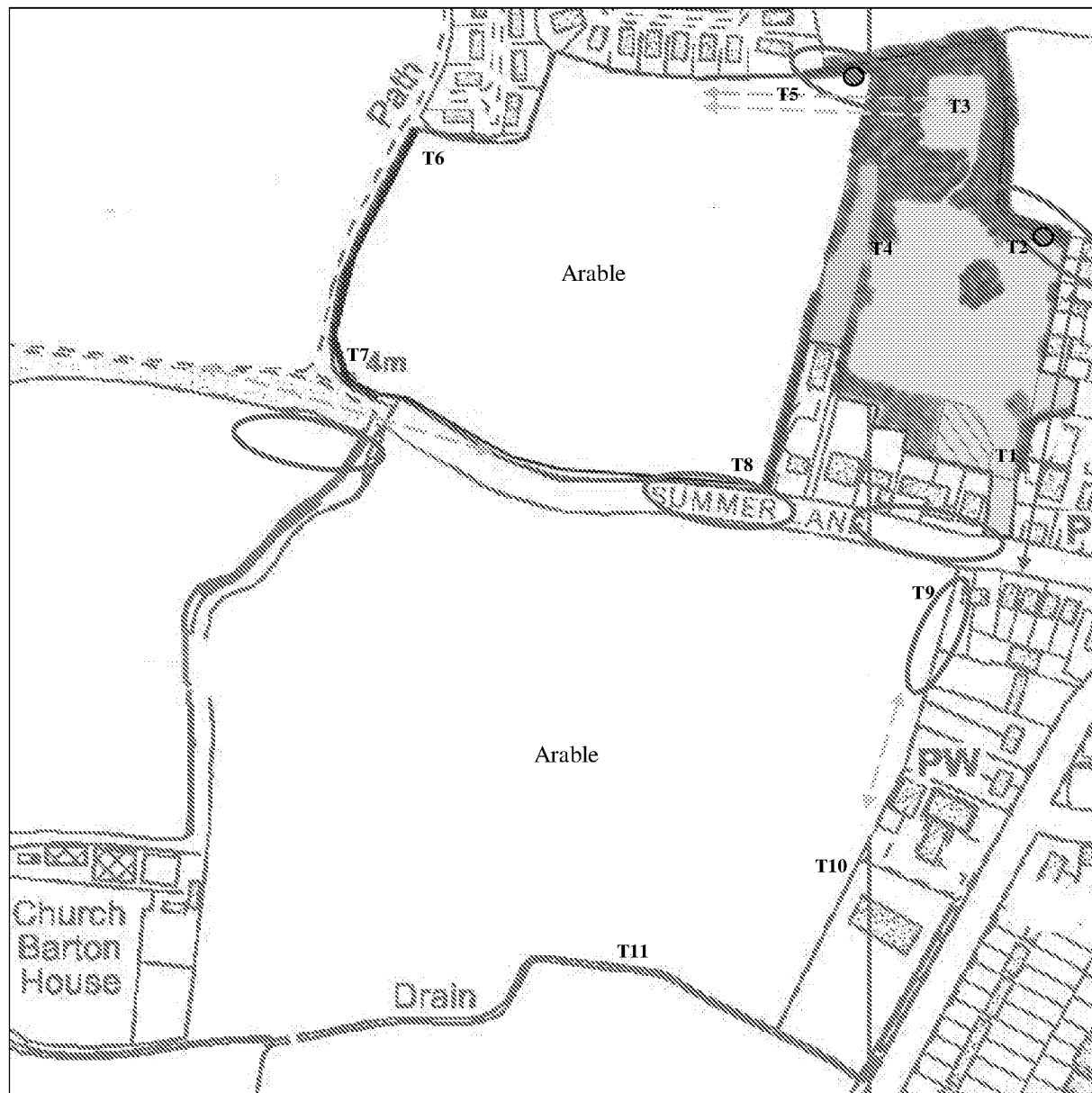


Key:

- Dunnock
- Song Thrush
- ⊗ Green Woodpecker
- ⊗ Blackcap
- ⊗ Whitethroat
- ⊗ House Sparrow
- ⊗ Starling

