

[REDACTED]

From: Amanda Scholes on behalf of Planning.Responses
Sent: 25 April 2019 08:11
To: Planning Scanning
Subject: FW: Reptile Habitat Status Misapprehension - AL/129/18/OUT – Land East of Orchard Gardens, Woodgate
Attachments: 04_19 AL-129-18-OUT - Ecological Assessment Feb 2017 (revision 1).pdf

From: Michael Eastham
Sent: 24 April 2019 16:48
To: Lynnyrd Wolfe
Cc: Planning.Responses
Subject: FW: Reptile Habitat Status Misapprehension - AL/129/18/OUT – Land East of Orchard Gardens, Woodgate

From: Michael Eastham
Sent: 15 April 2019 11:41
To: Planning.Responses
Subject: FW: Reptile Habitat Status Misapprehension - AL/129/18/OUT – Land East of Orchard Gardens, Woodgate

[REDACTED]

Thanks,

Michael

From: Liz Rogers [REDACTED]
Sent: 15 April 2019 09:51
To: Michael Eastham
Subject: RE: Reptile Habitat Status Misapprehension - AL/129/18/OUT – Land East of Orchard Gardens, Woodgate

Morning Michael,

Our consultation response of this site remains unchanged, reptiles surveys are required on the site, this recommendation is in line with Natural England's standing advice for reptiles (<https://www.gov.uk/guidance/reptiles-protection-surveys-and-licences>) and followings the legal requirements of the Wildlife and Countryside Act 1981 (as amended). We have repeatedly asking for reptiles surveys to be undertaken on this site as part of this application and as part of the previous application on the following dates 11/04/2019, 17/12/2018, 115/05/2017, 10/05/2017, 03/04/2017 and 16/11/2016 and we have provided extensive guidance on why these surveys are required and what they entail.

It should also be noted that the another development site bordering this site put in a hybrid planning application for 101 or 249 house (AL/15/17/PL) and for this application they had full surveys done for protected species in 2016 and these surveyed also included the land east of Orchard gardens which at the time had submitted a planning application for 57 units (AL/111/16/OUT). As part of this survey work full activity surveys for reptiles were done and included the land east of Orchard gardens. The Environmental Assessment (Feb 2017) submitted with the planning application AL/15/17/PL included the findings from the reptile surveys which took place in June 2016 and recorded common lizards and slow worms within the site boundary for the application AL/111/16/OUT and this new application AL/129/18/OUT. The map produced

from the surveys (Map 7 – phase two reptile survey results and location of refugia) clearly illustrates the location of the reptiles found during the survey being in this site. These surveys provide concrete evidence that reptiles were on the site land east of Orchards in 2016 (AL/111/16/OUT). The survey goes on to state due to the results of the reptile survey the site could be considered as a key reptile site. The survey report stated in paragraph 5.8.1 that;

'Surveys were undertaken within areas of suitable habitat and slow-worm and common lizard were recorded along some of the hedgerow bases, in the south-western field (now outside of the scheme) and the far northern field at the top of the site'.

These findings clearly shows that reptiles were on the Land east of Orchard gardens and further works are required for reptiles. I have attached a copy of the ecological assessment for ease of reference.

To conclude due to the previous ecological survey work for this site, Natural Englands standing advice and the legal requirements of the Wildlife and Countryside act reptiles activity surveys are required for this site, and if reptiles are found during the survey work we will also require that a mitigation strategy for reptiles is also produced and submitted as part of the planning application.

Many Thanks

Liz



Liz Rogers

Environment Officer

Environmental Protection

Chichester District Council

From: Michael Eastham [REDACTED]
Sent: 12 April 2019 08:39
To: Liz Rogers
Cc: Planning.Responses
Subject: FW: Reptile Habitat Status Misapprehension - AL/129/18/OUT – Land East of Orchard Gardens, Woodgate

Liz,

Please see the email below and the attachment from the applicant in reply to your consultation response to AL/129/18/OUT – Land East of Orchard Gardens, Woodgate.

I look forward to your reply.

Kind regards,

Michael

From: T Croucher [REDACTED]
Sent: 11 April 2019 17:44
To: Michael Eastham
Subject: Fw: Reptile Habitat Status Misapprehension

Dear Me Eastham

The attachment is " Legislative protection for herpetofauna" prepared by Amphibian and Reptile Conservation Group ARG UK

Just a note to clarify that the species that have the protection Ms Roger's refers to are in Section A of the

attachment. They and their habitats do not feature in this application. The four common or widespread reptiles which could apply to this site are in section B which explains their more limited protection.

Kind regards

David Loosley

From: T Croucher

Sent: 11 April 2019 16:44:59

To: Michael Eastham

Subject: Reptile Habitat Status Misapprehension

Dear Mr Eastham

Please find attached a independent summary of the legislation regarding the protection afforded to different UK reptiles. This demonstrates that the habitat for the 4 common reptiles is not protected. This is a distinction that should not have escaped a competent ecologist.

It appears that Ms Rogers might have been labouring under this misapprehension for some time and it has perhaps affected her view on this application, and possibly on others.

We trust that once Ms Rogers appreciates this distinction she will accept that the reptile habitat has no protection in this case.

It then follows that the site can be legally cleared to its boundaries leaving no refugia for reptiles. Alternatively it could be allowed to become completely overgrown with brambles providing no basking. Either way it would not provide suitable reptile habitat.

No planning = No provision or protection of reptile habitat on site.

Planning subject to Reptile mitigation enforced by s106 = Provision and Protection of Reptile habitat on site.

Care must still be taken to avoid intentionally killing or injuring reptiles during clearance and construction. That can be ensured by conditions requiring the involvement of a competent ecologist in preparing and implementing construction and landscape management plans.

The material consideration in relation to reptiles and biodiversity is therefore met by the grant of planning permission subject to conditions and s106. If you require any further input on this point please let me know.

Yours sincerely

David Loosley

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DX 57406 Littlehampton

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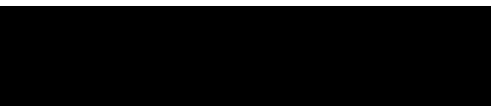
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**LAND AT WESTERGATE, CHICHESTER,
WEST SUSSEX**

ECOLOGICAL ASSESSMENT

Final Document (Revision 1)

February 2017

Preliminary Ecological Appraisals • Protected Species Surveys and Licensing • NVC • EclA • Management Plans
Habitats • Badger • Bats • Hazel Dormouse • Birds • Reptiles • Amphibians • Invertebrates • Riparian and Aquatic Species



ECOSA Quality Assurance Record

This report has been produced in accordance with Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Report Writing 2015¹. The report has been prepared in line with current best practice guidance and survey work has been undertaken in line with references within CIEEM's Source of Survey Guidance².

Description:	Ecological Assessment
Produced For:	CALA Homes (South Home Counties) Ltd
Issue:	Final (Revision 1)
Report Reference:	1888.F1
Date of Issue:	9 th February 2017
Date of Survey Works:	March - October 2016
Author:	Samantha Munslow BSc (Hons) MCIEEM CEnv Company Manager/Principal Ecologist
Checked and Reviewed by:	Simon Boswell MSc MCIEEM Principal Ecologist and GIS Specialist

DISCLAIMER

This is a technical report which does not represent legal advice. You may wish to seek legal advice if this is required.

This report may or may not be suitable to support a planning application. Should this report contain recommendations for further survey work or assessment, the results of this would be required in order to support a planning application.

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¹ Chartered Institute of Ecology and Environmental Management (2015). *Guidelines for Ecological Report Writing*. Technical Guidance Series. <http://www.cieem.net/publications/23/ecological-report-writing>

² www.cieem.net

**LAND AT WESTERGATE, CHICHESTER,
WEST SUSSEX**

ECOLOGICAL ASSESSMENT

Table of Contents

EXECUTIVE SUMMARY.....	1
1.0 INTRODUCTION	3
1.1 Background.....	3
1.2 Aims and Scope of Report.....	3
1.3 Site Setting and Description	4
1.4 Site Proposals.....	5
2.0 METHODS.....	6
2.1 Introduction	6
2.2 Zone of Influence	6
2.3 Desk-Based Assessment Methods	7
2.3.1 <i>Biological Records Centre</i>	7
2.3.2 <i>Multi-Agency Geographic Information for the Countryside (MAGIC)</i>	7
2.3.3 <i>Other Sources of Information</i>	8
2.4 Extended Phase 1 Habitat Survey Methods.....	8
2.4.1 <i>Vegetation</i>	8
2.4.2 <i>Bats</i>	9
2.4.3 <i>Otter</i>	9
2.4.4 <i>Badger</i>	9
2.4.5 <i>Dormouse</i>	9
2.4.6 <i>Water Vole</i>	9
2.4.7 <i>Birds</i>	10
2.4.8 <i>Reptiles</i>	10
2.4.9 <i>Great Crested Newt</i>	10
2.4.10 <i>Invertebrates</i>	10
2.4.11 <i>Other Relevant Species</i>	11
2.5 Extended Phase 1 Habitat Survey Details	11
2.6 Preliminary Ecological Appraisal Limitations	11
2.7 Initial Protected Species Assessment	11
2.8 Criteria used to Assess Ecological Value	12
2.9 National Vegetation Classification (NVC)	14
2.9.1 <i>Survey Methods</i>	14
2.9.2 <i>Survey Details</i>	14
2.9.3 <i>Survey Personnel</i>	14
2.9.4 <i>Survey Limitations</i>	14
2.10 Tree Climb and Inspect Survey in Respect of Bats	15
2.10.1 <i>Survey Methods</i>	15
2.10.2 <i>Survey Details</i>	15
2.10.3 <i>Survey Personnel</i>	15
2.10.4 <i>Survey Limitations</i>	15
2.11 Phase 2 Bat Transect Survey.....	16
2.11.1 <i>Survey Methods</i>	16
2.11.2 <i>Survey Details</i>	16
2.11.3 <i>Survey Personnel</i>	17
2.11.4 <i>Survey Limitations</i>	17
2.12 Automated Bat Detector Survey	18
2.12.1 <i>Survey Methods</i>	18

2.12.2	Data Analysis.....	18
2.12.3	Survey Details.....	19
2.12.4	Survey Limitations	21
2.13	Otter and Water Vole Survey.....	21
2.13.1	Survey Methods.....	21
2.13.2	Survey Details.....	22
2.13.3	Survey Personnel	22
2.13.4	Survey Limitations	22
2.14	Phase 2 Dormouse Survey.....	22
2.14.1	Survey Methods.....	22
2.14.2	Survey Details.....	23
2.14.3	Survey Personnel	23
2.14.4	Survey Limitations	23
2.15	Breeding Bird Survey.....	23
2.15.1	Survey Methods.....	23
2.15.2	Survey Details.....	25
2.15.3	Survey Personnel	25
2.15.4	Survey Limitations	25
2.16	Phase 2 Reptile Survey	25
2.16.1	Survey Methods.....	25
2.16.2	Survey Details.....	26
2.16.3	Survey Personnel	26
2.16.4	Survey Limitations	26
2.17	Great Crested Newt Environmental DNA (eDNA) Survey.....	27
2.17.1	Survey Methods.....	27
2.17.2	Survey Details.....	27
2.17.3	Survey Personnel	28
2.17.4	Survey Limitations	28
2.18	Invertebrate Survey	28
2.18.1	Survey Methods.....	28
2.18.2	Survey Details.....	28
2.18.3	Survey Personnel	28
2.18.4	Survey Limitations	29
3.0	RESULTS	30
3.1	Introduction	30
3.2	Desktop Study	30
3.2.1	Statutory and Non-Statutory Designated Sites.....	30
3.3	Vegetation.....	30
3.3.1	Improved Grassland	30
3.3.2	Poor Semi-improved Grassland	31
3.3.3	Arable.....	31
3.3.4	Hedgerows.....	31
3.3.5	Trees.....	32
3.3.6	Woodland.....	33
3.3.7	Dense / Continuous Scrub.....	33
3.3.8	Running Water.....	33
3.3.9	Summary	34
3.4	National Vegetation Classification (NVC) Results	34
3.4.1	Trampled grassland and arable.....	35
3.4.2	Bramble, nettle and other tall ruderal vegetation.....	35
3.4.3	Aquatic and marginal vegetation	35
3.4.4	Wet grassland.....	36
3.4.5	Dry neutral grassland.....	36
3.4.6	Woodland and hedgerows	37
3.4.7	Vegetation Classification	38
3.4.8	Summary Assessment.....	40
3.5	Bat Survey Results	41
3.5.1	Tree Climb and Inspect in Respect of Bats Results	41
3.5.2	Foraging and Commuting Habitat.....	41

3.5.3	<i>Phase 2 Bat Transect Survey Results</i>	42
3.5.4	<i>Automated Bat Detector Survey Results</i>	43
3.5.5	<i>Assessment of Value to Foraging and Commuting Bats</i>	46
3.6	Badger	47
3.7	Otter and Water Vole Survey Results	47
3.8	Dormouse Survey Results	48
3.9	Breeding Bird Survey Results	49
3.10	Reptile Survey Results	52
3.10.1	<i>Assessment of Population Size</i>	53
3.11	Great Crested Newt Environmental DNA (eDNA) Survey Results	53
3.12	Invertebrate Survey Results	54
3.12.1	<i>Phase 1 Invertebrate Survey</i>	54
3.12.2	<i>Phase 2 Invertebrate Survey</i>	54
3.12.3	<i>Summary Assessment</i>	56
3.13	Other Relevant Species	57
4.0	PLANNING POLICY CONTEXT	58
4.1	Introduction	58
4.2	Planning Policy	58
4.2.1	<i>National Policy</i>	58
4.2.2	<i>Local Policy</i>	59
5.0	EVALUATION, IMPACTS AND RECOMMENDATIONS	63
5.1	Introduction	63
5.2	Habitats	63
5.7.2	<i>Potential Impacts of Proposed Development</i>	68
5.7.3	<i>Outline of Recommendations</i>	69
5.11	Evaluation Against Relevant Planning Policy	72
5.12	Updating Surveys	73
6.0	CONCLUSION	74
Map 1	Site Location Plan	
Map 2	Phase 1 Habitat Map	
Map 3	National Vegetation Classification (NVC)	
Map 4	Bat Surveys	
Map 5	Location of Dormouse Tubes	
Map 6a	Breeding Bird Survey Results: Schedule 1 and Red Listed Species	
Map 6b	Breeding Bird Survey Results: Amber Listed Species	
Map 7	Phase 2 Reptile Survey Results and Location of Refugia	
Map 8	Location of Pond Surveyed and eDNA Results	
Map 9	Invertebrate Survey Results	
Appendix 1	Proposed Illustrative Landscape Framework	
Appendix 2	Vascular Plant List	
Appendix 3	National Vegetation Classification (NVC) Survey Photographs	

Appendix 4 Tree Climb and Inspect Survey Results

Appendix 5 Automated Detector Settings

Appendix 6 Invertebrate Survey Results

Appendix 7 Invertebrate Status Category Definitions and Criteria

Appendix 8 Protected Species Legislation

EXECUTIVE SUMMARY

- A Phase 1 ecological survey and a subsequent suite of Phase 2 ecological surveys were carried out by ECOSA Ltd over 2011 and 2012 at land at Westergate, Chichester, West Sussex PO20 3QR. An updating Preliminary Ecological Appraisal was carried out by ECOSA Ltd during March 2016.
- Further to the above, ECOSA were subsequently commissioned to undertake a suite of Phase 2 ecological surveys in order to establish the status of habitats, roosting, foraging and commuting bats, otter, dormouse, water vole, breeding birds, reptiles, great crested newt, and rare or scarce invertebrates at the site. Detailed botanical surveys were also carried out at the site.
- This report presents the findings of the updating ecological survey works carried out by ECOSA between March and November 2016. This report provides an assessment of potential ecological impacts of the proposed development on biodiversity, and provides recommendations based on the findings of the surveys and the identified impacts. The results of this assessment have informed the scheme layout that will avoid, where possible, impacts on key species and habitats, and will inform suitable mitigation to be incorporated into the design.
- The proposed development is for circa 350 dwellings, associated public open space, landscaping and formation of a new access road onto the A29. The design of the site and masterplan has been developed and informed, in part, by the results of the ecological surveys.
- The site is situated within the village of Westergate, West Sussex, approximately eight kilometres due east of Chichester city centre. The site is situated to the east of the A29 Westergate Street and is bordered to the south by the Portsmouth to London railway line. The site is bordered to the north and west by residential developments and to the east by open farmland.
- Much of the interior of the site will be developed, however because of the stream on the eastern site boundary, a considerable buffer will be retained and subsequently managed for biodiversity as much as possible. Impacts include loss of arable fields and grassland and damage/disturbance to retained habitats due to increased recreational pressure.
- Species/species groups which could be directly or indirectly impacted by the development of this site, in the absence of mitigation, include reptiles, bats, birds, badger and invertebrates.

- The most interesting areas of the site, in terms of habitats, are the hedgerows, mature trees (scattered across the site but mainly within the hedgerows) and wet woodland. These areas/features will all be retained wherever possible. There are opportunities for habitat enhancement and details of this will be included within the landscape report but also within the LEMP).
- Some of the mature trees on site provide suitable roosting features for bats and a moderate level of bat foraging and commuting activity was recorded on the site during the transect surveys. The Lidsey Rife and railway line are of particular importance to bats but activity was recorded across the entire site.
- The site supports a variety of breeding birds including red, amber and Schedule 1 listed species such as Cetti's warbler, linnet, song thrush, yellowhammer and dunnoek. The site provides a range of suitable nesting and foraging habitat for birds in the form of woodland, scrub, mature trees and hedgerows.
- Slow-worm and common lizard have been recorded in a number of locations across the site, including along hedgerow bases and within the tussocky grassland in the far north of the site.
- The invertebrate survey recorded a total of one Red Data Book and four Nationally Scarce species. Areas of most interest for invertebrates are the semi-improved grassland areas.
- Mitigation for the site has being developed with the architect and landscape architect and includes protection and enhancement of existing habitats, retention of a buffer along the eastern boundary and creation of wildflower meadow. Species-specific mitigation/enhancement will include retention of dark corridors, relocation of reptiles, sensitive works timings, introduction of bird and bat boxes and the use of sensitive lighting.
- An EMP will be prepared as part of the planning process and this will include details of mitigation and enhancement. The plan will include details on planting, species to be used, areas which will be managed and how the management will be designed. The plan will also include a Reptile Mitigation Strategy.
- The construction phase of the scheme will be guided by a Construction Environmental Management Plan (CEMP) in which an ecologist will provide information, including precautionary methods of works in relation to nesting birds, reptiles and protection of retained habitats.

1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been contracted by CALA Homes (South Home Counties) Limited to undertake an Ecological Assessment at land at Westergate, Chichester, West Sussex PO20 3QR (hereafter known as the "Site"). The site is centred on National Grid Reference (NGR) SU 941 048 (**Map 1**).

ECOSA were previously commissioned in 2011 and 2012 by Hampshire Developments to undertake Phase 1 and Phase 2 surveys at the site³. WYG also undertook a separate extended Phase 1 habitat survey in 2015⁴.

An updating Preliminary Ecological Appraisal was undertaken by ECOSA in March 2016 to ascertain the potential for protected habitats and species to be present within the site, to inform an initial assessment of impacts and outline further survey works, avoidance measures and recommendations.

The need to carry out further Phase 2 ecological surveys was identified during this Preliminary Ecological Appraisal. Phase 2 surveys subsequently undertaken consisted of National Vegetation Classification (NVC), bat surveys (tree climb and inspect, bat transect and automated detector), dormouse, otter, water vole, breeding bird, reptile, great crested newt and invertebrate surveys.

1.2 Aims and Scope of Report

This report presents the key findings of the Preliminary Ecological Appraisal and subsequent suite of Phase 2 ecological surveys carried out by ECOSA between March and November 2016.

The aim of these surveys is to ascertain the status of protected species groups and the value of habitats at the site in order for an appropriate impact assessment to be conducted. The results of this assessment will inform a detailed design that will avoid, where possible, impacts on key species and habitats, and will inform suitable mitigation to be incorporated into the design.

This report also assesses the compliance of the scheme with relevant local and national planning policy. Further recommendations where applicable are stated within the relevant sections of this report.

³ ECOSA (2011 and 2012) *Westergate, West Sussex – Phase 1 Ecological Survey* - Final Document dated September 2011 and *Westergate, West Sussex - Phase 2 Ecological Surveys* – Ecological Survey and Assessment Limited, Winchester, Hampshire

⁴ WYG (2015) *Westergate, West Sussex – Extended Phase 1 Habitat Survey*, dated April 2015.

1.3 Site Setting and Description

The site is situated in the South Coast Plain National Character Area, described by Natural England as follows⁵:

“The South Coast Plain National Character Area (NCA) is a narrow strip running along the Hampshire and Sussex coast from the edge of Southampton in the west to Brighton and Hove in the east. The South Hampshire Lowlands NCA rises gently in the north until Portsmouth, after which the higher South Downs NCA forms the backdrop along the remaining northern boundary. The underlying geology is part of the Hampshire Basin which stretches to Dorset and the northern half of the Isle of Wight, within the chalk borders of the Purbeck Hills, Cranborne Chase, South Downs and Salisbury Plain. The Arun, Adur, Hamble and Meon rivers drain south from the higher ground of the Downs, through this NCA to the coast, along with other smaller streams and rifies. Public water supply relies on surface water abstractions and groundwater from the Lower Greensand aquifer and the Worthing and Chichester chalk blocks.

The Solent and Southampton Water Special Protection Area (SPA) and Solent Maritime Special Area of Conservation (SAC) connect this coastline with the South Hampshire Lowlands NCA and New Forest NCA in the west and the Isle of Wight, to which it is also connected by Solent and Isle of Wight Lagoons SAC. In the west, there are views to the Isle of Wight across the Solent and to the New Forest NCA across Southampton Water. East–west trunk roads define the northern boundary; the M27 starts at Portsmouth and runs west to the New Forest NCA and the A27 runs east to Brighton and Hastings. The A3(M) cuts north through the Downs, linking this NCA with Surrey and London. The West Coastway Line railway runs between Southampton and Brighton and the port of Portsmouth provides international links. The Manhood Peninsula is a small triangular peninsula south of Chichester and remote from the rest of the NCA. Its southern headland, Selsey Bill, is a prominent coastal deposition feature, which projects out into the Solent well beyond the line of the rest of the coast. It is one of the last, and largest, relatively undeveloped stretches of coastline between Newhaven and Southampton.”

The site is 18.77 hectares (ha) in size and situated within the village of Westergate, West Sussex, approximately eight kilometres (km) due east of Chichester. The site is situated to the east of the A29 Westergate Street and is bordered to the south by an

⁵ National Character Areas (NCA) are defined by Natural England as ‘areas defined at the national level, which describe the geographical, ecological and historical variations in landscape character that make one area different from another. Their boundaries follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.’ (<https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making> - Natural England, first published 30th September 2014).

active railway line, and to the north and west by residential development. The eastern site boundary is formed by the Lidsey Rife (stream); beyond this lies open farmland under arable usage.

The site comprises an area of open land used for agriculture, hedgerows, treelines, wet woodland, two small streams (north-south and a second east-west).

1.4 Site Proposals

The proposals for the site entail the construction of residential dwellings and associated infrastructure. The proposed development is for circa 350 dwellings (mixture of houses and apartments, both private and affordable housing), associated public open space, landscaping and formation of a new access road onto the A29 Westergate Street. The proposed Illustrative Landscape Framework for the site is provided in **Appendix 1**.

2.0 METHODS

2.1 Introduction

This section details the methods used during the Ecological Assessment undertaken at the land at Westergate site, Chichester, between March and November 2016.

2.2 Zone of Influence

The Zone of Influence (Zol)⁶ for the proposed development was determined for each of the ecological receptors considered (habitats, communities or species). This is the area over which the activities associated with the proposed development could significantly affect an ecological feature. The Zol considered as part of this assessment is based on:

- Consideration of what the “important” ecological features are/could be within the site and surrounding area;
- The sensitivity of the receptor to any biophysical changes which could occur and the extent to which those changes could occur (including migratory/particularly mobile species);
- The characteristics of potential effects of the proposed development, and the distance and pathways that might be associated with that effect.

Initially, the Zol was developed on the basis of high-level, desk-based review of ecological resources in the general vicinity of the site, in combination with a review of the likely change-pathway-effect associated with the proposed development. **Table 1** provides the Zol for each of the receptors used for the purpose of this stage of the study.

Table 1: Zones of Influence for receptors

Receptor	Zone of Influence
Designated Sites (Statutory)	5m from the site
Designated Sites (Non-statutory)	1 km from the site
Habitats	The site
Badger	30m from the site
Bats	2km from the site
Breeding Birds	1 km from the site
Reptiles	1 km from the site
Water Vole	50m from the site

⁶ The Zone of Influence is defined by CIEEM as being the “areas / resources that may be affected by the biophysical changes caused by activities”.

Receptor	Zone of Influence
Otter	500m from the site
Great Crested Newt	500m from the Site

2.3 Desk-Based Assessment Methods

2.3.1 Biological Records Centre

Sussex Biological Record Centre (SxBRC) was consulted for information on non-statutory designated sites and protected and notable species records in the vicinity of the site. The search radius used has been based on the Zol. **Table 2** details the search distances used during the desk study.

Table 2: Desk study search distances

Receptor	Search Distance
Statutory Sites	5km
Non-Statutory Sites	1km
Protected Species / Notable Species (with the exception of bats and otter)	1km
Bats	2km
Otter	5km

2.3.2 Multi-Agency Geographic Information for the Countryside (MAGIC)

The Multi-Agency Geographic Information for the Countryside (MAGIC)⁷ database was accessed on 4th October 2016 in order to establish the presence of statutory designated sites located within the vicinity of the site. This included a search for all internationally and nationally designated sites such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites, Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) within 5km of the site. Where appropriate, the desk study search area was extended to take account of any appropriate statutory designated sites which need consideration in terms of potential indirect impacts and which support particularly mobile species.

⁷ <http://defra.magic.gov.uk>

2.3.3 Other Sources of Information

Online mapping resources, at an appropriate scale, were used to identify the presence of habitats such as woodland blocks, watercourse and hedgerows, in proximity to the site.

Online mapping resources at a minimum scale of 1:25,000 were used to identify the presence of ponds or other waterbodies within a 500 metre (m) radius of the site. The 500m is a standardised search radius to assist in the assessment of the potential of a site and its surrounding habitat to support great crested newt, based on current Natural England guidance⁸.

Previous surveys have been carried out at the site in 2011, 2012 and 2015^{3,4}; key findings from this work have been considered in this report and used to inform the ecological baseline.

Acknowledgement has also been given to the report produced for supporting the development of a Biodiversity/Green Corridor⁹.

2.4 Extended Phase 1 Habitat Survey Methods

The extended Phase 1 habitat survey was carried out on 2nd March 2016. The survey involved a walkover of the site to identify the habitat types present and to record evidence of the more commonly encountered protected species. The scope of the protected species was based on the habitats present with particular reference to bats, otter *Lutra lutra*, badger *Meles meles*, dormouse *Muscardinus avellanarius*, water vole *Arvicola amphibius*, birds, reptiles, great crested newt *Triturus cristatus* and invertebrates. The potential for the site to support other protected and notable species was also considered as part of the Preliminary Ecological Appraisal. Details of the species-specific appraisal methods are given below.

2.4.1 Vegetation

An assessment was made of all areas of vegetation within the site based on the standardised Phase 1 survey methodology¹⁰. This involved a walkover survey to identify broad vegetation types, which were then classified against Phase 1 habitat types, where appropriate. A list of characteristic plant species for each vegetation type

⁸ English Nature (2001) Great Crested Newt Mitigation Guidelines. Peterborough

⁹ (Aldingbourne Parish Council, 2016) Report on the Development of Biodiversity/Green Corridors in the Parish of Aldingbourne

¹⁰ JNCC (2010) Handbook for Phase 1 habitat survey: A technique for environmental audit – Field manual

was also compiled and any invasive species¹¹ encountered as an incidental result of the survey are noted.

2.4.2 Bats

An assessment was made of the suitability of trees on the site and immediately on the site boundary to support roosting bats based on the presence of features such as holes, cracks, splits, loose bark and ivy cladding in trees. An assessment was made of the suitability of the site and the surrounding landscape to support foraging and/or commuting bat species. The survey conformed to current Bat Conservation Trust guidelines¹².

2.4.3 Otter

The banks of streams on the site were assessed for their potential to support otter by reference to bank structure and the bank side vegetation. During the survey attention was paid to the presence of spraints, footprints, or any evidence of the presence of a holt. The site was also considered in terms of its suitability for resting up places for this species.

2.4.4 Badger

The survey involved a detailed investigation of the site to identify evidence of badger residence, foraging or territorial activity. Particular emphasis was placed on locating badger setts, paths, and signs of territorial activity such as latrine sites both on-site and within immediately adjacent areas where access was possible.

2.4.5 Dormouse

The assessment for the potential of the site to support dormouse was based on an assessment of habitat features that may indicate that dormice are present on the study area. This includes the presence of food sources such as common hazel *Corylus avellana* and honeysuckle *Lonicera periclymenum*. Additionally, the species requires a continuum of food supply so that habitat structure, diversity and connectivity to adjacent areas of woodland/scrub are important features for determining the potential presence of dormice.

2.4.6 Water Vole

The banks of the streams on the site were assessed for their potential to support water vole by reference to bank structure and the bank side vegetation. Water voles generally require sloping banks in which to burrow and well developed bank side vegetation to

¹¹ Plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)

¹² Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

provide shelter and food. During the survey attention was paid to the presence of burrows, latrines, feeding remains, trails and footprints.

2.4.7 Birds

The assessment of breeding birds and wintering birds on the site was based on the suitability of habitat present, evidence of nesting such as old or currently active nests and the presence of bird species that may potentially nest within the available habitat.

2.4.8 Reptiles

The reptile survey was based on an assessment of the suitability of habitat present within the site to support a population of reptiles. Reptiles particularly favour scrub and grassland interfaces and the presence of these is a good indication that reptiles may be present on-site. In addition, reptiles may utilise features such as bare ground for basking, tussocky grassland for shelter and compost heaps and rubble piles for breeding and/or hibernating.

2.4.9 Great Crested Newt

The assessment of the site to support great crested newts included establishing the presence of suitable aquatic habitats such as ponds within or adjacent to the site and the presence of suitable terrestrial habitat. Ponds that are densely shaded, highly eutrophic or that contain fish are likely to be less suitable for this species.

In addition, online mapping resources at a minimum scale of 1:25,000 were used to identify the presence of ponds or other waterbodies within a 500 metre (m) radius of the site. The 500m is a standardised search radius to assist in the assessment of the potential of a site and its surrounding habitat to support this species, based on current Natural England guidance¹³.

2.4.10 Invertebrates

An assessment was made of the site for its potential value to support diverse communities of invertebrates. The assessment was made based on the presence of habitat features which may support important invertebrate communities. These features include, for example, an abundance of dead wood, the presence of diverse plant communities, the presence of varied woodland structure and sunny woodland edges with a diverse flora, presence of ponds and water courses and the presence of free draining soil exposures. During the Phase 1 survey there was no attempt made to identify species present and where a site supports features that may be of importance

¹³ English Nature (2001) Great Crested Newt Mitigation Guidelines. Peterborough

to invertebrates then further Phase 2 surveys may be required to assess the importance of the site.

2.4.11 Other Relevant Species

An assessment was made for the potential of the site to support other notable species such as more rarely encountered protected species, United Kingdom Biodiversity Action Plan (UKBAP)¹⁴ species and Local Biodiversity Action Plan (LBAP) species, specific to the study region.

2.5 Extended Phase 1 Habitat Survey Details

The extended Phase 1 habitat survey was carried out by Simon Mason of ECOSA on 2nd March 2016. The weather conditions were sunny, dry and calm with approximately 30% cloud cover and an ambient temperature of 9°C.

During the survey, the surveyor was equipped with a ladder, 10x40 binoculars, a high powered torch and a digital camera.

2.6 Preliminary Ecological Appraisal Limitations

Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The field survey has therefore not produced a complete list of plants and animals and in the absence of evidence of any particular species should not be taken as conclusive proof that the species is not present or that it will not be present in the future.

The desk study data mainly originates from ad-hoc surveys by volunteers and other records from members of the public. Therefore the data search results cannot be taken as an exhaustive list of species present in the area.

Not all potential bat roosting features are accessible to the surveyor, e.g holes or cracks in trees, and therefore assessments are based upon the potential for these features to provide suitable roosting opportunities.

2.7 Initial Protected Species Assessment

As part of a Preliminary Ecological Appraisal, the assessment criteria is based on the potential for the site to support the species considered, this is usually based on habitat features, their suitability for the species and the results of any desk study data obtained as part of the appraisal. However, in many cases, Phase 2 surveys will be required to assess the status of species and hence the importance of a population at the site.

¹⁴ <http://jncc.defra.gov.uk/page-5717>

Therefore, the assessment should be considered a provisional assessment. **Table 3** defines the criteria used to assess the potential of the site to support protected species.

2.8 Criteria used to Assess Ecological Value

The ecological values provided within this report are based around both professional judgement and current published relevant guidance, including information sources such as *A Nature Conservation Review*¹⁵ and *Guidelines for Ecological Impact Assessment in the United Kingdom*¹⁶.

Table 3: Criteria used to assess ecological potential

	Bats ¹⁷		Other Protected Species ¹⁸
	Description of Roosting Habitats	Commuting and Foraging Habitats	
Species Present	Evidence of bat presence confirmed during survey, which may include presence of live or dead bats, droppings, feeding remains or urine stains etc. Where possible, a provisional assessment of roost status is made.	In some instances, bat presence can be confirmed from trees e.g. where staining or droppings are visible; where roosting bats have been observed entering/emerging from a tree; or where roosting bats can be heard.	The presence of a protected species can sometimes be confirmed by evidence recorded, for example guard hairs or latrines for badger or hazel nuts gnawed in the characteristic style for dormice.
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the status of the species present.		
High Potential	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.	On-site habitat is of high quality for a species or species group. The site is within or near a geographic stronghold. Good quality surrounding habitat and good connectivity.

¹⁵ Ratcliffe, D. (1977) *A Nature Conservation Review*. Cambridge University Press

¹⁶ IEEM (2006) *Guidelines for Ecological Impact Assessment in the UK*

¹⁷ The criteria are an attempt to qualify the potential for a given building or tree to support roosting bats and are to a degree subjective. Bats may make use of a single feature on an otherwise unsuitable building or tree and therefore an assessment of bat potential cannot solely be based on the quantity of potential roost features present. Taken from Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

¹⁸ Badger, dormouse, birds, reptiles, great crested newt, invertebrates, other notable species

	Bats ¹⁷		Other Protected Species ¹⁸
	Description of Roosting Habitats	Commuting and Foraging Habitats	
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the presence/likely absence of the species.		
Medium Potential	A structure of tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.	On-site habitat is of moderate quality, providing most of the species/species group requirements. Limiting factors may include small habitat area or disturbance.
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the presence/likely absence of the species.		
Low Potential	A structure with one or more potential roost sites that could be used by individual bats opportunistically/structure that does not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerows or un-vegetated stream, but isolated (i.e. not very well connected to the surrounding landscape by other habitat). Suitable, but isolated, habitat that could be used by small numbers of foraging bats such as a lone tree or a patch of scrub.	On-site habitat is of poor to moderate quality for the species or group. Presence cannot be discounted on the basis of distribution, isolation, surrounding habitats, etc.
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the presence/likely absence of the species.		
Negligible Potential	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.	Site includes very limited or poor quality habitat for the species /group; surrounding habitat is unlikely to support wider populations.
	Further Phase 2 surveys are unlikely to be required as species is unlikely to be present.		

2.9 National Vegetation Classification (NVC)

2.9.1 Survey Methods

All parts of the site and the boundaries where accessible were walked over and a list of vascular plant species¹⁹ recorded, where visible. The relative abundance of species over the site was estimated using the DAFOR scale²⁰. Localities of noteworthy species²¹ were recorded using a Global Positioning System (GPS) device. Searches were made for invasive non-native species likely to be present, particularly along watercourses. Vegetation types were recorded generally using Phase 1 categories and also assigned to NVC community or sub-community level²² where possible by making a visual assessment of species composition, vegetation structure and management. The boundaries of vegetation types were drawn onto printed aerial photographs and mapped later using Geographical Information System (GIS) software. Photographs were taken to record the appearance of the vegetation and to assist with vegetation mapping.

2.9.2 Survey Details

The NVC survey was carried out on 4th August 2016. The weather conditions were dry with approximately 70% cloud cover, an ambient temperature of 18°C, and a light westerly breeze.

2.9.3 Survey Personnel

The NVC survey was carried out by experienced botanical surveyor John Norton.

2.9.4 Survey Limitations

The survey was carried out under good weather conditions but it is acknowledged that certain species would not have been visible during the survey due to the time of year the survey was carried out. Spring and early summer species, for example, would not have been visible and therefore certain species will undoubtedly have been missed. It was not possible to accurately determine the composition of grass species in the sward of the wet grassland due to the late survey date and recent cutting which had taken place prior to the survey.

¹⁹ Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. & Taylor, I. (2014). *A Vascular Plant Red List for England*. Botanical Society of Britain and Ireland, Bristol.

²⁰ 'DAFOR' is a scale of species frequency/cover commonly used in botanical surveys, as follows: D = dominant
A = abundant, F = frequent, O = occasional, R = rare

²¹ Briggs, M. (ed.) (2001). *The Sussex Rare Plant Register*, Published by the Sussex Wildlife Trust on behalf of the Sussex Botanical Recording Society and the Sussex Biodiversity Record Centre.

²² Rodwell, J.S. (ed.) (1991-1995). *British plant communities, Volumes 1-5*. Cambridge University Press, Cambridge.

2.10 Tree Climb and Inspect Survey in Respect of Bats

2.10.1 Survey Methods

A number of mature trees originally identified during the 2011 Phase 1 survey works as providing potential opportunities for roosting bats were confirmed as continuing to provide bat roosting potential during the 2016 walkover survey. To provide a more detailed assessment of the suitability of the trees on site for roosting bats, these trees were subject to climb and inspect surveys (**Map 4**).

Each tree was climbed, where safe to do so, and any potential bat roost features were inspected using a video endoscope, torch and binoculars (equipment differed depending on the location and type of roost feature requiring inspection). Where evidence of roosting bats was identified, photographs were taken and a sample of droppings (if present) were also taken for analysis of the species.

In accordance with Health and Safety Executive guidance²³ (AFAG401) the tree inspection was carried out by a team of two ECOSA surveyors, experienced and trained in tree climbing. One surveyor climbed the tree and the other surveyor remained on the ground to perform a competent aerial rescue in case of an emergency. The tree climbing was carried out using an appropriate work-positioning system and suitable Personal Protective Equipment (PPE).

2.10.2 Survey Details

The tree climb and inspect survey was carried out on 8th July 2016. The weather conditions were dry with approximately 90% cloud cover, an ambient temperature of 18°C, and a light westerly breeze.

2.10.3 Survey Personnel

The climb and inspect surveys were carried out by experienced, bat licenced and certified ECOSA surveyors Brian Hicks and Edward Venables.

2.10.4 Survey Limitations

Three trees identified as supporting roosting features were not climbed and inspected during the survey due to their close proximity to overhead wires and covering of ivy. These trees have therefore not been closely inspected to assess the features for roosting bats. As none of the mature trees are being removed, it is not considered to be a significant limitation to the assessment.

²³ Health and Safety Executive (2013) AFAG201 (Rev.2), Tree Climbing Operations. Available from www.hse.gov.uk/pubns/afag401.htm

2.11 Phase 2 Bat Transect Survey

2.11.1 Survey Methods

Phase 2 bat transect surveys were completed between May and October 2016 to allow an assessment of the status of bats at the site to be made. Two surveyors walked a predetermined transect route across the site on a monthly basis. The transect route ensured that surveyors visited area of the site to take in a variety of habitat and included key habitat for bats such as woodland edges, hedgerows and the stream. The dusk transect surveys commenced at sunset and lasted for at least two hours after sunset.

During the transect surveys, one surveyor was equipped with a Pettersson D240X time-expansion bat detector linked to an Edirol RO-9 recording device for the full duration of each survey. The second surveyor navigated and recorded bats heard or seen by the first surveyor on a field survey sheet and a map.

The transect survey was punctuated by regular point counts, during which the surveyors stopped walking for a period of five minutes to record bat activity at that point. Point count locations were situated at key habitat features such as woodland edges and hedgerows (See **Map 4** for transect route).

2.11.2 Survey Details

Table 4 provides details of each transect visit.

Table 4: Bat transect survey details

Survey Date	Duration	Weather Conditions	Sunset/ Sunrise Time
23 rd May 2016	20:58 - 23:05	START: 15°C, 90% cloud cover, light breeze, dry	20:58
		END: 12°C, 90% cloud cover, light breeze, dry.	
28 th June 2016	21:20 - 23:20	START: 14.8°C, 10% cloud cover, light breeze, dry	21:20
		END: 15.4°C, 100% cloud cover, light breeze, dry	
25 th July 2016	21:23 - 23:24	START: 21°C, 80% cloud cover, no breeze, dry	21:23
		END: 17°C, 20% cloud cover, no breeze, dry	
15 th August 2016	20:15 - 22:30	START: 19°C, no cloud cover, no breeze, dry	20:22
		END: 16°C, no cloud cover, no breeze, dry	
27 th September 2016	18:40 - 20:15	START: 18°C, 100% cloud cover, no breeze, dry	18:40
		END: 16°C, 70% cloud cover, no breeze, dry	
13 th October 2016	18.14 – 20.14	START: 12°C, 90% cloud cover, no breeze, dry	18.14
		END: 11°C, 70% cloud cover, no breeze, dry	

2.11.3 Survey Personnel

The Phase 2 bat transect surveys were designed and coordinated by Principal Ecologist Simon Mason of ECOSA (Natural England Bat Class Licence No. 2015-16600-CLS-CLS) and carried out by suitably qualified and experienced ECOSA surveyors.

2.11.4 Survey Limitations

Some bat species, e.g. long-eared *Plecotus* bat species²⁴, generally emerge from their roosts in total darkness and do not produce strong echolocations, and therefore these

²⁴ There are two species of long-eared bat, the brown long-eared bat *Plecotus auritus* and the grey long-eared bat *Plecotus austriacus*. These species can only be separated by examination of physical characteristics and Phylogenetic Analysis Identification of bat droppings. Unless confirmation of identification has been made by visual identification the

bats can be difficult to observe and record during Phase 2 bat surveys, leading to under-recording.

A dusk/pre-dawn survey was not carried out at the site. The transect survey carried out on the 27th September did not extend to two hours after sunset and an April survey was not carried out. These limitations are not considered to compromise the survey effort or assessment of the site for bats.

2.12 Automated Bat Detector Survey

2.12.1 Survey Methods

In addition to manual activity transect surveys, a programme of automated surveys was completed across the site between May and October 2016 inclusive, using remote bat detectors placed within suitable bat foraging and commuting habitat on site in fixed locations (see **Map 4** for detector locations). The surveys were carried out in line with best practice guidance Bat Conservation Trust Guidelines²⁵.

Three Wildlife Acoustics Song Meter 2 (SM2+) detectors were deployed using a fixed sampling method. The locations of the detectors were chosen based on the experienced opinion of an ECOSA ecologist with knowledge of the site and the development proposals, and with a suitable level of experience of designing bat survey methodology. Data was collected over a total of five nights on each deployment. The settings used on the SM2 detectors are provided in **Appendix 5**.

Each SM2+ detector was placed within vegetation and had a microphone attached to a 3 metre (m) cable. The microphone was angled towards the ground and covered by a windshield to reduce the chances of water ingress. All detectors used SMX-U1 Ultrasonic Microphones and were left to record continuously over a five-night period. The devices were programmed to record between 30 minutes before sunset, until 30 minutes after sunrise the following morning.

2.12.2 Data Analysis

At the end of each automated survey period, the remote bat detectors were retrieved from the site, data was downloaded and then analysed using Kaleidoscope Pro[®] (Version 4.0.4). This program is designed to analyse large volumes of bat call data using an automated classifier (Bats of United Kingdom Version 3.1.3). Species calls

two species shall be referred to in this report as long-eared bat. The brown long-eared bat is the commonest of the two species typically being found roosting within large roof voids although small voids and trees are also utilised. The grey long-eared bat is rare and confined to southern England and like the brown long-eared typically roosts in roof voids.

²⁵ Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (Third Edition)*. The Bat Conservation Trust, London

were subsequently checked manually by a suitably qualified ecologist using the Kaleidoscope software, to verify their identities.

More information on the settings used for the static detectors are provided in **Appendix 5**.

Sonobat® (v2.9.7) was used to confirm the species identity for ambiguous bat calls. Where suitable recordings have been obtained, bats are identified to species level. For some groups, notably long-eared bat species and *Myotis*²⁶ bat species, specific identification is not always possible.

The data was then exported to Microsoft Excel for detailed analysis (i.e. counts of bat registrations) of various parameters.

The number of registrations recorded is not a measure of the number of bats present on a site; the number of registrations can only be used to provide a quantitative assessment of the level of bat activity at a particular location (i.e. the greater the number of registrations, the greater the level of bat activity). The data cannot differentiate between, for example, a single bat passing the detector 10 times or 10 bats passing the detector on a single occasion. The detectors were programmed to count each two second call as a single bat pass.

2.12.3 Survey Details

The Phase 2 automated SM2 bat detectors were programmed and deployed by a suitably experienced ECOSA surveyor. Data analysis will be conducted by a senior member of the ECOSA ecology team. **Table 5** provides details of the survey periods and weather conditions.

²⁶ There are seven species of *Myotis* bats in Britain. *Myotis* bats are very difficult to identify specifically, this can generally only be done by examination of physical features and Phylogenetic Analysis Identification of bat droppings. Many of these bats are common and will utilise buildings for roosting often occupying small and inaccessible voids. For the purpose of this report all species shall be referred to as *Myotis* bats unless a specific identification has been possible.

Table 5: Remote bat detector survey details

Survey Period (2016)	Date	Weather Conditions				Sunrise	Sunset
		Temperature (°C)		Wind (km/h)	Precipitation (mm)		
		High	Low				
May	25th	14	5	12	0.0	04:59	20:57
	26th	17	5	11	0.0	04:58	20:59
	27th	20	11	10	0.0	04:57	21:00
	28th	19	12	16	8.0	04:56	21:01
	29th	20	9	23	0.0	04:55	21:02
June	27 th	21	14	19	0.0	04:49	21:18
	28 th	17	11	15	5.0	04:50	21:18
	29 th	16	10	28	4.0	04:50	21:18
	30 th	18	13	19	0.0	04:51	21:18
	1 st	17	14	30	0.0	04:52	21:17
July	25 th	21	13	19	0.0	05:17	20:56
	26 th	20	11	13	0.0	05:19	20:55
	27 th	21	17	24	0.0	05:20	20:53
	28 th	20	10	15	0.6	05:22	20:52
	29 th	20	16	21	0.2	05:23	20:50
August	26 th	24	16	10	0.0	06:06	19:58
	27 th	26	13	15	0.0	06:07	19:56
	28 th	21	16	23	0.0	06:09	19:54
	29 th	22	12	11	0.0	06:10	19:52
	30 th	21	10	9	0.0	06:12	19:50
September	22 nd	20	11	11	0.0	06:47	18:58
	23 rd	18	7	9	0.0	06:49	18:56
	24 th	20	14	18	0.0	06:51	18:54
	25 th	19	12	23	0.0	06:52	18:51
	26 th	18	10	11	0.6	06:54	18:49
October	18 th	14	4	13	0.0	07:29	18:01
	19 th	14	6	17	0.0	07:31	17:59
	20 th	15	6	13	0.0	07:33	17:57
	21 st	13	6	14	0.0	07:34	17:55
	22 nd	14	5	12	0.0	07:36	17:53

2.12.4 Survey Limitations

The quality of both automated and hand-held bat detector recordings is based to a large extent on the proximity of a bat to the detector's microphone. Obstructions such as vegetation or environmental variables such as rainfall and wind noise from vegetation will all influence the quality of sound reaching the microphone and thus some bat echolocation recordings are of insufficient quality for specific identification. Bats routinely alter their echolocations in relation to behaviour and their environment. It is not always possible to make a robust identification of every bat recording.

Complications associated with the equipment are not usually evident until an attempt is made to retrieve data from the detectors at the end of a survey period. Any complications with equipment will be taken into account during the data analysis with the use of Activity Indexes (registrations per night) to ensure that a comparison can be made between each month. The SM2 positioned in Location A failed to record due to an unknown error in May and June 2016.

The use of bat detectors is likely to result in the under-recording of a percentage of bats present, such as those flying at height²⁷, which would be out of the recording range for the detectors.

Given the length of time which the detectors were deployed for it was not always possible to ensure that the detectors only recorded in optimal weather conditions. For example historical weather indicates that there was rain on a number of the days which the detector were deployed. On most occasions this was limited to only very low levels of precipitation which would be unlikely to significantly reduce the level of bat activity recorded. Whilst this may have had an impact on bat activity levels recorded overall it is not considered that this is a significant constraint when coupled with the number of nights recorded achieved and the Phase 2 bat transect surveys undertaken.

2.13 Otter and Water Vole Survey

2.13.1 Survey Methods

The otter and water vole survey involved a detailed investigation of the two small watercourses, the Lidsey Rife (eastern site boundary) and the small stream crossing the centre of the site, for evidence of otter, including holts, spraints, lying up places and prints, and for evidence of water vole including feeding remains, burrows, runs and prints.

²⁷ Collins, J., Jones, G. (2009). Differences in Bat Activity in Relation to Bat Detector Height: Implications for Bat Surveys at Proposed Windfarm Sites. *Acta Chiropterologica*, 11(2), 343-350.

2.13.2 Survey Details

The first survey was undertaken on 25th May 2016. Due to anecdotal evidence of water vole being present on site by local dog walkers during a public consultation event in September 2016, a second survey was carried out on the 7th October 2016.

The weather conditions on the first survey were dry and warm with an ambient temperature of 15°C and a light northerly breeze. On the second survey weather conditions were dry and mild with 100% cloud cover, an ambient temperature of 12°C and a light northerly breeze. The stretches of the stream and the Lidsey Rife were checked within the site boundaries.

2.13.3 Survey Personnel

The survey of 25th May 2016 was undertaken by experienced ECOSA Field Ecologist Brian Hicks. The survey of 7th October 2016 was undertaken by ECOSA Principal Ecologist Simon Colenutt.

2.13.4 Survey Limitations

Water levels of the Lidsey Rife were high at the time of the survey during the October survey resulting in searching for field evidence of these species difficult. Part of the western bank at the northern end of the stream had been mechanically cleared prior to the October survey. High water levels could have washed field signs away such as feeding remains and droppings/spraints. Clearance of the part of the bank could also have removed field signs. During the May survey, the banks of the Lidsey Rife and stream were very overgrown, resulting in reduced visibility of the banks.

2.14 Phase 2 Dormouse Survey

2.14.1 Survey Methods

The Phase 2 dormouse survey was undertaken in order to establish the presence or likely absence of dormouse from the site. The dormouse survey was undertaken based on methodology set out in the Dormouse Conservation Handbook²⁸.