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Figure 5: Breeding Birds



Key:

-  Pipistrelle main foraging
-  Pipistrelle commuting
-  Myotis passes recorded
-  Serotine passes recorded
-  Location of remote monitoring
- T#** Transect Monitoring points

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Figure 6: Bat Survey Results



Key:

- Slow Worm (1-2 ind. per dot)
- Common Lizard (1-2 ind. per dot)
- ⊙ Grass Snake (ind. record)

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Figure 7: Reptile Survey Results

8.0 BRIEF ASSESSMENT OF LIKELY IMPACTS WITHOUT MITIGATION

8.1 Introduction

- 8.1.1 In view of the predicted activities and the resultant biophysical changes associated with the proposal, as described in Section 3, this section identifies the main potential ecological impacts within the predicted zone of influence, those considered potentially likely to arise in the absence of mitigation. This exercise provides focus for recommendations for scheme design and mitigation.

8.2 Protected Sites

Potential Impacts on Designated Sites

- 8.2.1 Development of the site for residential housing would need to consider the potential for adverse effects from increased recreational pressure on the designated sites at Pagham Harbour, which is about 1km from the site. Impacts may arise from the cumulative increase in disturbance an additional population brought in by the development would create, and impacts on the designated features of the site such as waterfowl. Alone it is unlikely that a development of this scale would have an adverse effect on the features of Pagham Harbour SPA/Ramsar, but in combination there is potential for a cumulative effect.
- 8.2.2 Chichester Harbour SPA/Ramsar is around 7km from the site at its closest point and is considered sufficient distance away from this site to be unlikely to have adverse effects on the features of importance of these European Sites.
- 8.2.3 The potential impacts on Pagham Harbour SSSI/SPA/Ramsar is considered in a separate document, taking into account information for a Habitats Regulations Assessment of the sites features, including populations of waterfowl such as Brent Geese (see Ecology Solutions, 2015).

8.3 Habitats & Species on Site

Potential Impacts on Habitats and Vegetation

- 8.3.1 The habitats on site are generally of low nature conservation value with low species diversity. The impact of loss of these habitats is considered to be of low significance. The northern ditch line at Boundary 1, and the ditches on Boundaries 7 & 8 on site are also of relatively low intrinsic value, but have a value at a local level and should look to be retained where possible and enhanced within a scheme design with a buffer, to provide wildlife/natural corridor along the boundaries. Loss of boundary features should be mitigated for on a 1:1 or greater basis.

Potential for Impacts on Birds

- 8.3.2 The potential for nesting bird species to be affected by development is present. If woody or scrub areas were to be removed or cut during the nesting season there is the potential for the development to affect the nests of birds, which would be contrary to Section 1 of the Wildlife & Countryside Act 1981 (as amended).

Potential for Impacts on Badgers

- 8.3.3 There is suitable habitat on site for Badgers, but no evidence was noted during the site survey.

Potential for Impacts on Bats

- 8.3.4 The site is used by foraging and commuting bats, and is linked to habitats off site and potential local roost sites have been identified in housing off site. A development should consider the need to maintain green corridors through the site for bats. If the site is to be lit, or through the road network, this could without mitigation adversely affect the use of the wider area by wildlife. Loss of woody boundary features should be compensated for with new habitat creation.

Potential for Impacts on Water Vole

- 8.3.5 The potential impacts on the ditch lines in terms of habitat for Water Vole will be considered in detailed scheme design. The direct effect on ditches and their banks should be avoided in design of the Masterplan. The Masterplan shows the loss of approximately 155m along the eastern end of the Boundary 8 ditch. This would have a significant effect on a sub-optimal potential Water Vole habitat, that may be used seasonally. Without mitigation this has the potential to have an adverse impact on a protected species and species of local importance. The ditch at Boundary 1 is proposed to be retained in situ with it being opened up of the scrub that is present along all of its current length on site. A road crossing point is proposed to access land off site should this be developed. No Water Vole have been recorded in this area. Boundary 7 also is to be retained in situ and outside of the site,. The most significant Water Vole activity during survey work has been recorded in this ditch.