The survey involved the erection of 100 dormouse tubes. The tubes were secured to vegetation using heavy duty garden wire. The location of these tubes is shown on **Map 5**. Nest tubes were placed in suitable habitat across the site on 25th May 2016. An ecologist returned to check the nest tubes between the months of June and November 2016 at monthly intervals.

²⁸ Bright *et al.* (2006) *The Dormouse Conservation Handbook* (2nd Ed.). English Nature, Peterborough, UK

In accordance with survey guidance, absence of dormouse should not be assumed for a search effort of less than 20 points²⁹. A value is assigned to each month, which is weighted depending on the likelihood of finding evidence of dormouse in a given month. The values for each month that the tubes are in place are then added together. A minimum total value of 20 points is required to show that sufficient survey effort has been implemented to prove likely absence from site. The level of survey effort carried out at the land at Westergate site provides a search effort of 38 points.

2.14.2 Survey Details

Table 6 provides the details of the Phase 2 dormouse survey.

Table 6: Phase 2 dormouse survey details

Survey Date	Temperature	Weather Conditions
25 th May 2016	14°C	60% cloud cover, light wind and dry
9 th June 2016	16°C	No cloud cover, light wind, warm and dry
7 th July 2016	19°C	40% cloud cover, light wind, warm and dry
4 th August 2016	20°C	70% cloud cover, no wind, sunny
8 th September 2016	23°C	10% cloud cover, no wind, sunny
5 th October 2016	14°C	20% cloud cover, moderate breeze, sunny
3 rd November 2016	6°C	20% cloud cover, moderate breeze, dry

2.14.3 Survey Personnel

The Phase 2 dormouse surveys were co-ordinated by Edward Venables (Natural England Class Dormouse Licence No: 2015-13203-CLS-CLS) assisted by suitably qualified ECOSA surveyors.

2.14.4 Survey Limitations

There were no limitations to the Phase 2 dormouse survey.

2.15 Breeding Bird Survey

2.15.1 Survey Methods

A total of six breeding bird surveys were undertaken on site between May and June 2016 inclusive. The breeding bird surveys were based on the British Trust for Ornithology (BTO) Common Bird Census (CBC) methodology and aimed to assess the

²⁹ Each month, between April and November, inclusive is assigned an index of probability score, based on optimum survey timings.

breeding bird community and the number of active bird territories of each species within the site.

Each survey visit involved an experienced surveyor walking a pre-determined transect route across the site. The route included the perimeter of all habitat compartments on site and all major habitat types were visited. On each survey the start point of the route taken across the site was varied so that time-location bias was minimised across the survey period.

The surveys were carried out from approximately 06:30 hours onwards and completed by approximately 11:00 hours to coincide with the period of highest bird activity. Surveys were undertaken in suitable weather conditions (i.e. without strong winds or heavy rainfall).

Bird records (registrations) were recorded on field maps using standard CBC symbols and species codes, and transferred onto individual species maps at the end of the survey to assess bird territories. A minimum of two registrations of definite breeding behaviour was used to define a territory. Additional information used to determine the presence of a breeding territory included the discovery of an occupied nest, finding of eggshells within a territory of the species concerned, recently fledged birds, agitated behaviour and alarm calling from suitable habitat, antagonistic behaviour between two or more birds and adult birds collecting and carrying food, nest material or faecal sacs. The survey focused on identifying breeding territories of Red Listed and Amber Listed³⁰ Birds of Conservation Concern as well as Schedule 1 species³¹.

During each survey visit a transect route was walked around the site and the position of each bird seen or heard was accurately plotted on a survey map. Particular importance was placed on the location of individuals of the same species that could be heard or seen simultaneously and those that showed signs of holding territory or breeding. After each survey visit information for each species was transferred from the survey maps to a separate map. Clusters of registrations on this map coincide with the activity of territory holding birds, although with some species this varies with biology. The maps were then analysed to determine the number of pairs of each breeding

³⁰ The UK's birds are split in to three categories of conservation importance - red, amber and green. Red is the highest conservation priority, with species needing urgent action. Amber is the next most critical group, followed by green. Red List criteria include species which are: globally threatened; have been subject to historical population decline in UK during 1800–1995; are in severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period, or; subject to severe (at least 50%) contraction of UK breeding range over last 25 years, or longer-term period.

³¹ Birds listed on Schedule 1 of the Wildlife and Countryside Act (1981 as amended) are afforded additional protection receive further protection making it an offence to: Intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or; Intentionally or recklessly disturb the dependent young of any such bird.

species present, a process open to subjectivity in interpretation, and the maps were annotated to indicate the 'centre' of each territory.

2.15.2 Survey Details

The details of each survey visit are shown in **Table 7**.

Table 7: Phase 2 breeding bird survey details

Survey Date	Weather Conditions	Sunrise
20 th May 2016	11°C, 75% cloud cover, moderate south-westerly breeze, sunny	05:08
25 th May 2016	12°C, 100% cloud cover, calm, cool	05:02
1 st June 2016	15°C, 75% cloud cover, gentle north-easterly breeze, sunny	04:56
10 th June 2016	17°C, 100% cloud cover, light wind, hazy sunshine	04:51
17 th June 2016	15°C, 100% cloud cover, light wind, dry	04:50
21 st June 2016	15°C, 100% cloud cover with brighter spells, no wind, dry	04:50

2.15.3 Survey Personnel

The breeding bird survey visits were by experienced ECOSA ornithologists and Principal Ecologists, Simon Boswell and Simon Colenutt.

2.15.4 Survey Limitations

The survey was carried out in accordance with standard CBC methodology although commenced a little later in the season. The only exception was that the overall number of surveys advised within CBC bird survey guidelines was reduced to six rather than 10. This reduction in the number of visits was applied because of the relative simplicity of the on-site habitat structure, meaning that a high degree of confidence could be placed in the results of the survey with fewer visits than is standard.

2.16 Phase 2 Reptile Survey

2.16.1 Survey Methods

The reptile survey consisted of the laying of 100 bitumen roofing felt mats (refugia) approximately 500 x 500mm in areas of suitable habitat on the site (**Map 7**). Typically, this included areas of ruderal vegetation, rough grassland and "edge" habitats with good structural diversity and areas with exposure to the sun.

The refugia warm more rapidly than the surrounding environment and reptiles use them to thermoregulate. Inspection of refugia is most effectively carried out in marginal weather conditions such as cold but sunny weather or hazy and somewhat overcast conditions, as this will maximise the thermal value of the refugia for basking reptiles.

Inspections are generally ineffective in cold, wet conditions or in very hot sunny weather. The use of such refugia can be used as an effective way of surveying for all species of reptile and current survey guidance³² states that seven inspections are sufficient to confirm presence/probable absence and identify what species might be using a site. The inspection of natural refugia was also carried out, as well as casual observations and a search for suitable hibernation features across the site.

The refugia were placed on site on the 25th May 2016 with previously identified habitat which had been assessed as having potential to support species of reptile. The refugia were then inspected for reptiles on seven subsequent occasions. The species, sex (if possible) and age of all reptiles encountered was recorded. Signs of reptiles (such as sloughs) were also recorded.

2.16.2 Survey Details

Details for each Phase 2 reptile survey date are provided in **Table 8**.

Table 8: Phase 2 reptile survey details

Survey Date	Temperature	Time	Weather Conditions
25 th May 2016 (refugia distribution)	12°C	-	90% cloud cover, light wind, warm and dry
7 th June 2016	16°C	08:35	10% cloud cover, light wind, dry and sunny
9 th June 2016	16°C	10:30	No cloud cover, light wind, warm and dry
15 th June 2016	17°C	10:00	90% cloud cover, no wind, dry with sunny spells
17 th June 2016	14°C	09:10	100% cloud cover, light breeze, showers
21 st June 2016	16°C	10:30	50% cloud cover, no wind, dry and sunny
23 rd June 2016	18°C	11:00	100% cloud cover, light wind, dry and humid
27 th June 2016	18°C	18:00	90% cloud cover, calm, dry and hazy

2.16.3 Survey Personnel

The Phase 2 reptile surveys were coordinated by Simon Mason, Principal Ecologist of ECOSA and were carried out by experienced ECOSA surveyors.

2.16.4 Survey Limitations

There were no limitations to the reptile surveys. All checks were undertaken in suitable weather conditions at a time of year that is suitable for reptile surveys. Therefore, the reptile survey was considered to provide a robust assessment of the reptile population within the site.

³² Froglife (1999) *Reptile Survey: A Guide to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation*, Froglife Advice Sheet 10

2.17 Great Crested Newt Environmental DNA (eDNA) Survey

2.17.1 Survey Methods

The site and its immediate surrounds contain no standing freshwater habitats and therefore there is no potential for the site itself to support breeding great crested newts. Although the site does contain areas of suitable grassland, hedgerow and scrub habitat for this species to use during its terrestrial phase, the absence of suitable breeding habitat will significantly reduce the potential for this species to be present. A single pond is situated within 500m of the site. This pond is located approximately 110m east of the site on the opposite side of the chalk stream that forms the eastern boundary of the site. This stream forms a partial barrier to the site from this pond, reducing the likelihood of any newts associated with this pond using the terrestrial habitat on site.

However, due to the close proximity of this pond to the proposed development site, an Environmental DNA (eDNA) survey was undertaken to confirm the presence or likely absence of this species from this pond (**Map 8**).

The field sampling followed current guidance³³ and entailed the collection of 20 samples of 30 millilitres (ml) of water from pre-selected sub-sampling sites around the margin of the waterbody. Sub-sampling sites were chosen to include areas where great crested newt are likely to be present, such as areas of vegetation where they may be egg laying and areas of open water where they may be displaying. The 20 samples were then mixed into a single sterile bag from which six samples of water of 15ml were taken; each of which was preserved in 35ml of ethanol. The samples were then refrigerated before being sent to Crestwood Environmental Limited for laboratory analysis. Crestwood Environmental Limited undertook the analysis on the 10th May 2016 in accordance with the stipulated methodology found in the DEFRA Technical advice note (WC1067 Appendix 5 Technical advice note).

2.17.2 Survey Details

The eDNA sampling was carried out on the 4th May 2016. The weather conditions were sunny with 5% cloud cover, an ambient temperature of 14°C and a light wind.

³³ Biggs *et al* (2014) Analytical and methodological development for improved surveillance of the great crested newt. Appendix 5. Technical Advice note for field and laboratory sampling of great crested newt environmental DNA. Freshwater Habitats Trust, Oxford.

2.17.3 Survey Personnel

The eDNA sampling was carried out by experienced ECOSA surveyor Hugh Turner (Natural England Great Crested Newt Class Licence No. 2016-24123-CLS-CLS), assisted by a second experienced ECOSA surveyor.

2.17.4 Survey Limitations

The samples were taken within the required season (mid-April to June) when great crested newt eDNA is likely to be present within the pond and therefore, the analysis result indicates the presence or likely absence of the species from the waterbody.

2.18 Invertebrate Survey

2.18.1 Survey Methods

The Phase 1 survey involved a site walkover to carry out an initial assessment of all areas of semi-natural habitat for their potential value to support scarce invertebrate species.

The invertebrate surveys were carried out during the daytime. Survey methods involved visual searching of nectaring sites and basking areas, the use of a hand net or pooter to capture individual species, sweeping vegetation, beating foliage and grubbing.

It was not within the scope of the current survey to undertake an aquatic invertebrate survey, however the marginal vegetation of the Lidsey Rife and stream were included within the survey.

2.18.2 Survey Details

The Phase 1 invertebrate survey was carried out on the 3rd August 2016. The Phase 2 invertebrate surveys were carried out on the 3rd, 8th and 17th August 2016. The weather conditions during the surveys are detailed in **Table 9** below.

Table 9: Invertebrate survey details

Survey Date	Survey Type	Temperature	Weather Conditions
3 rd August 2016	Phase 1 and Phase 2	22°C	Initially overcast, becoming sunny with no cloud cover, gentle breeze, dry
8 th August 2016	Phase 2	24°C	Sunny, no cloud, light breeze, dry
17 th August 2016	Phase 2	23°C	Sunny with some hazy cloud, light breeze and dry

2.18.3 Survey Personnel

The invertebrate surveys were undertaken by experienced entomologist Adam Wright.

2.18.4 Survey Limitations

The woodland in the western part of the site was difficult for the surveyor to access due to the dense vegetation and wet conditions underfoot in certain areas. Therefore, certain areas of the woodland were not surveyed fully for the presence of rare or scarce invertebrates. However, as this area will be retained in full, it is not considered a significant limitation to this assessment.

The invertebrate surveys were undertaken during the month of August 2016 and therefore certain species/groups, occurring before this time of year during the spring/early summer, would not have been present, potentially leading to under-recording of certain species.

3.0 RESULTS

3.1 Introduction

This section details the results of the Ecological Assessment undertaken at the land at the Westergate site, Chichester, between March and November 2016.

3.2 Desktop Study

3.2.1 Statutory and Non-Statutory Designated Sites

There are two statutory designated sites of nature conservation situated within a 5km radius of the site and no non-statutory designated sites within 1km of the site. There are no sites within proximity to the site which could be impacted by the proposals in terms of particularly mobile species such as bats.

The nearest statutory designated site is the Brooks LNR (2.8km south) comprising meadow, reedbeds, ditches and floodplain woodland. Eartham Pit SSSI (3.8km north-west) is important for geological and archaeological reasons and Halnaker Chalk Pit SSSI (4km north-west) supports the large population of nationally rare plant species.

3.3 Vegetation

The vegetation within the site is described here in general terms using Phase 1 habitat survey terminology and refers to dominant, characteristic and other noteworthy species in each vegetation type within the survey area. The habitats on site are shown on **Map 2**. The habitat types on site consist of:

- Improved grassland;
- Poor semi-improved grassland;
- Arable;
- Hedgerows;
- Trees;
- Woodland;
- Dense / continuous scrub; and
- Running Water.

3.3.1 Improved Grassland

The majority of the site comprises a series of improved, species-poor grass leys, derived from historically improved grassland (**Figure 1**) dominated by agricultural grass species such as ryegrass *Lolium perenne*, Timothy *Phleum pratense*, smooth meadow-grass *Poa pratensis*, cock's-foot *Dactylis glomerata* and Yorkshire fog *Holcus lanatus*. Herbaceous species are few within the field interiors and are generally restricted to scentless mayweed *Tripleurospermum inodorum*, creeping buttercup *Ranunculus repens*, spear thistle *Cirsium vulgare*, creeping thistle *Cirsium arvense* and broad-

leaved dock *Rumex obtusifolius*. Areas of damper soils support abundant creeping buttercup alongside frequent fleabane *Pulicaria dysenterica*, knotgrass *Polygonum aviculare*, greater plantain *Plantago major* and fat hen *Chenopodium album*. The northern-most field is particularly herb-poor.

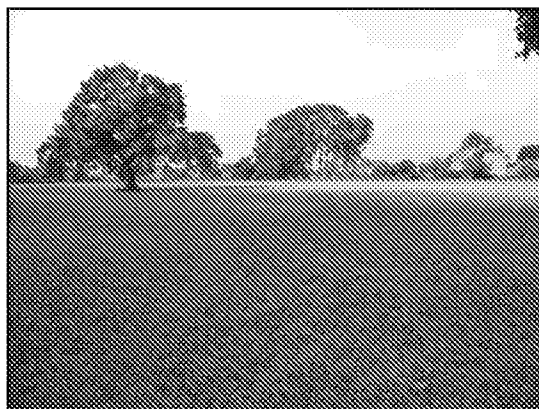


Figure 1: Example of species-poor improved grassland

3.3.2 Poor Semi-improved Grassland

In the south-east of the site lies a derelict and overgrown area of scrubby semi-improved species-poor grassland. The area is characterised by tall grassland and occasional common herbs comprising perennial ryegrass, false oat-grass *Arrhenatherum elatius*, ragwort, Michaelmas daisy *Aster novi-belgii*, creeping and spear thistles, common nettle *Urtica dioica*, perforate St. John's wort *Hypericum perforatum* and greater plantain. Since the original survey in 2011, this area has become increasingly encroached by dense bramble *Rubus fruticosus* aggregate scrub.

Strips of rough, dry grassland occur alongside the main stream. These are dominated by false-oat grass, common nettle and thistles.

3.3.3 Arable

The south of the site is dominated by a large arable field over five hectares in extent. At the time of the 2016 survey, the field had been ploughed and contained no vegetation although later in the year it contained a crop of broad bean. Field margins at the south-east and northern corner support a number of common arable weeds including goosefoots *Amaranthaceae* species, petty spurge *Euphorbia peplus* and scentless mayweed.

3.3.4 Hedgerows

The site contains a network of boundary hedgerows (**Figure 2** and **Figure 3**) as well as frequent mature trees and small areas of woodland and scrub. In the north and south of the site the boundaries comprise gappy blackthorn *Prunus spinosa* and hawthorn

Crataegus monogyna dominated hedgerows with frequent elder *Sambucus nigra*, field maple *Acer campestre*, sycamore *Acer pseudoplatanus*, dog rose *Rosa canina* and a hedgerow base of dense bramble and common nettle. These boundaries contain a number of large mature pedunculate oaks *Quercus robur* as well as horse chestnut *Aesculus hippocastanum* and ash *Fraxinus excelsior*.

Within the centre of the site, hedgerows running north to south comprise dense blackthorn dominated features containing hawthorn, hazel, elder, goat willow *Salix caprea* and frequent small pedunculate oaks, again, dense bramble and nettle is present at the bases of the hedgerows, resulting in large and bushy features.

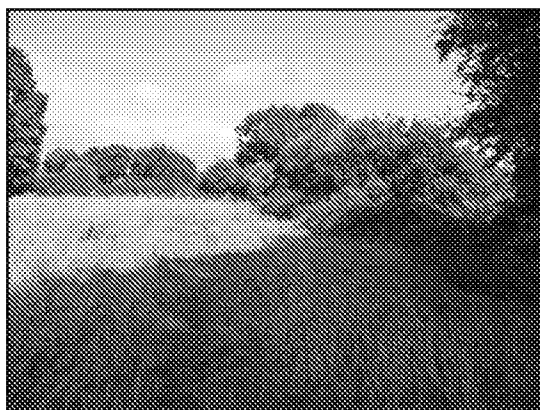


Figure 2: Boundary hedgerow in north of the site

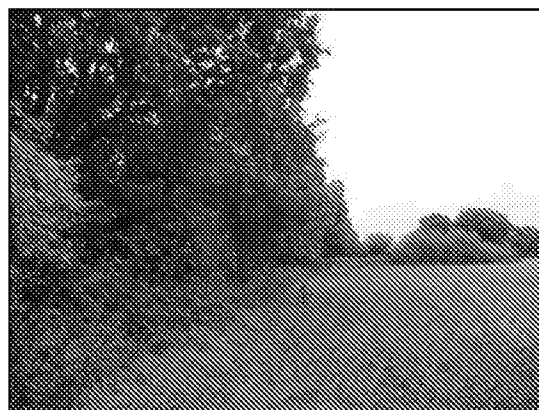


Figure 3: Boundary hedgerow with mature trees in north-west of the site

3.3.5 Trees

The stream channel (Lidsey Rife) forming the site's eastern boundary contains relatively few trees and shrubs and with occasional tall crack willow and ash trees. The overgrown scrubby field in the south-west of the site contains numerous small self-seeded or planted trees and shrubs including pedunculate oak, sycamore, hawthorn and elder as well as areas of dense blackthorn and bramble scrub. The northern part of the site contains a number of isolated mature trees, predominantly large pedunculate oak (Figure 4).

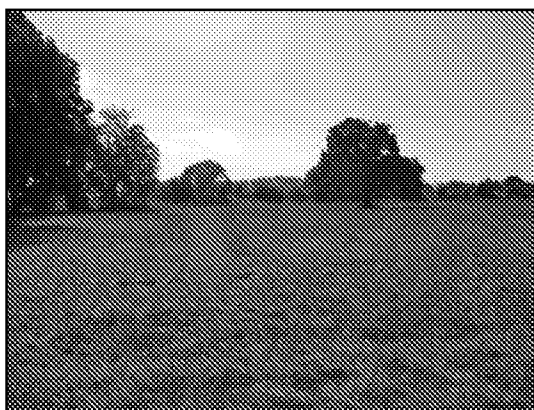


Figure 4: Isolated mature oak trees in the north of the site

3.3.6 Woodland

In the western central section of the site lies a small area of damp woodland dominated by tall, multi-stemmed crack willow *Salix fragilis* with a ground layer of tall common nettle and bramble with occasional meadowsweet *Filipendula ulmaria* and a carpet of ground ivy *Glechoma hederacea*. Running south from this damp woodland is a thick hedgerow/tree belt comprising dense elm *Ulmus*, hazel, ash, field maple, elder, blackthorn and hawthorn containing many tall mature oak and ash trees.

3.3.7 Dense / Continuous Scrub

The site supports a large amount of strongly nutrient-enriched unmanaged vegetation dominated by mixtures of bramble and common nettle. The southern end of the stream supports a richer type of damp, tall ruderal vegetation with frequent meadowsweet *Filipendula ulmaria* and other tall wetland species such as figwort *Scrophularia nodosa*.

3.3.8 Running Water

The site contains linear aquatic habitats in the form of two small chalk streams. The chalk stream (Lidsey Rife) flowing in a southerly direction and forms the eastern boundary of the site. The channel is generally deeply-incised, measuring approximately 2-to-3 metres (m) in width and approximately 1 to 2m deep. At the time of survey, the channel held approximately 0.5m depth of water and the channel substrate comprised a mix of bare coarse gravels and areas of deep fine silt. Aquatic vegetation includes species such as fool's watercress *Apium nodiflorum*, brooklime *Veronica beccabunga*, common water starwort *Callitriche stagnalis*, floating sweet-grass *Glyceria fluitans*, reed canary-grass *Phalaris arundinacea*, great willowherb *Epilobium hirsutum*, hemlock water dropwort *Oenanthe crocata* and yellow flag *Iris pseudocorus*.

Within the centre of the site, a narrow channel runs east-west, feeding into the stream at the eastern site boundary. This channel is an arm of the Rife and is well-vegetated with tall herbaceous vegetation including great willowherb, fool's watercress, hemlock water dropwort, pendulous sedge *Carex pendula*, common nettle, yellow flag, hedge bindweed *Calystegia sepium*, creeping buttercup, floating sweet-grass, brooklime and common reed *Phragmites australis*.

Overall, the site contains minimal aquatic vegetation which is restricted to the small stream at the eastern boundary and the small stream in the centre of the site. These features are generally choked with rank riparian vegetation and the extent of truly aquatic vegetation is minimal. Those species present are generally common and widespread and typical of linear watercourses situated within intensively-managed farmland and likely subject to some level of eutrophication.

3.3.9 Summary

Apart from the older stands of woodland, all of the vegetation types on the site are particularly associated with intensively managed agricultural landscape. The wet grassland is relatively strongly improved and has lost most of its floristic interest. The drier grassland has been recently abandoned and is derived from former improved grassland. The abundance of nettle and bramble on the site indicates high levels of fertility in the soil which may be partly natural or partly due to past intensive grazing management or use of artificial fertilisers.

3.4 National Vegetation Classification (NVC) Results

Wooded areas and watercourses have been assigned target note numbers (**TN** and **W**); simplified vegetation types and target notes are shown in **Map 3**. A full list of vascular plant species recorded during the survey is provided in **Appendix 2**. Photographs of vegetation recorded during the survey are presented in **Appendix 3**.

The site is bordered on the east side by the Lidsey Rife (stream) (**W1**), which has a ditch (**W2**) running perpendicular to it across the site. The small stream arises from an area with a stand of willow *Salix* species trees (**TN11**) and a strip of old woodland (**TN13**), with some scrub and tall herb between (**TN12**). The remainder of the site largely comprises a series of historically improved wet meadows (**TN3**, **TN4**, **TN6**, **TN7** and **TN8**) and four drier improved meadows (supporting neutral grassland) along the western edge (**TN2**, **TN5**, **TN10** and **TN14**). The wet meadows are managed for hay, but the dry meadows have been left unmanaged for several years and have become invaded by scrub and trees. There is a large arable field (**TN9**) in the south of the site and a wooded bank with adjacent scrub (**TN1**) at the northern end.

The two watercourses support a mix of marginal and emergent plant species in the channels. Most of this vegetation is shaded by adjacent dense bramble *Rubus fruticosus* aggregate, common nettle *Urtica dioica* and other tall ruderal vegetation. A small amount of aquatic vegetation was recorded in one location at the southern end of the Lidsey Rife where there is less shade.

The majority of the field boundaries comprise defunct hedgerows which are likely to have been historically dominated by English elm *Ulmus procera*. These now mostly consist of dense bramble, although a number of large, mature hedgerow trees remain and there are a few short sections of intact blackthorn-dominated hedgerow.

A total of 146 plant species was recorded during the survey, comprising one horsetail, two ferns, 25 grasses, rushes and sedges, 89 herbaceous species ('herbs') and 29 trees and shrubs. At least four species were garden escapes recorded in the abandoned grassland areas and several species were non-native species of disturbed

and arable habitats found along the main public rights of way and in the arable field. No invasive non-native species were recorded during the survey.

3.4.1 Trampled grassland and arable

Tracks and public rights of way on the site support small amounts of short ruderal vegetation, made up of grasses and herbs resistance to trampling. These include perennial rye-grass *Lolium perenne*, greater plantain *Plantago major*, creeping cinquefoil *Potentilla reptans* and pineappleweed *Matricaria discoidea*. Marsh cudweed *Gnaphalium uliginosum* was present on a damp part of the track to the south of the arable field.

The arable field (TN9) was under a mature crop of broad bean at the time of the survey. Unsprayed areas in the south-east and northern corners supported a number of common arable weeds, including goosefoots *Chenopodium* species, petty spurge *Euphorbia peplus* and scentless mayweed *Tripleurospermum inodorum*, together with some more noteworthy species such as sharp-leaved fluellen *Kickxia elatine* and field pansy *Viola arvensis*.

3.4.2 Bramble, nettle and other tall ruderal vegetation

The site supports a large amount of nutrient-enriched unmanaged vegetation dominated by mixtures of brambles and common nettle. This occurs mainly as strips up to four to five metres wide around the field boundaries and alongside the watercourses, particularly along the eastern bank of the Lidsey Rife (W1). Bramble also forms large, dense clumps within the abandoned areas of dry grassland and dominates the defunct sections of hedges. Great willowherb *Epilobium hirsutum* occurs within the nettle/bramble vegetation on damper ground beside watercourses, whilst drier areas also support taller herbs and grasses, especially creeping thistle *Cirsium arvense*. Other associated species in this vegetation include hedge bindweed *Calystegia sepium*, cleavers *Galium aparine* and occasional hop *Humulus lupulus*. The southern end of the stream supports a richer type of damp tall ruderal vegetation with frequent meadowsweet *Filipendula ulmaria* and other tall wetland species such as water figwort *Scrophularia auriculata*.

3.4.3 Aquatic and marginal vegetation

The most frequent species in the watercourses (W1 and W2) is fool's-water-cress *Apium nodiflorum*, with water-cress *Nasturtium officinale* recorded more locally at the southern end of W1 and in W2. Blunt-fruited water-starwort *Callitriche obtusangula* is also present at the southern end of Lidsey Rife. Emergents comprise branched bur-reed *Sparganium erectum* present at the southern end of W1 and yellow iris *Iris pseudacorus* in the northern section of W1 and a single clump in W2. Other species occurring on the banks include frequent great willowherb and hemlock water-dropwort,

with occasional water figwort, reed canary-grass *Phalaris arundinacea*, pendulous sedge, water mint *Mentha aquatica* and bittersweet *Solanum dulcamara*. This vegetation is rather fragmentary and largely over-topped by the tall ruderal vegetation.

3.4.4 Wet grassland

Most of the open grassland on the site (**TN3**, **TN4**, **TN6**, **TN7** and **TN8**) is 'floodplain grassland' or 'flood meadow' (grassland that is prone to flooding in winter). It has been significantly improved in the past and is likely to have been historically drained, so may now not flood very frequently. Current management is presumed to be by hay cutting (it had been cut approximately two weeks prior to the survey). It was not possible to accurately determine the composition of grass species in the sward due to the late survey date and recent cutting, but it was apparent that much of it is dominated by mixtures of perennial rye-grass, rough meadow-grass *Poa trivialis*, Yorkshire-fog *Holcus lanatus*, meadow foxtail *Alopecurus pratensis* and more locally, by species of drier grassland such as cock's-foot *Dactylis glomerata* and timothy *Phleum pratense*. Past herbicide weed control has resulted in a notably herb-poor sward, with creeping buttercup *Ranunculus repens* restricted to a few small patches. Hairy sedge *Carex hirta* has also survived in a few areas. Weedy species are at low frequency apart from common nettle which is locally dominant around the field margins as noted above, and broad-leaved dock *Rumex obtusifolius* which is locally abundant in some of the fields.

3.4.5 Dry neutral grassland

The four areas of drier grassland are likely to have been derived from historically improved grassland, possibly former horse pasture. The northernmost field (**TN2**) is very herb poor, with a closed, tussocky sward of Yorkshire-fog, false oat-grass *Arrhenatherum elatius* and tall fescue *Schedonorus arundinaceus*. Ragwort *Senecio jacobaea* is locally abundant in the northern half and much of the field has been invaded by bramble and tree saplings.

The western field (**TN5**) appears to have been more recently abandoned so does not support any significant areas of scrub, apart from some butterfly-bush *Buddleja davidii* and longer established bramble around some of the margins. The sward is dominated by mixtures of typical pasture grasses such as common bent *Agrostis capillaris*, creeping bent *Agrostis stolonifera*, Yorkshire-fog and perennial rye-grass, together with coarser, tussocky species such as false oat-grass, cock's-foot and timothy which are likely to be increasing due to lack of recent management. Herbs mainly comprise taller-growing weedy species such as ragwort, creeping thistle, spear thistle *Cirsium vulgare* and docks *Rumex* species.

The next field to the south (**TN14**) is the least improved of the four. It supports dry grassland dominated by false oat-grass and common bent. A small number of common

knapweed *Centaurea nigra* plants were recorded near the northern end of the field. The grassland also has frequent yarrow *Achillea millefolium* and lesser stitchwort *Stellaria graminea*, with some smaller cat's-tail *Phleum bertolonii*. The field is heavily invaded by nettle and bramble, and the southern end has developed into thicket stage scrub. Some very large ant-hills were noted, indicating a lack of disturbance in recent years.

The southernmost field (**TN10**) consists of dry to damp grassland dominated by false oat-grass and cock's-foot, with locally abundant Yorkshire-fog. Main herb species are ragwort, common fleabane *Pulicaria dysenterica*, vetches *Vicia* species and creeping thistle. Creeping buttercup and perforate St John's-wort *Hypericum perforatum* are locally frequent at the southern end. The area has been colonised by large clumps of bramble (including the strongly invasive species *Rubus armeniacus*), and in the southern half especially by silver birch *Betula pendula*, goat willow *Salix caprea* and various other trees, including pedunculate oak *Quercus robur*, ash *Fraxinus excelsior* and field maple *Acer campestre*. Dog rose *Rosa canina* is occasional and next to one of the gardens there is a large patch of Japanese honeysuckle *Lonicera japonica*.

Strips of rough, dry grassland also occur alongside the Lidsey Rife (**W1**) and in **TN3**. These are dominated by false oat-grass, often also with hogweed *Heracleum sphondylium*, nettle and thistles and are otherwise largely herb poor. A patch of scattered plants of burnet-saxifrage *Pimpinella saxifraga* was noted by the path near the northern end of **TN3**. This species is usually associated with unimproved semi-natural grasslands, and may either be just surviving here or could have been deliberately sown.

3.4.6 Woodland and hedgerows

The site includes a stand of mature crack willow *Salix fragilis* (**TN11**) which is probably associated with a ditch coming off the minor watercourse (**W2**). The field layer flora is dominated by bramble and nettle, with hemlock water-dropwort *Oenanthe crocata* and soft rush *Juncus effusus* also present.

TN13 is a narrow strip of semi-natural woodland flanking the western end of the watercourse (**W2**), with a public footpath running through it. There are willow species alongside the stream and a line of mature pedunculate oak trees on a dry bank to the north of the footpath, with hazel *Corylus avellana* and field maple. The stream banks are dominated by pendulous sedge *Carex pendula* and the field layer by bramble, dog's mercury *Mercurialis perennis* and false brome *Brachypodium sylvaticum*. There is also large clump of butcher's-broom *Ruscus aculeatus*.

Between **TN9** and **TN10** there is dense line of scrub and trees, which may have been an old hedgerow. It includes a veteran ash stool and some mature pedunculate oaks.

Other woody species include elm, field maple, hazel, grey willow *Salix cinerea* and field rose *Rosa arvensis*. Black bryony *Tamus communis* was also recorded.

The east side of the arable field (TN9) is bordered by a hedgerow which is defunct in places, but otherwise is made up of hawthorn *Crataegus monogyna* with occasional elder *Sambucus nigra*, blackthorn *Prunus spinosa*, hazel, field maple, pedunculate oak, grey willow and dogwood *Cornus sanguinea*. This and other hedges around the site also have abundant bramble and patches of ivy *Hedera helix* underneath. Hedge woundwort *Stachys sylvatica* was recorded here and in a few other hedges around the site.

The hedge between TN6 and TN7 is largely defunct, but includes three mature pedunculate oak trees and a section dominated by plum *Prunus domestica* at the northern end.

The hedge between TN14, TN5 and TN6 is a largely intact hedge with some mature pedunculate oak trees and a mature sycamore *Acer pseudoplatanus* and horse-chestnut *Aesculus hippocastanum*. Ash and field maple are also present. There are some free-standing mature pedunculate oaks within TN5 and mature sycamore and field maple between TN5 and TN4.

Between TN3 and TN4 there is a largely defunct hedge, with several mature field maples and a large clump of mature pedunculate oak trees. The northern boundary of TN4 is a hedge of hawthorn, hazel and elder, with four mature pedunculate oaks.

The western boundary of TN1 is a wooded bank, dominated by a dense line of mature hazel stools. This feature continues around the northern boundary of TN2, where there is a line of mature pedunculate oaks. Under the hazel there is a poorly developed field layer of ivy, due to dense shading, with some soft shield-fern *Polystichum setiferum* and lords-and-ladies *Arum maculatum*. The eastern boundary of TN1, east of the stream (W1) is a tall, unmanaged hedgerow of hawthorn, elm, elder and dog rose. The remainder of TN1 consists of nettle, bramble and tall herb either side of the public footpath, with frequent hawthorn and elder scrub.

Scattered mature trees occur along the stream (W1) and include three mature ash near the southern end and a mature crack willow at the junction with W2.

3.4.7 Vegetation Classification

Simplified vegetation types are shown on Map 3. Some of the more trampled areas along footpaths have been shown on the map and largely correspond to MG7f *Lolium perenne-Poa pratensis* grassland. Greater plantain is a distinctive associate of this type. The whole of TN9 has been mapped as 'arable', but the arable weed flora is

probably restricted to the corners of the area and locally along the margins. This vegetation is not well defined enough in terms of its species composition to be able to assign to an NVC community.

Tall ruderal vegetation is classified as **OV24** *Urtica dioica*-*Galium aparine* community, with the nettle-dominated areas corresponding to **OV24a** Typical sub-community and the bramble-dominated areas to **OV24b** *Arrhenatherum elatius*-*Rubus fruticosus* aggregate sub-community. However, some of the denser bramble along field boundaries and on the dry grassland falls under **W24** *Rubus fruticosus*-*Holcus lanatus* underscrub. The richer area of tall ruderal vegetation at the southern end of the stream is likely to correspond to **OV26c** *Epilobium hirsutum* community, *Filipendula ulmaria*-*Angelica sylvestris* sub-community.

The fragmentary marginal and emergent vegetation in the stream channels has an affinity to **S23** Other water margin vegetation (i.e. stands of *Apium nodiflorum*) and **S14d** *Sparganium erectum* swamp, *Phalaris arundinacea* sub-community (larger clumps of emergents).

The wet grassland on the site falls under **MG7d** *Lolium perenne*-*Alopecurus pratensis* grassland. The unmanaged dry grassland largely corresponds to **MG1a** *Arrhenatherum elatius* grassland, *Festuca rubra* sub-community (where red fescue *Festuca rubra* is replaced by bents *Agrostis* species), but areas with more frequent nettle and thistles correspond to **MG1b** *Urtica dioica* sub-community. The latter type has been mapped with the tall ruderal vegetation. Some of the damper and shorter areas can be classified as **MG6a** *Lolium perenne*-*Cynosurus cristatus* grassland, Typical sub-community or are transitional (intermediate) between MG6a and MG1a.

It is difficult to accurately assign NVC types to the small areas of woodland which have reduced diversity of field layer flora, but the linear stand of wet crack willow woodland (**TN11**) are referable to **W6** *Alnus glutinosa*-*Urtica dioica* woodland and probably to the **W6b** *Salix fragilis* sub-community. The woodland flanking the stream (**TN13**) is typical of **W8** *Fraxinus excelsior*-*Acer campestre*-*Mercurialis perennis* woodland and can probably be classified under the species poor **W8d** *Hedera helix* sub-community.

The sections of hedgerow dominated by hawthorn, elm and other woody shrubs are classified as **W21a** *Crataegus monogyna*-*Hedera helix* scrub, *Hedera helix*-*Urtica dioica* sub-community. Where a woodland structure is starting to develop with a canopy, shrub layer and field layer, then they may be referable to **W8d** as above. This may apply to the wooded bank in **TN1** and part of the hedge between **TN9** and **TN10**.

3.4.8 Summary Assessment

The total of 146 vascular plant species recorded is a moderately high total for a site of this size during a single survey visit, but the species diversity was relatively low in most of the habitats and within each target note area, except along parts of the watercourses. The majority of the species recorded are common and widespread species and many are indicative of agriculturally improved and nutrient-enriched habitats. Species of infertile, unimproved grassland such as burnet-saxifrage and common knapweed were rare or scattered over the site.

Apart from the older stands of woodland, all of the vegetation types on the site are particularly associated with intensively managed agricultural landscapes. The wet grassland is relatively strongly improved and has lost most of its floristic interest. The drier grassland has been recently abandoned, but has also clearly been derived from former improved grassland with low herb diversity.

No recognised indicator species of traditionally managed unimproved grassland were recorded during the survey. The abundance of nettle and bramble on the site and species such as fool's-water-cress along the watercourses indicates high levels of fertility in the soil, which may be partly natural or partly due to past intensive grazing management or use of artificial fertilisers.

No nationally scarce or rare species were found and none with any recognised national conservation status (e.g. species listed as Near Threatened or under higher threat categories in the England Red List (Stroh *et al.* 2014, see section 2 for full reference). None of the species recorded are local or rare in West Sussex and none are listed in the Sussex Rare Plant Register (Briggs 2001, see section 2 for full reference).

A total of six species were recorded that are regarded as indicators of ancient woodland (**Appendix 2**), i.e. woodland that has existed since at least 1600AD. This is a relatively low total and includes common and widespread species such as field maple and pendulous sedge. However, it is likely that a few more species would be recorded during a survey in spring, when hedgerow bases would be more visible and spring-flowering bulbs and other plants would be flowering. Based on the presence of woodland indicators and other factors (such as the presence of old trees), it is apparent that the hedge between **TN9** and **TN10** and the wooded strip (**TN13**) are relatively old features, and may well be 'ancient' in terms of their age. The strip of crack willow trees (**TN11**) may also be relatively old.

The most important features of the site in terms of its vegetation are the older woodland, hedgerows, mature trees and watercourses. Some of the dry grassland (e.g. **TN10**, **TN14**) has potential to improve in herb richness and overall quality if scrub removal and mowing or grazing management were reintroduced.

3.5 Bat Survey Results

3.5.1 Tree Climb and Inspect in Respect of Bats Results

The full results of the 2016 tree climb and inspect survey (including photographs) are presented in **Appendix 4**. Phase 2 emergence surveys undertaken on these trees in 2012 recorded no bats emerging. No direct evidence of bats was recorded at any of the trees climbed and inspected during 2016.

However, two mature trees (a field maple (**T4**) and an oak (**T6**)) provide medium suitability for roosting bats. Nine trees provide low suitability for roosting bats and three were assessed as providing negligible suitability for roosting bats. It was not possible to climb two trees for reasons of health and safety due to close proximity of overhead lines; and a third tree was not climbed as the potential roosting features were obscured by ivy cladding covering the entire tree, making climbing it difficult and potentially damaging to the roost features.

3.5.2 Foraging and Commuting Habitat

The SxBRC data search returned 145 bat records within a 2km radius of the site, of which 128 were recorded within the last 10 years. Species recorded within a 2km radius of the site include:

- Common pipistrelle *Pipistrellus pipistrellus*;
- Soprano pipistrelle *Pipistrellus pygmaeus*;
- Brown long-eared bat *Plecotus auritus*;
- Serotine *Eptesicus serotinus*;
- Noctule *Nyctalus noctula*;
- Bechstein's bat *Myotis bechsteinii*;
- Natterer's bat *Myotis nattereri*; and
- Barbastelle *Barbastella barbastellus*.

The nearest bat roost returned within the desk study data is located approximately 1.2km north-east of the site; a long-eared bat *Plecotus* species³⁴ roost recorded in 2005. Other nearby bat roosts returned within the desk study data are located approximately 1.4km from the site boundaries; serotine, long-eared bat species and

³⁴ There are two species of long-eared bat, the brown long-eared bat *Plecotus auritus* and the grey long-eared bat *Plecotus austriacus*. These species can only be separated by examination of physical characteristics and Phylogenetic Analysis Identification of bat droppings. Unless confirmation of identification has been made by visual identification the two species shall be referred to in this report as long-eared bat. The brown long-eared bat is the commonest of the two species typically being found roosting within large roof voids although small voids and trees are also utilised. The grey long-eared bat is rare and confined to southern England and like the brown long-eared typically roosts in roof voids.

pipistrelle *Pipistrellus* species were recorded during 2003 and 2004. A serotine roost record from 2007 is located approximately 1.5km south-east of the site. Other bat records, either roosting or foraging and commuting, are associated with Shripney to the south, Aldingbourne to the west, and Fontwell and Slindon Wood to the north. The Bechstein record is a single field record from 2006 in Slindon Wood some 3km north of the site. There were a number of barbastelle records returned within the desk study data (record dates between 2013 and 2015) from various locations within same grid square or adjacent grid squares to the site. Data entries for barbastelle records associated with Slindon Wood (all records from one surveyor) suggest that that woodland is a maternity site for barbastelle, with numerous records of foraging and commuting bats and lactating females included in the data.

The mature hedgerows, small area of damp woodland in the west and chalk stream along the eastern boundary provide good quality bat foraging and commuting habitat. A series of Phase 2 bat activity surveys were undertaken by ECOSA in 2012. These surveys identified a total of six species of bat foraging within the site including common pipistrelle, soprano pipistrelle, noctule, serotine, *Myotis* species, and long-eared bat species. The majority of bat registrations were recorded from the more densely vegetated central and northern areas of the site with the central hedgerows being particularly favoured. Very few bats were recorded in the centre of the fields away from the boundary features with occasional noctule being recorded foraging high over the fields. No significant commuting activity was recorded during the surveys. The site has high suitability for foraging and commuting bats.

3.5.3 Phase 2 Bat Transect Survey Results

The 2016 bat transect surveys recorded five species of bat: common pipistrelle, soprano pipistrelle, *Myotis* bat species, long-eared *Plecotus* bat species and serotine *Eptesicus serotinus*. Bat activity was recorded along the entire transect route indicating that bats are using a variety of habitats across the site for commuting and/or foraging. Unsurprisingly, bats were recorded using boundary features such as hedgerows, woodland edges, areas of scrub and, most notably, along the two watercourses and the railway line. A summary of the findings of each transect is provided in **Table 10** below.

Table 10: Bat activity recorded during transect surveys

Survey Date	General Bat Activity at the Site
23 rd May 2016 (dusk)	A moderate level of bat activity was recorded throughout the duration of the survey. The vast majority of the activity was attributed to both common and soprano pipistrelle. Foraging and commuting activity was particularly evident along the watercourses and the railway line. Bat foraging and commuting activity was, however, recorded along the entire transect.

Survey Date	General Bat Activity at the Site
28 th June 2016 (dusk)	A relatively moderate level of bat activity was recorded throughout the duration of the survey. Common pipistrelle and soprano pipistrelle were the only species recorded. Foraging and commuting activity was recorded sporadically for the duration of the survey along much of the boundary habitat within the entire transect. Near constant foraging activity was recorded along the boundary hedgerow just north of the railway line and along the Lidsey Rife.
25 th July 2016 (dusk)	The level of activity recorded during the July survey was greatest in comparison to the rest of the season and also yielded the greatest diversity of species. Species recorded were soprano and common pipistrelle, <i>Myotis</i> bat species, long-eared bat species and serotine. The majority of activity was attributable to common and soprano pipistrelle. The areas of the site with the greatest activity were the railway line and the Lidsey Rife although activity was recorded along the entire transect.
15 th August 2016 (dusk)	A relatively moderate level of bat activity was recorded throughout the duration of the survey. Common pipistrelle was the only species recorded during the survey. Bats were noted foraging and commuting along boundary habitat along the entire transect with near constant foraging activity recorded along the boundary immediately north of the railway line.
27 th September 2016 (dusk)	Near constant foraging and commuting activity was recorded along the railway line. Low levels of activity were recorded elsewhere along the transect for the duration of the survey. Common pipistrelle and one registration of <i>Myotis</i> bat species were recorded.
13 th October 2016 (dusk)	A relatively low level of bat activity in comparison to the rest of the season. Species recorded comprise soprano and common pipistrelle and <i>Myotis</i> bat species. The majority of the activity was recorded along the railway line and the Lidsey Rife.

3.5.4 Automated Bat Detector Survey Results

The automated bat detector survey results recorded 43,326 bat registrations of eight different species during the survey period May to October 2016. Species recorded on the static detectors comprise: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule, serotine, long-eared bat species, barbastelle and *Myotis* bat species. Detector locations are shown on **Map 4**.

Activity Levels by Survey Period

Table 11 provides a summary of the number and species of bat registrations recorded during each survey period.

Table 11: Summary of static detector registrations

Period	Species	No. Registrations	Activity Index
May-16	Common Pipistrelle	2,993	299.3
	<i>Myotis</i> species	15	1.5

	Noctule	3	0.3
	Soprano Pipistrelle	317	31.7
	Long-eared Bat	1	0.1
	Serotine	6	0.6
	Barbastelle	1	0.1
May-16 Total		3,336	333.6
Jun-16	Common Pipistrelle	8,487	848.7
	<i>Myotis</i> species	37	3.7
	Noctule	15	1.5
	Soprano Pipistrelle	306	30.6
	Serotine	4	0.4
	Barbastelle	0	0.0
Jun-16 Total		8,849	884.9
Jul-16	Common Pipistrelle	13,539	902.6
	<i>Myotis</i> species	35	2.3
	Noctule	31	2.1
	Soprano Pipistrelle	1,097	73.1
	Long-eared Bat	2	0.1
	Serotine	39	2.6
	Nathusius' Pipistrelle	4	0.3
	Barbastelle	0	0.0
Jul-16 Total		14,747	983.1
Aug-16	Common Pipistrelle	3,639	242.6
	<i>Myotis</i> species	13	0.9
	Noctule	32	2.1
	Soprano Pipistrelle	375	25.0
	Serotine	1	0.1
Aug-16 Total		4,060	270.7
Sep-16	Common Pipistrelle	6,751	450.1
	<i>Myotis</i> species	74	4.9
	Noctule	21	1.4

	Soprano Pipistrelle	161	10.7
	Long-eared Bat	0	0.0
	Serotine	4	0.3
Sep-16 Total		7011	467.4
Oct-16	Common Pipistrelle	320	21.3
	<i>Myotis</i> species	11	0.7
	Noctule	4	0.3
	Soprano Pipistrelle	41	2.7
	Serotine	1	0.1
	Nathusius' Pipistrelle	8	0.5
	Barbastelle	1	0.1
Oct-16 Total		386	25.7
Grand Total		38,389	2965.4

Species Activity

Common pipistrelle registrations were recorded the most frequently (35,729 registrations) followed by soprano pipistrelle (2,297 registrations), *Myotis* bat species (185 registrations) and noctule (106 registrations) and serotine (55 registrations). Significantly lower numbers of registrations were made of Nathusius' pipistrelle (12 registrations), barbastelle (2 registrations) and long-eared bat species (3 registrations).

The level of foraging and commuting bats was highest in July (both the transect and static detector surveys reflect this) with a total of 14,747 registrations. October was the month with the lowest level of bat activity, with just 386 registrations on the static detectors. Although one static detector failed to record in May and June at Location A, it is still apparent that the location where the majority of foraging and commuting activity was recorded was location C in the south-eastern corner of the site near to the railway line.

Table 12 shows the number of registrations and proportion of recorded bat activity at the site by species. Common pipistrelle represents 93.07% of recorded activity and soprano pipistrelle 5.98%. The remaining six species/species groups made up less than 1% of the registrations.

Table 12: Number of registrations and proportion of bat activity from each species

Species	No. Registrations	% Registrations
Common Pipistrelle	35,729	93.07%
Soprano Pipistrelle	2,297	5.98%
<i>Myotis</i> species	185	0.48%
Noctule	106	0.28%
Serotine	55	0.14%
Nathusius' Pipistrelle	12	0.03%
Barbastelle	2	0.01%
Long-eared Bat	3	0.01%
Grand Total	38,389	100.00%

3.5.5 Assessment of Value to Foraging and Commuting Bats

From the 2016 bat transect surveys, a total of five species were recorded comprising common and soprano pipistrelle (the majority of activity is attributable to these species), *Myotis* bat species, long-eared bat species and serotine. Foraging and commuting bat activity was recorded along the entire transect although areas of specific activity during the transect surveys were habitats associated with the watercourses and the railway line bordering the southern edge of the site.

During the 2012 bat surveys, noctule *Nyctalus noctula* were also recorded foraging and commuting within the site. A moderate level of bat activity was recorded during the 2012 surveys; activity was recorded across the entire site and common pipistrelle was the most abundant species recorded. Desk study data indicates that a total of eight bat species are present within a 2km radius of the site including barbastelle records, a single Nathusius' pipistrelle record (2015, commuting record, Barnham, east of the site) and a single Bechstein record (2006, record type unknown, Slindon Wood north of the site).

The static detectors recorded a total of eight species of bat using the site. Foraging and commuting activity was recorded across the entire site although the areas which appear to be most frequently used by bats appear to be the Lidsey Rife, small stream dissecting the site and the southern site boundary bordering the railway line. Bats are using all hedgerows within and bordering the site. Barbastelle and Nathusius' pipistrelle registrations were picked up at Location C only (south-eastern corner of the site); neither of these species were recorded during the transect surveys. All other bat species were recorded at Locations A, B and C and were also picked up during the transect survey.

Current guidance on valuing bats in Ecological Impact Assessment³⁵ was consulted to assess the value of the on-site foraging and commuting habitat for bats. **Table 11** shows the geographic level of value of foraging and commuting habitat at the site.

Of the species recorded around the site, Nathusius' pipistrelle, and barbastelle are particularly rare species. The number of recordings relating to both of these species is low in comparison to the rest of the bat species but, as these are such rare species, numbers are expected to be relatively low.