Potential for Impacts on Reptiles

- 8.3.6 Three species of reptile have been recorded on site. There is a moderate population of Slow Worm and Common Lizard, and Grass Snake has been recorded. The development would see the direct impact on populations of reptiles within the Horse paddock and builder's yard. Without mitigation there would be an adverse impact on these populations of reptiles.

9.0 POTENTIAL FOR ECOLOGICAL MITIGATION & ENHANCEMENT

9.1 Introduction

- 9.1.1 The potential for impacts without mitigation was considered in Section 5, and broad mitigation recommendations are provided for consideration for a future development proposal. Recommendations are also made for further survey work on site and in the Zone of Influence.

9.2 Mitigation and Opportunities for Ecological Gain

Habitats

- 9.2.1 The ditch lines and as far as possible rough grassland arable margins, hedges and scrub should be retained in situ and buffered as part of a scheme. Green corridors should also be provided through a development (which is provided along the northern boundary, and eastern boundary of the arable field, where a buffer/hedges are present). Any new plantings within the edges of the scheme or along green corridors should be native species and based on the local situation. Measures should also be taken to ensure construction does not impact on retained habitats through fencing and measures to avoid pollution events. Any loss of semi-natural vegetation features should be compensated for at least 1:1 or greater. This is provided by the additional open space areas south of the site. New wetland features, along the northern and north western boundary of the proposed development should be designed with water retention during the spring summer, and banks with natural vegetation that are left undisturbed in places
- 9.2.2 The provision of a large area of open space to the south of the scheme and along its northern/north western boundaries will provide opportunities for creation of new habitats for wildlife, and the design of this area should have input from an ecologist. Habitats should include:
- A new ditch/watercourse that connects the ditch at Boundary 1 to the retained section at Boundary 8. This length is approximately 231m. This ditch will need to have regard to potential Water Vole mitigation requirements (See below). Where possible sections of the ditch should be allowed to develop naturally from bare ground. Suitable locally sourced native wetland seed mixes could also be planted. If mitigation measures allow, there may be potential to translocate some of the seed bank from the sections of lost ditch at Boundary 8 to the new ditch;
 - The ditch line should be designed to retain water through the year as far as possible, with designs to allow water retention at low flow periods;
 - A series of attenuation ponds are to be provided along the length of the ditch as part of the SUDS strategy. These will be connected to the new ditch at this location. It is recommended that these ponds are varied in profile and designed to allow some water retention through the year to provide new wildlife habitat suitable to local features including Water Vole. The pond features should in part be allowed to develop naturally with some bare ground habitat along the edges to allow natural colonisation, with potential local seed bank resources also available from the lost sections of Ditch 8. Where wild flower seeding is proposed this should be of locally sourced native stock;

- Wetlands to be designed should also be of value to amphibians and invertebrates with a mosaic of ponds with different features and water depths;
- Along the arable field boundaries south of the scheme in the proposed open space there should be retention of rough grassland strips to the existing arable field within this area as reptile habitat;
- The open spaces should have native wildflower seeding of local provenance and suited to locally present species;
- Retention and enhancement of existing ditch lines in this area (southern boundary of amenity area) could be considered to enhance wetland habitats;
- Native woody planting in a natural mosaic that provides levels of semi-natural scrub, linear hedge features and some trees. The design should look to link linear features in the landscape to provide foraging opportunities for Bats;
- Management of created grasslands and scrub/woody vegetation to provide new opportunities in the medium to long term for species such as reptiles and invertebrates. This includes allowing a rough grassland margin to boundary and woody features and reduced management of grasslands. Some areas of grassland should be outside of annual hay cutting to provide this edge habitat.
- Provision of a diversity of habitats for invertebrates, including woodpiles through habitat management, rough grassland edges, and any new wetland/pond features;
- Provision of a management plan for long term management objectives and prescriptions including regard to ecology features, and presence of protected species. Ecology prescriptions should be drafted by an experienced ecologist.