Considering the results of the activity surveys and automated surveys, site is considered to be of **local importance** to the majority of foraging and commuting bat species. The site was assessed to be of **county importance** for barbastelle and Nathusius' pipistrelle.

Table 11: Value of the site to bat species/species complexes

Species	Foraging and Commuting Value
Common Pipistrelle	Local
Soprano Pipistrelle	Local
Nathusius' pipistrelle	County
Serotine	Local
<i>Myotis</i> bat species	Local
Noctule	Local
Barbastelle	County
Long-eared bat species	Local

3.6 Badger

No evidence of badger presence or activity was recorded on the site in 2012 or 2016. A number of well-worn mammal paths are present in the fields and along the base of the hedgerows which may be indicative of badger. The site contains suitable badger habitat in the form of open grassland, hedgerows and scrub and, given the site's rural setting, it is considered highly likely that badgers will be present within the surrounding landscape. Overall the site is assessed to have medium potential to support resident badger. It is likely that badger would visit the site for foraging or for commuting.

3.7 Otter and Water Vole Survey Results

Desk study records reveal water vole has been recorded on the Lidsey Rife (two records from 2012 and 2013) and at Lidsey Sewage Works located approximately 1km south of the site's southern boundary. There are other water vole records for locations within a 1km grid square of the site at Aldingbourne Lake, Barnham and Chichester.

³⁵ Wray, S. *et al.* (2010) Valuing Bats in EcIA. In Practice No. 70, December 2010, P. 23-25, Chartered Institute of Environmental and Ecological Management (CIEEM)

An otter record (from 2004) was returned within the desk study data from a site located in North Bersted, Bognor Regis approximately 4km south of the site.

The water vole survey carried out in 2012 by ECOSA recorded no evidence of otter or water vole along the two watercourses. The 2016 surveys also recorded no direct evidence of otter or water vole. A number of burrows were recorded along the Lidsey Rife but these were attributed to brown rat *Rattus norvegicus* rather than water vole. There were no feeding remains, runs or latrines indicative of water vole occupation along the watercourses. Droppings were recorded scattered in one small section of the Rife but these were rat droppings. An adult brown rat was recorded in the southern end of the Rife within the site.

No field signs of any small mammal were recorded along the small stream and this was almost entirely swamped with bramble and great willowherb. During the October survey the water levels were higher than at the time of the May survey. Anecdotal evidence from a dog walker encountered during the survey suggests that the watercourses are drier in summer. Water levels in both the small stream and the Rife are likely to fluctuate throughout the year; the range of potential prey items to otter, such as fish or aquatic invertebrates is likely to be limited by this factor. In terms of suitability of these watercourses for otter, the site does not provide suitability for lying up places for this species due to the high level of disturbance from walkers and specifically, dog walkers. Public footpaths run along the entire length of the both the small stream and the Lidsey Rife and the footpaths are regularly used.

Due to the nature of the watercourses and levels of disturbance, otter are considered **absent** from the site and are unlikely to even use the site for commuting. It is also considered that water vole are **absent** from the site although it is acknowledged that water vole are likely to be present further south of the site on the Lidsey Rife; a relatively recent record of this species was returned within the desk study data.

3.8 Dormouse Survey Results

The results of the Phase 2 dormouse survey undertaken to date are presented in **Table 12**.

Table 12: Phase 2 dormouse survey results

Survey Date	Dormouse Nest	Dormouse Individual	Notes
9 th June 2016	Nil result	Nil result	No other small mammal nests or activity were recorded.
7 th July 2016	Nil result	Nil result	Two individual wood mouse <i>Apodemus sylvaticus</i> and a nest was recorded in Tube 55. One individual wood mouse and a nest was recorded in Tube 99.
4 th August 2016	Nil result	Nil result	Wood mouse nests were recorded in Tubes 8, 55 and 99.
8 th September 2016	Nil result	Nil result	Wood mouse nests were recorded in Tubes 7, 33, 66, 69, 72 and 99.
5 th October 2016	Nil result	Nil result	Two individual woodmouse were recorded in Tube 33. Woodmouse nests were recorded in Tubes 5, 33, 39, 55, 66, 86 and 99.
3 rd November 2016	Nil result	Nil result	No other small mammal nests or activity were recorded.

No records of dormouse were returned for the site within the desk study data. No dormice or signs of dormouse were recorded on site during the 2012 dormouse survey. No natural dormouse nests were recorded during any of the site visits carried out by ecologists who visited the site during 2016. There was no fruiting hazel on the site, therefore the surveyor was unable to check for feeding remains.

Given the results of the 2012 and 2016 dormouse surveys, it is considered that the species is likely **absent** from the site. The habitat on site does provide suitable habitat for dormouse in the way of woodland, scrub and hedgerow habitats. The site is linked to the wider landscape to the south via the railway line; links to off-site habitat on the north, east and western site boundaries, however, are not contiguous.

3.9 Breeding Bird Survey Results

Table 13 provides a list of red and amber listed bird species with breeding territories recorded within the site.

The locations of where red and amber listed bird species were recorded singing or displaying territorial behaviour during the breeding bird surveys are presented on **Maps 6a and 6b**.

The location of where Cetti's warbler *Cettia cetti* (a Schedule 1 listed species which is afforded protection in terms of disturbance) was heard singing is also shown on **Map 6a**.

Table 13: Red and amber listed species bird territories recorded within the site

Common name	Scientific name	Conservation Status ³⁶	Estimated Number of Territories
Linnet	<i>Carduelis cannabina</i>	Red listed	1
Song thrush	<i>Turdus philomelos</i>	Red listed	6
Yellowhammer	<i>Emberiza citrinella</i>	Red listed	1
Dunnock	<i>Prunella modularis</i>	Amber listed	2

The SxBRC data search returned 412 records comprising 38 notable bird species located within a 1km radius of the site. Song thrush and dunnock were frequently recorded throughout the surveys within boundary and on-site hedgerows. House sparrow *Passer domesticus* territories are associated with residential housing bounding the site to the west. Linnet *Carduelis cannabina* were recorded on site and breed within the grassland field bounding the south-western site boundary and along the southern site boundary. Skylark *Alauda arvensis* hold breeding territories within the fields to the east of the site on the opposite bank of the Lidsey Rife. Cetti's warbler was recorded within the wet woodland on the western site boundary.

A number of other red and amber listed species were recorded on the site (although not displaying territorial behaviour) including bullfinch *Pyrrhula pyrrhula*, kestrel *Falco tinnunculus* (foraging), marsh tit *Poecile palustris* and stock dove *Columba oenas*. Kingfisher *Alcedo atthis* was recorded at the northern end of the Lidsey Rife during the otter and water vole survey on 7th October 2016. Kingfisher has also been recorded at the southern area of the Rife (from personal communication with local resident in 2016 and reference to the Biodiversity/Green Corridor report, 2016). These species were not recorded holding territories and therefore they were not confirmed as breeding on site.

Red and amber listed species recorded flying over the site include black-headed gull *Chroicocephalus ridibundus*, lesser black-headed gull *Larus fuscus*, house martin *Delichon urbicum*, starling *Sturnus vulgaris*, swift *Apus apus* and herring gull *Larus argentatus*.

³⁶ Eaton MA, Aebischer NJ, Brown AF, Hearn RD, Lock L, Musgrove AJ, Noble DG, Stroud DA and Gregory RD (2015) Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 108, 708–746.

The distribution of breeding amber and red listed species is restricted to the boundaries of the site, with the exception of the far northern area of the site and wooded areas.

Other species recorded during the breeding bird surveys (seen or heard) include:

- Blackbird *Turdus merula*;
- Blackcap *Sylvia atricapilla*;
- Blue tit *Cyanistes caeruleus*;
- Carrion crow *Corvus corone*;
- Chaffinch *Fringilla coelebs*;
- Chiffchaff *Phylloscopus collybita*;
- Collared dove *Streptopelia decaocto*;
- Garden warbler *Sylvia borin*;
- Goldcrest *Regulus regulus*;
- Goldfinch *Carduelis carduelis*;
- Great tit *Parus major*;
- Great spotted woodpecker *Dendrocopos major*;
- Greenfinch *Carduelis chloris*;
- Green woodpecker *Picris viridis*;
- Jackdaw *Coloeus monedula*;
- Jack snipe *Limnocyrtus minimus* (recorded during the otter and water vole survey on 7th October 2016);
- Jay *Garrulus glandarius*;
- Lesser whitethroat *Sylvia curruca*;
- Long-tailed tit *Aegithalos caudatus*;
- Magpie *Pica pica*;
- Pheasant *Phasianus colchicus*;
- Reed warbler *Acrocephalus scirpaceus*;
- Robin *Erithacus rubecula*;
- Rook *Corvus frugilegus*;
- Sparrowhawk *Accipiter nisus*;
- Swallow *Hirundo rustica*;
- Whitethroat *Sylvia communis*;
- Wren *Troglodytes troglodytes*; and
- Woodpigeon *Columba palumbus*.

Anecdotal records (personal communication with a local resident, 2016) and reference to the Biodiversity/Green Corridor report, 2016 reveals the following bird species have also been seen/heard around the site: lapwing *Vanellus vanellus*, buzzard *Buteo buteo*, peregrine *Falco peregrinus*, merlin *Falco columbarius*, red kite *Milvus milvus*, wood

warbler *Phylloscopus sibilatrix*, red-legged partridge *Alectoris rufa*, barn owl *Tyto alba* (regularly seen foraging) and tawny owl *Strix aluco*.

3.10 Reptile Survey Results

The SxBRC data search returned a total of 19 reptile records within a 1km radius of the site, consisting of slow-worm *Anguis fragilis*, common lizard *Zootoca vivipara*, grass snake *Natrix natrix* and adder *Vipera berus*. Low numbers of adult and juvenile slow-worm and common lizard were recorded on site during surveys carried out in 2012 within the south-western field. Suitable habitat for reptiles is present around the site, particularly at the bases of hedgerows, along the streams, in the south-west corner of the site and the far northern areas of grassland near the school. Suitable hibernation features are present on site in the form of hedgerow bases, any hills and tussocky grassland.

Table 14 provides a summary of the Phase 2 reptile surveys undertaken at the site in 2016, whilst **Map 7** provides the distribution of the results. The survey recorded a site-wide adult peak count of 31 slow-worm and four common lizard; no other species were encountered during the surveys. Reptiles were recorded in the south-western field (now outside of the development footprint), the hedgerows and the northernmost field near to the school. Although not recorded during the survey, it is likely that grass snake would use the site due to the presence of the streams, providing foraging opportunities and suitable basking and hibernation features. Furthermore, two recent records of grass snake were returned within the desk study data for locations adjacent to the site.

Table 14: Summary Phase 2 Reptile Survey Results

Survey Date	Number of Individuals Recorded*			
	Slow-worm	Common Lizard	Grass Snake	Adder
25 th May 2016 (refugia distribution)	0	0	0	0
7 th June 2016	12 (6)*	0	0	0
9 th June 2016	3 (1)	0	0	0
15 th June 2016	11 (3)	2	0	0
17 th June 2016	8 (7)	0	0	0
21 st June 2016	16 (7)	4	0	0
23 rd June 2016	31 (20) 4u**	2u	0	0
27 th June 2016	14 (15) 2u	4u	0	0
Adult Peak Count	31	4	0	0

* Juvenile numbers provided in brackets ** u = Individual of unknown sex

3.10.1 Assessment of Population Size

Table 15 shows the current guidance³⁷ for assessing the population size of reptiles based on a refugia density of ten per hectare.

Table 15: Criteria for population size assessment*

Species	Low Population	Good Population	Exceptional Population
Common lizard	<5	5-20	>20
Slow-worm	<5	5 - 20	>20

* Based upon a refugia density of 10 per hectare

Guidelines developed for assessing reptile populations³⁸ suggest that sites which support three or more species of reptile or an exceptional population of a single species should be considered as a 'key reptile site'. Based on the density of refugia and number of individuals recorded, the site could be considered to be a key reptile site.

3.11 Great Crested Newt Environmental DNA (eDNA) Survey Results

The SxBRC data search returned a total of three great crested newt records from within a 1km radius of the site from 1992 and 2013; however these records are located over 500m west and south-west of the site.

The site and its immediate surrounds contain no standing freshwater habitats and therefore there is no potential for the site to support breeding great crested newts. Although the site does contain areas of suitable grassland/scrub habitat for this species in its terrestrial phase, the absence of suitable breeding habitat will significantly reduce the potential for this species to be present. A single pond is situated within 500m of the site. This pond is located approximately 110m east of the site on the opposite side of the chalk stream that forms the eastern boundary of the site. This stream, with moderate to fast flowing water, essentially forms a barrier to the site from this pond.

The eDNA analysis of the water samples taken from the aforementioned pond (**Map 8**) confirmed that great crested newt are absent from the pond, with an eDNA score of 0 out of 12; a negative result. Further to the above, it is therefore considered that great crested newt are likely **absent** from the site.

³⁷ Froglife (1999) Reptile Survey: A Guide to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation, Froglife Advice Sheet 10

³⁸ Hill, D., Fasham, M., Tucker, G., Shewry, M., & Shaw, P. (2005) *Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring*, Cambridge

3.12 Invertebrate Survey Results

The survey area contains a variety of habitats with potential to support scarce insect species, including semi-improved grassland, scrub, woodland, hedgerows and watercourses. Some of the habitats on site are of poor quality and thus of limited entomological value. It was not within the scope of the current survey to undertake an aquatic invertebrate survey; however marginal vegetation of the Lidsey Rife and small stream was included.

For the purposes of entomological survey the site was divided into several compartments, which are shown on **Map 9**.

3.12.1 Phase 1 Invertebrate Survey

The main habitat features considered likely to support scarce invertebrates present within the survey area include the semi-improved grassland and scrub (contained within Compartments A, C, D, E and H), deciduous woodland (within Compartment H), hedgerows (criss-crossing the site) and watercourses and streamside vegetation (although of generally poor quality).

3.12.2 Phase 2 Invertebrate Survey

Desk study data revealed a number of recent (2015) records for stag beetle *Lucanus cervus* within the Parish of Aldingbourne (unspecific locations) and Barnham and a purple emperor *Apatura iris* butterfly records (2033) from a location immediately adjacent to the site. During the Phase 2 invertebrate survey a number of scarce species were recorded. These are considered in more detail below. A list of all invertebrate species recorded during the 2016 surveys is provided in **Appendix 6**. Where possible, locations from which scarce or threatened species were recorded are shown on **Map 9**. Details of invertebrate status category definitions and criteria are provided in **Appendix 7**.

Lepidoptera

Small heath *Coenonympha pamphilus* UK BAP

A specimen of the small heath was noted in flight in Area C on 17th August 2016. Larvae of this butterfly feed on fine grasses such as annual meadow grass. The small heath is primarily associated with open grassland sites. It is widespread in Britain, but due to a considerable recent national decline has been added to the national BAP listings for monitoring purposes. The small heath remains a relatively common butterfly in southern England.

Cinnabar moth *Tyria jacobaeae* **UK BAP**

A common species whose larvae develop on ragwort, a plant which is widely but patchily distributed across the survey area. Caterpillars were recorded feeding on ragwort in Areas A and F on 3rd August 2016 and in Area J on 8th August 2016. Cinnabar caterpillars were also found on ragwort bordering the southern boundary track on 8th August. The moth remains widespread and frequent through much of the British Isles. It has, however, declined considerably over the last 35 years, and for this reason has been added to the UK BAP listings for monitoring purposes.

Diptera

Picture-winged fly *Merzomyia westermanni* **Nationally Scarce (N)**

This species is amongst the largest of British tephritids and has very heavily patterned brown wings and a brown body. A single specimen was swept from ragwort in Area J on 17th August 2016 in an area of rank grassland at NGR: SU 940046. Larvae of this species develop in the capitula of hoary ragwort and, rarely, common ragwort. *Merzomyia westermanni* is widely distributed in south east England and the Midlands, and is particularly frequent around the greater London area. It is scarce in northern England and apparently absent from the south west. There are a number of modern records of *Merzomyia westermanni* from West Sussex.

Picture-winged fly *Myopites inulaedyssentericae* **Rare (RDB 3)**

Specimens of this fly were found by sweeping common fleabane in several areas of the site on all three survey visits. On 3rd August 2016, specimens were recorded from the southern end of Area C, from the north-western corner of Area I, and from Area J. Specimens were recorded in the same compartments on 8th August, and in Areas A, I and J on 17th August. Larvae of this species develop in the seed heads of common fleabane. In the past *Myopites inulaedyssentericae* was an extremely localised species in southern and south-eastern England. Although it is still largely confined to this geographical area, *Myopites inulaedyssentericae* appears to have become more common in recent decades. Hampshire, Dorset, Kent and the Isle of Wight appear to be strongholds for this species. There are several modern records for West Sussex.

Hymenoptera

Social wasp *Dolichovespula media* **Nationally Scarce (Na)**

Dolichovespula media was recorded visiting a hogweed flower head at NGR: SU 942052 in Area G on 3rd August 2016. This species is a relatively recent colonist in Britain, having first been found in East Sussex in 1980. It spread quickly to become established in south-eastern England, and is now recorded from Kent to Cornwall, in north Wales, and as far north as Durham and Cumbria. Because of this rapid establishment, the status of *Dolichovespula media* is likely to be downgraded in any

future review³⁹. *Dolichovespula media* is an aerial nester, suspending its nest from the branches of trees and bushes.

Mining bee *Andrena trimmerana* **Nationally Scarce (Nb)**

A male specimen of *Andrena trimmerana* was found visiting a hogweed inflorescence at NGR: SU 942052 in Area G on 3rd August 2016. *Andrena trimmerana* is a predominantly southern species, particularly associated with warm coastal grassland, although other habitats including woodland edges are also utilised. *Andrena trimmerana* is a double-brooded species utilising a variety of plant species for pollen collection. There is a possibility that the two broods actually represent two distinct closely related species, but at present research to establish whether or not this is the case is ongoing. Falk (1991) notes a considerable decline at inland sites⁴⁰. Locally, *Andrena trimmerana* has been recently recorded in West Sussex on several occasions.

Mining bee *Lasioglossum pauxillum* **Nationally Scarce (Na)**

This species was found during general sweeping in Area J and from vegetation bordering the southern boundary track on 8th August 2016. *Lasioglossum pauxillum* was also recorded from the north-west corner of Area I on 17th August 2016. *Lasioglossum pauxillum* nests in sparsely vegetated light soils in warm, sunny conditions. It may be found in a variety of habitats including calcareous grassland, soft rock coastal cliffs and heathland. Previously, *Lasioglossum pauxillum* was a scarce species restricted to south east England, but in the last decade it has increased in frequency and expanded its range northwards and westwards⁴¹.

3.12.3 **Summary Assessment**

The invertebrate surveys carried out during 2016 recorded a total of one Red Data Book and four Nationally Scarce species.

During the survey, all scarce species recorded, with the exception of small heath butterfly, were confined to areas which contained rank semi-improved grassland where plants such as ragwort, common fleabane and hogweed are abundant. The current survey shows that these areas support the main entomological interest of the site

³⁹ Edwards, R. (Ed.). 1997. "Provisional atlas of the aculeate Hymenoptera of Britain and Ireland part 1". Bees, Wasps and Ants Recording Society, Biological Records Centre, Huntingdon.

⁴⁰ Falk, S. J. (1991) "A review of the scarce and threatened bees, wasps and ants of Great Britain". Research & Survey in Nature Conservation No. 35. Nature Conservancy Council, Peterborough

⁴¹ Edwards, R. & Broad, G. (Eds.) (2005). 'Provisional atlas of the aculeate Hymenoptera of Britain and Ireland part 5.' Centre for Ecology and Hydrology, Huntingdon

during late summer, and that loss of these habitats within the site could exert an adverse effect on the scarce insects recorded here.

The most notable areas for invertebrates, according to the survey data collated, are the southern edges of Compartments Area A and C, north-west corner of Compartment I, Compartments F, G (northern end of the site) and J (rough grassland outside of the site boundary) and the rank grassland bordering the southern site boundary along the railway line.

Retention of rank grassland with ragworts and common fleabane in parts of the site could help safeguard the continued presence of picture-winged flies *Myopites inulaedyssentericae* and *Merzomyia westermanni*. Additionally, these flies develop in the seed heads of common fleabane and hoary ragwort respectively, so cutting the vegetation prior to these plants having set seed would prove deleterious to these flies. The mining bees *Andrena trimmerana* and *Lasioglossum pauxillum*, and the median wasp *Dolichovespula media* require flower-rich areas from which to forage. The hogweed in Areas F and G are attractive to both *Andrena trimmerana* and *Dolichovespula media*, and cutting these plants too early would remove this valuable late summer foraging resource. These plants had just been cut on the visit of 17th August, by which time their inflorescences were starting to go to seed; a slightly later cut may have allowed a better rate of reseedling.

Based on the results of the 2016 invertebrate surveys, the site is considered to be of local entomological interest. However, it is considered that a survey carried out earlier in the season is likely to provide further records of scarce insect species. Although it is unlikely that entomological survey in spring or early summer would produce significant finds within the areas of improved grassland (the east of Compartment A, majority of Compartment C and Compartments D, E and H), it is considered likely that further species of scarce insects would be found in the areas of rank grassland and along the hedgerows which provide richer nectar sources.

3.13 Other Relevant Species

No evidence of other protected species was recorded on the site during the survey although anecdotal records (from personal communication with a local dog walker) suggest that stoat *Mustela erminea* have been seen on the site.

4.0 PLANNING POLICY CONTEXT

4.1 Introduction

This section summarises the planning policy in relation to ecology and biodiversity within the Arun District Council administrative area.

4.2 Planning Policy

4.2.1 National Policy

The National Planning Policy Framework (NPPF) sets out the government's requirements for the planning system in England. A number of sections of the NPPF are relevant when taking into account development proposals and the environment. As set out within Paragraph 14 of the NPPF *"At heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking"*. However Paragraph 119 goes on to state that *"The presumption in favour of sustainable development does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined"*.

The general impetus of the NPPF in relation to ecology and biodiversity is for development proposals to not only minimise the impacts on biodiversity but also to provide enhancement. Paragraph 109 states that the planning system should contribute to and enhance the natural environment by *"...minimising impacts on biodiversity and providing net gains in biodiversity where possible..."*

Paragraph 118 states that *"when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity"*. A number of principles are set out in Paragraph 118 including the principle that where harm cannot be adequately avoided then it should be mitigated for, or as a last resort, compensated for. Where impacts occur on nationally designated sites, the benefits must clearly outweigh any adverse impact and incorporating biodiversity in and around developments should be encouraged. Protection of irreplaceable habitats, such as ancient woodlands and those sites proposed as SPAs, SACs and Ramsar sites or acting as compensation for SPAs, SACs and Ramsar sites, should receive the same protection as European sites.

In addition to the NPPF, Circular 06/05 provides guidance on the application of the law relating to planning and nature conservation as it applies in England. Paragraph 98 states *"the presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat"*. Whilst paragraph 99 states *"it is essential*

that the presence or otherwise of a protected species, and the extent that they may be affected by the proposed development, is established before planning permission is granted”.

4.2.2 Local Policy

Local planning policy in relation to ecology and biodiversity within Arun District Council is provided by the saved policies within the Arun District Local Plan 2003. These are summarised below:

- **Policy GEN28 - Trees and Woodland**

Development will not be permitted if it would damage or destroy one or more trees protected by a tree preservation order, identified as ancient woodland or in a conservation area unless:

- The removal of one or more trees would be in the interests of good arboricultural practice; or
- The benefits of the proposed development outweigh the amenity value of the protected trees;
- Conditions may be used to ensure that, for any trees which are removed as part of a development, an equivalent number are planted on the site.

- **Policy GEN29 - Nature Conservation Across the District**

Development will only be permitted on sites which contain semi-natural habitats, features of nature conservation interest, or within wildlife corridors, where these can be largely retained and sympathetically incorporated into the scheme. Legal agreements may be used to offset the loss of, or impact on, any nature conservation resource present on the site prior to development.

- **Policy AREA13 - Sites of International Importance for Nature Conservation**

Proposals for development in, or likely to affect (directly or indirectly) a site of international importance for nature conservation will be subject to the most rigorous examination. Development not directly connected with or necessary to the management of the site which is likely to have an adverse effect on the site, will not be permitted unless: there is no alternative solution, there are reasons of public health or public safety, or there are benefits of primary importance to the environment.

Where such sites do not host a priority habitat or species, development will not be permitted unless there are imperative reasons of overriding public interest.

Where development is permitted, the use of conditions or planning obligations will be considered in order to avoid and minimise harm to the site, to enhance the site's nature conservation interest, and to secure any compensatory or mitigation measures and appropriate management that may be required.

- **Policy AREA14 - Sites of National Importance for Nature Conservation**

Proposals for development in, or likely to affect (directly or indirectly) Sites of Special Scientific Interest will be subject to special scrutiny. Where such development is likely to have an adverse effect, it will not be permitted unless the reasons for the development clearly outweigh the nature conservation value of the site itself and the national policy to safeguard the national network of such sites.

Where the site concerned is a National Nature Reserve, a site identified by the Nature Conservation Review or Geological Conservation Review, particular regard will be paid to the national importance of that site.

Where development is permitted, harm to the nature conservation interest must be minimised. The use of conditions or planning agreements will be considered to ensure the protection and enhancement of the nature conservation interest, and to provide appropriate compensatory or mitigation measures and site management.

- **Policy AREA15 - Sites of Local Importance for Nature Conservation**

Proposals for development in, or likely to have an adverse effect (directly or indirectly) on a Local Nature Reserve, Site of Nature Conservation Importance (including ancient woodlands or wildlife corridors) or Regionally Important Geological/Geomorphological Site will not be permitted unless it can be demonstrated that reasons for the proposal outweigh the need to safeguard the nature conservation value of the site/feature. Where development is permitted which would damage the nature conservation value of the site/feature, such damage should be kept to a minimum.

Conditions or planning obligations will be used to secure necessary compensatory or mitigation measures, enhancement and site management. Where appropriate, the Authority will consider the use of legal agreements to provide appropriate compensatory measures, enhancement and site management.

Local Plan 2011-2031

A new Arun District Local Plan covering the period from 2011-2031 was submitted on 30th January 2015 for independent examination to the Secretary of State for Communities and Local Government via the Planning Inspectorate. This Plan will

eventually supersede the 2003 Local Plan. The Policies within the emerging Local Plan largely reflect the existing policy contained within the adopted Local Plan.

Aldingbourne Neighbourhood Development Plan 2014-2034

The Aldingbourne Neighbourhood Development Plan referendum was held on 18th October 2016 and was voted in favour of Arun District Council and South Downs National Park Authority using the Plan to help decide planning applications in this area. Saved policies relevant to ecology and biodiversity are summarised below:

- **Policy EH2 - Green Infrastructure and Ecosystem Services**

New development within, or immediately adjacent to the Biodiversity Corridors identified on Maps A1 and A2 will only be supported where it can be clearly demonstrated that development proposals will not give rise to any significant harm to the integrity or function of the Biodiversity Corridors.

- **EH2.1** Green Infrastructure corridors such as woodland and well maintained hedgerows provide important wildlife habitats and cover for migration of wildlife. The parish of Aldingbourne has a number of small copses, old orchards, mature hedgerows, ponds, watercourses and similar habitats hosting a variety of wildlife. These have potential to enhance biodiversity within the parish and provide important connections between the South Downs and the coast, if they are better connected to form wildlife corridors.
- **EH2.2** All development with the potential to adversely impact on the areas defined on Map A will be required to demonstrate how the scheme will impact on the integrity and function of the Biodiversity Corridors. Where necessary, this should include the identification of avoidance and mitigation measures sufficient to avoid any significant harm to the designation. Developers are strongly encouraged to also demonstrate how the overall function and integrity of the Biodiversity Corridors may be enhanced to provide a 'net gain'. Proposals should also include a management plan to ensure that effective long-term management of the key features within the Biodiversity Corridor can be achieved.

(Justification: Objective 2c; NPPF 11 paras 109,114,117.)

- **Policy EH4 - Protection of watercourses**

Proposals that support and promote river catchment management, wildlife conservation and reduce flood risk will be supported.

- **EH4.1** Across the Worthing, Chichester and East Hampshire Chalk aquifers, inappropriate land management and other practices are leading

to rising nitrate levels. The Plan policy seeks to address diffuse pollution issues at source through catchment management schemes, rather than at “end of pipe”. As the chalk aquifer gives rise to the chalk streams flowing through the parish, together they form part of the Arun and Western Streams river catchment area. It is important that there is conformity with neighbouring, “upstream” policies. Sussex Wildlife Trust has identified those streams to the West of the parish as relatively natural but all of them as having potential to be restored to provide greater biodiversity. SWT also noted that an ancient woodland upstream seems to be associated with a more natural state, and may play an important role.

(Justification: Objective 2d, 2c; NPPF 11 paras 109,114,117)

- **Policy EH6 - Protection of trees and hedgerows**

Development that damages or results in the loss of trees of arboricultural and amenity value or loss of hedgerows and/or priority habitat, or which significantly damages ecological networks will be resisted, unless the need for, and benefits of, development in that location clearly outweigh the loss.

Development proposals, where appropriate, must be designed to incorporate biodiversity within and around developments and enhance ecological networks, seeking to retain wherever possible ancient trees, trees of good arboricultural and amenity value and hedgerows to contribute to the Government’s target to halt the decline in biodiversity by aiming for a net gain for nature.

Proposals which affect sites with existing trees or hedgerows should be accompanied by a survey that establishes the health and longevity of any affected trees or hedgerows and a management plan to demonstrate how they will be so maintained.

- **EH6.1** Trees and hedgerows contribute to the open and pleasant feel of the Parish, its play areas and residential properties. The removal of trees to make way for development can completely change the amenities of an area and must be resisted. Loss of areas of ground cover and habitat such as unimproved grassland can have a significant effect on wildlife such as small mammals and bats. Aldingbourne is a breeding ground for 17 of the 18 UK resident bat species. It is also home to a number of types of owl which feed on small mammals.

(Justification: Objective 2c; NPPF 11)

5.0 EVALUATION, IMPACTS AND RECOMMENDATIONS

5.1 Introduction

This section presents the conclusions of the Ecological Assessment. It provides an initial assessment of the likely ecological impacts to the proposed development, and outline recommendations for any mitigation/enhancement measures considered necessary. Full details of the evaluations, impacts and recommendations relating to protected species at the site are discussed in the relevant sections below. An outline of protected species legislation relevant to the findings of this report is provided in **Appendix 8**.

Development areas of the site will avoid the most valuable habitats which have been identified during the Preliminary Ecological Appraisal, the Phase 2 ecological surveys and also discussions with local residents during the Public Consultation. As many impacts as possible have therefore been avoided. Residual impacts will be reduced as much as possible with the following recommendations. Many of the recommendations will be incorporated into a Construction Environmental Management Plan (CEMP) to ensure avoidance of impacts during construction. Aftercare of the site will be managed by the implementation of a site-wide Landscape and Ecological Management Plan (LEMP) and it is recommended that both of these documents are conditioned as part of the planning process.

5.2 Habitats

5.2.1 Summary

The main habitats on site comprise arable fields, wet and dry meadows, hedgerows, mature trees, two watercourses (including the Lidsey Rife on the eastern site boundary), wet woodland, and field boundaries colonised with ruderal species and dense bramble scrub. The most notable habitats have been assessed as being the wet woodland, hedgerows, mature trees and eastern boundary watercourses. Some of the dry grassland has the potential to become more species diverse but is currently being encroached by scrub. No national scarce or rare species were recorded. Apart from the wet woodland, the vegetation types on site are associated with intensively managed agricultural landscapes. The wet grassland has lost much of its floristic interest and the dry grassland has been recently abandoned and contains low herb diversity.

5.2.2 Potential Impacts of Proposed Development

The habitats of most value on the site are being retained wherever possible, comprising the wet woodland, hedgerows, mature trees and watercourses. However, impacts include:

- Loss of habitat comprising arable fields, hedgerow, trampled grassland, wet grassland and dry grassland;
- Loss of small sections of hedgerows to provide pedestrian access;
- Degradation of retained habitats due to increased recreational pressure, including dog fouling; and
- Water pollution of the Rife and small stream during construction and operation related impacts brought about by increased habitat degradation.

5.2.3 Outline of Recommendations

The proposed landscape masterplan for the site has been designed with input from an ecologist and includes the following:

- Incorporation of 3.9 hectares of natural and semi-natural areas. There will also be a large amount of open space within the site although this will mainly be created and managed for amenity purposes;
- Hedgerows which are currently defunct will be planted up with native species which reflect those species currently present on site. Existing links on site will be retained and in particular, links will be retained and strengthened (where necessary) with the wet woodland. Approximately 450m of new native hedgerow will be planted across the site;
- Native tree planting will be introduced in the southern area of the site to form an avenue along the main road running north to south through the site. The total amount of new tree planting will be approximately 1,000m²;
- Biodiversity Area planting (along the watercourses) will be approximately 5.2 hectares. Approximately 0.7 hectares of habitat will be retained and enhanced along the Rife. The Rife and small stream will be fenced off to ensure no further degradation of the banks and in-stream habitat and a buffer will be retained along both watercourse. The Rife will continue to function as a corridor and will be enhanced and habitats managed appropriately through the implementation of the LEMP. The LEMP will be agreed with the local authority as part of the planning process; and
- Water butts and composting facilities will be incorporated into the new housing estate. Each new home owner will be provided with a leaflet explaining the wildlife value of the site and simple measures to reduce impacts on habitats and wildlife (Wildlife Awareness Leaflets). There will also be a Wildlife Information Board along the Rife corridor, encouraging new residents to take

an interest in their local environment. Dog bins will be introduced to reduce the level of dog fouling, leading to increased nutrient levels and subsequent changes to floral diversity.

5.3 Bats

5.3.1 Summary

Transect surveys and static bat detector surveys carried out between May and October 2016 revealed eight species of bat. Bats have been recorded using the hedgerows both within the site and around the site boundary. Linear features which appear to be particularly favoured by foraging and commuting bats are the railway line along the southern boundary and the Lidsey Rife on the eastern site boundary. The majority of records were common pipistrelle and soprano pipistrelle; registrations of barbastelle and Nauthusius' pipistrelle were also picked up on the static recorders in very low numbers. A total of 11 trees on site offer varying degrees of suitability for roosting bats although none of these trees are being removed or impacted by the proposals and were therefore not subjected to presence/likely absence surveys. The site is of local importance for bats overall.

5.3.2 Potential Impacts of Proposed Development

Any lighting introduced on site will result in an increase in illumination of foraging and commuting habitat could have adverse impacts on bats post-development. Any construction activities carried out outside of daylight hours could also impact on bats.

There is potential to enhance the on-site habitat for foraging, commuting and roosting bats through the provision of public open space, hedgerow planting, the strengthening and retention of valuable habitats such as mature trees, hedgerows and woodland, and the provision and management of buffer habitat. Avoidance and enhancement of existing features within the site have the potential to provide excellent bat foraging habitat.

In England, bats and their habitat are fully protected under the Wildlife and Countryside Act 1981 through inclusion in Schedule 5. In addition, all bat species are protected under the Conservation of Habitats and Species Regulations 2010; see **Appendix 8** for details.

5.3.3 Outline of Recommendations

An ecologist has been involved with the landscape proposals and scheme design for the site. Hedgerows and woodland will be retained and buffered from the development. Public open space will be designed to provide foraging and commuting habitat for bats through the provision of native species planting and woody vegetation linkage across

the site. Specifically, the particularly well-used foraging and commuting corridors (Rife and railway line) will remain unaffected (no habitat loss and no lighting).

There will be no night-time working and therefore no lighting impacts during the construction phase of the scheme. Lighting to be installed in the new development will comprise hooded luminaires directed away from vegetation. Ideally the bulbs will be LED and at the warmer end of the spectrum (e.g. avoiding blue or white light). LED lights emit much lower levels of UV and therefore have a lower impact on wildlife⁴². The new lighting will be motion-activated and task related, associated with specific entrance/exit points of the development. The lux level will be as low as possible to allow the task to be carried out safely and effectively. Guidance on task related lighting levels published by the Chartered Institution of Building Services Engineers (CIBSE)⁴³ will be followed. An ecologist will feed into and review the lighting plans for the scheme.

All of the mature trees on site, and in particular, trees which have been identified as supporting suitable roosting features for bats, will be retained and protected in accordance with BS 5837:2012, along with the hedgerows. As an enhancement measure, new bat boxes will be erected on a number of the retained mature trees and on a number of new properties. Details of locations, types of boxes and numbers, together with the lighting plans, hedgerow/meadow planting and habitat enhancement, will be included in the LEMP.

5.4 Badger

5.4.1 Summary Evaluation

No evidence of badger presence or activity was recorded on the site in 2012 or 2016. No setts have been recorded during 2012 or 2016 on site. A number of well-worn mammal paths are present in the fields and along the base of the hedgerows but these were attributable to fox. It is, however, likely that badger would visit the site for foraging and would almost certainly use the site for moving around the wider area.

5.4.2 Potential Impacts of Proposed Development

Retention of all the boundary vegetation and hedgerows will ensure habitat loss for badger is kept to a minimum, however, there will be an overall loss of habitat due to the development of the grassland and arable fields.

⁴² *Wildlife and Artificial Lighting Seminar*, 21st – 22nd March 2014, Arup London, Bat Conservation Trust.

⁴³ CIBSE (1992) *Lighting Guide 6: The Outdoor Environment*; CIBSE (2002) *Code for Lighting*, Butterworth-Heinemann, UK.

5.4.3 Outline of Recommendations

The landscape proposals for the site include native species planting and retention of all boundary habitats and hedgerows. In the unlikely event that a badger becomes trapped in excavations during the construction phase of the development, a timber ramp should be inserted to allow the animal to escape of its own accord. No impenetrable fencing will be installed on the site to ensure the free movement of wildlife, including badger, around the site and on/off the site from the wider area.

5.5 Otter and Water Vole

5.5.1 Summary Evaluation

No signs of water vole or otter were recorded along the Rife or the small stream, and habitat for both of these species here is not currently suitable. Water vole has been recorded further downstream of the site and it is possible that with appropriate management, this species could colonise the stretch of the Rife and the small stream on site.

5.5.2 Potential Impacts of Proposed Development

No negative impacts on these species will arise from the development. However, there is the opportunity to enhance the watercourses within the site and encourage colonisation of water vole and potentially lessen levels of disturbance to a sufficient level for otter to use the watercourses as a commuting corridor.

5.5.3 Outline of Recommendations

The Rife and small stream are being retained and will be managed to increase their value as wildlife corridors. They will both be fenced off and the level of shading will be managed to encourage a richer diversity of flora to develop. Buffers of native planting, managed for wildlife, will be retained along the stream and the Rife. Further detail will be included within the LEMP.

5.6 Dormouse

5.6.1 Summary Evaluation

No records of dormouse were returned for the site within the desk study data. No dormice or signs of dormouse were recorded on site during the 2012 and 2016 Phase 2 dormouse surveys. It is considered that the species is likely **absent** from the site, however, suitable habitat is present on site for this species and the limitations associated with just one season of survey data for this species is acknowledged. It is therefore, possible, that dormouse could be using habitat associated with the site, either for the purpose of moving around the landscape (commuting) or foraging.

5.6.2 Potential Impacts of Proposed Development

Given the likely absence of dormouse on the site, it is considered unlikely that the development proposals will give rise to impacts on this species. The landscape proposals for the site retain the majority of existing hedgerows, the boundary vegetation and all mature trees. There will also be a considerable amount of native species planting; if dormouse are using the site in small numbers, the development will not result in an overall loss of suitable habitat for this species.

5.6.3 Outline of Recommendations

As a precautionary measure, vegetation clearance of scrub and the small length of hedgerow which is to be removed will be undertaken under the supervision of a suitably qualified ecologist. This will involve the clearance of vegetation by hand to a height of circa 10 centimetres (cm). If practicable, vegetation clearance works will be undertaken in May prior to the young being born, or late September and October when young have left the nests, in order to minimise potential impacts on dormice. Any clearance will involve a detailed search for dormouse and dormouse nests; in the unlikely event that individual dormice or nests are identified, works will cease and a European Protected Species Mitigation (EPSM) licence will be sought from Natural England.

To create enhanced habitat for wildlife in general, new landscaping will incorporate locally sourced native woody vegetation and links will be retained and improved wherever possible; all gappy hedgerows will be strengthened with native planting. Important species for dormouse include dogwood *Cornus sanguinea*, hazel, hawthorn *Crataegus monogyna*, spindle *Euonymus europaeus*, pedunculate oak *Quercus robur*, elder *Sambucus nigra*, wych elm *Ulmus glabra*, holly *Ilex aquifolium*, blackthorn *Prunus spinosa*, field maple *Acer campestre*, wild privet *Ligustrum vulgare*, guelder rose *Viburnum opulus*, field rose *Rosa arvensis* and traveller's joy *Clematis vitalba*. A selection of these species will be included within the landscape proposals for the site.

5.7 Breeding Birds

5.7.1 Summary Evaluation

Three red listed species and one amber listed species of conservation concern were recorded holding breeding territories on site. Additionally, Cetti's warbler, a Schedule 1 listed species, which is afforded protection in terms of disturbance, was recorded within the area of wet woodland on the western boundary.

5.7.2 Potential Impacts of Proposed Development

The site proposals will potentially result in construction related impacts on nesting birds if vegetation clearance is carried out within the bird nesting season, long-term impacts on nesting bird habitat due to losses of "natural" habitat, increased predation pressures

arising from cats, and degradation of retained habitat due to increased recreational pressures.

The proposals for the site retain suitable habitat currently used for breeding birds including the woodland, trees and hedgerows. Scrub removal in certain areas of the site would impact on birds if vegetation clearance is carried out during the nesting bird season.

Overall, the landscape proposals for the site will ensure no overall loss of habitat currently used by breeding birds, but construction impacts will give rise to levels of disturbance and certain areas of the site will undoubtedly reduce in their suitability for nesting in the short-term.

All birds, their nests, eggs and young are legally protected; see **Appendix 8** for details.

5.7.3 *Outline of Recommendations*

All vegetation clearance will be carried out outside of the nesting bird season (March to August inclusive). If this is not possible, an ecologist will be on site to perform nesting birds checks of vegetation no more than 24 hours prior to clearance taking place. Suitable mitigation will be recommended by the visiting ecologist. More detailed recommendations will be included in the LEMP.

There are no additional recommendations to be made in relation to breeding birds in terms of retention of habitats and planting. As an enhancement measure, artificial nesting boxes will be included on some of the new houses. Full landscape details, including species planting, together with the models of nesting boxes, locations and numbers of boxes, will be included within the LEMP.

5.8 Reptiles

5.8.1 *Summary Evaluation*

Surveys were undertaken within areas of suitable habitat and slow-worm and common lizard were recorded along some of the hedgerow bases, in the south-western field (now outside of the scheme) and the far northern field at the top of the site. Suitable hibernation features are located within the hedgerow bases and within the tussocky grassland in the north.

5.8.2 *Potential Impacts of Proposed Development*

The majority of the habitats suitable for reptiles are being retained. The northernmost field and the majority of hedgerows are being retained. Overall, the amount of suitable reptile habitat currently present on site will be retained. There is a risk of impacting individual animals during the construction phase of the scheme.

Widespread reptile species (slow-worm *Anguis fragilis*, common lizard *Zootoca vivipara* and grass snake *Natrix natrix*) are protected under the Wildlife and Countryside Act 1981 against harm; see **Appendix 8** for details.

5.8.3 Outline of Recommendations

Given the population of slow-worm and common lizard within the site it will be necessary to ensure that these animals are not harmed during the necessary ground clearance works prior to development, and that animals are not present within the development area during construction works. It will therefore be necessary to undertake a capture and relocation exercise to move animals away from the areas of the site being developed.

Much of the habitat suitable for reptiles will be retained and enhanced as part of the scheme, including hedgerow bases, edges of the stream and Rife, and the northern field. However, to ensure that reptiles are not harmed during construction, where suitable reptile habitat is being removed, reptiles will be relocated to a temporary receptor area. This will be the northernmost field at the top of the site adjacent to the school (see **Map 3**, TN1). This area of the site will be enhanced to increase the carrying capacity for reptiles.

Full details of this exercise will be provided within a reptile mitigation strategy for the site. A reptile exclusion fence will be erected around each of the development areas across the site to create a barrier between habitat where reptiles have been recorded and where suitable reptile habitat is present (mainly at the bases of hedgerows across the site) and the development areas. Where possible, animals will be left in-situ with translocation only taking place where suitable reptile habitat is not being retained. The capture and removal of animals will be undertaken in conjunction with the careful strimming of areas of suitable habitat, carried out or supervised by a suitably qualified ecologist.

Reptile capture and removal will be undertaken between April and September when reptiles are not in winter hibernation. Relocation will be permitted in early October if weather conditions are suitable. A high density of refugia will be distributed within the areas of the site where suitable reptile is present and is not being retained. The refugia will be inspected on a daily basis until five 'clear' visits have been achieved. It is envisaged that the translocation will take a minimum of 60 days. All captured animals will be placed within the temporary holding area in the field in the far north of the site.

Prior to the relocation of reptiles, the temporary receptor site will be enhanced to increase its carrying capacity to receive reptiles from the construction footprint. A total of four hibernacula and two log piles will be created. Once construction is complete, all fencing will be removed to allow the animals to disperse into the rest of the site. Habitat

being created within the SUDS area will provide a continuation of habitat and a corridor for animals; it is envisaged that over time, this part of the site will provide an enhancement for reptiles. This area will be managed in the long-term to maintain high quality reptile habitat and this will be addressed in the LEMP.

A detailed reptile mitigation strategy will be included in the LEMP and will provide further details of the exact timings of the fencing, translocation, habitat enhancement works and the areas involved in the translocation. Details of the reptile mitigation needed on site will also be included within the CEMP will should be conditioned as part of the planning application.

5.9 Great Crested Newt

5.9.1 Summary Evaluation

The site contains limited terrestrial habitat for the species along the field boundaries, hedgerows and woodland, but the species is considered absent from the site based on the results of the eDNA survey carried out.

5.9.2 Potential Impacts of Proposed Development

The development will not result in any negative impacts on this species.

5.9.3 Outline of Recommendations

The native retention and management of valuable habitats, native planting and provision of ponds in associated with the SUDS along the Rife will enhance the overall habitats for amphibians in general.

5.10 Invertebrates

5.10.1 Summary Evaluation

The invertebrate surveys carried out during 2016 recorded a total of one Red Data Book and four Nationally Scarce species. Details of invertebrate status category definitions and criteria are provided in **Appendix 7**.

During the survey, all scarce species recorded, with the exception of small heath butterfly, were confined to areas which contained rank semi-improved grassland where plants such as ragwort, common fleabane and hogweed are abundant.

The most notable areas for invertebrates, according to the survey data collated, are the southern edges of Compartments Area A and C, north-west corner of Compartment I, Compartments F, G (northern end of the site) and J (rough grassland outside of the site boundary) and the rank grassland bordering the southern site boundary along the railway line (**Map 9**).

Based on the results of the 2016 invertebrate surveys, the site is considered to be of local entomological interest.

5.10.2 Potential Impacts of Proposed Development

Nationally scarce and rare invertebrate species were recorded in areas of on-site woodland, watercourses and hedgerows, and grassland margins adjacent to these areas, which are largely being retained as part of the site proposals; however, the proposals will result in the disturbance of these species during construction and landscaping. Furthermore, the loss of rank grassland would result in habitat loss for picture-winged flies *Myopites inulaedyssentericae* and *Merzomyia westermanni*.

5.10.3 Outline of Recommendations

Areas of rank grassland will be retained along the bases of hedgerows and along the edges of the small stream and Rife. Management of the site post construction will be carried out in such a way as to ensure that common fleabane and hoary ragwort is allowed to flower before it the grassland is cut.

The LEMP will include how retained habitats on site and newly created areas are to be suitable managed, with clearly set aims, objectives and timeframes. Provision of a buffer zone around the area of wet woodland and associated adjacent grassland on the western boundary will help to allow nationally scarce and rare species to flourish here. Species-rich meadow planting along the stream, Rife and within the SUDS area will benefit mining bees *Andrena trimmerana* and *Lasioglossum pauxillum*, and the median wasp *Dolichovespula media* which require flower-rich areas in which to forage.

Creation of new habitats using native species of local provenance will help enhance the site for terrestrial invertebrates in general. Whilst no specific mitigation is recommended for aquatic invertebrates, construction activities and drainage design must minimise any risk of pollution incidents and run-off adversely affecting the on-site water courses.

Sensitive lighting measures will also ensure that impacts to night-flying species are kept to a minimum and an ecologist will feed into and review the lighting proposals for the site to ensure light pollution is reduced as much as possible.

5.11 Evaluation Against Relevant Planning Policy

The above recommendations are required to be incorporated into and implemented via a Construction Environmental Management Plan (CEMP) to ensure avoidance of impacts during construction, and a site-wide LEMP to include detailed reptile mitigation, and that these documents are conditioned as part of the planning process to achieve compliance with the NPPF, Local Plan, and policies EH2, EH4 and EH6 of the

Aldingbourne Neighbourhood Development Plan (as the proposed development site boundary is within the boundary of Aldingbourne Parish).

5.12 Updating Surveys

If works have not commenced by March 2018, the ecological assessment may need to be updated to ensure any changes over that time are recorded and to ensure the impact assessment and mitigation remains suitable. If the planning application boundary changes or the proposals for the site alter, a re-assessment of the impacts may be required. As the construction of the site progresses, ecologists will be visiting the site to provide supervision for various aspects of the site preparation. During these visits, should the need be identified to update any species or habitat surveys, this will be communicated to the project manager and the appropriate action taken. Generally, desk study data and field data is accepted to be valid for between 12-24 months (depending on the nature of the data).

6.0 CONCLUSION

The site contains habitats suitable to support a range of habitats and both botanical and faunal species of note and rarity. The site has been proposed to be a Biodiversity Corridor in the Parish of Aldingbourne.

The habitats across the site are associated with intensively managed agricultural landscapes. The wet grassland is relatively improved, the drier grassland recently abandoned with low herb diversity. Species recorded across the site suggest high levels of fertility in the soil, possibly due to past agricultural usage.

The most interesting areas of the site in terms of habitats, are the hedgerows, mature trees (scattered across the site but mainly within the hedgerows), watercourses and wet woodland. These areas/features will be retained wherever possible and will be appropriately managed to improve their condition. Protection of retained habitats, management and enhancement measures will be detailed with the LEMP for the site to ensure that appropriate protection measures are implemented during the construction phase of the scheme and post construction, these habitats receive the management they need. It is acknowledged that much of the existing arable and grassland habitats will be lost. The landscape report provides detail on species planting and habitats being created. A SUDS area will be created along the Rife, planted up with native species to create wildflower meadows, native tree planting and hedgerow planting will be introduced and the wet woodland, mature trees and hedgerows retained/planted up where appropriate.