Nesting Birds

- 9.2.3 Any woody habitat that could contain a bird's nest should be removed outside of the nesting bird season, which is usually from end February to end August. It may be possible to check small amounts of woody vegetation does not contain a bird nest during the nesting period, but this should only be done by a suitably qualified ecologist. Arable areas should have regard to potential for ground nesting and crop nesting species, with suitable checks prior to construction and planning pre-construction to reduce potential for ground nesting birds.
- 9.2.4 Nest box features should be installed on retained woody vegetation and/or within new dwellings.

Foxes & Badgers

- 9.2.5 Removal of the dense scrub should be undertaken sensitively with checks to ensure that no active Fox earth is affected, and update checks for Badgers should be made. Foxes are likely to be breeding with young underground during January to June, and any potential Fox earths within a construction zone should be closed down prior to works commencing, and outside the breeding period.

Bats

- 9.2.6 No roosts are present on site. Foraging and commuting bats use the site, including bats from local roosts. The scheme design should look to maintain green links moving through the site from east to west and north to south. The large area of open space along the western boundary of the site should include linear woody features to enhance the local landscape for bats.

- 9.2.7 Any scheme lighting and security lighting should aim to ensure that the boundaries are not within the lit curtilage and remains a dark zone, through the use of downward facing directional lighting. Where possible the landscape planting on boundaries should avoid being lit. This will allow natural corridors to develop through the site.
- 9.2.8 New bat roost features should be incorporated into the scheme through bat boxes on trees where suitable, and/or on new dwellings, in locations suitable for potential use and agreed within a detailed ecology mitigation method statement.

Water Vole

- 9.2.9 A mitigation strategy for Water Vole should take into account the seasonal timings for works on potentially suitable Water Vole habitat. The main principals of mitigation include:
- Design of scheme to avoid impacts on identified Water Vole habitats;
 - Where a habitat is affected, reduction of impact to ensure that less than 50m of the ditch is disturbed/affected. This is not possible for the ditch along Boundary 8. Here c155m of ditch will be removed as part of the scheme. Compensation for loss of this ditch, which is regarded as sub-optimal Water Vole habitat, is to provide a new ditch along the north west boundary of the site that links Boundary 1 ditch (which will be opened up of scrub), and retained section of the Boundary 8 ditch. The new ditch will be c231m and will also connect to new attenuation ponds along the boundary;
 - It is recommended that the new wetland habitats to be created should be designed to hold water through the year as far as possible, this could be achieved through mini wiers along the length to pond water and reduce loss during low flow periods. Attenuation pond design could also be varied to provide areas that dry out and areas that are wet;
 - Update Water Vole surveys will be required prior to construction for ditches affected by the scheme, particularly the ditch at Boundary 8 to be directly affected, but also ditch at Boundary 1 where a new road route is proposed. The present survey did not record evidence of Water Vole along ditch 1 or the eastern section of ditch 8, but Water Voles were recorded further west where it meets the ditch along Boundary 7.
 - A detailed mitigation method statement will be required based on a detailed scheme design that takes into account relevant latest guidance on Water Vole mitigation in the Water Vole Conservation Handbook and Natural England Standing Advice. This provides methods for displacement mitigation techniques and translocation. Displacement can only be undertaken between late Feb and early April. For stretches of ditch with Water Vole presence over 50m in length translocation to newly created habitat may be the only mitigation option. This would require ensuring the proposed new ditch line is created and of a suitable habitat structure for Water Vole prior to translocation through planting and seeding the ditch with locally sourced native species. Translocation can only be undertaken under a Licence from Natural England with agreed method statements and conservation gain demonstrated;
 - For retained ditches, buffers of minimum 5m width along the banks of ditches close to the construction area with construction fencing is recommended, to ensure that habitats are retained in situ and construction impacts are avoided in retained habitats.

- The detailed mitigation method statement for detailed scheme design should be agreed through consultation.