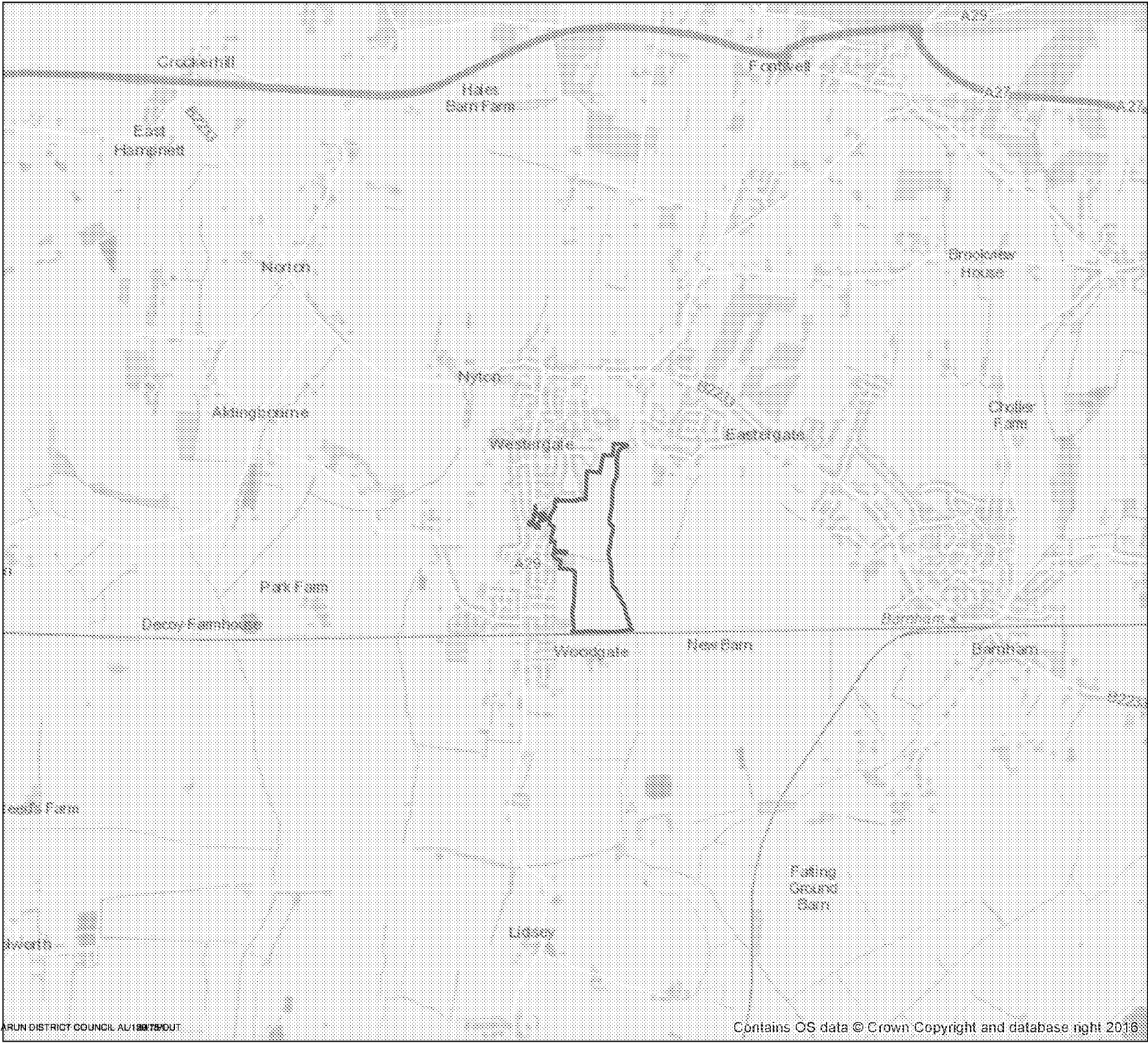
The tussocky field in the far north of the site will also be retained and will act as a temporary holding site for reptiles which will need to be relocated from small areas of the site during the construction phase. A detailed reptile translocation strategy will be included within the LEMP, providing information on the method of translocation, fencing locations and aftercare of habitat for reptiles.

Species-specific mitigation will include retention of dark corridors and sensitive works timings to avoid impacts on specific species including nesting birds and reptiles. The site will not be fenced and wildlife will be able to move across the site with no barriers to dispersal. New roads within the development will be sensitively lit to ensure light levels are kept as low as possible. Enhancement measures will be included within the landscape planting but species-specific enhancement measures will also be introduced, including nesting and roosting boxes for birds and bats, compost facilities, rainwater butts, wildlife awareness notice boards around the development and an allotment and orchard.

A CEMP will be implemented during the development phase and an ecologist will provide input into this document to ensure biodiversity is protected during the

construction activities. The CEMP and LEMP will be conditioned as part of the planning application and will ensure compliance with the NPPF, Local Plan, and policies EH2, EH4 and EH6 of the Aldingbourne Neighbourhood Development Plan.

Map 1 Site Location Plan



**LAND AT WESTERGATE,
CHICHESTER, WEST SUSSEX**

ECOLOGICAL ASSESSMENT

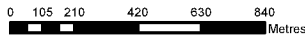
Map 1 - Site Location

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev.1

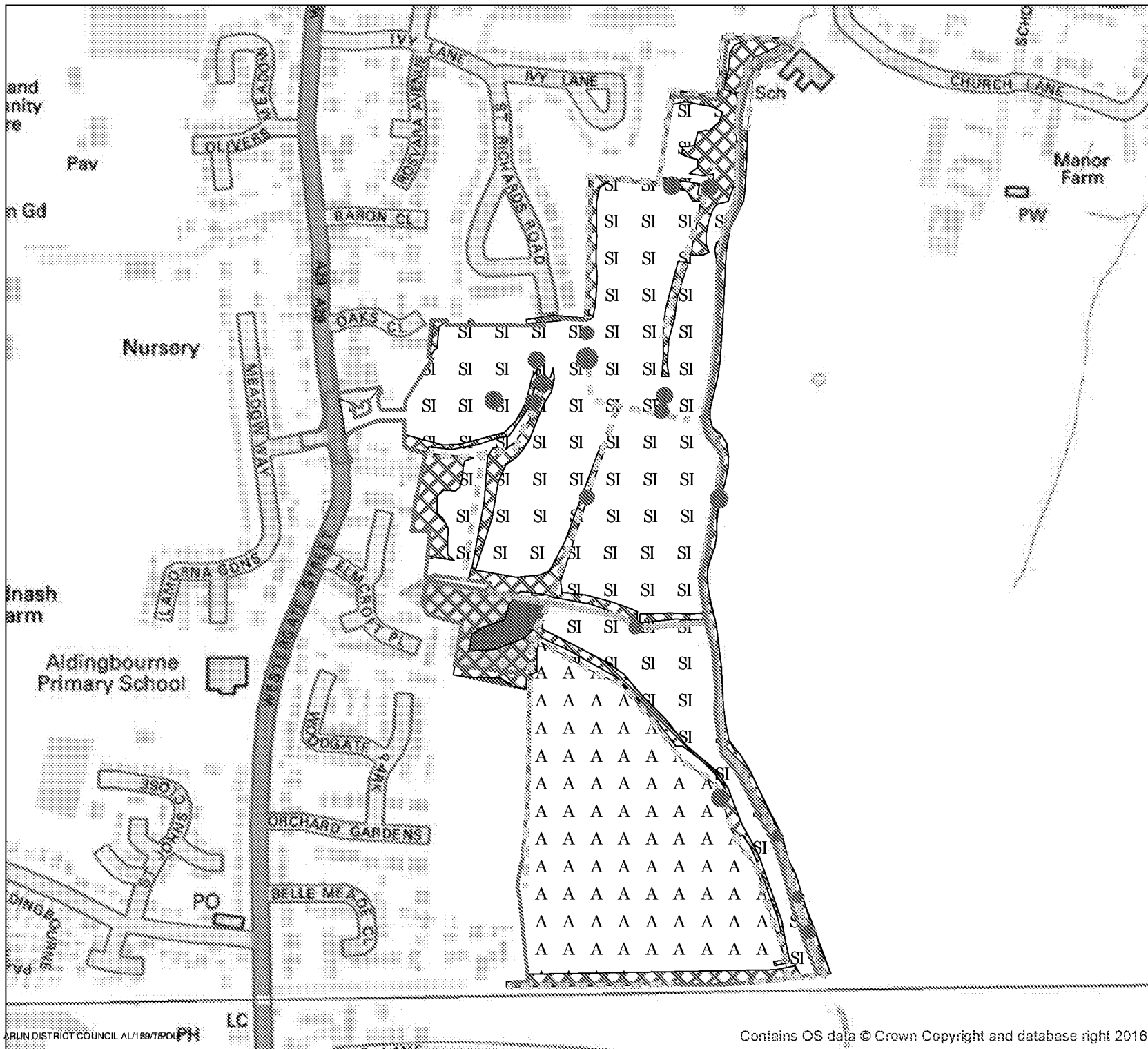
KEY

==== Site Boundary

Scale at A4: 1:25,000



Map 2 Phase 1 Habitat Map



LAND AT WESTERGATE, CHICHESTER, WEST SUSSEX

ECOLOGICAL ASSESSMENT

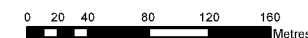
Map 2 - Phase 1 Habitat Map

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev.1

KEY

- Site Boundary
- Scattered Trees
- Dense/Continuous Scrub
- Poor Semi-Improved Grassland
- Arable
- Woodland
- Hedgerow
- Watercourse

Scale at A4: 1:5,000



Map 3 National Vegetation Classification (NVC)



**LAND AT WESTERGATE,
CHICHESTER, WEST SUSSEX**

ECOLOGICAL ASSESSMENT

**Map 3 - National Vegetation Classification
(NVC)**

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev.1

KEY

- Site Boundary
- Wider Survey Area
- Watercourse
- Dry Neutral Grassland (Unmanaged) : MG1a, MG6a
- Bramble, Nettle and Other Tall Ruderal Vegetation : OV24, OV26, W24, MG1b
- Trampled Grassland (MG7f) and Arable
- Wet Grassland (Managed) : MG7d
- Woodland and Hedgerows : W6b, W8d, W21a
- TN1 Target Note
- W1 Watercourse Reference No.

Scale at A4: 1:5,000

0 20 40 80 120 160 Metres



Source: Esri, DigitalGlobe, GeoEye, IGN, AerGRID, IGN, IGP, swisstopo, and the GIS User Community

Map 4 Bat Surveys

LAND AT WESTERGATE, CHICHESTER, WEST SUSSEX

ECOLOGICAL ASSESSMENT

Map 4 - Bat Surveys

Client: CALA Homes (South Home Counties) Ltd.

Date: February 2017

Status: Final Rev. 1

KEY

Site Boundary

Wider Survey Area

Location of Trees Subject to Climb and Inspect Survey

Location of SM2 Automated Detectors

Bat Transect Route

Five Minute Point Count

Scale at A4: 1:5,000

0 20 40 80 120 160 Metres



Source: Esri, DigitalGlobe, GeoEye, IGN, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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Map 5 Location of Dormouse Tubes



Source: Esri, DigitalGlobe, GeoEye, IGN, Aeri, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, IGP, swisstopo, and the GIS User Community

LAND AT WESTERGATE, CHICHESTER, WEST SUSSEX

ECOLOGICAL ASSESSMENT

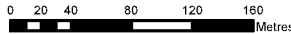
Map 5 - Location of Dormouse Tubes

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev. 1

KEY

- Site Boundary
- Wider Survey Area
- Location of Dormouse Tubes

Scale at A4: 1:5,000



Map 6a Breeding Bird Survey Results: Schedule 1 and Red Listed Species



LAND AT WESTERGATE, CHICHESTER, WEST SUSSEX

ECOLOGICAL ASSESSMENT

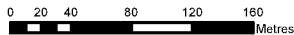
Map 6a - Breeding Bird Survey Results:
Schedule 1 and Red Listed Species

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev. 1

KEY

- Site Boundary
- CW Cetti's Warbler (Schedule 1)
- LI Linnet (Red Listed)
- ST Song Thrush (Red Listed)
- Y Yellowhammer (Red Listed)

Scale at A4: 1:5,000



Map 6b Breeding Bird Survey Results: Amber Listed Species



**LAND AT WESTERGATE,
CHICHESTER, WEST SUSSEX**

ECOLOGICAL ASSESSMENT

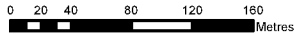
Map 6b - Breeding Bird Survey Results:
Amber Listed Species

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev. 1

KEY

- Site Boundary
- Bullfinch
- Dunnock
- Stock Dove

Scale at A4: 1:5,000



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS,
USDA, USGS, AeroGRID, IGN, IGP, swisstopo, and the GIS User
Community

Map 7 Phase 2 Reptile Survey Results and Location of Refugia



LAND AT WESTERGATE, CHICHESTER, WEST SUSSEX

ECOLOGICAL ASSESSMENT

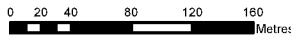
Map 7 - Phase 2 Reptile Survey Results and Location of Refugia

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev. 1

KEY

- Site Boundary
- Wider Survey Area
- Location of Reptile Refugia
- Location of Slow-worm Records
- Location of Common Lizard Records

Scale at A4: 1:5,000



Source: Esri, DigitalGlobe, GeoEye, IGN, Earthstar Geographics, CNES/Airbus DS,
USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User
Community

Map 8 Location of Pond Surveyed and eDNA Results

Map 9 Invertebrate Survey Results



LAND AT WESTERGATE, CHICHESTER, WEST SUSSEX

ECOLOGICAL ASSESSMENT

Map 9 - Invertebrate Survey Results

Client:	CALA Homes (South Home Counties) Ltd.
Date:	February 2017
Status:	Final Rev. 1

KEY

- Site Boundary
- Wider Survey Area
- *Andrena trimmerana*, Nationally Scarce (Nb)
- *Dolichovespula media*, Nationally Scarce (Na)
- *Merzomyia westermanni*, Nationally Scarce (N)
- *Myopites inulaedysentericae*, Rare (RDB 3)
- A Survey Compartment, as Referenced in Report

Scale at A4: 1:5,000

0 20 40 80 120 160 Metres



Appendix 1 Proposed Illustrative Landscape Framework



Coloured Site Layout
Land East of Westergate, West Sussex
16046 / C101J
Scale 1:1000 @ A0 February 2017

ARUP DISTRICT COUNCIL ALBATROSS

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Appendix 2 Vascular Plant List

The following is a species list of vascular plants recorded by J. Norton and D. Allan on 4th August 2016. Scientific and English names follow Stace's *New Flora of the British Isles*, 3rd Edition, 2010. Unless otherwise stated, species were recorded from grassland areas. No indicator species of acid to neutral grassland or calcareous grassland were recorded.

Key

Indicator column (Ind.)

W = Ancient Woodland Vascular Plants (AWVP) - species most strongly associated with ancient woodland and typical components of botanically rich ancient woodland communities (100 species).

Reference: Rose, F. (1999). *Indicators of Ancient Woodland* – the use of vascular plants in evaluating ancient woodland for nature conservation. *British Wildlife* 10: 241-251.

Frequency codes (DAFOR):

D = dominant, A = abundant, F = frequent, O = occasional, R = rare, L = locally, P = present (frequency not able to be estimated in current season).

Species	English name	Ind.	DAFOR	Comments
Ferns and horsetails				
<i>Dryopteris filix-mas</i>	Male-fern		R	Scrub/treelines.
<i>Equisetum arvense</i>	Field Horsetail		R	
<i>Polystichum setiferum</i>	Soft Shield-fern	W	R	At least two plants on wooded bank by path, N end of site.
Grasses, rushes and sedges				
<i>Agrostis capillaris</i>	Common Bent		O	
<i>Agrostis gigantea</i>	Black Bent		R	
<i>Agrostis stolonifera</i>	Creeping Bent		A	
<i>Alopecurus pratensis</i>	Meadow Foxtail		LF	Difficult to estimate due to recent mowing, but probably widespread over wet grassland.
<i>Arrhenatherum elatius</i>	False Oat-grass		LA	Rough grassland, field edges, etc.
<i>Avena fatua</i>	Wild Oat		R	Arable field.
<i>Brachypodium sylvaticum</i>	False Brome		O	Scrub/treelines.
<i>Bromus hordeaceus</i>	Soft-brome		O	
<i>Carex hirta</i>	Hairy Sedge		LA	Wet grassland.
<i>Carex pendula</i>	Pendulous Sedge	W	R	LF in wooded strip and R on stream.
<i>Dactylis glomerata</i>	Cock's-foot		F	
<i>Echinochloa crus-galli</i>	Cockspur		R	Arable field.
<i>Elytrigia repens</i>	Common Couch		R	Maybe more frequent.
<i>Glyceria fluitans</i>	Floating Sweet-grass		R	Stream/ditches.
<i>Holcus lanatus</i>	Yorkshire-fog		A	
<i>Hordeum murinum</i>	Wall Barley		R	Paths.
<i>Juncus effusus</i>	Soft Rush		R	Under willow woodland.

Species	English name	Ind.	DAFOR	Comments
<i>Juncus inflexus</i>	Hard Rush		R	
<i>Lolium perenne</i>	Perennial Rye-grass		A	
<i>Phalaris arundinacea</i>	Reed Canary-grass		O	Stream/ditches.
<i>Phleum bertolonii</i>	Smaller Cat's-tail		R	
<i>Phleum pratense</i>	Timothy		LF	Possibly sown in meadows.
<i>Poa annua</i>	Annual Meadow-grass		O	Paths.
<i>Poa trivialis</i>	Rough Meadow-grass		A	
<i>Schedonorus arundinaceus</i>	Tall Fescue		O	
Herbs				
<i>Achillea millefolium</i>	Yarrow		R	Only in one spot in dry grassland near asphalt area.
<i>Alliaria petiolata</i>	Garlic Mustard		R	
<i>Anagallis arvensis</i>	Scarlet Pimpernel		R	Arable field.
<i>Anthriscus sylvestris</i>	Cow Parsley		P	Field edges.
<i>Apium nodiflorum</i>	Fool's-water-cress		LA	Stream/ditches.
<i>Arctium minus</i>	Lesser Burdock		R	
<i>Artemisia vulgaris</i>	Mugwort		R	
<i>Arum maculatum</i>	Lords-and-ladies		R	Scrub/treelines.
<i>Ballota nigra</i>	Black Horehound		R	
<i>Barbarea vulgaris</i>	Winter-cress		R	Stream/ditches.
<i>Bryonia dioica</i>	White Bryony		O	Scrub/treelines.
<i>Callitriche obtusangula</i>	Blunt-fruited Water-starwort		R	Small patches at S end of stream.
<i>Calystegia sepium</i>	Hedge Bindweed		LF	Scrub/treelines.
<i>Capsella bursa-pastoris</i>	Shepherd's-purse		R	Paths.
<i>Centaurea nigra</i>	Common Knapweed		R	Only in one spot in dry grassland near asphalt area.
<i>Cerastium fontanum</i>	Common Mouse-ear		R	
<i>Chenopodium polyspermum</i>	Many-seeded Goosefoot		R	Arable field.
<i>Cirsium arvense</i>	Creeping Thistle		LF	
<i>Cirsium vulgare</i>	Spear Thistle		R	
<i>Convolvulus arvensis</i>	Field Bindweed		O	
<i>Conyza floribunda</i>	Bilbao Fleabane		R	Arable field.
<i>Crepis capillaris</i>	Smooth Hawk's-beard		R	
<i>Digitalis purpurea</i>	Foxglove		R	
<i>Dipsacus fullonum</i>	Wild Teasel		O	
<i>Epilobium hirsutum</i>	Great Willowherb		F	Stream/ditches.
<i>Epilobium tetragonum</i>	Square-stalked Willowherb		R	Stream/ditches.
<i>Euphorbia peplus</i>	Petty Spurge		R	Arable field.
<i>Filipendula ulmaria</i>	Meadowsweet		R	S end of stream.
<i>Galium aparine</i>	Cleavers		P	In nettle stands, field edges.
<i>Geranium dissectum</i>	Cut-leaved Crane's-bill		R	
<i>Glechoma hederacea</i>	Ground-ivy		R	
<i>Gnaphalium uliginosum</i>	Marsh Cudweed		R	Track, S side of arable field.
<i>Helminthotheca echioides</i>	Bristly Oxtongue		R	
<i>Heracleum sphondylium</i>	Hogweed		O	
<i>Hirschfeldia incana</i>	Hoary Mustard		R	
<i>Hypericum perforatum</i>	Perforate St John's-wort		R	
<i>Iris pseudacorus</i>	Yellow Iris		P	Stream/ditches.
<i>Kickxia elatine</i>	Sharp-leaved Fluellen		R	Arable field.
<i>Lactuca serriola</i>	Prickly Lettuce		O	
<i>Lamium album</i>	White Dead-nettle		O	

Species	English name	Ind.	DAFOR	Comments
<i>Lepidium squamatum</i>	Swine-cress		R	Arable field.
<i>Lycopus europaeus</i>	Gypsywort		R	
<i>Malva moschata</i>	Musk Mallow		R	
<i>Malva sylvestris</i>	Common Mallow		R	
<i>Matricaria discoidea</i>	Pineappleweed		O	Arable field, paths.
<i>Melissa officinalis</i>	Balm		R	Garden escape in rough grassland.
<i>Mentha aquatica</i>	Water Mint		R	S end of stream.
<i>Mercurialis perennis</i>	Dog's Mercury		LF	Wooded strip.
<i>Nasturtium officinale</i>	Water-cress		R	Stream/ditches.
<i>Oenanthe crocata</i>	Hemlock Water-dropwort		LF	Stream/ditches.
<i>Persicaria amphibia</i>	Amphibious Bistort		R	By S end of stream.
<i>Persicaria maculosa</i>	Redshank		O	Arable field, etc.
<i>Pimpinella saxifraga</i>	Burnet Saxifrage		R	Several plants along edge of path by stream, SU 9425 0512.
<i>Plantago lanceolata</i>	Ribwort Plantain		R	
<i>Plantago major</i>	Greater Plantain		LF	Trampled paths.
<i>Polygonum aviculare</i>	Knotgrass		LF	Trampled paths.
<i>Potentilla reptans</i>	Creeping Cinquefoil		LF	
<i>Poterium sanguisorba</i>	Salad Burnet		R	Possibly cultivated variety, sown.
<i>Prunella vulgaris</i>	Selfheal		R	
<i>Pulicaria dysenterica</i>	Common Fleabane		R	
<i>Ranunculus acris</i>	Meadow Buttercup		R	
<i>Ranunculus repens</i>	Creeping Buttercup		LF	
<i>Rumex obtusifolius</i>	Broad-leaved Dock		O	
<i>Rumex sanguineus</i>	Wood Dock		O	
<i>Scrophularia auriculata</i>	Water Figwort		O	Stream/ditches.
<i>Sedum album</i>	White Stonecrop		R	Edges of old asphalt area (garden escape).
<i>Senecio jacobaea</i>	Ragwort		O	
<i>Silene dioica</i>	Red Campion		O	Scrub/treelines.
<i>Sisymbrium officinale</i>	Hedge Mustard		O	Paths.
<i>Solanum dulcamara</i>	Bittersweet		R	Stream/ditches.
<i>Solanum nigrum</i>	Black Nightshade		R	Arable field.
<i>Sonchus asper</i>	Prickly Sow-thistle		R	
<i>Sparganium erectum</i>	Branched Bur-reed		LF	Stream/ditches.
<i>Stachys palustris</i>	Marsh Woundwort		LF	Rough grassland.
<i>Stachys sylvatica</i>	Hedge Woundwort		R	Hedges/treelines.
<i>Stellaria graminea</i>	Lesser Stitchwort		R	
<i>Tamus communis</i>	Black Bryony	W	R	Hedges/treelines.
<i>Taraxacum agg.</i>	Dandelion		O	
<i>Torilis japonica</i>	Upright Hedge-parsley		R	Dry grassland.
<i>Trifolium repens</i>	White Clover		LF	
<i>Tripleurospermum inodorum</i>	Scentless Mayweed		LA	Arable field.
<i>Urtica dioica</i>	Common Nettle		A	Field edges and streamsides.
<i>Verbena bonariensis</i>	Argentinian Vervain		R	Garden escape in rough grassland.
<i>Veronica persica</i>	Common Field-speedwell		R	Arable field.
<i>Vicia cracca</i>	Tufted Vetch		R	
<i>Vicia hirsuta</i>	Hairy Tare		P	Rough grassland.
<i>Vicia sativa subsp. segetalis</i>	Common Vetch		R	Rough grassland.
<i>Vicia tetrasperma</i>	Smooth Tare		R	
<i>Viola arvensis</i>	Field Pansy		R	Arable field.