Reptiles

- 9.2.10 Three species of reptile have been recorded on site. The proposed development is likely to have a direct impact on these populations without mitigation. The main aim of the mitigation strategy is to avoid harm to reptiles and retain the populations within the local environment. This will be through a mitigation strategy to translocate the population of reptiles in the construction works area to the proposed wider retained habitats, whilst new habitats are also being created in informal open space south of the site. The potential translocation area has also been surveyed for reptiles and low numbers of reptiles are present. However the strategy will see the retention of the edge habitat in these areas, which provides a large area of edge habitat in the local countryside. This will be linked to new habitat creation, and prescriptions for this open space will have regard to enhance and create new reptile habitat.
- 9.2.11 The population within the construction zone will therefore be subject to the translocation methodology outlined below. This site therefore fulfils the criteria as the most suitable translocation site (more details of criteria are provided in **Technical Appendix 12**). This area is shown in **Figure 2** along the northern, eastern and southern edges of the proposed informal and formal open space. The initial habitat for translocation includes the c2m x c400m boundary habitat to the farmland that has a low population of reptiles but suitable habitat. New habitat will be created as part of the open space and the translocated population will be able to colonise this new habitat. Around the development site areas of retained boundary are provided and these should be fenced from development activities. Here the existing population can be retained and links to the wider field network re-provided through the northern buffer zone, and new habitat in this area.
- 9.2.12 The long term management of this area will need to be prescribed to cater for reptiles, as well as other informal recreational activities and nature conservation interests, and this will need to be provided in a detailed Landscape and Biodiversity Management Plan for open spaces around the site. The amount of suitable reptile edge habitat can be increased through habitat management in the longer term management of the site. The created habitats with native hedge planting and wildflower grasslands on site, will also in time provide new niches for reptiles to colonise expanding the amount of local habitats for reptile populations.
- 9.2.13 The broad strategy will involve the following:
- The areas within the construction zone of the site will be sensitively strimmed to c10cm using hand tools, careful not to harm reptiles potentially present; Where trees and bushes are also to be removed, due regard will be had to the mitigation strategy for nesting birds below;
 - Reptile protective fencing will need be placed along retained boundary areas. This fencing will be to standard guidelines;
 - Refugia will be placed along the construction works area and a relocation of reptiles will be made based on the strategy outlined in **Technical Appendix 12** to the retained habitat that has been fenced from the construction zone;

- Following 3-5 negative visits in suitable conditions a destructive search will be undertaken of the works area by a suitably qualified ecologist. The construction area will be phased to allow for progressive destructive searches through the site to tie in with construction area phases;
- The fencing will continue to provide protection of the retained habitat from construction intrusion;
- Following construction, the area on the retained side of the fencing will be reconnected with the new open space areas and reptile populations will be allowed to colonise the new habitats over time;
- Long term management proposals of retained habitat are provided in a management plan;
- A mitigation method statement is to be drawn up for detailed scheme design and agreed with the Local Authority.

9.2.14 The reptile strategy will be undertaken during the period March-October. Where potential reptile habitat is contained within the works area outside this period, no construction works will be undertaken in this habitat during this period.

Potential for Ecology Gain on a future scheme

9.2.15 The large areas of open space habitats to the south of the scheme will provide opportunity to provide new wildlife habitats and to enhance existing features such as ditches and rough grassland edges in this area. Design of this area should have regard to the mitigation principles outlined above and detailed design should be undertaken with input from an ecologist.

9.2.16 Other areas of open space within the scheme for landscaping and boundary planting, and any 'SUDS' drainage solutions should be influenced by an ecologist during detailed drawing of a scheme. This will ensure that the open space and landscaping can serve a dual purpose of landscaping and wildlife enhancement,

9.2.17 The long term management of open space retained and created habitats should be detailed in a management plan that includes biodiversity prescriptions and a description and regard to ecological features present on site, including protected species presence.

10.0 CONCLUSIONS

10.1 An ecological assessment of the site was undertaken in order to provide an indication of the potential for habitats and species of conservation concern to be present on site. A number of ecological features have been recorded during detailed survey, with recommendations for scheme design and mitigation and habitat creation. The details of this mitigation strategy will need to be set out in mitigation method statements to accompany a detailed scheme design, having regard to protected species. A landscape and biodiversity management plan for retained and created habitats will also need to be provided for long term management of habitats on site.

11.0 REFERENCES

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Report Author

Gareth Knass LLb Hons MSc MCIEEM

Report Review

Anthony Blunden MSc MCIEEM CEnv

Aluco Ecology Ltd

Ref: 1302