Species	English name	Ind.	DAFOR	Comments
Trees and shrubs				
<i>Acer campestre</i>	Field Maple	W	F	Hedges/treelines.
<i>Acer platanoides</i>	Norway Maple		R	
<i>Acer pseudoplatanus</i>	Sycamore		R	Several mature trees.
<i>Aesculus hippocastanum</i>	Horse-chestnut		R	Scrub/treelines.
<i>Betula pendula</i>	Silver Birch		LF	Invading dry grassland.
<i>Buddleja davidii</i>	Butterfly-bush		R	Scrub/treelines.
<i>Clematis vitalba</i>	Traveller's-joy		O	
<i>Cornus sanguinea</i>	Dogwood		O	Scrub/treelines.
<i>Corylus avellana</i>	Hazel		O	Scrub/treelines.
<i>Crataegus monogyna</i>	Hawthorn		LF	Scrub/treelines.
<i>Fraxinus excelsior</i>	Ash		O	Hedges/treelines, inc. mature trees.
<i>Hedera helix</i>	Ivy		O	Scrub/treelines.
<i>Humulus lupulus</i>	Hop		O	Scrub/treelines.
<i>Lonicera japonica</i>	Japanese Honeysuckle		LA	Invading dry grassland next to garden of house.
<i>Lonicera periclymenum</i>	Honeysuckle		R	Scrub/treelines.
<i>Prunus domestica</i>	Plum		R	Scrub/treelines.
<i>Prunus spinosa</i>	Blackthorn		LF	Scrub/treelines
<i>Quercus ilex</i>	Evergreen Oak		R	Sapling noted.
<i>Quercus robur</i>	Pedunculate Oak		LF	Scrub/treelines.
<i>Rosa arvensis</i>	Field Rose	W	R	Scrub/treelines.
<i>Rosa canina</i> agg.	Dog Rose and hybrids		O	Scrub/treelines.
<i>Rubus armeniacus</i>	'Himalayan Giant' Bramble		P	Invading dry grassland; scrub/treelines.
<i>Rubus fruticosus</i> agg.	Bramble		LA	
<i>Ruscus aculeatus</i>	Butcher's-broom	W	R	Patch along wooded strip.
<i>Salix caprea</i>	Goat Willow		LF	Scrub invading dry grassland.
<i>Salix cinerea</i>	Grey Willow		O	Scrub/treelines.
<i>Salix fragilis</i>	Crack Willow		R-LD	Mature tree along stream and stand of trees in S part of site.
<i>Sambucus nigra</i>	Elder		LF	Scrub/treelines.
<i>Ulmus procera</i>	English Elm		LF	Scrub/treelines.

Summary

Total species:	Ferns and horsetails	3
	Grasses, rushes and sedges	25
	Herbs	89
	Trees and shrubs	29
	All vascular plants	146
Total indicator species:	Ancient woodland vascular plants	6

Appendix 3 National Vegetation Classification (NVC) Survey Photographs

Target notes referred to in photograph descriptions are shown on **Map 3**.



Figure 1: Footpath at northern end of site (TN1) viewing north (stream W1 on right)
Scrub and tall herb with hogweed, common nettle and hedge bindweed (MG1b/OV24a)



Figure 2: Recently mown wet grassland in TN3 with some dock invasion (MG7d)



Figure 3: TN5, dry neutral grassland (MG1a, MG6a) with oak tree



Figure 4: TN6, recently mown herb poor wet grassland (MG7d)



Figure 5: TN8 viewing north-west along defunct hedge towards crack willow woodland (TN11) with margin of tall ruderal herb (OV24/OV26)



Figure 6: Northern corner of arable field (TN9) with weedy patch in foreground and broad bean crop



Figure 7: TN10, unmanaged dry grassland dominated by false oat-grass (MG1a)



Figure 8: TN10, northern end with shorter grassland and abundant ragwort (MG6a)



Figure 9: Wooded strip (TN13) viewing east, with crack willow and pendulous sedge along watercourse to right



Figure 10: TN14, dry grassland (MG1a) and tree saplings



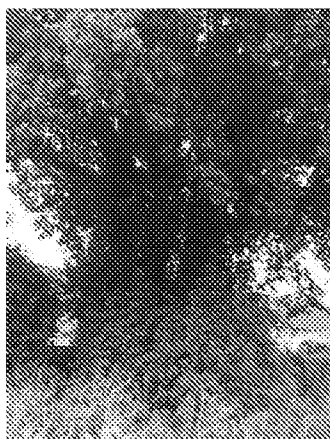
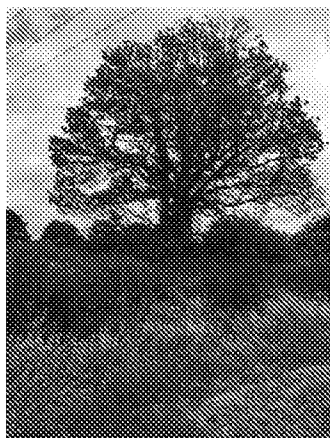
Figure 11: Typical section of the main stream (W1) next to TN8, viewing north, with nettle and bramble covering the channel (OV24)

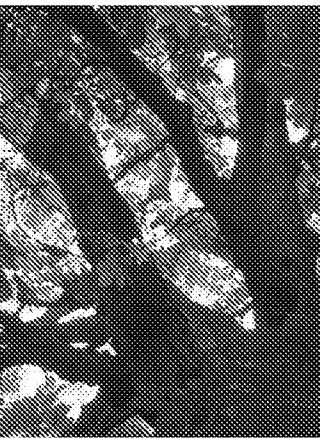


Figure 12: Watercourse W2 with clump of yellow iris

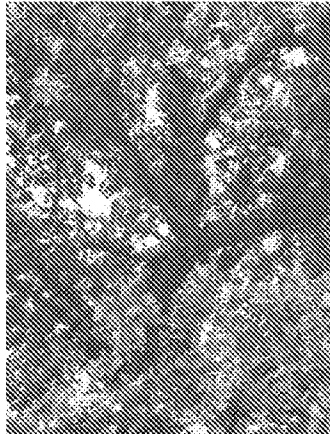
Appendix 4 Tree Climb and Inspect Survey Results

Tree No.	Species	Potential Roosting Features	Roost Potential	Photograph	Comments
1	Oak	Split on branch.	Low	 Figure 1: Mature oak	Split in end of branch but cavity only extends approximately 15 centimetres (cm). No direct evidence of bats was recorded but feature confirmed to have low suitability for roosting bats. No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.
2	Oak	Callus roll present around deadwood limb scar.	Low	 Figure 2: Mature oak	Extends slightly into stem. No direct evidence of bats was recorded but feature confirmed to have low suitability for roosting bats. No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.

Tree No.	Species	Potential Roosting Features	Roost Potential	Photograph	Comments
3	Oak	Ivy clad stem.	Low	 Figure 3: Mature oak	<i>Tree not climbed. No other potential roost features apart from ivy and this could not be inspected in any detail from tree climb and inspect survey as ivy covers entire tree. Ivy is not mature (dense) but could be used by individual bats as day/night roost.</i> No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost features provided on site.
4	Field maple	Rot hole.	Medium	 Figure 4: Mature oak	<i>Tree not climbed due to proximity to overhead wires.</i> If being removed from site, Phase 2 bat surveys will be required.
5	Oak	Callus roll and rot hole.	Negligible	 Figure 5: Mature oak	Features do not extend into stem. No further surveys needed if tree not being retained. Replacement roost feature will need to be provided on site.

Tree No.	Species	Potential Roosting Features	Roost Potential	Photograph	Comments
6	Oak	Rot hole.	Medium	 Figure 6: Mature oak	<i>Tree not climbed due to proximity to overhead wires.</i> If being removed from site, Phase 2 bat surveys will be required.
7	Sycamore	Ivy clad.	Low	No photograph available.	No direct evidence of bats was recorded. No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.
8	Horse chestnut	Woodpecker hole.	Negligible	 Figure 7: Horse chesnut	Hole does not extend up into stem. No direct evidence of bats was recorded. No further surveys or mitigation needed if tree not being retained. Replacement roost to be provided on site.

Tree No.	Species	Potential Roosting Features	Roost Potential	Photograph	Comments
9	Oak	Ivy clad.	Low	 Figure 8: Mature oak	No direct evidence of bats was recorded. No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.
10	Oak	Ivy clad.	Low	Photograph not available	No direct evidence of bats was recorded. No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.
11	Oak	Ivy clad.	Low	Photograph not available	No direct evidence of bats was recorded. No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.

Tree No.	Species	Potential Roosting Features	Roost Potential	Photograph	Comments
12	Oak	Callus roll and limb scar on end of branch.	Low	 Figure 9: Mature oak	Limb scar extends approximately 10cm into branch. No direct evidence of bats was recorded. No further surveys needed if tree not being retained. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.
13	Oak	Limb scar.	Negligible	 Figure 10: Mature oak	Limb scar does not extend into stem. No direct evidence of bats was recorded. No further surveys needed if tree not being retained. Replacement roost to be provided on site.
14	Oak	Loose bark on branch.	Low	Photograph not available	Features are suitable for individual bats. No direct evidence of bats was recorded. No further surveys needed. Precautionary approach to felling if tree not being retained and replacement roost to be provided on site.

Appendix 5 Automated Detector Settings

SM2 Detector Settings

SM2 detectors can be calibrated in a number of different settings which can result in the potential variations in the way that bat calls are recorded. **Table 1** details the standard settings used by ECOSA during automated detector surveys undertaken.

Table 1: Standard SM2 settings

Option	Basic Setup
Settings - Audio	
Sample rate	192000Khz
Channels	Mono L (left)
Compression	WAV
Gain Left	+0.00
Gain Right	+0.00
Settings - Audio Advanced	
Dig High Pass Filter (HPF) Left	Fs/12
Dig High Pass Filter (HPF) Right	Off
Digital Low Pass Filter (LPF) Left	Off
Digital Low Pass Filter (LPF) Right	Off
Trig Lvl Left	12SNR
Trig Lvl Right	Off
Trg Win Left	2.0s
Trg Win Right	2.0s
Trg Max Length	2s
Bits (Div Ratio)	16
Nap Trg Lvl	Off

Data Conversion Settings

In order to analyse the data efficiently the raw .wav files recorded on the SM2 detector are subsequently converted to zero crossing (.wc) files which are subject to automated classification by Wildlife Acoustics Kaleidoscope Pro. During the conversion process the data is filtered to remove noise files in line with Wildlife Acoustics recommended setting as provided in **Table 2**.

Table 2: Noise File Filtering Settings

Option	Basic Setup
Signal of Interest – Frequency	8 – 120 kHz
Signal of Interest – Call Length	2 - 500ms
Signal of Interest – Minimum Number of Calls	2
Advanced Signal Enhancement	On

All filtered noise files are kept and subsequently assessed for bat calls in order to ensure that no bat calls have been incorrectly classified as noise. The “Advanced Signal Enhancement” setting discards files which Kaleidoscope assessed as being insufficient quality. Any discarded files are subsequently not stored by Kaleidoscope and therefore, not subject to analysis by an ecologist.

Appendix 6 Invertebrate Survey Results

Invertebrate Species recorded from land at Westergate, Chichester during August 2016

Order	Family	Scientific Name	English Name	Status	Date
ORTHOPTERA (Grasshoppers and Crickets)		<i>Chorthippus brunneus</i>	Field grasshopper	Common Widespread	3/8/2016
		<i>Chorthippus parallelus</i>	Meadow grasshopper	Common Widespread	8/8/2016
		<i>Leptophyes punctatissima</i>	Speckled Bush Cricket	Common Widespread	3/8/2016
		<i>Pholidoptera griseoaptera</i>	Dark Bush Cricket	Common Widespread	3/8/2016
DERMAPTERA (Earwigs)		<i>Forficula auricularia</i>	Common earwig	Common, Widespread	3/8/2016
HEMIPTERA (True Bugs)	Pentatomidae (Shield Bugs)	<i>Dolycoris baccarum</i>	Sloe bug	Common Widespread	17/8/2016
		<i>Palomena prasina</i>	Green shieldbug	Common Widespread	3/8/2016
	Rhopalidae (Rhopalid Bugs)	<i>Coryzus hyosciami</i>	Cinnamon bug	Common Widespread	8/8/2016
	Scutelleridae (Tortoise Bugs)	<i>Euygaster testudinaria</i>	Common Tortoise Bug	Common Widespread	3/8/2016
ODONATA (Dragonflies and Damselflies)	Libellulidae (Skimmers and Darters)	<i>Sympetrum striolatum</i>	Common darter	Common Widespread	17/8/2016
LEPIDOPTERA (Butterflies and Moths)		<i>Coenonympha pamphilus</i>	Small Tortoiseshell	UK BAP (Research only)	17/8/2016
		<i>Colias croceus</i>	Clouded Yellow	Common Widespread	17/8/2016
		<i>Inachis io</i>	Peacock	Common Widespread	3/8/2016

Order	Family	Scientific Name	English Name	Status	Date
		<i>Maniola jurtina</i>	Meadow brown	Common Widespread	3/8/2016
		<i>Pararge aegeria</i>	Speckled Wood	Common Widespread	8/8/2016
		<i>Pieris brassicae</i>	Large white	Common Widespread	3/8/2016
		<i>Pieris napi</i>	Green-veined white	Common Widespread	3/8/2016
		<i>Pieris rapae</i>	Small white	Common Widespread	3/8/2016
		<i>Polygonia c – album</i>	Comma	Common Widespread	3/8/2016
		<i>Polyommatus icarus</i>	Common blue	Common Widespread	3/8/2016
		<i>Pyronia tithonus</i>	Gatekeeper	Common Widespread	3/8/2016
		<i>Vanessa atalanta</i>	Red Admiral	Common Widespread	3/8/2016
		<i>Tyria jacobaeae</i>	Cinnabar Moth	UK BAP (Research only)	3/8/2016
DIPTERA (True Flies)	Stratiomyiidae (Soldier flies)	<i>Pachygaster atra</i>		Common, Widespread	3/8/2016
	Dolichopodidae (Long-headed flies)	<i>Dolichopus festivus</i>		Common Widespread	17/8/2016
		<i>Dolichopus griseiventris</i>		Common Widespread	3/8/2016
		<i>Dolichopus trivialis</i>		Common Widespread	3/8/2016
	Syrphidae (Hoverflies)	<i>Cheilosia bergenstammi</i>		Common Widespread	3/8/2016
		<i>Cheilosia illustrata</i>		Common Widespread	3/8/2016
		<i>Cheilosia impressa</i>		Common Widespread	8/8/2016

Order	Family	Scientific Name	English Name	Status	Date
		<i>Cheilosia pagana</i>		Common Widespread	3/8/2016
		<i>Cheilosia scutellata</i>		Common Widespread	3/8/2016
		<i>Cheilosia vernalis</i>		Common Widespread	3/8/2016
		<i>Cheilosia vulpina</i>		Common Widespread	3/8/2016
		<i>Chrysogaster solstitialis</i>		Common Widespread	3/8/2016
		<i>Chrysotoxum bicinctum</i>		Common Widespread	8/8/2016
		<i>Episyrphus balteatus</i>		Common Widespread	3/8/2016
		<i>Eristalis arbustorum</i>		Common, Widespread	3/8/2016
		<i>Eristalis interruptus</i>		Common, Widespread	8/8/2016
		<i>Eristalis pertinax</i>		Common, Widespread	3/8/2016
		<i>Eristalis tenax</i>		Common Widespread	3/8/2016
		<i>Eupeodes luniger</i>		Common Widespread	3/8/2016
		<i>Helophilus pendulua</i>		Common Widespread	17/8/2016
		<i>Helophilus trivittatus</i>		Common Widespread	17/8/2016
		<i>Melanostoma mellinum</i>		Common Widespread	3/8/2016
		<i>Melanostoma scalare</i>		Common Widespread	3/8/2016
		<i>Myathropa florea</i>		Common Widespread	3/8/2016
		<i>Platycheirus albimanus</i>		Common Widespread	3/8/2016
		<i>Platycheirus peltatus</i>		Common Widespread	8/8/2016

Order	Family	Scientific Name	English Name	Status	Date
		<i>Platycheirus rosarum</i>		Common Widespread	17/8/2016
		<i>Riponnensia splendens</i>		Common Widespread	8/8/2016
		<i>Sphaerophoria scripta</i>		Common Widespread	3/8/2016
		<i>Sphaerophoria taeniata</i>		Common Widespread	8/8/2016
		<i>Syritta pipiens</i>		Common Widespread	3/8/2016
		<i>Syrphus ribesii</i>		Common Widespread	17/8/2016
		<i>Syrphus vitripennis</i>		Common Widespread	3/8/2016
		<i>Volucella zonaria</i>		Common Widespread	3/8/2016
	Conopidae (Thick-headed flies)	<i>Conops quadrifascitatus</i>		Common Widespread	17/8/2016
		<i>Physocephalus rufipes</i>		Common Widespread	17/8/2016
		<i>Sicus ferrugineus</i>		Common Widespread	3/8/2016
	Tephritidae (Picture-winged flies)	<i>Merzomyia westermanni</i>		Nationally Scarce N	17/8/2016
		<i>Myopites inulaedyssentericae</i>		Rare RDB 3	3/8/2016
		<i>Sphenella marginata</i>		Common Widespread	3/8/2016
		<i>Tephritis cometa</i>		Common Widespread	3/8/2016
		<i>Tephritis divisa</i>		Common Widespread	3/8/2016
		<i>Tephritis formosa</i>		Common Widespread	3/8/2016
		<i>Tephritis vespertina</i>		Common Widespread	3/8/2016
		<i>Terellia serratulae</i>		Common Widespread	17/8/2016

Order	Family	Scientific Name	English Name	Status	Date
		<i>Trupanea stellata</i>		Local Widespread	3/8/2016
		<i>Xyphosia miliaris</i>		Common Widespread	17/8/2016
	Sciomyzidae (Snail-killing flies)	<i>Tetanocaera elata</i>		Common Widespread	3/8/2016
	Tachinidae (Tachinid flies)	<i>Eriothrix rufomaculatus</i>		Common Widespread	3/8/2016
		<i>Eurithia anthophila</i>		Common Widespread	8/8/2016
HYMENOPTERA (Bees, Wasps, Ants and Relatives)	Eumenidae (Potter and Mason wasps)	<i>Ancistrocerus trifasciatus</i>		Common, Widespread	3/8/2016
	Vespidae (Social Wasps)	<i>Dolichovespula media</i>	Median wasp	Nationally Scarce Na	3/8/2016
		<i>Vespula germanica</i>	German wasp	Common Widespread	3/8/2016
		<i>Vespula vulgaris</i>	Common wasp	Common Widespread	3/8/2016
	Crabronidae (Digger Wasps)	<i>Cerceris rybybensis</i>		Common Widespread	8/8/2016
		<i>Crossocerus podagricus</i>		Common Widespread	8/8/2016
		<i>Ectemnius continuus</i>		Common Widespread	8/8/2016
	Colletidae (Mining and Yellow faced bees)	<i>Hylaeus communis</i>		Common, Widespread	8/8/2016

Order	Family	Scientific Name	English Name	Status	Date
	Andrenidae (Mining Bees)	<i>Andrena bicolor</i>		Common Widespread	8/8/2016
		<i>Andrena dorsata</i>		Common Widespread	3/8/2016
		<i>Andrena flavipes</i>		Common Widespread	3/8/2016
		<i>Andrena minutula</i>		Common Widespread	8/8/2016
		<i>Andrena trimmerana</i>		Nationally Scarce Nb	3/8/2016
	Halictidae (Mining and Cuckoo Bees)	<i>Halictus tumulorum</i>		Common Widespread	17/8/2016
		<i>Lasioglossum calceatum</i>		Common Widespread	3/8/2016
		<i>Lasioglossum fulvicorne</i>		Common Widespread	8/8/2016
		<i>Lasioglossum morio</i>		Common Widespread	8/8/2016
		<i>Lasioglossum pauxillum</i>		Nationally Scarce Na	8/8/2016
		<i>Sphecodes ephippius</i>		Common Widespread	8/8/2016
	Apidae (Social and Cuckoo Bees)	<i>Apis mellifera</i>	Honey bee	Common Widespread	3/8/2016
		<i>Bombus hortorum</i>	A garden bumblebee	Common Widespread	3/8/2016
		<i>Bombus lapidarius</i>	Red-tailed bumblebee	Common Widespread	3/8/2016
		<i>Bombus lucorum</i>	White-tailed bumblebee	Common, Widespread	3/8/2016
		<i>Bombus pascuorum</i>	Common carder bee	Common, Widespread	3/8/2016
		<i>Bombus terrestris</i>	Buff-tailed bumblebee	Common, Widespread	8/8/2016

Order	Family	Scientific Name	English Name	Status	Date
COLEOPTERA (Beetles)	Cantharidae (Soldier Beetles)	<i>Rhagonycha fulva</i>		Common, Widespread	8/8/2016
	Cerambycidae (Longhorn Beetles)	<i>Strangalia maculata</i>		Common Widespread	3/8/2016
	Chrysomelidae (Leaf Beetles)	<i>Cassida murea</i>		Local Widespread	3/8/2016
	Coccinellidae (Ladybirds)	<i>Coccinella 7 – punctata</i>	Seven spot Ladybird	Common, Widespread	8/8/2016
		<i>Tythaspis 16 – punctata</i>	Six22–spot Ladybirdteen spot Ladybird	Common Widespread	8/8/2016
	Oedemeridae (Oedemerid Beetles)	<i>Oedemera nobilis</i>		Common, Widespread	3/8/2016

Appendix 7 Invertebrate Status Category Definitions and Criteria

RDB 1 - Endangered

Taxa in danger of extinction and whose survival is unlikely if causal factors continue operating.

- Species which are known or believed to occur as only a single population within one 10km square of the National Grid.
- Species which only occur in habitats known to be particularly vulnerable.
- Species which have shown a rapid or continuous decline over the last twenty years and are now estimated to exist in five or fewer 10km squares.
- Species which are possibly extinct but have been recorded in the 20th century and if rediscovered would need protection.

RDB 2 - Vulnerable

Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating.

- Species declining throughout their range.
- Species in vulnerable habitats.

RDB 3 - Rare

Taxa with small populations that are not at present Endangered or Vulnerable, but are at risk.

- Species which are estimated to exist in only fifteen or fewer post 1970 10km squares. This criterion may be relaxed where populations are likely to exist in over fifteen 10km squares but occupy small areas of especially vulnerable habitat.

Nationally Scarce (Na)

Taxa which do not fall within the RDB categories but which are none - the - less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid.

Nationally Scarce (Nb)

Taxa which do not fall within the RDB categories but which are none - the - less uncommon and thought to occur in between 31 and 100 10km squares of the national Grid.

Nationally Scarce (N)

Species which are estimated to occur within the range of 16 to 100 10km squares.

Local

These species may have a restricted geographical range in the UK, for example a requirement for warmth (southern species - usually denoted by species that occur wholly or mainly South of the Severn - Wash line), or cooler environments (northern species occurring wholly or mainly North of the Severn - Wash line) or upland species occurring only in more montane regions in the UK e.g. Dartmoor, Scottish Highlands or Snowdonia. However, within these geographic ranges such species may occur in some abundance in a variety of habitats. Alternatively, some local species have a wide geographical national distribution but occur only in a specific habitat type due to foraging or nesting requirements. For example, some species breed only in sand, or collect pollen and/or nectar only from plants occurring on chalk grassland or their larval development is dependent upon fen conditions or water seepages. Nonetheless, local species may be abundant within areas supporting their specific requirements, differentiating them from Nationally Scarce or threatened species which often have a combination of very exacting geographical and microhabitat requirements.

Common and Widespread

This denotes species that occur over a wide geographical area in the UK, and which have fairly undemanding requirements in terms of habitat type for larval development. Examples include species which develop in decaying vegetation, feed on aphids, live in stems of scrubby plants with no specific host requirement, feed on a variety of grasses or develop in any type of water body (even puddles). Alternatively, they may be mass migrants from continental Europe - some hoverflies e.g. *Episyrphus balteatus* or some common *Eupeodes* species arrive in millions each year and have no exacting habitat requirements.

Appendix 8 Protected Species Legislation

Bats

All UK bat species are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2010. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence to:

- Deliberately capture, injure or kill any such animal;
- Deliberately disturb any such animal, including in particular any disturbance which is likely:
 - To impair its ability to survive, breed, or rear or nurture their young;
 - To impair its ability to hibernate or migrate;
 - To affect significantly the local distribution or abundance of that species;
- Damage or destroy a breeding site or resting place of any such animal;
- Intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

In addition, five British bat species are listed on Annex II of the Habitats Directive. These are:

- Greater horseshoe bat *Rhinolophus ferrumequinum*;
- Lesser horseshoe bat *Rhinolophus hipposideros*;
- Bechstein's bat *Myotis bechsteinii*;
- Barbastelle *Barbastella barbastellus*; and
- Greater mouse-eared bat *Myotis myotis*.

In certain circumstances where these species are found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status. Outside SACs, the level of legal protection that these species receive is the same as for other bat species.

Dormouse, Otter and Great Crested Newt

These species are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2010. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations. These make it an offence to:

- Deliberately capture, injure or kill any such animal;
- Deliberately disturb any such animal, including in particular any disturbance which is likely, to impair its ability to survive, breed, or rear or nurture their young, to impair its ability to hibernate or migrate;
- To affect significantly the local distribution or abundance of that species;
- Damage or destroy a breeding site or resting place of any such animal;
- Intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any place that any one of these species uses for shelter or protection.

Badger

The Protection of Badgers Act 1992 consolidates previous legislation (including the Badgers Acts 1973 and 1991 Badgers (Further Protection) Act 1991). It makes it an offence to:

- Kill, injure or take a badger;
- Attempt to kill, injure or take a badger; or
- To damage or interfere with a sett.

The 1992 Act defines a badger sett as '*any structure or place which displays signs indicating current use by a badger*'.

Water Vole

The water vole is listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is afforded limited protection under Section 9 of this Act. This makes it an offence to:

- Intentionally kill, injure, or take (handle) a water vole;
- Intentionally or recklessly damage or destroy or obstruct access to any structure or place which water voles use for shelter or protection; or

- Intentionally or recklessly disturb water voles while they are using such a place.

Breeding Birds

With certain exceptions, all wild birds, their nests and eggs are protected by Section 1 of the Wildlife and Countryside Act 1981 (as amended). Therefore, it is an offence, to:

- Intentionally kill, injure or take any wild bird;
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- Intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 subject to various controls. Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- Intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- Intentionally or recklessly disturb the dependent young of any such bird.

Reptiles

The four widespread species of reptile that are native to Britain, namely common or viviparous lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*, are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence to:

- Intentionally kill or injure any of these species.

The remaining native species of British reptile (sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*) receive a higher level of protection via inclusion under Schedule 2 of the Conservation of Habitats and Species Regulations 2010. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations (in England and Wales only) and the Wildlife and Countryside Act 1981 (as amended). The distribution of these species are restricted to only a few sites in England.